مكتب التنظيم و الرقابة
Regulation & Supervision Bureau

Consultation Document

Regulatory review of price controls for 2018 onwards

RC1 final proposals

12 November 2017

EC/E02/109

Document	Approved by	Recipients of controlled copies
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Foreword

1. In 2016, the Bureau commenced the review of price controls that apply to the four electricity, water and wastewater network companies operating in the Emirate of Abu Dhabi (AADC, ADDC, ADSSC and TRANSCO). We published the first consultation paper in February 2016, followed by the second consultation paper in September 2016 and draft proposals in April 2017 to set the Regulatory Controls 1 (RC1) for 2018 onwards.

2. We received detailed responses to the draft proposals from ADWEA and network companies and held meetings with them and DoF. This document sets out our final proposals on the RC1 taking into account these responses and discussions. These final proposals (i) retain a number of important features of the current PC5 controls, particularly the overall concept of maximum allowed revenue (MAR) and the inflation indexation of all its components, (ii) tailor the regulatory regime to allow flexible arrangements on opex, capex and incentives, and (iii) allow and facilitate adequate funding levels for the sector's capex and opex to enable the continuation of the sector's operations and maintenance of sector's assets for its long-term sustainability and growth.

3. On ADWEA's suggestion, we offered the licensees derogations on 26 October 2017 to make entire revenue adjustment for unduly earned financing costs relating to PC4 (2012-2013) and PC5 (2014-2015) capex underspending to the 2017 MAR (rather than to the MAR over the RC1 period). While ADSSC confirmed its acceptance, ADWEA's response did not confirm other companies' acceptance of such derogations and proposed new major changes, including extension to cover 2016 and 2017 capex and use of different calculation methodology and efficiency scores. Accordingly, these final proposals offer licensees two options – RC1 without derogation and RC1 with derogation - with separate draft licence modifications and financial models (which set out separate MAR profiles and notified values 'a' and 'b') being issued with these final proposals for each option.

4. Each company is requested to communicate in writing its acceptance or otherwise of the proposed licence modifications for either option by **12 December 2017** to:

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SAIF SAEED AL QUBAISI
Director General

Executive summary

Introduction

1. This document describes the Bureau's final proposals for the RC1 controls for AADC, ADDC, TRANSCO and ADSSC for 2018 onwards, taking into account their responses to our draft proposals issued in April 2017. These final proposals offer the licensees two options with separate draft licence modifications and financial models being issued with these final proposals for each option:

    a) Option 1: RC1 final proposals without derogations to apply adjustment for PC4-PC5 capex financing costs to 2017 MAR (i.e such adjustment to apply over RC1 period) resulting in lower MAR over RC1 period (AED 9 billion in 2018 prices in total); or

    b) Option 2: RC1 final proposals with derogations to apply adjustment for PC4-PC5 capex financing costs to 2017 MAR (i.e such adjustments then do not apply over RC1 period) resulting in higher MAR over RC1 period.

Strategic objectives and issues (Section 2)

2. Our final proposals retain the five strategic areas as summarised below.

3. On the treatment of government funding, our final proposals are:

    (a) to defer discussions and visibility on repayment and return on Government funding to the Bureau, subsidy payment reforms, ring-fencing, and settlement of unpaid subsidy (the latter may not be an issue if adjustment of PC4-PC5 capex financing costs is made to the 2017 MAR - as per the proposed derogation) to separate work streams (outside the RC1 consultation process). We highlight that the price control regime envisages that depreciation and return on capital allowances are provided in the MAR to enable the repayment of, and return on, investment by the network companies to fund providers (such as DoF) and/or funding of companies' future capex requirement. We also understand that the Government subsidy in future will be paid by the Department of Energy (DoE) as per Law No. (1) of 2017 concerning the Financial System for the Government of Abu Dhabi;

    (b) to determine a market-based rate of return for RC1 in line with the approach used in the previous control reviews; and

    (c) to maintain the approach used in the previous price controls in relation to inflation indexation of the RAV and depreciation.

4. With respect to the efficient use of capital, the Bureau maintains its proposals to move from the existing ex-post capex reviews to forward-looking, ex-ante capex reviews with (i) limited periodic ex-post capex reviews (next planned for 2018 to close PC5 capex) and (ii) an interim ex-ante capex review in 2019 (to review and if necessary reset ex-ante capex allowances for 2020-2021).

5. In relation to cost controlling and revenue profiling, we retain the use of X-factors in the final proposals to appropriately profile the MAR during the RC1 period, but limit the size of X-factors to ensure profitability of licensees in each year of the RC1 period.

6. We look to enhance transparency and sustainability of the sector, by strengthening the regulatory framework and related arrangements for areas such as ADWEA recharge, tankering services, distribution and supply of recycled water, wastewater informative billing, companies' financial strength and demand side management (DSM).

7. For monitoring customer services activities and outputs in the sector, we propose specific incentives with targets and KPIs for RC1 and future developments during the RC1 period.

Form of controls (Section 3)

8. Our final proposals on the form, structure, separation and duration of RC1 are to:

   (a) continue with the CPI-X revenue cap form of price controls for RC1;

   (b) retain the current separation of price controls for all companies with enhanced scope by allowing appropriate opex allowances for certain new activities;

   (c) develop new, separate price controls for recycled water distribution and supply businesses of AADC and ADDC in future, with suitable adjustments to price controls for ADSSC to reflect assets and resources transferred to AADC and ADDC;

   (d) set the RC1 price controls for four years (2018-2021), with regular capex reviews and annual adjustments for specific opex items and modify the licences to apply the Bureau's proposals or directive on price controls and MAR beyond 2021 unless the licences are modified or agreed otherwise;

   (e) retain the existing cost pass-through arrangements and add a new term "L" in the MAR formula for each licensee to treat all the Bureau's licence fees on a pass-through basis;

   (f) structure MAR formula for each company with a fixed element and a variable element linked to the output-based revenue driver, using 85:15 weights for calibrating the RC1 controls and current licence definitions of revenue drivers – the exception is the change in revenue driver for TRANSCO to total metered and estimated units transmitted; and

   (g) set the general structure of the MAR for each business for any year "t" of the RC1 period as follows:

   $$MAR_t = \text{Pass through costs}_t + a_t + (b_t \times \text{Revenue driver}_t) + Q_t + L_t - K_t$$

   where:

      (i) "a_t" and "b_t" are the notified values for the year "t". For 2018, these values are determined by the Bureau through price control calculations set out in these final proposals. For subsequent years, the values of "a_t" and "b_t" are indexed against the UAE Consumer Price Index (CPI) less X factor; and

(ii) "Q_t", "L_t", and "K_t" are the performance incentive amount, the Bureau's licence fee, and the correction factor for the year "t", respectively.

Table 1: Revenue-drivers – final proposals

Company	Revenue-driver	Revenue-driver weight in MAR formula
AADC/ADDC (both water & electricity)	Fixed term	85%
	Number of customer accounts	15%
TRANSCO (both water & electricity)	Fixed term	85%
	Metered units transmitted (irrespective of MDEC compliance) – changed to total metered and estimated units transmitted in final proposals	15%
ADSSC	Fixed term	85%
	Annual flow at treatment plants	15%

Operating costs (Section 4)

9. Our RC1 opex projections, in 2018 prices, adopted in these final proposals and listed in **Table 2** below are based on our opex consultant's final report issued in June 2017 (which uses the companies' 2016 audited opex as the base level instead of 2015 audited opex used in their draft report and our draft proposals). These opex allowances amount to around AED 3.2 billion per year (in 2018 prices) for RC1.

Table 2: RC1 opex projections – final proposals

AED million, 2018 prices		**2018**	**2019**	**2020**	**2021**
AADC	Electricity	498	487	472	461
	Water	239	237	233	231
	Total	736	724	706	692
ADDC	Electricity	669	660	653	643
	Water	439	441	443	444
	Total	1,108	1,101	1,096	1,088
TRANSCO	Electricity	384	386	383	380
	Water	374	377	380	384
	Total	757	763	762	764
ADSSC	Total	724	660	650	641
Total		**3,325**	**3,247**	**3,213**	**3,184**

10. The above RC1 opex projections:

(a) include provisional cost allowances for Emiratisation, direct staff training, mega developments based on the estimates, subject to annual adjustments for outturn results during the relevant year of the RC1 period;

(b) exclude the Bureau's licence fees given the pass-through treatment for RC1;

(c) include allowances for additional capabilities (DSM, resource resilience and VAT) and LARS, subject to proof of hiring of staff for these activities and functions;

(d) do not include additional opex allowances for (i) water pumping and substation energy costs where metering and billing arrangements do not exist and GCCIA costs for TRANSCO and (ii) costs for distribution companies billing services to ADSSC and corresponding savings for distribution companies. These allowances

will be provided upon receiving and assessing the required information and justification from companies or commencement of the services; and

(e) include opex savings from various initiatives such as transfer of operation and maintenance of street lighting from distribution companies to Municipalities, distribution companies' billing services to Municipalities, customer service transformation or digitisation and commissioning of ADSSC's STEP project.

11. As depicted in the below figure, our final opex allowances for four companies in aggregate are (in 2018 prices):

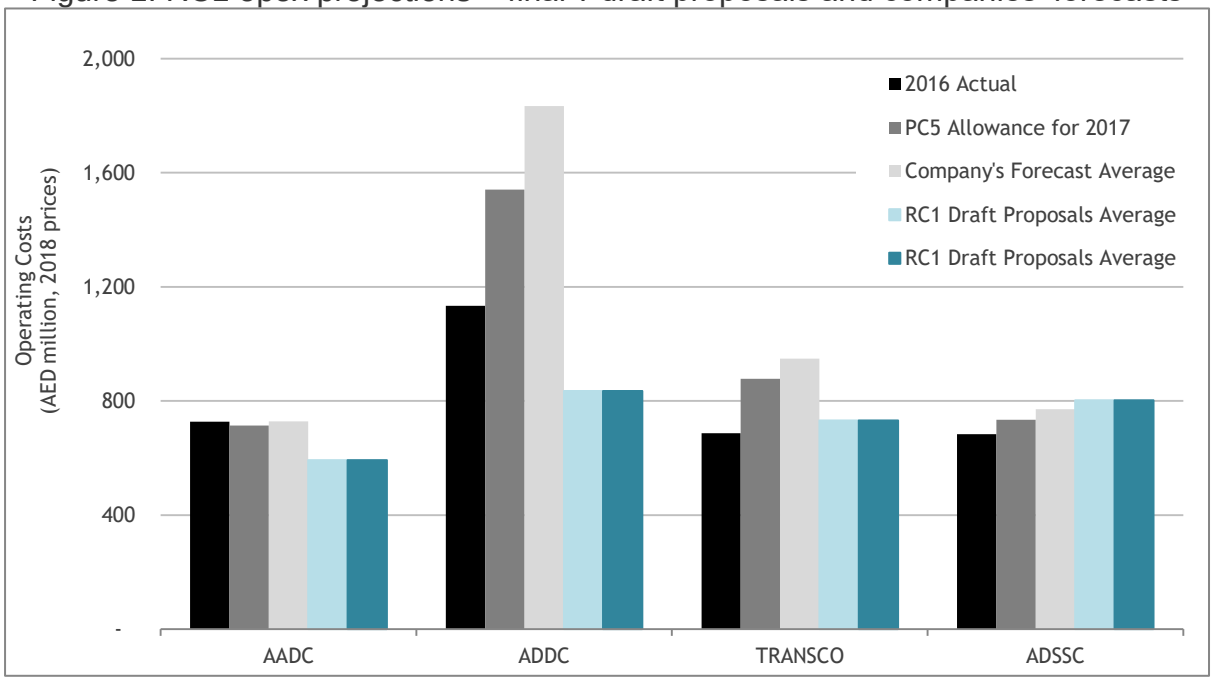
(a) higher than the RC1 draft proposals by AED 279 million p.a. or 9.4%;

(b) lower than the network licensees' forecasts by 24% on average over the RC1 period for the four companies;

(c) lower than the PC5 opex levels by AED 626 million or 16.2%; and

(d) indicating almost no change in costs from 2016 actuals.

Figure 1: RC1 opex projections – final v draft proposals and companies' forecasts



Capital expenditure (Section 5)

Past capex - PC4 capex (2012-2013) and PC5 capex (2014-2015)

12. We do not agree with ADWEA's suggestion to extend PC4 (2010-2011) capex efficiency scores to PC4-PC5 (2012-2015) and to PC5 (2016-2017) capex – note that the former were in fact based on PC3 (2006-2009) capex review whose scores were also adjusted upward significantly to allow time for companies and shareholder to improve capex processes. Accordingly, we retain the efficiency scores as per the draft proposals for PC4 and PC5 capex as below.

Table 3: PC4 (2012-2013) and PC5 (2014-2015) - capex efficiency scores

	PC4 Capex		PC5 capex	
	Electricity	Water / Wastewater	Electricity	Water / Wastewater
AADC	92.38%	91.58%	91.02%	92.69%
ADDC	89.08%	89.01%	88.38%	90.65%
TRANSCO	93.67%	92.97%	94.98%	90.90%
ADSSC		94.00%		91.23%

13. The additional (shortfall) efficient PC4 and PC5 capex (against the provisional PC4 and PC5 allowances) therefore remain the same as in the draft proposals, but expressed in 2018 prices in the RC1 final proposals. This amounts to a total of minus AED 24.1 billion (2018 prices) for the four companies, which is being clawed-back at this review through a downward adjustment to the regulatory asset values (RAVs).

Table 4: PC4 and PC5 additional (shortfall) efficient capex –final proposals

		PC4 Capex			PC5 capex		
AED million, 2018 prices		2012	2013	Total	2014	2015	Total
AADC	Electricity	(677)	239	(438)	(527)	(598)	(1,125)
	Water	39	294	332	(117)	(229)	(346)
ADDC	Electricity	(822)	(450)	(1,272)	(2,147)	(2,363)	(4,510)
	Water	(303)	88	(215)	39	(306)	(267)
TRANSCO	Electricity	(4,939)	(3,002)	(7,941)	(57)	(1,244)	(1,301)
	Water	(181)	(2,136)	(2,317)	(1,883)	(1,721)	(3,604)
ADSSC	Total	91	(1,213)	(1,122)	429	(359)	71
Total		**(6,792)**	**(6,180)**	**(12,972)**	**(4,262)**	**(6,819)**	**(11,081)**

14. The capex under-spending during 2012-2015 is the main reason for reduction in MAR for RC1 compared to PC5. The ex-post review of 2016-2017 (the last two years of PC5) is planned to be conducted by the Bureau in 2018.

Future capex - RC1 capex (2018-2021)

15. Based on the ex-ante review concluded in February 2017, we retain the following RC1 capex allowances as per the draft proposals. Given the quality and justification of capex schemes submitted by the companies, the RC1 capex allowances (AED 12.2 billion in total) are significantly lower than the allowances made at the previous price control reviews (eg, over AED 40 billion in total for PC5, in 2014 prices). These allowances are another main reason for lower MAR estimates for RC1.

Table 5: RC1 capex allowances – final proposals

AED million, 2018 prices		**2018**	**2019**	**2020**	**2021**	**Total**
AADC	Electricity	771	544	196	130	**1,641**
	Water	294	157	66	43	**560**
ADDC	Electricity	541	210	38	8	**797**
	Water	605	431	251	195	**1,482**
TRANSCO	Electricity	1,006	742	323	345	**2,416**
	Water	201	168	151	75	**596**
ADSSC	Total	1,444	1,289	1,016	948	**4,697**
Total		**4,862**	**3,541**	**2,042**	**1,744**	**12,189**

16. The capex schemes approved by the Bureau through ex-ante review may see changes in their actual expenditure against ex-ante allowance as these will be subject to ex-post review in future should the actual expenditure differ by the proposed 10% thresholds. The companies may undertake additional capex schemes that have not been approved through ex-ante review or change the scope of approved schemes and these will be subject to full ex-post review in future. In case of ADSSC, any new ISTP or investment in treatment plant should have the Bureau's prior approval.

17. Given the companies' performance during the first ex-ante capex review, the Bureau has agreed with the companies to provide further flexibility by planning an interim ex-ante review in 2019 of the last two years of RC1 period (2020-2021) and if necessary resetting the ex-ante allowances for 2020-2021 capex.

18. We have also accepted the companies' suggestion to undertake ex-post efficiency review (with the help of external consultant) of capex incurred during RC1 on an annual basis to minimise the time lag between the year of capex incurred and the year of review and to minimise the magnitude of adjustment to MAR. Accordingly, 2018 capex will be reviewed in 2019 for consideration to adjust MAR for 2020, 2019 capex will be reviewed in 2020 for 2021 MAR adjustment and so on, through a derogation.

Financial issues (Section 6)

19. We suggest in these final proposals continuing with:

    (a) inflation indexation of RAV and depreciation allowance (one key reason for higher MAR than the draft proposals); and

    (b) the straight-line method for regulatory depreciation but using our consultant's final recommendations on extended life assumptions for new assets of 40 years for electricity and water businesses and 60 years for wastewater businesses.

20. The Bureau continues its approach for calculation of return based on mid-year RAVs and calculation of the opening and closing RAVs for each year of RC1. The additional efficient PC4 and PC5 capex have been rolled into the RAVs, decreasing the 2018 opening RAV by about AED 20.9 billion (2018 prices) to AED 114.2 billion. With the addition of the RC1 capex allowances offset by the total depreciation on RAVs, these RAVs have decreased to AED 108 billion (2018 prices) by the end of 2021.

21. The unduly earned financing costs of the difference between efficient and provisional estimates of PC4 (2012-2013) and PC5 (2014-2015) capex have been recovered as an adjustment to RC1 revenue of about AED 9 billion (in 2018 prices) in present value terms.

22. Accepting ADWEA's suggestion, we offered each licensee a derogation on 26 October 2017 (for their acceptance by 30 October 2017) to make the above revenue adjustment (about AED 8.8 million in 2017 prices) to the 2017 MAR (rather than to the MAR over RC1 period). While ADSSC expressed willingness to accept the proposed derogation for consistency with other licensees, we did not receive unconditional confirmation from AADC, ADDC and TRANSCO. We have therefore not issued any such derogation to any licensee. However, to retain the flexibility offered to the licensees, these final proposals

offer the licensees two options with separate draft license modifications and financial models being issued with these final proposals for each option:

(a) Option 1: RC1 final proposals without derogations to apply adjustment for PC4-PC5 capex financing costs to 2017 MAR (ie, adjustment of AED 9 billion in 2018 prices will apply over RC1 period) resulting in lower MAR over RC1 period; or

(b) Option 2: RC1 final proposals with derogations to apply adjustment (of about AED 8.8 billion in 2017 prices) for PC4-PC5 capex financing costs to the 2017 MAR (ie, adjustment will not apply over RC1 period) resulting in higher MAR over RC1 period.

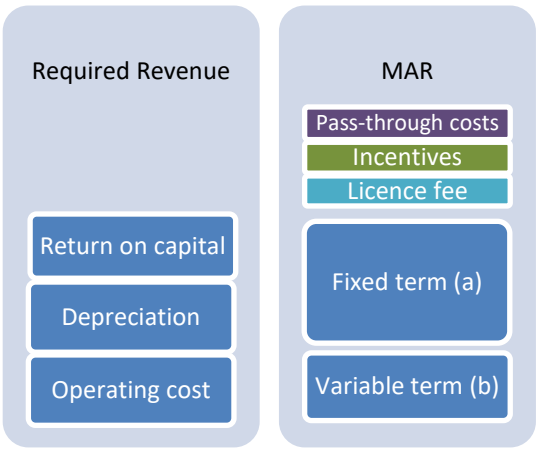
23. We have agreed to the retrospective adjustments to the 2017 MAR through derogation as an exceptional case given the magnitude of adjustments, the fact that these relate to the period of mostly subsidised customer tariffs, and that only a limited time is left for companies to close their accounts for 2017.

24. Based on the overseas regulatory proposals and evidence from the local and regional capital markets, we have proposed a real cost of capital of 4.5% for RC1.

Price control calculations (Section 7)

25. Consistent with the previous price control reviews, a "building-block" approach has been adopted to determine the revenue requirement (comprising opex, depreciation and return on capital) and a net present value (NPV) framework to determine the notified values "a" and "b" for RC1.

Figure 2: Price control calculations framework



Option1 - If 2017 MAR adjustment derogation is not accepted

26. Assuming the Bureau's offered derogations to apply the entire adjustment of unduly earned financing costs in relation to PC4 (2012-2013) and PC5 (2014-2015) capex underspent in the 2017 MAR (instead of RC1 revenue) are not accepted by the licensees, such adjustment will apply to RC1 revenue resulting in lower notified values ('a' and 'b') for each business than those values under option 2. These values are reflected in the first set of draft licence modifications (in relation to the charge restrictions conditions schedule of the respective licences) being issued with these final proposals.

27. The notified values ('a' and 'b') determined for option 1 in these final proposals for 2018 (expressed in 2018 prices) are given below. For subsequent years, these values will be adjusted annually by CPI-X indexation. In contrast to previous price controls, we have used non-zero but small X-factors to suitably profile the MAR for each electricity business over RC1 period to minimise the step change from year to another and other important considerations such as the impact on total sector costs, customer tariffs and companies' profitability. The X factor for water and wastewater business continues to be zero, as in the previous price controls.

Table 6: Notified values for RC1 – final proposals (Option 1)

2018 prices		X	a		b	
AADC	Electricity	10%	1,198.82	AEDm	1,375.46	AED / customer account
	Water	0%	507.41	AEDm	930.52	AED / customer account
ADDC	Electricity	10%	2,134.28	AEDm	943.21	AED / customer account
	Water	0%	887.31	AEDm	486.28	AED / customer account
TRANSCO	Electricity	10%	2,590.07	AEDm	0.5040	Fills / kWh
	Water	0%	1,296.81	AEDm	0.7280	AED / TIG
ADSSC		0%	1,824.17	AEDm	0.6926	AED / m3 wastewater treated

Notes: These notified values for 2018 are based on an assumed UAE CPI of 108.00 (base year 2014 = 100) for 2017.

28. The table below presents the projected MAR in respect of "own" costs (i.e., excluding pass-through costs, if applicable, licence fee, Q and K terms) for each business for 2018-2021:

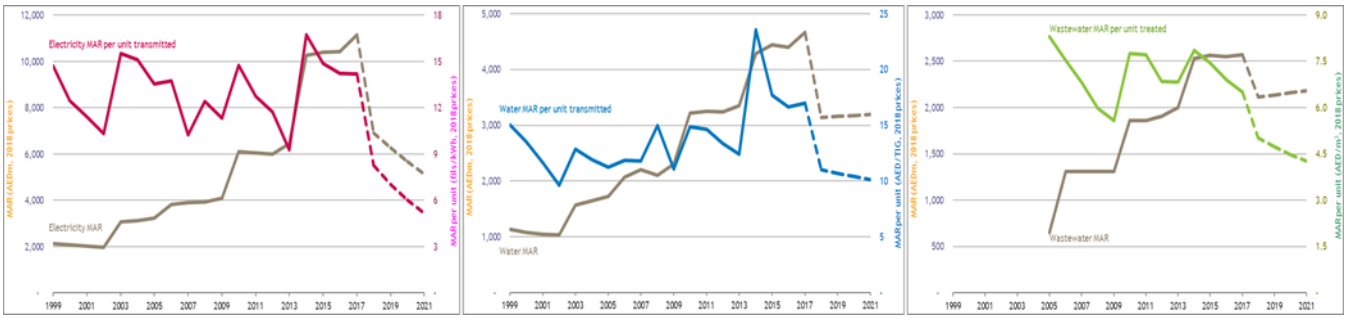
Table 7: Projected MAR over RC1 period – final proposals (Option 1)

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	1,406	1,268	1,144	1,032
	Water	593	596	598	601
ADDC	Electricity	2,495	2,256	2,040	1,846
	Water	1,037	1,042	1,046	1,051
TRANSCO	Electricity	3,012	2,735	2,483	2,254
	Water	1,515	1,522	1,530	1,537
ADSSC	Total	2,117	2,136	2,158	2,178
Total		**12,175**	**11,556**	**11,000**	**10,500**

29. The majority of the projected MAR is accounted for by regulatory depreciation, followed by opex and the return on capital. In aggregate, the average return on capital or profit is expected to be around AED 2.5 billion (2018 prices) a year over the RC1 period.

30. The charts below show the expected effect of these final proposals on the total price-controlled costs and unit costs for electricity, water and wastewater, respectively (in 2018 prices). The MAR per unit has been calculated using units transmitted for electricity and water businesses (in fils/kWh and AED/TIG, respectively) and units treated for sewerage business (in AED/m^3).

Figure 3: Projected trends of price-controlled MARs (Option 1)

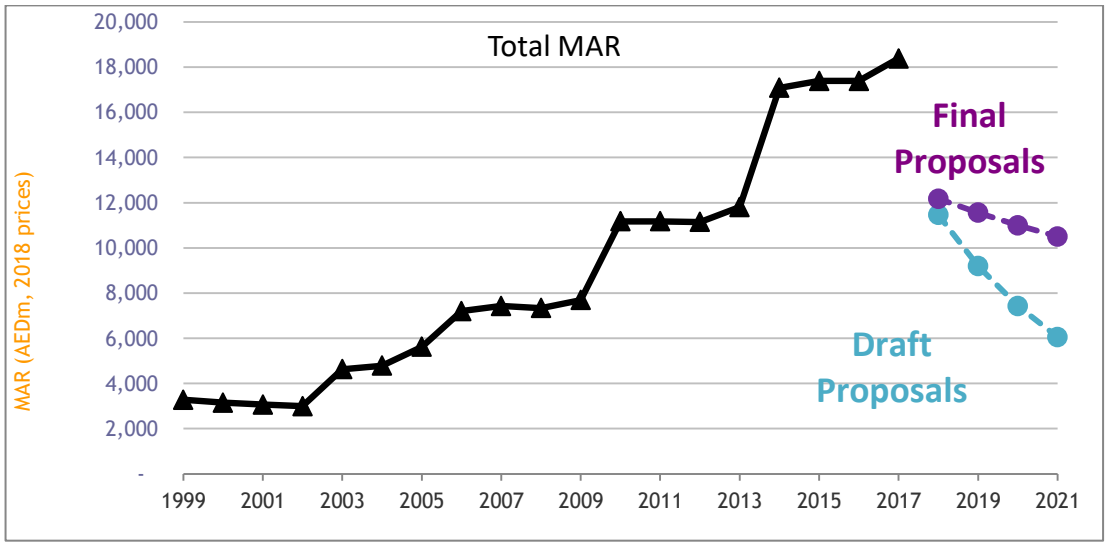


31. These charts indicate that the annual MARs are expected to decline in real terms. This decline in total MAR and the projected increase in demand means that the final proposals are expected to result in a declining trend for the unit cost for electricity, water and wastewater businesses.

32. The total 2018 projected MAR is lower than the 2016 actual MAR by AED 5.2 billion (or 30%) in real terms. The projected MARs continue to decrease over the RC1 period. By 2021, the total projected MAR is less than the total 2016 actual MAR by AED 6.9 billion (in 2018 prices) or 40%.

33. As the comparison in the following chart shows, the total MAR for RC1 projected in these final proposals is higher than that in the draft proposals by about AED 2.8 billion per annum or 32% on average over the RC1 period. Overall, we consider PC5 was a period of excessive MAR due to significant capex underspending. The RC1 period is expected to see MAR returning to normal level in line with PC4.

Figure 4: Total projected MAR - final v draft proposals (Option 1)



Option 2 - if 2017 MAR adjustment derogation is accepted

34. As discussed above, if the companies accept the Bureau's offered derogations to apply the entire adjustment of unduly earned financing costs in relation to PC4 (2012-2013) and PC5 (2014-2015) capex underspent in the 2017 MAR (instead of RC1 revenue), then the notified values ('a' and 'b') for each business for the RC1 period will significantly

increase compared to option 1. These values are reflected in the second set of draft licence modifications being issued with these final proposals.

Table 8: Notified values for RC1 with 2017 derogation – final proposals (Option 2)

2018 prices		X	a		b	
AADC	Electricity	10%	1,348.45	AEDm	1,547.14	AED / customer account
	Water	0%	495.13	AEDm	908.00	AED / customer account
ADDC	Electricity	10%	2,633.72	AEDm	1,163.94	AED / customer account
	Water	0%	928.17	AEDm	508.67	AED / customer account
TRANSCO	Electricity	10%	3,693.71	AEDm	0.7188	Fills / kWh
	Water	0%	1,763.20	AEDm	0.9898	AED / TIG
ADSSC		0%	1,905.37	AEDm	0.7235	AED / m^3 wastewater treated

Notes: These notified values for 2018 are based on an assumed UAE CPI of 108.00 (base year 2014 = 100) for 2017.

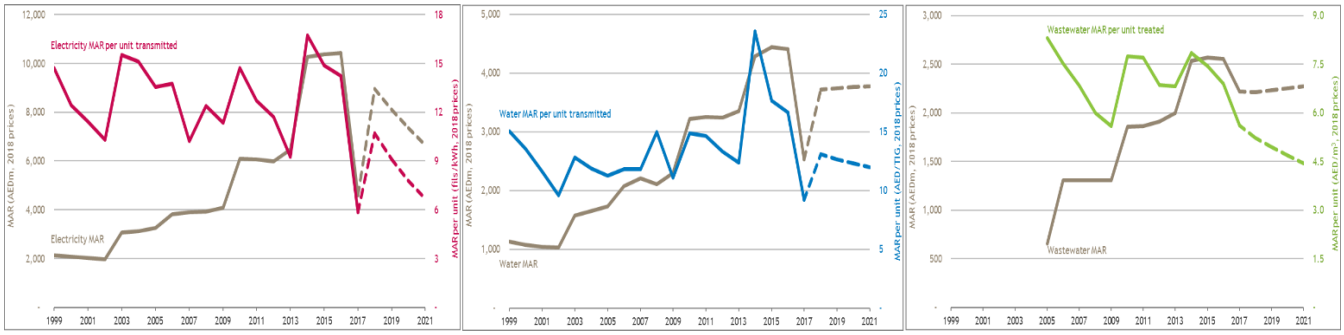
35. The projected MAR in respect of "own" costs for each business for 2018-2021 will be as follows, resulting in the average return on capital or profit of around AED 4.9 billion (2018 prices) a year over the RC1 period for the four companies in total.

Table 9: Projected MAR over RC1 period with derogation–final proposals (Option 2)

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	1,581	1,427	1,287	1,161
	Water	579	581	584	587
ADDC	Electricity	3,079	2,784	2,518	2,277
	Water	1,085	1,090	1,094	1,100
TRANSCO	Electricity	4,296	3,900	3,541	3,214
	Water	2,060	2,070	2,080	2,090
ADSSC	Total	2,211	2,232	2,254	2,275
Total		**14,890**	**14,083**	**13,358**	**12,705**

36. The charts below show the expected effect of these final proposals on the total price-controlled costs and unit costs for electricity, water and wastewater, respectively (in 2018 prices).

Figure 5: Projected trends of price-controlled MARs (Option 2)

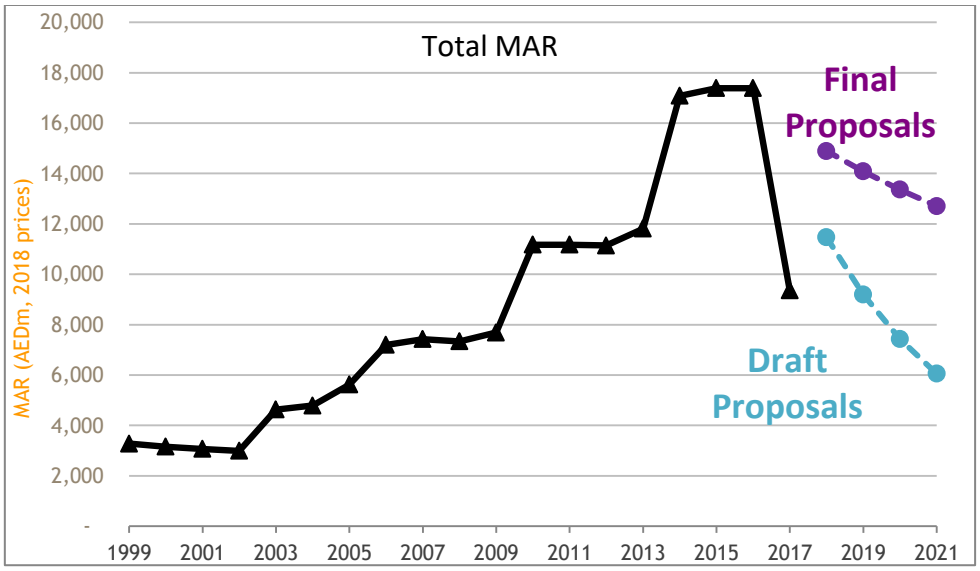


37. These charts indicate that the annual MARs will be expected to stay flat or marginally increase in real terms. This trend in total MAR and the projected increase in demand means that the final proposals will be expected to result in a declining trend for the unit cost for electricity, water and wastewater businesses.

38. The total 2018 projected MAR will be lower than the 2016 actual MAR by AED 2.5 billion (or 14%) in real terms. The projected MARs continue to decrease over the RC1 period. By 2021, the total projected MAR is less than the total 2016 actual MAR by AED 4.7 billion (in 2018 prices) or 27%.

39. The total projected MAR for RC1 in these final proposals will be higher than that in the draft proposals by about AED 5.2 billion per annum or 61% on average over RC1 period.

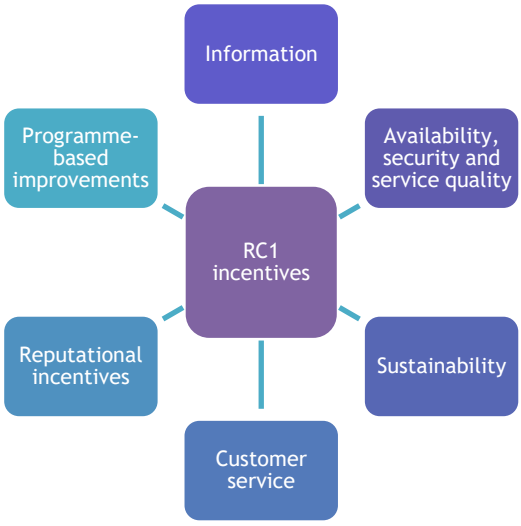
Figure 6: Total projected MAR - final v draft proposals (Option 1)



Performance incentives (Section 8)

40. Similar to the previous price controls, we retain performance incentive schemes in the RC1 to encourage improvements in key areas of the companies' operations and performance against pre-defined targets through financial bonuses and penalties via the Q term in the MAR formula. We retain 6 key areas of incentives from the draft proposals:

Figure 7: Six areas of incentives for RC1



41. We suggest continuing with the new incentives suggested in the draft proposals as follows:

    (a) availability, security and quality of supply incentives related to non-revenue water and by-pass of ground storage tanks (AADC and ADDC water), system despatch costs (TRANSCO electricity) and recycled water quality compliance (ADSSC);

    (b) DSM incentives for AADC and ADDC (water and electricity); and

    (c) developing incentives for demand forecasting during the RC1 period.

42. Key changes from the draft proposals include the following to address stakeholders' concerns:

    (a) Introducing:

        (i) an overall incentive cap of 4% of companies' annual MAR (during the RC1 period), in addition to the cap on individual incentives at 0.5% of the MAR;

        (ii) both financial bonus and penalty for incentives related to the provision of high quality information;

    (b) Withdrawing:

        (i) reputational incentives related to business continuity management (BCM) and system minutes loss; and

        (ii) sustainability incentive related to health, safety and environment (HSE).

43. The table below provides a comprehensive overview about the individual incentives that we have proposed for RC1, highlighting the main changes from PC5 and the RC1 draft proposals. Individual incentives are discussed in detail in **Annexes C-G**.

Table 10: Incentives – Summary of changes in RC1 final proposals

S.No.	Individual incentive	Relevant businesses	Existing or new incentive	Changes from PC5 or RC1 draft proposals
Annex C – Provision of high quality information				
C.1	SBAs / PCRs	All	Existing	Now bonus and penalty incentive
C2	AIS	All	Existing	
Annex D – Availability, security and quality of supply				
D.1	Water quality	Water	Existing	None
D.2	Removal of timed supply	AADC and ADDC Water	Existing	Financial incentive for AADC, reputational for ADDC; Absolute targets
D.3 & D.11	Interface metering	Water, Electricity	Existing	Dead-bands introduced
D.4	Water meter penetration	AADC and ADDC Water	Revised	Unchanged form draft proposals; Incentive renamed from PC5
D.5	Security of supply	TRANSCO Water	Existing	Absolute target based on supplied quantities;Metric based on notified unsupplied quantities;
D.6	Non-revenue water	AADC and ADDC Water	New	Agreed to make incentive reputational if the Bureau's subsidy payment reforms proposal is implemented
D.7	By-pass of ground storage tanks	AADC and ADDC Water	New	Implementation is in 2020;
D.8	SAIDI	AADC and ADDC Electricity	Existing	Targets reviewed to align with Government latest targets
D.9	SAIFI			
D.10	Distribution loss reduction	AADC and ADDC Electricity	Existing	AMR removed; Includes units in distribution network points;
D.11	Interface metering	Electricity	Existing	Dead bands
D.12	Unsupplied energy	TRANSCO Electricity	Existing	Incentive renamed from PC5; Penalty based on VOLL, bonus only if no unsupplied energy (change from PC5)
D.13	System despatch costs	TRANSCO Electricity	New	None
D.14	Biosolids reuse	Wastewater	Existing	Targets revised from PC5
D.15	Recycled water quality compliance	Wastewater	New	None
Annex E – Sustainability				
E.1 & E.2	Demand side management	AADC and ADDC, Water and Electricity	New	None
E.3	HSE reporting	All	New	Withdrawn
Annex F – Customer Services				
F.1	Customer complaints	AADC, ADDC, ADSSC	New	None
Annex G – Reputational and monitored KPIs				
G.1 & G.2	Transmission system availability	TRANSCO Water and Electricity	Existing	Removed financial incentive (change from PC5)
G.3	Financial performance ratios	All	New	None
G.4	Business continuity management	All	New	Withdrawn
G.5	System minutes loss	TRANSCO Electricity	New	Withdrawn

Glossary

AADC	Al Ain Distribution Company
ABC	Activity Based Costing
ADDC	Abu Dhabi Distribution Company
ADSSC	Abu Dhabi Sewage Services Company
ADWEA	Abu Dhabi Water and Electricity Authority
ADWEC	Abu Dhabi Water and Electricity Company
AED	United Arab Emirate Dirham
AIS	Annual Information Submission
AMR	Advanced Meter Reading
BCM	Business Continuity Management
BST	(ADWEC's) Bulk Supply Tariff
CAPM	Capital Asset Pricing Model
CPI	Consumer Price Index
Deloitte	Deloitte & Touche M.E. (Bureau's consultant)
DoF	Department of Finance
DSM	Demand Side Management
EY	Ernst & Young (ADWEA Consultant)
FTE	Full Time Employee
HSE	Health, Safety and Environment
IM	Interface Metering
KPI	Key Performance Indicator
LARS	Liwa Aquifer Recharge Scheme (TRANSCO)
MAR	Maximum Allowed Revenue
MTI	MAR and Tariff Information (for AADC, ADDC and ADSSC)
PC1	First Price Control covering the period 1999-2002
PC2	Second Price Control covering the period 2003-2005
PC3	Third Price Control covering the period 2006-2009 (for ADSSC, mid-2005 to 2009)
PC4	Fourth Price Control covering the period 2010-2013
PC5	Fifth Price Control covering the period 2014-2017
PCR	Price Control Return
PIS	Performance Incentive Scheme
PPA	Power Purchase Agreement
PWPA	Power and Water Purchase Agreement
RAG	Regulatory Accounting Guideline
RASCO	Remote Area Service Company or, as formally called, Abu Dhabi Company for Servicing Remote Areas (ADCSRA)
RAV	Regulatory Asset Value
RC1	First Regulatory Control covering the period 2018-2021
RIG	Regulatory Instructions and Guidance
SBA	Separate Business Account
STA	Sewage Treatment Agreement
STEP	Strategic Tunnel Enhancement Programme (ADSSC)
TA	Technical Assessor
TRANSCO	Abu Dhabi Transmission and Despatch Company
TUoS	(TRANSCO's) Transmission Use of System (Charges)
VAT	Value Added Tax
WACC	Weighted Average Cost of Capital
WQPA	Water Quality Performance Assessment

Contents

1. Introduction and background

Price controls to date

1.1 Network companies in the electricity, water and wastewater sector in the Emirate of Abu Dhabi are natural monopolies and have been subject to price controls set by the Bureau:

(a) For **AADC**, **ADDC** and **TRANSCO**:

(i) the first price controls (PC1) set in 1999 were applied to a four-year period (1999-2002);

(ii) the second price controls (PC2) were set in 2002 to apply for three years (2003-2005); and

(iii) the third price controls (PC3) set in 2005 for four years (2006-2009).

(b) In 2007, the Bureau set the first price control for **ADSSC** to apply from the date ADSSC was established (21 June 2005) until 31 December 2009;

(c) This was followed by the fourth price controls (PC4) set in 2009 for all the four network companies together, for four years (2010-2013); and

(d) In 2013, we set the current or fifth price controls (PC5), for all four network companies to apply for four years (2014-2017).

Figure 1.1: Multi-year price controls for network companies

PC1	PC2	PC3	PC4	PC5	RC1
1999-2002	2003-2005	2006-2009	2010-2013	2014-2017	2018-2021

Current review

1.2 The current PC5 price controls for all four network companies are due to expire at the end of 2017. Accordingly, new controls are required to be in place to take effect from 1 January 2018. The Bureau therefore commenced a consultation process to set the new regulatory controls (RC1) for 2018 onwards.

Consultation process upto draft proposals

1.3 The consultation process up to the publication of RC1 draft proposals is summarised as follows:

(a) We issued an initial letter on 23 November 2015 to the network companies setting out a high-level timetable for this price control review, along with our initial thoughts on the strategic issues and objectives for this price control review with the stakeholders;

(b) The Bureau issued its first consultation paper in February 2016 setting out its initial views on the main issues that should be considered in setting the RC1 controls;

(c) The Bureau issued the second consultation paper in September 2016, after taking account of the detailed responses from the network licensees and ADWEA to the first consultation paper; and

(d) We issued the draft proposals on 25 April 2017 to set out our draft price control calculations for RC1 after taking into account the detailed responses from the network licensees and ADWEA to the second consultation paper. We requested responses to the draft proposals by 10 June 2017.

Consultation process after draft proposals

ADWEA's request for extended consultation

1.4 Following the publication of the RC1 draft proposals, ADWEA requested, via its letter dated 10 May 2017, an extension in the response timeline and updated draft proposals to address the following key concerns:

(a) removal of inflation from depreciation and RAV;

(b) reduction in WACC;

(c) treatment of all funding as equity at network company or Abu Dhabi Power Corporation (APC) level;

(d) considerable reductions in operating and capital expenditure allowances; and

(e) inclusion of work streams not related to the regulation of the sector such as ring fencing and return on Government funding.

1.5 The Bureau responded to ADWEA on 14 May 2017 advising that the response timeline could not be extended because ADWEA's response to the RC1 second consultation paper was already delayed by a month and the consultation should be concluded within the legal timeline with publication of RC1 final proposals by 17 November 2017. However, the Bureau offered presenting a detailed summary of the RC1 draft proposals to the network licensees and ADWEA in May 2017 in order to facilitate their review of the draft proposals so as to ensure timely responses by 10 June 2017. Further, the Bureau offered a Director General level meeting in June 2017 to address ADWEA's key concerns following detailed responses. Similar communication occurred between ADWEA and the Bureau via their letters dated 31 May and 5 June 2017 respectively wherein we reiterated the above position, referred to detailed explanations in our draft proposals on ADWEA's key concerns and sought detailed responses from licensees to progress the consultation in a meaningful manner.

Extended consultation

1.6 Accordingly:

(a) the Bureau made a detailed presentation of the RC1 draft proposals to the network licensees and ADWEA on 22 May 2017. We then received detailed responses to the draft proposals from ADWEA and ADSSC on 13 June 2017.

(b) subsequently, we held meetings at the Director General level between ADWEA and the Bureau on 20 June and 3 July 2017 to discuss ADWEA's key concerns

highlighted in its letter of 14 May 2017 and its detailed response of 13 June 2017. At the meetings, we explained how the Bureau can address many of ADWEA group's ten key concerns relating to:

(i) Treatment and adjustment for Government return on investment;

(ii) Ring-fencing proposals;

(iii) Subsidy payment reforms;

(iv) Ex-post capex PC4 and PC5 efficiency reviews;

(v) Future capex allowances;

(vi) Performance incentives;

(vii) Inflation indexation of the regulatory depreciation and RAV;

(viii) WACC;

(ix) RC1 opex allowances; and

(x) Asset life assumptions.

1.7 On 6 July 2017, our consultants also presented the recommendations from the final reports to the sector on RC1 opex and asset life assumptions. In response to certain concerns expressed by TRANSCO and ADSSC, we offered another opportunity for the companies to provide specific comments and views on these final reports within a week for the consultant's consideration.

1.8 Subsequently, ADWEA group, TRANSCO and ADSSC provided additional submissions regarding the RC1 draft proposals and Deloitte's reports via their letters in July, August, September and October 2017 as follows:

(a) 12 July – ADWEA group's additional response on RC1 draft proposals, including its consultant Ernst & Young (EY) report on cost of capital, inflation indexation and opex.

(b) 13 July – Letters from TRANSCO and AADC providing additional comments on Deloitte report on asset life.

(c) 30 July – ADWEA's letter indicating that network cost forecasts in all regulatory submissions and reports should be based on current MAR formula and notified values as per PC5 controls.

(d) 20 August – ADWEA's letter summarising its ten key concerns and showing acceptance or appreciation of the Bureau's proposals for feasibility on six of such concerns.

(e) 10 September – ADWEA's letter highlighting some of the ten issues raised before and focusing on the past unpaid subsidy by DoF and validity of the existing licence and existing price controls.

(f) 8 October – ADWEA's letter reiterating its key concerns raised before and highlighting two additional issues, namely MAR profiling and VAT treatment.

Bureau's updated proposals and thinking

1.9 Through the Bureau's letters dated 17 and 24 August and 15 October 2017, we responded to all correspondence from ADWEA group and its network companies by sharing our latest thinking/proposals on the ten key issues listed in paragraph 1.6 above. In summary, we stated that we had considered and would continue considering all the information received and developing the RC1 final proposals in the above areas. In particular, we believed that our flexibility on the first 6 topics (for example, to separate some of them for discussion outside the RC1 or to undertake an interim ex-ante capex review during RC1 period) should help the companies and the Bureau to agree on the RC1 final proposals. Our 15 October letter provided further clarity on our updated proposals / thinking on the key issues to ADWEA and reiterated our position on the continuation of the existing PC5 price controls only upto the end of 2017 as per the licences and the use of the RC1 draft proposals or final proposals for 2018 onwards unless the licences are modified or agreed otherwise. We also provided a similar update to ADSSC on its key issues via our letter dated 15 August 2017.

1.10 Our RC1 opex and assets life consultant, Deloitte, has also considered ADWEA group's and licensees' additional comments on its final reports and provided detailed feedback and updates through addendums to their final reports separately for opex and assets live assumptions. These addendums are being issued to ADWEA group and licensees with these RC1 final proposals.

Further engagement with DoF and ADWEA

1.11 On DoF's request, we also met DoF and ADWEA on 28 August 2017 where they raised three key issues on RC1, seeking: i) adjustment for unpaid subsidy for 2014-2016 in the RC1 ii) reasonable WACC for RC1 calculations, and iii) inflation indexation of depreciation and RAV. Our responses and proposals on these issues are summarised as follows:

(a) The unpaid subsidy for previous years is a matter between ADWEA and DoF and should not be addressed through future price controls by adjusting past subsidy against future costs since this will:

(i) increase the MAR and hence increase the cost-reflective tariffs for future years for customers who have already been paying cost reflective tariffs, thereby potentially resulting in cross subsidy between customers; and

(ii) not solve DoF and ADWEA's accounting issue relating to settlement of outstanding subsidy.

(b) However, later on in a meeting on 17 October 2017 and subsequent discussions, ADWEA further clarified its position on this matter and suggested making this entire revenue adjustment for PC4 and PC5 capex related financing costs to the 2017 MARs of the relevant licensees, rather than the MARs over the RC1 period. The Bureau is willing to accept ADWEA's suggestion and has offered on 26 October 2017 a derogation for each licensee (for acceptance by 30 October 2017) to make this entire adjustment to the 2017 MAR. Accordingly, these final proposals also provide notified values ('a' and 'b') and projected MARs applicable in case the licensees accept the Bureau's 2017 MAR derogation.

(c) The Bureau believes that the WACC in these final proposals is reasonable and takes account of interests of all the stakeholders including shareholders and customers. As suggested by DoF, the Bureau has commissioned a report from an independent consultant (Deloitte) on WACC which is being issued with the RC1 final proposals to ADWEA group and licensees. See Section 6 for further details.

(d) As suggested by DoF, we have considered the adverse impact on companies' financial position of our proposal to remove the inflation indexation from the regulatory depreciation and RAV in the RC1 price controls. We have also given due consideration to the licensees' detailed responses and ADWEA's consultant report on this topic. Based on all the considerations, we have dropped our suggestion to remove the inflation indexation in the RC1 final proposals. Sections 2 and 6 discuss this issue in detail.

1.12 We now publish this document to describe our final proposals on the RC1 controls, having taken into account the licensees' and ADWEA's responses to the draft proposals.

1.13 On ADWEA's suggestion, we offered the licensees derogations on 26 October 2017 to make entire revenue adjustment for unduly earned financing costs relating to PC4 (2012-2013) and PC5 (2014-2015) capex underspending to the 2017 MAR (rather than to the MAR over the RC1 period). While ADSSC confirmed its acceptance, ADWEA's 5 November 2017 and TRANSCO's 2 November 2017 response did not confirm unconditional acceptance of such derogations and proposed new major changes including extension to cover 2016 and 2017 capex, and use of different calculation methodology and efficiency scores. Accordingly, these final proposals offer the licensees two options with separate draft licence modifications and financial models being issued with these final proposals for each option:

a) Option 1: RC1 final proposals without derogations to apply adjustment for PC4-PC5 capex financing costs to 2017 MAR (i.e such adjustment to apply over RC1 period) resulting in lower MAR over RC1 period (AED 9 billion in 2018 prices in total)

b) Option 2: RC1 final proposals with derogations to apply adjustment for PC4-PC5 capex financing costs to 2017 MAR (i.e such adjustments then do not apply over RC1 period) resulting in higher MAR over RC1 period.

Accordingly, we are issuing two sets of draft licence modification and financial models (with and without derogation acceptance) to each company for its review to give effect to these final proposals on 1 January 2018. Licensees are requested to state their acceptance of one of the two sets in their responses to the RC1 final proposals. We welcome ADWEA's positive response agreeing in-principle to the derogations, thereby making option 2 more likely to be accepted.

Further engagement with ECO

1.14 The Bureau met with the Abu Dhabi Executive Committee (ECO) on 14 August 2017 and 11 September 2017 on the RC1 draft proposals, during which ECO team raised a number of items in relation to MAR levels under RC1 draft proposals, methodology for calculating tariffs, the rationale for using estimated figures rather than actuals, and the frequency of companies' capex reviews. We updated ECO with our plans for the RC1

final proposals to increase the MAR level and the frequency of ex-post capex reviews to address stakeholders' concerns.

Overall timetable

1.15 **Table 1.1** below sets out the timetable for this review.

Table 1.1: Timetable for 2017 price control review

Approximate date	Task
23 November 2015	**Bureau issued RC1** Initial Letter
4 February 2016	Bureau published RC1 **First Consultation Paper**
7 April 2016	Companies responded to RC1 First Consultation Paper
30 April 2016	Companies submitted 2015 audited Separate Business Accounts (SBAs)
18 September 2016	Bureau published RC1 **Second Consultation Paper**
31 October 2016	Companies submitted 2016 Annual Information Submissions (AIS)
17 November 2016	ADSSC responded to RC1 Second Consultation Paper
14 December 2016	ADWEA group responded to RC1 Second Consultation Paper
25 April 2017	Bureau published RC1 **Draft Proposals**
30 April 2017	Companies submitted 2016 audited SBAs
22 May 2017	Bureau presented detailed summary of RC1 draft proposals to network licensees and ADWEA
May – June 2017	Bureau responded to ADWEA's letters dated 10 and 31 May 2017 on 14 May and 5 June 2017 regarding ADWEA's key concerns and its request for extended consultation and updated proposals before final proposals
June 2017	Bureau's RC1 opex and asset life consultant published final reports
11 June 2017	ADWEA responded to RC1 draft proposals
13 June 2017	ADSSC responded to RC1 draft proposals
20 June / 3 July 2017	Bureau held Director General level meeting to discuss ADWEA's key concerns
6 July 2017	Bureau's RC1 opex and asset life consultant presented its final reports to sector
13 July 2017	ADWEA group, TRANSCO and ADSSC provided additional comments and feedback (including ADWEA consultant EY's three reports on opex, WACC and inflation indexation depreciation and RAV).
30 July 2017	ADWEA letter indicating that network cost forecasts in all sector regulatory submissions and reports should be based on current MAR formulas and notified values
15 August 2017	Bureau responded to and updated ADSSC via a letter on its key issues
17 August 2017	Bureau responded to ADWEA group's all correspondence particularly ten concerns by sharing our latest thinking/proposals and advice on use of RC1 draft proposals and RC1 final proposals in the sector regulatory submissions and reports until the licence modifications are agreed and issued.
20 August 2017	ADWEA's letter summarising its ten key concerns and showing acceptance or appreciation of the Bureau's proposals for flexibility on six of such concerns.
24 August 2017	Bureau responded to ADWEA's letter dated 20 August 2017 reiterating our position from the Bureau's letter dated 17 August 2017.
10 September 2017	ADWEA's letter highlighting some of the ten issues raised before and focusing on the unpaid subsidy by DoF and validity of the existing licence and existing price controls.
8 October 2017	ADWEA's letter reiterating its key concerns and highlighting two additional issues, namely MAR profiling and VAT treatment.
15 October 2017	Bureau responded to ADWEA's letter dated 10 September 2017 providing further clarity on the Bureau's latest proposals / thinking on key issues.
26 October 2017	RSB letters to ADWEA and ADSSC with draft derogation to make entire revenue adjustment for unduly earned financing costs for PC4-PC5 capex in 2017 MARs for licensees' acceptance and expressing our agreement to retain the inflation indexation of depreciation and RAV.
31 October 2017	ADSSC acceptance of the Bureau's draft derogation for 2017 MAR adjustment for consistency with other licensees.

2 November 2017	TRANSCO response to the Bureau's offered derogation with similar issues as raised in ADWEA's 5 November letter (discussed below).
5 November 2017	ADWEA response to the Bureau's offered derogation seeking major changes to calculation methodology, efficiency scores and extension of adjustment to 2017 MAR to cover 2016 and 2017 capex.
12 November 2017	Bureau publishes RC1 **Final Proposals**
1 January 2018	RC1 takes effect (if Final Proposals are accepted)

Regulatory arrangements

Roles and duties of the Bureau

1.16 The RC1 first and second consultation papers and draft proposals summarised the role, main duties and functions of the Bureau as the regulatory body for the water, wastewater and electricity sector under Law No (2) of 1998 as amended from time to time, including:

(a) ensuring safe, secured and continued supply of water and electricity and wastewater services to customers; and

(b) protecting the interest of consumers with regards to the terms and conditions and price of supply.

1.17 Further, the Bureau has an obligation to act consistently, to minimise the regulatory burden on licensees, to take account of the financial position of licensees, and to give reasons for our decisions.

1.18 This price control review is governed by these duties, functions and obligations, as well as the statutory requirement for the network companies to accept our proposed licence modifications before they are applied.

Current price controls

1.19 Earlier RC1 consultation papers described the main elements of the current price controls for the network companies such as:

(a) The CPI-X revenue caps, defining the MAR for each company or business with a fixed term and one or two variable terms involving output-based revenue drivers.

(b) Separate price controls for the water and electricity businesses of the companies, with no separation of controls between distribution and supply businesses of AADC and ADDC and between ADSSC's three separate businesses (sewerage, wastewater treatment and disposal).

(c) Pass-through treatment for costs that are subject to competition or regulation in other parts of the supply chain (e.g. bulk supply and transmission charges).

(d) Building-block approach to setting the price controls to allow companies to recover the estimated efficient levels of opex, regulatory depreciation and return on RAV.

(e) Incentives for companies to reduce costs.

(f) Ex-post approach to capex regulation with only provisional allowances made in price controls for future and ex-post efficiency reviews and adjustments made at the next price control reviews for actual efficient capex.

(g) Setting opex allowances using a hybrid of top-down and bottom-up approaches and including various specific allowances for additional roles and responsibilities, as well as capability building in important areas subject to annual adjustments for actual out turn values of pre-specified parameters.

(h) Setting regulatory depreciation allowances based on assumed asset-life of 30 years for all new investments by AADC, ADDC and TRANSCO and 50 years for ADSSC.

(i) Setting WACC based on overseas regulatory decisions and crosschecked against the local and regional capital market estimates.

(j) Scope of price controls covering TRANSCO's unlicensed transmission activities in other Emirates.

(k) Incentives for quality of service, outputs and performance on an annual basis against pre-defined performance indicators and targets, with Technical Assessor (TA) and Regulatory Instructions and Guidance (RIG) playing important roles.

Related work streams

1.20 A number of related work streams supported this price control review, as summarised in **Figure 1.2** below**.** We shared with the licensees the scope of work, timetable and deliverables of these streams and summarised them in the previous consultation papers. Initial, interim, draft and final reports on the opex, asset life and capex reviews were shared, presented and discussed with companies and benefited from their feedback. We are also issuing with the RC1 final proposals our consultant Deloitte's addendums to their final reports for opex and assets life assumptions and their report on WACC. These work streams and their results are discussed in the relevant sections of this document.

Figure 1.2: Work streams related to RC1 review

PC4 ex-post capex review (2012-2013)	•Final reports issued in June 2016
PC5 ex-post capex review (2014-2015)	•Final reports issued in January 2017
RC1 ex-ante capex review	•Final reports issued in February 2017
RC1 opex assessment	•Final report issued in June 2017 and addundum to the final report issued with RC1 final propsoals
RC1 asset-life assessment	•Final reports issued in June 2017 and addundum to the final report issued with RC1 final propsoals
Alignment of regulatory & funding arrangements for ADSSC	•On-going and independent from RC1 consultation
Activity Based Costing (ABC) system	•On-going and independent from RC1 consultation
Ring-fencing	•On-going and independent from RC1 consultation
Return of and return on Government funding	•On-going and independent from RC1 consultation

2. Strategic objectives and issues

Introduction

2.1 The RC1 draft proposals set out our thinking on the key challenges and objectives for this price control review. We highlighted a number of strategic issues in relation to the funding and regulatory arrangements for the four network companies and the way they were implemented previously.

2.2 This section deals with the key aspects that should inform the strategic review of the regulatory regime, summarises the suggestions made by licensees in this respect, and sets out our final proposals on such matters. Subsequent sections of this document detail the design and implementation issues on certain aspects of price controls that arise from the discussion in this section.

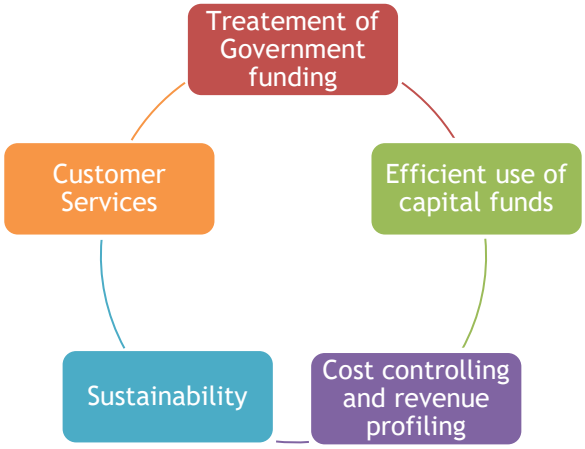
Strategic challenges and objectives for this review

Draft proposals

2.3 Previous consultation papers on RC1 identified five strategic challenges and objectives for this price control review and discussed ways to address them.

2.4 Given the general agreement and support of the stakeholders, we maintained the focus on the five strategic areas in the draft proposals, listed in **Figure 2.1**.

Figure 2.1: Five strategic challenges and issues for this review



Responses

2.5 In their responses to the RC1 draft proposals, ADWEA group and ADSSC did not provide specific comments on the strategic objectives and issues. ADWEA group however provided the following general comments:

(a) ADWEA group highlighted its focus on combining efforts with the Bureau and establishing a constructive and collaborative process for the benefit of the

Emirate. It suggested that the Bureau did not engage with it, before issuing the draft proposals, on those areas where the Bureau indicated the sector had not presented alternatives proposals. Accordingly, ADWEA group requested more active engagement. It also suggested that the Bureau should not undertake work that conflicts with their role as the regulator.

(b) The regulatory model adopted in Abu Dhabi was predicated on the assumption that the sector would move to a privatisation model based on the regulatory models from the UK and Australia.

(c) ADWEA group confirmed that it understands the regulatory framework and process in place, which was the reason why its response identified the risks to the sector from the RC1 draft proposals. However, it indicated that, based on its experience, the understanding about the regulatory framework in Government, ECO and DoF is non-existent, very limited and/or confused. On this basis, ADWEA claimed that the regulatory model is complex.

(d) ADWEA group agreed with the Bureau that the focus should be on making sure the regulatory economic framework is the most suitable for meeting the needs of the sector and its customers, as well as Government objectives. It indicated that the framework should ensure adequate funding for the sector, appropriately incentivise desired behaviour and activities, be understandable to key stakeholders, and minimise the regulatory burden (both cost and complexity of compliance). It also suggested the framework is at risk of failing the Government's objectives.

Assessment

2.6 While ADWEA group and ADSSC did not provide specific comments on the strategic objectives and issues in response to the RC1 draft proposals, we recall that in first and second consultations, these stakeholders generally agreed with the strategic challenges and objectives, and identified specific issues and opportunities for the price control review. On ADWEA group's general comments, we respond as follows:

(a) As stated in the previous RC1 consultation papers – particularly the draft proposals – we share the views about the benefits of cooperating to address the sector future challenges and the Government objectives for the sector. Regarding ADWEA group requests for active engagement, we highlight that we have been engaged with the sector through extensive meetings, presentations and responses on overall RC1 framework and related workstreams on capex, opex and asset life over more than two years. Before publishing the RC1 draft proposals, we received and reviewed detailed responses from ADWEA group and ADSSC, and held constructive meetings with ADWEA group's Regulatory Adviser Committee (RAC) and ADSSC to discuss their key concerns and our likely draft proposals. Furthermore, for some issues (such as, asset management) where we had requested alternatives, detailed proposals from the sector are subject to ongoing discussions with the Bureau. In some cases, these would have already been included in the discussions on previous price controls. In any case, as described in Section 1, the Bureau continued to have extensive engagement with ADWEA group and ADSSC since publication of the RC1 draft

proposals through various meetings, presentations and formal correspondence, providing additional opportunities for them to share their concerns, feedback and for sharing our latest thinking/proposals on such matters, often by extending timelines against a tight timetable set out in the law for issue of the RC1 final proposals. While acting always within our statutory duties and functions under Law No (2) of 1998, we will continue undertaking or facilitating work where the sector is absent and/or is unable to deliver independently. In practice, we will not replace the network companies in their operational duties, but will tailor the regulatory framework to ensure delivery of the objectives for which the companies are responsible. The supply side group and Demand Side Management (DSM) are two examples where we have had a collaborative approach with the sector but were forced to undertake regulatory work to make sure the network companies fulfilled their responsibilities and delivered the Emirate's objectives.

(b) While considering best international regulatory practices – such as in the UK or Australia as highlighted by ADWEA – we have tailored Abu Dhabi's regulatory framework over time to ensure its applicability in Abu Dhabi, including the introduction of various flexible adjustments in response to ADWEA group's views.

(c) We welcome ADWEA group's confirmation that it fully understands the regulatory framework. However, based on our direct experience, we disagree with its statement that the understanding from Government, ECO and DoF is non-existent, very limited and/or confused. Nevertheless, we always welcome suggestions to make our regulatory framework simpler and more effective.

(d) We also welcome ADWEA's alignment on the drive for a suitable regulatory economic framework that meets the needs of the sector and its customers, as well as the Government's objectives. In line with our statutory duties, the previous consultation stages and these final proposals all provide a balance between ensuring an economically efficient and sustainable sector (while adequately funding efficient costs of companies) and incentivising the network companies to perform and deliver good quality outcomes.

Final proposals

2.7 In view of the above, the RC1 final proposals retain focus on the following five strategic areas:

(a) treatment of government funding;

(b) efficient use of capital funds;

(c) cost controlling and revenue profiling;

(d) sustainability; and

(e) customer services.

Treatment of Government funding

Draft proposals

2.8 The draft proposals highlighted the challenges arising from a lack of visibility and control over licensees' funding arrangements. This in turn reduces both the incentive for the licensees to improve efficiency and the drive to respond to regulatory incentives under the price controls.

2.9 Accordingly, and following consideration of the responses to the second consultation paper, we set out our draft proposals as follows:

(a) to treat all Government funds for AADC, ADDC and TRANSCO as equity and return all cash from the sector (at the regulated businesses or Abu Dhabi Power Corporation level) to Government after meeting expenses and future capex requirements, as per the arrangement proposed to the Government, with DoF and ADWEA support. If these arrangements are not fully implemented and in a manner which is transparent to the Bureau, we reserve the right to progress/implement the proposal for netting-off the repayment of government funds from the MAR;

(b) to determine a market-based rate of return for RC1 in line with the approach used in the previous control reviews, as per the outcome of our engagement with DoF and ADWEA; and

(c) to explicitly define the depreciation allowance in price controls to repay only the capital investment, and consequently exclude inflation indexation from depreciation and RAV.

Responses

2.10 ADWEA group and ADSSC did not support netting-off the repayment of Government debt from the MAR, or removal of inflation indexation from depreciation and RAV.

Repayment of Government funding

2.11 ADWEA group's specific comments on repayment of Government funding are summarised as follows:

(a) As the government's representative for the sector, ADWEA deals transparently with DoF and other government entities on funding arrangements. It noted that the Bureau's role in determining the sector's funding mechanism does not include determining the use of the return-on-capital from the funding received via the MAR. ADWEA group added that, consequently, the Bureau does not have visibility of the amounts repaid to date.

(b) The Bureau did not explain how the regulatory and funding model would work and why the Bureau needed visibility on fund flows when there are no direct Government loans to the sector companies. ADWEA group also questioned that, if the Government pays IWPP and fuel costs directly, why this would change the effectiveness of price controls, efficiency incentives and efficient subsidy. It

added that reconciliation between estimated and actual subsidies was available. ADWEA has the legal responsibility to manage the funding and that ADWEA is not a regulated entity.

(c) According to ADWEA, it and DoF did not support the Bureau's proposed arrangements (as suggested in the draft proposals) and have submitted their final proposal during February 2017 for the Government's review and approval and are operating under these proposals.

(d) ADWEA group also reiterated its position that decisions regarding the group's treasury functions rest with ADWEA.

2.12 ADWEA group also raised a new issue not previously raised or discussed by ADWEA or any licensee in this RC1 review. It sought an upward adjustment to MAR for subsidy amounts due but not received by ADWEA from DoF in 2014-2016. In aggregate, this unpaid subsidy amounts to AED 7.5 billion in nominal prices and AED 7.9 billion in 2018 prices. ADWEA group agreed that the capex-related MAR allowances received above the capex amounts actually spent should be returned. However, it suggested that the past unpaid subsidy should be deducted from the capex allowances to be returned in the RC1 calculations. However, at a meeting on 17 October 2017 and subsequent discussions, ADWEA further clarified its position on this matter and suggested making this entire revenue adjustment for PC4 and PC5 capex related financing costs to the 2017 MARs of the relevant licensees, rather than the MARs over the RC1 period.

2.13 ADSSC indicated that a principle for agreement has been reached and that it will start operating on a full-MAR approach from 2018.

Removal of inflation indexation from depreciation

2.14 ADWEA group noted that the reopening of this area by the Bureau sets a precedent, under which it reserves the right to reopen previously accepted or agreed areas, where it believes the current treatment is not the most appropriate (indicating inefficient capex spend as an example). As in the previous RC1 consultations, ADWEA group rejected any adjustment to the roll-forward mechanism for the RAV, and requested continuing with inflation indexation for depreciation. It also stated that:

(a) The application of the privatisation model to the Abu Dhabi sector is the key reason why the model succeeded, with international and local investors participating in the utility sector. However, the Bureau's proposal will provide a significant obstacle to this model.

(b) The Bureau should demonstrate how the proposals would protect the long-term interests of consumers of water and electricity – and, by referencing unnamed academic experts, claimed that existing customers should not be forced to pay for assets that will benefit others paying only a fraction of their cost. According to ADWEA group, the regulatory model represents a contract or commitment to protect over time the real value of invested assets (including securing a reasonable return on investments), which the group and investors expect the Bureau to honour.

(c) The RAV protection is seen as the major regulatory commitment that underpins investor expectations and ensures network utilities are able to maintain adequate operating and financial capital maintenance. To support its view, ADWEA referenced regulators (Energy Networks Australia and Ofwat), World Bank, academic experts (un-named) and credit agencies' views and practices.

(d) The Bureau should follow the principles of transparency, predictability and consistency, and that the proposed removal of inflation indexation from depreciation and RAV increases risk, lowering assigned credit ratings (to 'junk' investment grade). In consequence, this would increase future borrowing costs and result in the licensees being unable to finance adequately their operations. These elements are based on strong cash-flow protection and highly predictable cash-flows, which would be lost with the Bureau's proposal.

2.15 ADSSC indicated that removing inflation from depreciation and RAV would seriously restrict funds and adversely affect both investment and its business. Potentially, this could create an underfunded and inefficient sector that will inevitably cause service reductions and quality compromise.

2.16 ADWEA consultant (EY) report concluded, with the use of sample calculations, that the Bureau's proposed approach to inflation compensation at RC1 is not consistent with regulatory best practice, and could lead to significant under/over-compensation of investors for the risks they bear, depending on the exact value of inflation.

Allowed rate of return

2.17 In relation to WACC, ADWEA group welcomed the overall approach to be adopted for the RC1. However, it highlighted the need to consider the gearing assumption given ADWEA group's zero actual gearing, as ADWEA has fully paid some external debt by May 2017 and it is precluded from obtaining further external debt. (ADWEA's detailed comments on WACC and our assessment are presented in Section 6).

2.18 ADWEA group also indicated that it did not support the financial ratios proposed in the RC1 draft proposals.

2.19 ADSSC did not comment on the allowed rate of return.

Assessment

2.20 The Bureau's assessment of stakeholders' comments on individual topics is as follows:

Repayment of Government funding

2.21 In relation to ADWEA group's comments to the RC1 draft proposals:

(a) The Bureau reiterates, as stated in the previous RC1 consultation papers, that funding has not been transparent in the past, and we have had either limited or no visibility about the flow of funds between ADWEA group and DoF. For this reason, the Government has requested the Bureau's involvement on this issue. This requirement has been emphasised by the Bureau to ADWEA at many

occasions and as recently as 20 September 2017 at a Director General level meeting.

(b) Previous RC1 consultation papers explained in detail how the regulatory and funding framework was meant to be implemented, why the actual implementation differs and creates issues, and the need for transparency in the flow of funds. The existing arrangements are not sufficiently robust since no or limited repayment of Government funds has led to the network companies accumulating significant liabilities over time, thereby risking the financial stability and future of the network companies and the sector. While ADWEA is not regulated, its role in funding and lack of transparency of fund flows for the Bureau creates a gap for the regulatory framework and for the Bureau's statutory duties to ensure the economic and continued availability of supplies and services for customers, as stressed by ADWEA group itself, and to ensure that the network companies are financially robust, sound and viable, or maintain adequate operating and financial capital maintenance. Given this gap, therefore, our RC1 proposals for the treatment of government funding are designed to address the misalignment of regulatory and funding arrangements, the lack of visibility about the flow of funds, and the risks to the network companies' financial position. We note that in previous RC1 consultation stages the network companies indicated that they had neither visibility nor information on the amount of funds that ADWEA sources for them and/or on their behalf.

(c) The submission of a final proposal on funding arrangements to the Government by ADWEA and DoF without the Bureau's agreement or even engagement strengthens our concerns about the lack of transparency, particularly when the Government directed ADWEA, DoF and the Bureau to work together on this matter and for the Bureau to submit proposals. To address our concerns and support ADWEA's claims about transparency, we would like to receive the said proposals from ADWEA and DoF at the earliest. This requirement has been emphasised by the Bureau to ADWEA at many occasions and as recently as 20 September 2017 at a Director General level meeting.

(d) In relation to the separate treasury function, as indicated in the RC1 draft proposals, we look forward to receiving ADWEA's analysis and results. In the absence of changes to treasury functions, we reiterate that ADWEA is required to improve and reach appropriate and acceptable transparency levels – for the Bureau and for the Government – on funds flowing into and out of the regulated/licensed businesses.

2.22 In relation to ADWEA group's suggestion for adjusting future MAR in the price control for subsidy amounts not paid by DoF from 2014-2016, we do not agree with such suggestion for the following reasons:

(a) We note that ADWEA group, despite the directions from the Government, strongly opposes both the Bureau's involvement in the Government funding arrangements, and the proposal to net-off Government funding from the MAR. We are unclear why the group defends this opposition regarding funds that are due to return to the Government, but then takes the opposite view for funds that are due to ADWEA from Government. We do not accept such conflicting position

and defer any discussion on unpaid subsidy to occur alongside that on full visibility and implementation on return on Government investment and particularly subsidy payment reforms.

(b) In a meeting with DoF and ADWEA on 28 August 2017, the Bureau explained that the subsidy payment is a matter between ADWEA and DoF and should not be addressed through price controls by adjusting past subsidy against future costs. If DoF is convinced that it owes money to ADWEA then it should pay it directly as per the established regulatory framework.

(c) The Bureau uses the "building-block" approach, consistent with previous price controls, for determining licensees revenue requirements based on opex, regulatory depreciation and return on capital allowances. We note that this approach does not allow adjustments for past unpaid subsidy, as initially requested by ADWEA. At the meeting on 28 August 2017, the Bureau therefore suggested that the Government/DoF need to decide what to do on past unpaid subsidy, since price control calculation is based on costs to estimate total revenue requirement.

(d) We believe that any price control adjustment will not solve the accounting challenges between DoF and ADWEA in relation to the settlement of outstanding receivables balances. We also believe that any adjustment for past unpaid subsidy cannot be made to TRANSCO's price controls (where most of the capex underspending is due) since TRANSCO does not receive any subsidy and that it is not appropriate to allocate any paid or unpaid subsidy to different parts of the supply chain in the water and electricity sector as the subsidy is paid by the Government for and on behalf of the customers and not to fund the sector costs per se. Going forward, all stakeholders should also agree the approach to address any subsidy that the distribution companies do not receive but are entitled to (as a result of the Government's direction to apply lower tariffs to any customers than the cost-reflective tariffs).

(e) As agreed at the meeting between DoF, ADWEA and the Bureau on 28 August 2017, the Bureau and DoF met on 7 September 2017 to discuss this issue further. Applying a cooperative approach with the aim of addressing this issue for the benefits of all stakeholders, we suggested an option whereby the price control / MAR for the RC1 period (2018-2021) is calculated for each network company using the standard building-block approach as used in the previous price controls but then, for the purposes of subsidy calculation, the calculated MAR for each year is grossed-up or increased upward by an equal annual amount (for each year of RC1 period) necessary for ADWEA to recover the unpaid subsidy. This will ensure no change to the three standard building blocks of price controls / MAR (opex, depreciation and return on capital) and hence the customer tariffs derived from MAR. DoF appreciated the Bureau's flexibility but emphasised options for (a) no inflation and financing cost or return adjustments, and (b) adjusting the MAR for subsidy purposes as early as possible in the RC1 period. DoF suggested for the Bureau not to include any gross-up or upward adjustment of MAR for unpaid subsidy in the RC1 final proposals and suggested further

discussion on profiling this MAR adjustment for subsidy purposes over RC1 period after the Bureau has the final modelling results for RC1.

2.23 However, we note ADWEA's clarification and suggestion to make entire adjustment of unduly earned financing costs relating to PC4 (2012-2013) and PC5 (2014-2015) capex underspending to the 2017 MARs. Since this will reduce the amount of distribution companies' subsidy entitlement, in turn outstanding subsidy balance, if any as of 31 December 2017, the issue of unpaid subsidy may no longer be relevant. Accepting ADWEA's suggestion, we have issued to the companies for their acceptance a draft derogation to effectuate this entire adjustment in the 2017 MAR. However, except of ADSSC, none of the other licensees have provided their unconditional acceptance of the offered derogations. See section 6 and 7 for further discussions on this matter.

2.24 As we have agreed in our letter dated 17 August 2017 to ADWEA, we would like to separate issues relating to repayment of government funding, unpaid subsidy and ring-fencing from the RC1 consultation to ensure that the RC1 final proposals are issued and agreed in a timely manner, and given ADWEA's argument that fund flows at ADWEA level are not of concern or within regulation scope of the Bureau (which we do not agree). However:

(a) ADWEA is required to provide transparency/share the February 2017 proposal to Government (as requested at the meeting on 28 August 2017) and the agreement reached with DoF (as requested at the meeting on 20 September 2017) on the Government return on investment and subsidy payment.

(b) By way of support, we are willing to hold a workgroup with ADWEA and DoF on the annual reconciliation of subsidy entitlement and actual amounts paid, and provide all assistance within our powers to verify the MAR allowances.

2.25 We look forward for the conclusion and full implementation of the principle of agreement between ADSSC and DoF, also agreed by the Bureau, from 2018 onwards.

Removal of inflation indexation from depreciation

2.26 ADWEA group's assertion that the Bureau is reopening previous price controls on this topic – and thus reserves the right to do the same for other topics – is incorrect. Our RC1 draft proposals are neither retrospective, nor retrospectively change the regulatory contract and the conditions that were accepted and fully implemented by the licensees.

(a) We welcome and share ADWEA group's assessment on the success of the regulatory model applied to Abu Dhabi. While the Abu Dhabi regulatory model is based on the principles of the privatisation model and international best practice, it has been tailored and amended over time to meet the reality, specificities and requirements of the Emirate. As the sector as not been privatised and there is no plan for privatisation of network companies, we do not see how our proposal would provide a significant obstacle to private investment. Nonetheless, while the regulatory model has evolved over time, we recognise that our proposal for removing inflation indexation is among the most significant and high-impact modifications proposed to the model since 1999.

(b) We share ADWEA group's assertion that the sanctity of a regulatory contract once approved should be respected. However, the price control review is precisely a review of the regulatory contract for the next regulatory period. As explained in detail in previous RC1 consultation papers, we did not propose any retrospective change to the price controls or the MAR to claw-back any revenue earned by licensees in the past.

(c) We acknowledge the generic statements from regulators, credit agencies and academic experts included within ADWEA group's response. Notably, in the absence of more precise referencing, we are unable to verify these and, more importantly, the context in which they were made. In any case, we do not fully understand what ADWEA group means by RAV protection. The Bureau strives to maintain a stable regulatory environment, in accordance with its statutory duties and functions. We consider that some of the proposals under this RC1 review are strategic in nature, and therefore have a wide reach and important impact. However, the regulatory framework remains stable, focused on promoting an efficient sector and balancing protecting customer interests with ensuring a safe and robust financeable sector. We note that, while not frequent, the re-evaluation of assets is not a new element, even in the context of regulated utilities. In particular, this has been present in privatisation processes - under which model the sector's regulatory framework is based, as noted by ADWEA group.

(d) As mentioned above, we do not consider that our proposal violates the principles of transparency, predictability and consistency – we have included our views and proposals since the start of the RC1 review, and have identified, as early as November 2015, the treatment of government funding as a strategic objective to be dealt with in this review. As discussed above, the price control review is the process for agreeing a revised regulatory contract for future. Notwithstanding, we recognise that the proposal to remove inflation indexation from depreciation and RAV will have a significant effect on future cash-flows of licensees. However, the most significant impact on and risk to stable and highly predictable cash-flows from this or later reviews is the significant difference between capex forecast and the actual capex spent. This results from the licensees' inability to provide robust and meaningful forecast, with satisfactory confidence.

2.27 We do not agree with ADSSC's views since the Government continues to fund all its capex requests, and the MAR remains sufficient to repay such funding if full MAR payment arrangement is implemented from 2018 onwards for ADSSC.

2.28 We have reviewed ADWEA consultant (EY) report and have given due consideration to its calculations and conclusion that the removal of inflation indexation from depreciation and RAV will mean the licensees will not be able to earn the rate of return or WACC allowed in the price controls. We have also considered:

(a) Our statutory duties to ensure consistency and to take account of the financial position of the licensees; and

(b) the adverse impact on cash-flows over the RC1 period;

Accordingly, we have decided not to implement this proposal in these final proposals.

Allowed rate of return

2.29 We welcome ADWEA group's agreement with the overall approach to be adopted for the RC1. However, we do not agree that actual, zero external debt for ADWEA group should be the sole factor in determining the WACC for price controls. We note that:

(a) ADWEA group's response contradicts its and DoF earlier responses, where they requested using a market-based rate of return required by private investors;

(b) The Bureau's statutory duties and approach to date to WACC estimation (which ADWEA group and DoF support) do not allow basing our WACC estimate on an inefficient capital structure; and

(c) As per DoF's suggestion, we have commissioned a report from an independent consultant on WACC assessment which is being issued to DoF, ADWEA and licensees with these RC1 final proposals.

2.30 In relation to ADWEA lack of support for the financial ratios proposed in the RC1 draft proposals, we understand that this relates to the specific ratios proposed, and, as stated in its response to the draft proposals, ADWEA continues supporting the introduction of financial ratios. Therefore, we maintain the proposal to introduce financial ratios. These ratios and the relevant responses are discussed further in Section 8 and **Annex G**.

2.31 Further to the above considerations, when determining the allowed rate of return, we continue using the approach used for previous price controls to determine the market-based WACC, having considered both a variety of sources to identify market returns and an optimal gearing level in order to ensure efficient costs. Further details are included in Section 6.

Final proposals

2.32 In light of the above discussion, our final proposals are:

(a) to defer discussions on repayment and return on Government funding, subsidy payment reforms, ring-fencing and settlement of unpaid subsidy and reconciliation to separate work streams (outside the RC1 consultation process), to ensure that the RC1 final proposals are published and accepted in a timely manner to deliver the benefits and savings to the sector, Government and customers at the earliest;

(b) to accept ADWEA's suggestion to apply entire revenue adjustment for unduly earned financing costs relating to PC4 (2012-2013) and PC5 (2014-2015) capex underspending to the 2017 MAR if the licensees confirm their acceptance of the Bureau's draft derogation issued to the companies on 26 October 2017;

(c) to determine a market-based rate of return for RC1 in line with the approach used in the previous control reviews, as per the outcome of our engagement with DoF and ADWEA; and

(d) maintain the approach used in the previous price controls in relation to inflation indexation of the RAV and depreciation.

Efficient use of capital funds

Draft proposals

2.33 In the previous RC1 consultation papers, we highlighted the challenges with the backward-looking, ex-post approach to capex regulation over the previous reviews. Accordingly, we considered options to enhance both the approach to capex reviews and the efficient use of capital funds. Given wider support from the sector, our draft proposals were to:

(a) move from the existing ex-post capex reviews to forward-looking, ex-ante capex reviews at the price control review, with:

(i) limited periodic ex-post capex reviews (next planned for 2018 to close PC5 capex) in the future; and

(ii) an interim ex-ante capex review in 2019 (to review and if necessary reset ex-ante capex allowances for 2020-2021);

which are likely to result in regular capex adjustments to the price controls;

(b) promote and support better alignment between different stakeholders in the sector's capital approval and budgeting process; and

(c) strengthen the processes and methods to record and report the network companies' costs and outputs – including implementation of the ABC system by the network companies.

Responses

2.34 Noting the challenges of moving to an ex-ante capex regime, ADWEA group's response to the draft proposals set out that:

(a) Effective operation of the sector requires sufficient capital projects, but there is less information on these projects and their expected costs in the latter years of the RC1 period, as reflected in the reduced ex-ante allowances over the RC1 period;

(b) Ex-ante capex reviews should be conducted annually for a successful transition to a full ex-ante approach;

(c) The prepayment of provisional capex should be reconciled regularly with actual capital spent, with annual MAR adjustments made where the actual spend varies by more than 20% of the provisional amount. The ex-post capex review after two years is welcomed, but the group requested clarification about the meaning of the 'limited' review proposed by the Bureau;

(d) In other jurisdictions – eg, Transgrid in Australia – actual capex costs are rolled over into the RAV;

(e) The companies have not accepted previous capex reviews reports and demanded the refund (spread evenly over the RC1 period) of deductions applied

to date in ex-post capex reviews since 1999, adding that this neither effects prior year MARs nor provides any funding in excess of actual expenditure. The group also claimed that their request to re-open historically-accepted treatments is in line with the Bureau's approach in re-opening the treatment of inflation indexation of RAV and depreciation. However, ADWEA later suggested to apply 2010-2011 capex efficiency scores to PC4 (2012-2013) and PC5 (2014-2017) capex to calculate actual efficient capex instead of recently determined efficiency scores for 2012-2015 capex and planned reviews for 2016 and 2017 capex during RC1;

(f) A new incentive for capital efficiency should be considered based on appropriate, benchmarked targets / objectives, and subject to the same bonus / penalty thresholds as other incentives;

(g) ADWEA group also noted that the licensees' IT systems are mainly provided and updated by ADWEA, for efficiency and economies of scale, and that it was discussing the progress on the implementation of the Activity-Based Costing (ABC) system; and

(h) ADWEA group raised a new issue to the RC1 consultation, by requesting deduction of unpaid subsidy in the past from the capex allowances to be returned in the RC1 calculations. However, ADWEA later clarified its position on this matter as discussed in para 2.12 and Sections 2 and 6.

2.35 ADSSC agreed with the migration from ex-post to ex-ante capex reviews, welcoming both the gradual transition and the proposed interim ex-ante review in 2019.

Assessment

2.36 The Bureau welcomes the sector support for the proposal to move from the existing ex-post capex reviews to forward-looking, ex-ante capex reviews, and for the interim ex-ante capex review during the RC1 period.

2.37 Our assessment of ADWEA group's comments is as follows:

(a) Assessing, planning and delivering capex projects to meet customer and operational requirements are the licensees' core responsibilities. However, the sector apparently remains unable to robustly forecast its business for periods longer than one or two years ahead. We note that this issue has persisted for many years and has been highlighted by the Bureau at each price control review and other occasions, but has not been addressed by licensees to this date. During the RC1 ex-ante capex review, we expended significant effort to make sure licensees could provide the most accurate and reasonable capex forecasts for the RC1 period. The companies were not able to provide sufficient information to allow the ex-ante review to be implemented as planned. As a result, the capex allowances for RC1 are lower than the allowances that the Bureau made at the previous price control reviews. This is attributed generally to the low number of applications for new projects particularly in the later years of RC1, as well as a significant lack of information and justification from the companies for the projects for which we did receive applications. This highlighted a lack of longer term planning and the need for significant improvements in companies' capex

planning, approval and procurement processes. Nevertheless, we incorporated allowances for all recurring projects. We do not see there was any way to include further allowances for ex-ante capex.

(b) We agree, as already proposed in the RC1 draft proposals, that an interim ex-ante capex review in 2019 is suitable to address the uncertainty and capex requirements for 2020-2021. As the licensees clearly expressed their constraints during the last capex reviews to undertake or support two capex reviews at the same time, we have proposed ex-post capex reviews every two years (the next planned to be in 2018), and the same for ex-ante capex reviews (the first in 2019, though there might be small overlaps). However, we have also accepted the companies' suggestion to undertake ex-post efficiency review (with the help of external consultant) of capex incurred during RC1 on an annual basis to minimise the time lag between the year of capex incurred and the year of review and minimise the magnitude of adjustment to MAR. Accordingly, 2018 capex will be reviewed in 2019 for consideration to adjust MAR for 2020, 2019 capex will be reviewed in 2020 for 2021 MAR adjustment and so on, through a derogation.

(c) We welcome ADWEA group's support for the ex-post capex review in 2018. With the transition to an ex-ante capex approach, which will set out firm capex allowances for the price control period, the adjustments to provisional capex related allowances are expected to be limited in the future. Therefore, we do not consider the adjustment proposed by the group to be necessary. However, we may review this on a case-by-case basis during the RC1 period, if requested by a licensee with robust analysis and justification. In relation to limited ex-post capex reviews, we clarify that (as indicated in the RC1 draft proposals) during the transition to the full ex-ante approach, we will conduct regular ex-post reviews to approve any change in the capex allowed by the price controls for those projects deviating from the approved ex-ante capex by 10% or more. This will apply only to capex spent from the start of the RC1 period – whereas ex-post capex reviews for the PC5 remaining period will have the full scope in line with previous ex-post reviews. The companies may also undertake additional capex schemes not approved in ex-ante review and also change the scope of approved schemes. Such projects will be subject to a full ex-post review. We also expect that with the transition to the full ex-ante capex approach, the ex-post reviews will phase out.

(d) We note ADWEA group's reference to the case of Transgrid Australia, where actual capex spending appears to be fully reflected in the RAV but after a significant lag and without all financing costs. While we are unclear whether the group's suggestion is to adopt the same mechanism, we highlight that the regulatory frameworks in the two jurisdictions, while may be based on the same best international practice, differ significantly in certain aspects. This is to ensure that the framework is adapted specifically for the jurisdictions in which they apply. This is the case with the regulatory framework in Abu Dhabi. For example, Transgrid Australia bears the full risk of under/over capex spending in related MAR allowances (because these allowances are fixed for the price control period). However, in Abu Dhabi, the MAR will be adjusted across price control periods to make sure that any allowances relating to under/overspent capex are

re-allocated to the licensees, such that they bear no risk in this respect. Section 5 discusses the capex review arrangements in further detail.

(e) The past ex-post capex reviews determine the inefficient capex. Under the Bureau's statutory duties – namely ensuring economic efficiency of the sector and protecting customer interest – it is neither acceptable nor justifiable to include inefficient costs in determining the sector's price control allowances. Specifically, it is also not acceptable for customers to pay and the Government provide funds to cover inefficient costs. The treatment of past ex-post capex reviews and the final reports have not only been accepted by the network companies – despite normal disagreements about specific aspects of the reports – but have also been transposed into the companies' licences accordingly. Pertinently, these have been accepted and implemented up to this date. Moreover, licensees have been providing SBAs/PCRs annually that incorporate the ex-post capex reviews. On this basis, ADWEA group's request is effectively re-opening past price controls, which it has not supported with any reasonable grounds. Therefore, we do not accept such re-opening. Notably, our RC1 proposals are not retrospective, despite the group's many claims throughout this process. Further, ADWEA's reference to our proposal to remove inflation indexation from depreciation and RAV is no more valid as we move away from this approach in these final proposals. Finally, we do not agree to extend PC4 (2010-2011) capex efficiency scores to PC4-PC5 (2012-2015) and to PC5 (2016-2017) capex. The former were themselves based on PC3 (2006-2009) capex review whose scores were adjusted upward significantly to allow time for companies and shareholder to improve capex processes. This was done as one-off relaxation and not to be repeated– refer to the Bureau's PC5 final proposals. We do not believe the efficiency scores derived in such a manner for capex dated back as earlier as 2006 are reflective of the efficiency of 2015 or 2016 capex and provide appropriate signal to the companies to improve efficiency after 15-17 years of sector restructuring.

(f) We disagree that an incentive, as proposed by ADWEA group, is best for promoting capital efficiency. This is neither consistent with international best practice – where ex-ante and ex-post capex approaches are used – nor consistent with the price control itself, which is the primary and cost-reflective incentive-tool for driving capital efficiency. We also consider that the first key step towards capital efficiency needs robust business cases for capex projects and reasonably accurate capex forecasts covering a reasonable time-period. Crucially, this would allow us to assess capital efficiency much more in line with international best practice, as ADWEA group has requested. Accordingly, we will not include the incentive proposed by the group in the RC1, but we remain open to discussing incentives for improving capex forecasting and asset management as part of the improvement programmes incentives.

(g) In relation to the ABC system, we reiterate both our support for and the importance of ABC to the sector. In addition, we expect that the group's assessment does not represent a step back in this project, and look forward to the results and implementation of ABC.

(h) We have discussed in detail earlier in Section 2 the new issue raised by ADWEA relating to the past unpaid subsidy and its subsequent clarification and our assessment and support for discussion / settlement outside the RC1 consultation process.

2.38 We welcome ADSSC support for the ex-ante approach.

Final proposals

2.39 In view of the above, we have retained our proposals on efficient use of capital funds as set out in the draft proposals, and reproduced in paragraph 2.33 above.

Controlling and smoothing costs and revenues

Draft proposals

2.40 In the previous RC1 consultation papers, we noted that increasing costs and increasing MAR have increased focus on the sector's need and ability to achieve cost savings and efficiency. This rising cost trend has also been characterised by a step increase in MAR at the start of each price control review, followed by a relatively flat MAR over the remaining period. Other challenges have included subsidy payment requirements, determination of end-user tariffs, transmission charges, the development of informative billing for ADSSC, and the subsidy payment reforms (where the subsidy is calculated based on metered units).

2.41 In the previous RC1 consultation papers, we noted that the fast-paced development of the Emirate and the associated rapid demand growth for water, electricity and sewerage services has created significant pressure on the sector over the years. The Bureau also proposed more direct options for smoothing the MAR profile over future years by using:

2.42 X-factors; and

2.43 extended asset-life assumptions for new investments, for the price control purposes.

Responses

2.44 ADWEA group agreed that there is potential benefit from better aligning the MAR with the actual timing and quantum of costs. Therefore, it welcomed initiatives such as more frequent capex and opex reviews/adjustments, and adjustments to asset lives where they reflect useful economic lives. The group also noted that:

(a) In relation to MAR profiling:

(i) The cost smoothing mechanism should reflect the actual revenue/costs experienced. The proposed profiling, implying a total loss for the sector of AED 1.4 billion in 2021 (suggested in RC1 draft proposals), is flawed and without any apparent benefit to the sector or its customers.

(ii) The X-factor was an economic signal of efficiency gains within the CPI-X regulation. ADWEA group proposed that the Bureau maintains an

appropriate economic signal by limiting the X-factor to a maximum of the realistically achievable annual efficiency gains (over and above those expected for the economy as a whole), and not misleading other stakeholders that there are considerable and on-going efficiency improvements. It did not accept applying an X-factor that leads to negative revenue in any period. Particularly, it did not accept the proposed linear smoothing with X set to 25, and suggested keeping the X-factor at zero.

(iii) Agreeing with clarification in the draft proposals that the Bureau is not responsible for setting tariffs, and that this is a requirement for the distribution companies under Licence Condition 32, ADWEA group requested the Bureau to stop engaging with the Government on this topic without involving the distribution companies.

(b) With regards to asset life assumptions for price controls:

(i) Agreeing that a focus on technical lives is appropriate, and should be the basis for changes to the regulatory and financial lives, the group considered it a good practice to harmonise all three lives while they could be different. Any changes in asset lives should be both technically justified and financially beneficial to Abu Dhabi.

(ii) ADWEA group claimed that the sector rejected the Bureau's consultant interim and draft reports and the assessments were incomplete in a number of material respects. It is unclear how work already committed will be addressed should asset-life extension be adopted – in particular how to change current asset specifications without disruption to the capital programme. There are divergent views between the asset lives proposed and those the group considered reasonable. For these reasons, ADWEA group considered that the work undertaken in the draft report is insufficient and does not adequately demonstrate that extending the asset lives is either financially or technically desirable.

(iii) The current regulatory asset life adopted by the Bureau is 30 years, but the asset lives adopted by the sector and detailed in the useful life policy provided to the consultant were, on average, 40 years. In the absence of compelling arguments for change, the current asset lives should remain unchanged. The group offered its availability to assist in further analysis to address the shortcomings identified in its response.

(iv) ADWEA group also provided further observations covering aspects such as operating environment, asset inter-relationships, water pipelines, storage tanks, water pumps, benchmarking, inconsistencies, operating costs, technical advances and obsolescence, asset life calculations and financial impacts.

2.45 ADSSC welcomed smoothing the MAR, but noted that it should reflect investment profiles and not affect existing planned projects already being developed. It added that the use of X factors raises concern as the current application neither produces results nor

drives efficiency – the market and political environment make it unviable and unfair. ADSSC considered that asset life extension is not a fair method for smoothing the MAR, and the life of any asset should be agreed and kept consistent.

Assessment

2.46 We note the support for better alignment of the MAR with the actual costs, and for the Bureau's proposed flexibility with the proposed reviews of capex and opex. Our assessment of ADWEA's specific comments is as follows:

(a) In relation to the responses from ADWEA group on MAR profiling:

(i) As requested by licensees in their responses, and proposed in our previous RC1 consultation papers, the MAR was profiled on a revenue neutral basis in net present value terms over the RC1 period. Given that some respondents indicated clearly that they had no objections if this approach was followed, we do not understand the change in position given ADWEA group has not provided any justification. Furthermore, we are surprised that the group is concerned with a possible loss of AED 1.4 billion in the final year of RC1 (as suggested in the RC1 draft proposals, but no longer the case in final proposals), but remained silent on the additional profit of AED 2.6 billion – compared with a non-profiled MAR – that the group would receive in the first year of RC1 (under the RC1 draft proposals). In profiling the MAR, we considered a number of different factors, starting with the timing and actual level of costs, the impact on profitability, total sector costs (particularly the impact of nuclear costs), and stability of end-user tariffs. While profitability is important, it is not and should not be the only factor to consider when profiling the MAR, particularly when the sector companies have earned excessive profits during the PC4 and PC5 periods due to significant underspending against capex allowances. Nonetheless, given the responses obtained and considering other changes made in these final proposals, we have reviewed our proposals to limit the application of X-factor only to the electricity business and make sure the profiled MAR will not cause significant deficits in any company and/or business over the RC1 period. We consider that our MAR profiling proposals provide benefits to the end-users via final tariff stability, without any financial detriment to the network companies.

(ii) We note the responses about the efficiency and economic signals through the X-factor. However, in the CPI-X framework applied in Abu Dhabi, the X-factor is exclusively a profiling factor, unrelated with efficiency – this has been the case since the start of price regulation in the Abu Dhabi sector, and explicitly clarified in the previous price control reviews. We note that the overall framework embeds efficiency via the opex and capex reviews conducted as part of setting the price controls. Nonetheless, we have also given due attention to the considerations (including profitability of licensees in each year of the RC1 period)

identified by ADWEA group while calibrating/limiting the X-factor in these final proposals. For further details, refer to Section 7.

(iii) In relation to the determination of subsidised customer tariffs, we note that ADWEA group has now understood that the Bureau's role is only one of support, and it is the Government who sets the tariff. Importantly, it is both incorrect and misleading for ADWEA group to indicate that we have dealt with the Government on this matter without involving the distribution companies. On the contrary, we have engaged extensively with the distribution companies on this matter and have workgroups to assess the effect of tariffs proposals. Going forward, we expect that the distribution companies will be able to respond even more comprehensively to the requirements in this area. We also find ADWEA's response to RC1 contradictory to (i) ADWEA's position at the Director General level meeting on 7 September 2017, where ADWEA agreed / supported the Bureau to submit a consolidated analysis / proposal on customer tariffs to the Government, and (ii) ADDC's letter dated 30 August 2017 and AADC's letter dated 7 September 2017, extending their no objection for the Bureau to submit such proposal / analysis to the Government.

(b) Regarding ADWEA group's response on the asset lives assumption for price controls:

(i) We welcome the confirmation of the approach followed by our consultants to focus on technical lives. We note the group's preference for harmonising technical, financial and regulatory lives, and its suggestion that this is a good practice. We highlight that, as set out in the group's own response, the sector financial accounts include average statutory asset lives of 40 years, while the regulatory asset lives are currently 30 years. We also note the group's recommendation to continue with regulatory asset lives unchanged. We agree that technical, financial and regulatory lives can be different – and understand that this is normal in many developed jurisdictions. From the regulatory perspective, the most important driver in the asset lives recommendation is to make sure inter-generational costs and benefits are appropriately accounted for and balanced with financeability of the sector. The best way for meeting this objective is for asset lives to best-match actual asset lives – this was the focus of our consultant's work on this workstream. ADWEA group's response appears to be clear that the current regulatory asset life assumptions differ from the actual asset lives, but retains the view that these assumptions should remain unchanged.

(ii) It is incorrect to indicate that the sector has rejected our consultant's interim and draft reports. There was no such statement provided in previous responses to the consultant's reports. Furthermore, such an assessment is unwarranted, given the intention was to develop the work by engaging with the sector and receiving feedback. For example, we note that the sector provided strong feedback about the need for technical input when responding to the consultant's interim report on asset life

assumptions. The consultant then addressed this with technical visits and meetings with the companies, and documented these in the draft report. In relation to the existing capital programmes implementation during RC1, we note that the draft report and the consultant's presentation were very clear that the change in regulatory asset lives assumptions is based on the existing capabilities and practices – in terms of asset specification, design and construction. As such, no changes are necessary in the companies' practices, and, specifically, no changes in asset specifications for the capital program planned for RC1. We note that, to inform the asset categorisation and the asset life assumptions, the consultant did extensive benchmarking as far back as the interim report. This benchmarking work was reviewed and verified by the sector, and following comments received from the sector, further improved by the consultant in the draft report. Therefore, we were surprised in June 2017, just days before the consultant provided the final report, ADWEA presented its own, new benchmark exercise to challenge the previous results. We note that the benchmarking conducted by the consultants was independent, reviewed and commented on by the sector. It was then fully documented in at least three reports over the last year. While we have requested the consultant considers this belated evidence, we note that the sector has not reviewed ADWEA's report, and that the information therein does not appear to allow its full verification. In any case, the consultant considered this evidence and provided its assessment in an addendum to the final report, where it provided further clarifications and indicated that no significant new information and/or data was submitted by the sector/ADWEA. The consultant therefore maintained unchanged the final report recommendations on asset life assumptions. Section 6 discusses in further detail the asset life assumptions.

(iii) We welcome ADWEA group's availability to assist with further asset life analysis, which we will benefit from during the next price control review for any further extension in asset life assumptions, as per the consultant's final report recommendation. However, given the consultant's work and the sector's engagement over the last year, we find no support for the group's assertion that the consultant's report does not adequately demonstrate that extending the asset lives is either financially or technically desirable. In particular, we note both the extensive information included in the consultant's report and ADWEA group's response identifying the difference between the existing regulatory asset life assumption and the average assumption used for the sector's statutory financial accounts.

(iv) Finally, we note ADWEA group's additional comments from 11 June 2017. The consultant considered these along with the sector's additional evidence and addressed all the comments in the final report. Nonetheless, we note that the sector was given substantial time to consider and provide feedback to the consultant's draft report, with views requested by 3 April 2017 – the latest comments from the group were

more than two months late. We also note that many of those comments refer to items already covered in the consultant's interim report – which the sector had the opportunity to review and comment on during November 2017. Other areas were even covered in the consultant's inception report of August 2016 (such as asset categories). We note ADWEA group's repeatedly-raised suggestion that the result is more important than the timetable. However, given that the consultant has asked repeatedly for information and engaged extensively with all the companies over the last year, we are unclear how ADWEA group believes responses that are over two months late (or in many years a year late) will help achieve a better and more robust end-result. While the group stated support for the consultant's work, in June 2017 comments were provided on items where information was sought in August 2016, and hence do not appear to substantiate the group's stated support.

2.47 We welcome ADSSC support for smoothing the MAR, and, as stated above, we agree that one key element for smoothing the MAR is to link it closely to the time and level of sector costs. That said, it is also important to consider also other factors, such as end-user price stability. We reiterate that the X-factor in the Abu Dhabi price control framework is not an efficiency assumption, but rather a MAR profiling factor. Finally, we consider that while asset life extension may help smooth the MAR, in the long term the key objective of this work is to balance the sector costs and benefits across end-users over time and to align price control assumptions with the activities observed in practice. The fact this review uses it as a smoothing element is a result of regulatory asset life assumptions having been underestimated for some time – as the results of the consultant's work shows.

Final proposals

2.48 In view of the above, we retain the use of X-factors in the final proposals to appropriately profile the MAR during the RC1 period, but limit the size of X-factors as much as possible to ensure profitability of licensees in each year of the RC1 period.

2.49 We have adopted the consultant's final report recommendation for extended asset life assumptions for new investments, for price control purposes (see Section 6).

Sustainability

Draft proposals

2.50 In the previous RC1 consultation papers, we indicated that greater transparency is required from the sector on costs and level of efficiency. This is driven by the rapid development of the Emirate, the increasing demand, investment and overall sector costs, and customer tariff reforms.

2.51 To enhance the sector's transparency and sustainability, we maintained in the draft proposals the need to strengthen the regulatory framework and related arrangements in areas such as ADWEA recharge, tankering services, distribution and supply of recycled water, wastewater informative billing, companies' financial strength and DSM.

Responses

2.52 ADWEA group responded that there is little, if any, benefit available from changing the regulatory framework in several of the listed areas listed and that an increased regulatory burden was likely. ADSSC, on the other hand, supported our call for greater transparency and sustainability, and welcomed further developments in these areas. ADWEA group also offered specific comments as follows:

(a) The information published in the Bureau's annual report is limited and not sufficient to give meaningful transparency. Nonetheless, ADWEA proposed obtaining an annual external report from an audit firm to confirm all ADWEA recharges are fair value.

(b) ADWEA group agreed in principle to performance incentives. However, it noted, among other things, that these should be under the companies' remit and control, should include reasonable incentive levels and should minimise the regulatory burden. It suggested that the total potential impact of the combined incentives should be capped and incentives should be proportional to the actual annual profit. Accordingly, it suggested a total cap on all agreed financial incentives in any one year of +/- 3% of total profit (defined as net income recorded in the SBA of the relevant year for the product). In addition, the group did not support penalty-only incentives, and reserved the right to reject all penalties if it is not satisfied with the overall level of RC1 funding.

(c) In relation to TUoS and DUoS charges, ADWEA group explained that the use of uniform charges for all customers does not reflect the difference in supply costs between customer segments. It welcomed working constructively with the Bureau to formulate more granular, and therefore reflective, figures.

(d) ADWEA group acknowledged the Bureau's concerns about DSM, but did not accept that the network companies created obstacles to progress. It highlighted that the sector companies have little control over the critical demand management factors and have no licence obligations regarding DSM. It therefore encouraged the Bureau – which it believes has no authority in new or unregulated matters – to engage constructively with the sector to determine both the commitments the sector agrees are appropriate and the conditions the sector will require before agreeing. Finally, the group highlighted that the draft proposals would disrupt the effectiveness of DSM plans, as it would artificially reduce the unit MAR, and the cost-reflective tariff.

Assessment

2.53 We welcome the support from ADSSC to our proposals to enhance transparency and sustainability in the sector. In relation to the specific comments received from ADWEA group:

(a) As discussed in the draft proposals, the network companies are required by their licences and Regulatory Accounting Guidelines (RAGs) to ensure fair valuation of services provided by ADWEA or its affiliates. We continue to work with licensees and ADWEA to ensure that these requirements are met. In this sense, we consider the group's suggestion for an external audit report about the fairness of

ADWEA's recharges to be a positive step in the right direction. In any case, we note that such a report must provide details and justification for its conclusions, including market assessment or benchmarking of valuation of the services by a third party, rather than a simple letter stating the recharges' fairness.

(b) We welcome ADWEA group's general support for performance incentives, and note that:

(i) The design of our proposals considers how to minimise the regulatory reporting burden, balanced against the needs to monitor and incentivise performance. With this in mind, we also propose reputational incentives to both lessen the financial burden and track important areas of business performance. On this basis, we have given due consideration to the sector responses to our draft proposals on incentives, and have decided to withdraw the system minutes lost, the business continuity management (BCM) and the health, safety, and environment (HSE) incentives in these final proposals.

(ii) We believe that all the areas for incentives included in the RC1proposals are under the control of the licensees. This includes DSM, where we believe the distribution companies have a direct role in effecting consumption savings by end-users.

(iii) In relation to the financial impact of the incentives, each incentive is already capped at 0.5% of the annual MAR, which also effectively caps the combined effect of the incentives. However, we do not agree that the incentive cap should be based on profits. Importantly, we do not regulate the companies' profits, but only their revenues. Therefore, the financial cap should only be set with reference to revenue. In any case, considering the concern of ADWEA group with the overall impact of financial incentives, our final proposal is to cap the combined financial impact of incentives to +/- 4% of the MAR. We note that this arrangement already existed with PC3, which also had the same overall cap on incentives, albeit there were slightly fewer incentives during the PC3 period.

(iv) Finally, we note the concerns about penalty-only incentives. Although, as explained in previous consultation papers, this type of incentives may have an important role in very specific areas (such as statutory requirements where performance has proved volatile over time), our final proposal is to maintain in the RC1 period incentives which provide both for a financial bonus and penalty. Incentives are further discussed in Section 8 and Annexes C-G.

(c) In relation to TUoS and DUoS charges, we welcome ADWEA group's offer to work constructively to formulate more granular figures. We are open to discuss with the network companies how the methodologies and processes can improve, and expect that the companies will have all the detailed costs for accurately allocating and estimating the cost-to-serve any customer group. We encourage the distribution companies to develop and propose appropriate changes to MTI

statement, which should provide another opportunity to address these matters. For avoidance of doubt, the total costs or revenues recovered under the TUoS and DUoS should remain capped by the relevant MARs and regulatory framework.

(d) We recognise that, ultimately, demand side response rest with end-users. However, the distribution companies can lead the DSM initiatives and influence the outcome significantly. In our view, well designed and tailored DSM programmes and initiatives will be effective in driving end-user consumption savings. By contrast, a lack of DSM initiatives, or those that are poorly-designed and poorly-implemented, will have little or no effect in saving consumption.

(e) In this respect, as holders of the direct relationship with end-users, the distribution companies' role is critical for promoting and achieving successful DSM implementation. As this will translate into consumption savings, our proposed incentive is simply a mechanism to motivate the distribution companies to perform when designing and delivering DSM. The group's view that we have no authority or engagement in new or unregulated matters ignores the regulatory framework on DSM introduced through PC4 and, more prominently, PC5 on the distribution companies request and acceptance. Yet, this did not prevent the distribution companies' and ADWEA slow progress on DSM. Moreover, we have worked extensively over the four years to facilitate the delivery of this important initiative, especially our attempt to clarify the regulatory framework by proposing a DSM licence modification. The fact that the group now indicates that there is no licence obligation on DSM, despite our effort and engagement, strongly suggests that the group has done very little to be part of the solution for what is an important Government objective. Finally, we note that:

(i) the RC1 proposals represent no artificial reduction of tariffs in the sector, but rather reflect the sector's costs and forecast for the RC1 period; and

(ii) when network costs are combined with those from other parts of the sector value-chain, there is unlikely, over the RC1 period, to be any significant drop expected in the cost-reflective tariffs for customers.

Final proposals

2.54 The RC1 final proposals look to enhance transparency and sustainability of the sector, by to strengthening the regulatory framework and related arrangements for areas such as ADWEA recharge, tankering services, distribution and supply of recycled water, wastewater informative billing, companies' financial strength and DSM.

Customer service

Draft proposals

2.55 As customer service is expected to be highly significant over the next price control period, our draft proposals included specific incentives, with targets and KPIs, for monitoring customer services activities and outputs in the sector. We also proposed that,

during the RC1 period, we would continue reviewing and considering how the economic regulatory framework can facilitate and improve the way in which companies provide their services to end-users.

Responses

2.56 ADWEA group did not comment on this strategic objective. ADSSC indicated that it has taken steps to align with existing practices for the water and electricity sector. However, it noted that new incentives need careful consideration about the nature of services required and the cultural requirements in Abu Dhabi.

Assessment

2.57 We welcome ADSSC initiative to align with the practices for water and electricity, to the extent that these may facilitate the customers' experiences with the utilities services provided by the sector. We note ADSSC's concern about introducing new incentives, and have looked at developing customer services incentives that are relevant to the sector and to end-users in Abu Dhabi.

Final proposals

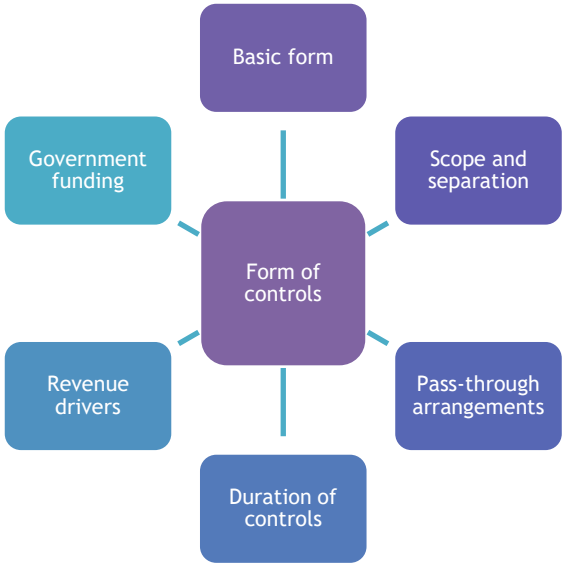
2.58 For monitoring customer services activities and outputs in the sector, we propose specific incentives with targets and KPIs, as described in Section 8. During the RC1 period we will continue reviewing and considering how the economic regulatory framework can facilitate and improve the way in which companies provide their services to end-users.

3. Form of controls

Introduction

3.1 The Bureau's earlier consultation papers set out the key issues that should be considered in designing the RC1 controls, as summarised in the figure below:

Figure 3.1 – Form of new controls



3.2 Price controls have various features designed to balance the advantages of providing efficiency incentives against the disadvantages of placing undue risks on licensees. For instance, each price control:

(a) includes cost pass-through terms allowing the recovery of costs over which the licensees have limited or no control;

(b) is set for a fixed number of years, allowing licensees to retain the benefits of efficiency savings for a number of years, before a medium-term review to take account of unexpected developments and cost changes; and

(c) defines the scope of activities subject to price control regulation, ensuring that licensees have clarity as to whether a business activity is subject to regulation or to normal commercial considerations and risks.

3.3 The Bureau's earlier consultation papers and draft proposals invited stakeholders to comment on whether the current form of the price controls remains appropriate and whether any changes are required to address the strategic issues discussed in Section 2.

3.4 This Section 3 summarises and assesses the stakeholders' responses to the draft proposals and sets out the Bureau's final proposals on the form of controls for RC1.

Basic form of price control

Draft proposals

3.5 The draft proposals stated that, given the licensees' general support for the existing regime, the core elements of the existing price control remain appropriate. These include encouraging efficiency and providing certainty, which reflect our experience to date and align with our statutory duties. Accordingly, we retained our proposal to continue with the CPI-X revenue cap form of price controls for RC1.

Responses

3.6 ADWEA group and ADSSC did not object to the continuation of the current CPI-X form of controls. However, ADWEA group shared the following comments:

(a) ADWEA group acknowledged the Bureau's justification for a written consultation process due to transparency and legal requirements but supported by meetings via workgroups as per ADWEA group's earlier suggestion. However, its view was that undertaking the majority of the consultation process in written format is both inefficient and ineffective. Given the time required to resolve significant areas of disagreement via working group meetings, It recommended a single, effective meeting as long as the final conclusion and justification are appropriately documented.

(b) The group considered that the proposals are often driven by the Bureau in meetings, with limited or no support or consultation from the licensees.

(c) ADWEA group stated that it is unable to accept the Bureau's final report on PC5 ex-post capex review and stressed that it should also be reimbursed the difference between its actual and efficient capex since 1999.

Assessment

3.7 The Bureau welcomes the stakeholders' support for the current form of controls. Our assessment of the specific issues raised by ADWEA group is summarised below:

(a) We note ADWEA group's acknowledgement of the necessity for a written consultation process, as highlighted by the Bureau in the RC1 draft proposals. While we have extensive engagements with the licensees on RC1 for now over 2 years, we also accepted the group's suggestion for a single, effective meeting to agree final considerations and held this meeting at a senior management level on 20 June 2017 (continued on 3 July 2017). For details on this meeting and various other meetings / engagements, refer to Sections 1 and 2.

(b) The Bureau took the initiative to hold meetings with stakeholders at each stage of consultation. For instance, at the draft proposals stage:

(i) Meeting between the Bureau and ADWEA group's Regulatory Advisory Committee on 22 March 2017: We engaged in detailed discussions related to various RC1 topics and provided further clarification on these topics through an extensive review of the draft minutes of this meeting.

On the group's request, we provided variance and impact analysis in the RC1 draft proposals and such analysis for each business in our presentation on 22 May 2017.

(ii) Presentation to the sector on RC1 draft proposals on 22 May 2017: No questions or requests for explanation were raised by ADWEA group at the presentation made by the Bureau, except for a few queries from AADC (in addition to those from ADSSC), despite the Bureau's offer to answer or discuss any questions or issues on RC1 draft proposals.

(iii) Director General level meeting on 20 June 2017 (continued on 3 July 2017): The Bureau opened a dialogue in which it offered explanations and clarifications in relation to ADWEA group's major concerns and queries and offered flexibility to address concerns except for a few ones in view of the statutory duties. This meeting was followed by the Bureau's updated proposals on 17 August 2017, 17 October 2017 and 26 October 2017 to address ADWEA group's key concerns and document the senior management level agreement before proceeding to publish the RC1 final proposals.

(c) ADWEA's concerns on PC5 ex-post capex review and suggestion for refund of previously disallowed, inefficient capex are discussed in Sections 2 and 5.

Final proposals

3.8 In view of the above, we retain our proposal to continue with the CPI-X revenue cap form of price controls for RC1.

Scope and separation of controls

Draft proposals

3.9 Currently, there are separate price controls for the water and electricity businesses of AADC, ADDC and TRANSCO. No such separation exists for either ADSSC's sewerage, wastewater treatment and disposal businesses or the distribution companies' distribution and supply businesses.

3.10 In the draft proposals, we suggested retaining the current separation of price controls for all licensees with the following specific provisions:

(a) The Bureau will consider further separation in the next price controls, if sufficient and robust information specifically cost allocation and justification is provided;

(b) At present, a separate control is justified for the distribution and supply of recycled water by AADC and ADDC; and

(c) The scope of existing price controls for licensees should be enhanced for RC1 by allowing appropriate opex allowances for:

(i) AADC, ADDC and ADSSC: management of tankering services for water, wastewater and non-drinking water (as part of the price controls for AADC and ADDC water businesses and ADSSC wastewater business);

(ii) ADSSC: informative billing (as part of the price controls for ADSSC wastewater business); and

(iii) TRANSCO: Liwa aquifer as a strategic storage (as part of the price controls for TRANSCO water business).

3.11 We also explained how various new activities / businesses of each company are treated under the regulatory framework, as summarised in the table below:

Table 3.1: Activities and the regulatory arrangement

Activity	Regulated	Non-regulated	Separate price control	Opex allowance in price controls
Billing for municipality fees - by AADC and ADDC		✓	×	×
Billing for wastewater tariffs - by AADC and ADDC		✓	×	×
Billing for wastewater tariffs - for ADSSC	✓		×	✓
Distribution and supply of recycled water - by AADC and ADDC	✓		✓	✓
Liwa aquifer reservoir and storage - by TRANSCO	✓		×	✓
Management of tankering - by AADC, ADDC & ADSSC	✓		×	×

Responses

3.12 ADWEA group and ADSSC are broadly satisfied with the existing arrangements on the scope and separation of price controls. Further, ADWEA group supported the Bureau's suggestion to exclude the distribution and supply of recycled water from this price control consultation and requested separate proposals on this.

Assessment

3.13 We welcome the respondents' support for the draft proposals on the scope and separation of controls. The Bureau also welcomes the distribution companies' initial draft application in May and June 2017 (which were further revised and clarified subsequently) for the recycled water distribution and supply licences. However, we will be able to develop our proposals on any new separate price controls for the recycled water only upon the receipt of the business plans as well as detailed information on the new and transferred assets, staffing plan, and opex, requested from the distribution companies.

Final proposals

3.14 In these final proposals, we have retained the current separation of price controls for all companies and enhanced the scope of existing price controls for companies by allowing appropriate opex allowances as set out in paragraph 3.10 (c) above.

3.15 During the RC1 period, we will also develop our proposals on new, separate price controls for recycled water distribution and supply businesses once all the requested information is received from the distribution companies. This may also require suitable

adjustments to price controls for ADSSC if assets and resources are transferred from ADSSC to the distribution companies.

Cost pass-through arrangements

Draft proposals

3.16 The Bureau suggested retaining the existing pass–through cost arrangements and adding a new term "L" in the MAR formula for each licensee to treat all the Bureau's licence fees on a pass-through basis (to promote consolidation, to increase transparency and to avoid the need for issuing annual derogations).

Table 3.2: Pass-through costs – draft / final proposals

Company	Pass-through items
AADC/ADDC	Bulk power and water purchases Transmission charges
TRANSCO	Purchase of ancillary services related to electricity business
ADSSC	Payments under the long-term Sewage Treatment Agreements (STAs)
All companies	Bureau's licence fees

Responses

3.17 ADWEA group and ADSSC broadly supported the existing pass-through costs arrangements and provided the following specific comments:

(a) In relation to the Bureau's clarification on the subsidy payment reforms proposed as per the Government directives, ADWEA group expressed its disappointment regarding the Bureau's view that both AADC and ADDC should not receive Government subsidy for avoidable losses while considerable benchmarks are provided by ADWEA group to show that both companies' avoidable losses compare favourably with those in other jurisdictions. The group highlighted the productive and meaningful discussions it had with DoF in relation to defining the level of acceptable avoidable losses. The group stated that DoF has agreed not to carry out any subsidy deductions as long as the group meets its non-revenue water targets. Accordingly, ADWEA group sought our confirmation that since the non-revenue water losses incentive has been proposed in the draft proposals, the Bureau accepted the group's position on the subsidy payment reforms.

(b) The group argued that it remains unclear how the introduction of the new L-term in the MAR formula will increase transparency regarding our licence fees. The group considered that our publicly available audited accounts offer limited information and suggested we should strive for greater disclosure and share the scope and results of our cost benchmarking.

(c) ADSSC argued that cost of outsourced O&M services competitively tendered to the private operators under the performance-related contracts and, in future,

potential payments to the distribution companies for billing services should be treated on a pass-through basis under price controls. ADSSC also sought a periodic assessment to ensure that the Bureau's fees and charges are fair and representative.

Assessment

3.18 We note the stakeholders' general support to the existing pass-through arrangements. Our assessment of their other comments is as follows:

(a) The Bureau was not made aware of any discussions that ADWEA group had with DoF in relation to avoidable losses, subsidy reforms and cost reflective tariffs other than the group's response in June 2017 and subsequent meetings with ADWEA and DoF in August 2017 (see Sections 1 and 2). This indicates a continued lack of transparency from ADWEA group on funding arrangements. We are also not aware of considerable efforts of the group on providing benchmarks that would justify the reasonableness of the distribution companies' avoidable losses. In any case, we maintain that it is not appropriate for utility companies to bill and collect revenue or subsidy for inefficiency such as avoidable losses. The Bureau proposes to discuss subsidy payment reforms and distribution companies' benchmarking of losses separately to RC1.

(b) Our accounts - audited annually by an independent accounting firm - and scale of charges and services (which sets out the approach to licence fee calculation) are made publicly available on our website and the latest relate to 2016. This ensures the full transparency and acts as the best practice that should be considered by other entities for adoption. ADWEA group did not provide any basis or justification for its request and role to review the scope and results of the Bureau's cost benchmarking that was submitted to the Government. As explained in our earlier RC1 consultation papers and draft proposals, the addition of the new L-term in the MAR formula allows for the Bureau's licence fee to be treated on a pass through basis in full in comparison with the current practice in which the regular fees are financed via opex allowances and the one-off project-specific fees are allowed a pass-through treatment via derogations. Therefore, the new L-term formalises and simplifies this treatment and is in line with best practice for utility regulation in other jurisdictions.

(c) Whilst we agree with ADSSC's view that outsourced O&M services should be competitively procured, such an arrangement does not automatically justify pass-through of the costs under MAR without any review. Based on our opex consultant's final report, we note that these O&M contracts are procured through a tender process and are also periodically retendered. This should provide an opportunity for ADSSC to achieve and deliver the proposed efficiency savings. However, the competitiveness and reasonableness of these costs were for ADSSC to demonstrate to our opex consultant for their inclusion in the RC1 opex projections. We note that ADSSC did not explain the basis of or the regulatory precedence for its "independent" assessment of the costs incurred by the independent regulator and audited by an independent auditor while these costs are treated on a pass-through basis for the licensees.

Final proposals

3.19 In these final proposals, we continue with our proposal to:

(a) retain the existing cost pass-through arrangements; and

(b) add a new term "L" in the MAR formula for each licensee to treat all the Bureau's licence fees on a pass-through basis.

Duration of controls

Draft proposals

3.20 Taking account of the stakeholders' earlier suggestions and the need for efficiency incentives and a reduction in the exposure to potential unanticipated outcomes, the Bureau proposed a four-year duration (2018-2021) for the RC1 price controls.

Figure 3.2: Multi-year price controls for network companies

PC1	PC2	PC3	PC4	PC5	RC1
1999-2002	2003-2005	2006-2009	2010-2013	2014-2017	2018 onwards

Responses

3.21 No respondents commented further on the proposed duration of controls.

Assessment

3.22 While we did not receive any further comments, we note the stakeholders' earlier suggestion or support for the four-year duration of RC1 controls and the consistency with the practice to date.

3.23 In correspondence following the RC1 draft proposals, ADWEA raised an issue in relation to the continuation or roll-over of PC5 beyond the agreed duration of 2014-2017 since the RC1 proposals are not accepted. We have highlighted in our response to ADWEA that the mechanism for any roll-over or extension of price controls to any future year for any licensee will need to be directed or approved by the Bureau keeping in view the precedents in the sector on such roll-over and our statutory duties to protect various stakeholders, particularly the customers. To fully address this issue and avoid any further confusion in the future, we propose to amend the charge restriction conditions schedules of network companies' licences to clarify that the MAR and the price control framework set out in the licences will apply only to 2018-2021 and, beyond this period the Bureau's proposals or directive will apply unless the licences are modified or agreed otherwise.

Final proposals

3.24 In light of the overall agreement, we retain the proposal to set the RC1 price controls for four years (2018-2021), with regular capex reviews and annual adjustments for specific opex items (as discussed in Sections 4 and 5). We also propose to modify the licences to

apply the Bureau's proposals or directive on price controls and MAR beyond 2021 unless the licences are modified or agreed otherwise.

Revenue drivers

Draft proposals

3.25 As explained in the Bureau's earlier consultation papers, the current MAR formula involves a fixed term and one or two variable terms for outputs- based revenue drivers. These fixed and variable elements are calibrated using an 80:20 weight ratio.

3.26 Given concerns about implications of using outputs-based revenue drivers (such as undue MAR variations and conflicts with DSM and sustainability), we proposed to structure the MAR formula for each company with a fixed term and only one variable term using an 85:15 weight ratio for calibrating the RC1 controls, as summarised below:

Table 3.3: Revenue-drivers – draft / final proposals

Company	Revenue-driver	Weight in MAR formula
AADC/ADDC (both water & electricity)	Fixed term	85%
	Number of customer accounts	15%
TRANSCO (both water & electricity)	Fixed term	85%
	Metered units transmitted (irrespective of MDEC compliance) – changed to total metered and estimated units transmitted in final proposals	15%
ADSSC	Fixed term	85%
	Annual flow at treatment plants	15%

Responses

3.27 ADWEA group agreed to the removal of a unit based revenue driver for the distribution companies as it is counter to the objective of the group's DSM initiative and supported the use of units transmitted revenue driver for TRANSCO and customer number revenue drivers for the distribution companies.

Assessment

3.28 The Bureau welcomes the stakeholders' general support for the draft proposals on revenue drivers and their weights in the MAR formulas.

Final proposals

3.29 In view of the support from the licensees, we retain the structure of the MAR formula for each licensee as described in the draft proposals (see **Table 3.3**), with the change in revenue driver for TRANSCO to total metered and estimated units transmitted as discussed later in this section.

Structure of RC1 controls

3.30 In light of the above and discussions in Sections 2, 6, and 7, the general structure of the MAR for each business for any year "t" of the RC1 period as follows:

$$MAR_t = \text{Pass through costs}_t + a_{t-1} + (b_t \times \text{Revenue driver}_t) + Q_t + L_t - K_t$$

where:

(a) "a_t" and "b_t" are the notified values for the year "t". For 2018, these values are determined by the Bureau through price control calculations set out in these final proposals. For subsequent years, values of "a_t" and "b_t" are indexed against the UAE Consumer Price Index (CPI) less X factor as set out in the following paragraph. In contrast to the draft proposals, we have now accepted the stakeholders' suggestion for the UAE CPI indexation of the value of "a" in full without any distinction between depreciation and non-depreciation related allowances (see Sections 2, 6 and 7).

(b) "Q_t", "L_t", and "K_t" are the performance incentive amount, the Bureau's licence fee, and the correction factor for the year "t", respectively.

3.31 The notified values "a" and "b" will be indexed using the following formulas from year t-1 to year t:

(a) $$a_t = a_{t-1} \times \left(1 + \frac{CPI - X}{100}\right)$$

(b) $$b_t = b_{t-1} \times \left(1 + \frac{CPI - X}{100}\right)$$

3.32 In these final proposals, we have used the following UAE CPI figures where the 2017 CPI figure is an estimate and will be adjusted to an actual figure through the annual indexation formula in the audited PCRs during the RC1 period, as and when this actual figure becomes available.

Table 3.4: UAE CPI and inflation

	2009	2010	2011	2012	2013	2014	2015	2016	2017
UAE CPI	94.34	95.17	96.00	96.64	97.71	100.00	104.07	105.75	108.00
UAE Inflation	1.51%	0.88%	0.88%	0.66%	1.10%	2.35%	4.07%	1.62%	

Source: Federal Competitiveness and Statistics Authority (Base year 2014 = 100). 2017 CPI is based on an assumed CPI value of 108.00.

Price control calculations

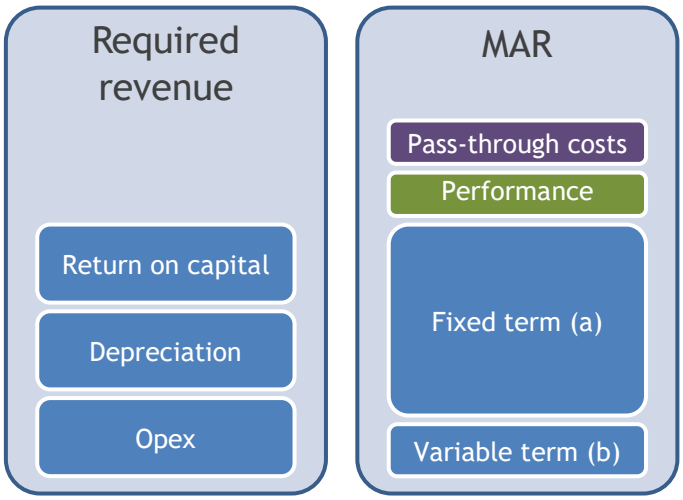
Draft proposals

3.33 In the draft proposals, the Bureau suggested adopting an NPV-based three building-block approach (opex, regulatory depreciation, and return on capital) to price control calculations. This is similar to the approach used for the previous price control reviews, but with two main differences for RC1:

(a) Calculation of the notified value of "a" and "b" terms only (and no value of "c" term, as discussed in the preceding paragraphs); and

(b) Use of a non-zero x-factor to profile the MARs appropriately (as discussed in Sections 2, 6 and 7).

Figure 3.3: Building-blocks of revenue requirement



Responses

3.34 No respondents to the draft proposals commented on the above approach. However, their concerns relating to the lack of inflation indexation of depreciation allowance in the value "a" term have been discussed, addressed and accepted in Sections 2, 6 and 7.

Assessment and final proposals

3.35 In light of the overall agreement, the final proposals are based on the NPV based three building-block approach to price control calculations as adopted in the draft proposals but with inflation indexation of RAV and depreciation (discussed in Sections 2, 6 and 7) - that is, we use the same approach as used in previous price control reviews.

Revenue driver projections

Draft proposals

3.36 In the draft proposals, we adopted the revenue driver projections provided by the four network companies in their latest 2016 Annual Information Submissions (AIS) which have been reviewed by the independent Technical Assessor (TA).

Responses

3.37 ADWEA group suggested adopting total (metered and estimated) units transmitted revenue driver for TRANSCO as well as the estimation method permitted under MDEC for such units. The group also suggested no further review of or adjustment to the revenue driver projections since they are based on ADWEC's forecasts and verified by the TA.

Assessment and final proposals

3.38 Based on ADWEA group's suggestion, we propose redefining TRANSCO's metered units transmitted revenue driver for both water and electricity businesses as total units transmitted to include both metered (whether MDEC or non-MDEC compliant) and estimated units provided the estimation method is agreed with the Bureau specifically for price control purposes. Once agreed, such a method can become part of a RIG issued by the Bureau, if necessary. We do not propose making changes to the definitions of other revenue drivers and retain them as set out in the draft proposals and the current licences.

3.39 Accordingly, the following table sets out the revenue driver projections we have adopted in these final proposals. These projections are the same for all revenue drivers as set out in the draft proposals, except in the case of TRANSCO where, as per TRANSCO's suggestion, we have included both metered and estimated units as provided by TRANSCO in its 2016 AIS.

Table 3.5: Revenue driver projections for RC1 – final proposals

			2018	2019	2020	2021
AADC	**Electricity customer accounts**	**Customers**	**150,353**	**153,089**	**155,653**	**158,048**
	Water customer accounts	**Customers**	**91,917**	**94,775**	**97,823**	**101,072**
ADDC	**Electricity customer accounts**	**Customers**	**382,583**	**395,056**	**407,934**	**421,233**
	Water customer accounts	**Customers**	**308,535**	**317,279**	**326,982**	**337,330**
TRANSCO	Electricity metered units transmitted	GWh	83,780	89,033	94,286	99,540
	Electricity non-metered units transmitted (estimated)	GWh	0	0	0	0
	Electricity total units transmitted	**GWh**	**83,780**	**89,033**	**94,286**	**99,540**
	Water metered units transmitted	MIG	284,772	294,988	305,203	315,418
	Water non-metered units transmitted (estimated)	MIG	14,826	14,826	14,826	14,826
	Water total units transmitted	**MIG**	**299,598**	**309,814**	**320,029**	**330,244**
ADSSC	**Annual wastewater flow treated**	**1000 m3**	**422,083**	**450,846**	**481,636**	**511,012**

Source: Network companies' 2016 AIS submissions.
Notes: CAGR stands for compounded average growth rate.

4. Operating expenditure

Introduction

4.1 Operating expenditure or opex (i.e., operating cost excluding depreciation) constitutes one of the three building blocks of a company's required revenue; namely opex, return of capital or depreciation, and return on capital. As opex is one of the main inputs to the price control calculations and essential for the day to day running of the business, it is therefore important to make appropriate allowances for operating costs for these purposes. The Bureau in its draft proposals presented proposed opex allowances for RC1 based on external consultant - Deloitte & Touche M.E. (the 'Bureau's RC1 opex consultant') draft report on RC1 opex projections, developed by employing a hybrid of both a high-level top-down approach and a more detailed bottom-up approach similar to PC5.

4.2 The Bureau's RC1 opex consultant has issued its final opex report in June 2017 that sets out the final recommendations on the opex allowances for RC1, taking account of the companies' comments on draft opex report and further information and justifications for costs provided by the companies. The consultant also presented the final opex report in a workshop with the sector on 6 July 2017. On the companies' request, the Bureau allowed another final opportunity for licensees to provide additional comments and information/justifications to our opex consultant for updates in the final recommendations, if any. The companies provided additional comments on the final opex report and ADWEA shared its consultant's (EY) report providing comments on Deloitte's methodology for setting the allowance. Deloitte reviewed all these comments and issued an addendum to the final report, responding to these comments. This addendum (being issued to ADWEA and licensees with these final proposals) concludes that the companies and ADWEA's consultant did not provide any new information or compelling justification to change Deloitte's recommendations in the final opex report.

4.3 This Section 4 summarises the companies' opex performance over 2010-2016 (as provided in our draft proposals with updates for 2016) and the work already completed by the opex consultant and reported in the consultant's final opex report and addendum. In addition, its provides a high-level assessment of the licensees' main concerns and important issues while discussing the approach to developing opex projections and treatment of certain specific costs (the consultant's final report and addendum to the final report deal with the companies' detailed comments).

Companies' opex performance

4.4 In the RC1 draft proposals, we assessed the companies' opex performance from 2010 to 2015 and observed that the companies' opex increased over this period broadly in line with inflation and growth in the businesses. We have now updated this analysis to take account of actual opex for 2016 reported in the companies' 2016 SBAs (**Figure 4.1**). During 2010-2016, the four companies' aggregate opex increased on average by 2% a year from around AED 2.7 billion per year to AED 3.1 billion per year in nominal terms. The companies, in general, have exceeded the price control opex allowances during the

period 2010-2013. However, they have either met or spent less than the opex allowances set for the three years of PC5 (2014-2016).

4.5 In the earlier consultation papers and draft proposals, we expressed our concerns over:

(a) the distribution companies' high supply business costs compared with the distribution business costs; and

(b) inconsistencies between capitalisation policies used in setting the price control opex allowances and in recording and reporting of these costs in the SBAs.

Figure 4.1: Companies' 2010-2016 actual opex performance (nominal prices)

Source: Companies' 2010-2016 SBAs

Notes: "PC allowance" standards for opex allowance provided under price controls for the company on an aggregate basis, adjusted for PC5 opex adjustments and costs allowed on a pass-through basis via derogations.

4.6 A number of trends can be observed from this analysis (with all figures in nominal prices):

(a) over the period of 2010-2016, AADC's actual opex increased on average by around 2% a year. During this time, AADC did not meet the annual price control opex target except in 2014 and 2016;

(b) ADDC's actual opex increased on average by almost 2% a year over the period of 2010-2016. ADDC did not meet the annual price control opex target during 2010-2013; however, it outperformed the targets during 2014-2016;

(c) TRANSCO's actual opex increased on average by 3% a year over 2010-2016. Broadly, it met the annual price control opex targets over the period of 2011-2016, but marginally missed the 2010 target;

(d) ADSSC's actual opex increased on average by almost 3% a year over 2010-2016. During this time, ADSSC did not meet the annual price control opex target except once in 2015;

(e) staff costs continued to constitute the largest or major part (49% to 72%) of the companies' opex; and

(f) for both AADC and ADDC combined, the share of supply business costs in the total opex gradually decreased from 46% in 2010 to about 40% in 2016.

Approach to opex projections and allowances

Approach to opex projections

4.7 The Bureau's RC1 opex consultant employed the following seven-step methodology, similar to PC5, for developing the RC1 opex projections. This methodology involves using both a high-level top-down approach and a more detailed bottom-up approach that uses various cost and efficiency benchmarks from the sector and elsewhere:

(a) **Step 1** - establish the company's base-level cost from 2016 (the latest audited actual costs) by excluding mainly non-cash items and the cost of discontinuing activities (such as operation and maintenance of street lighting activity transferring from the distribution companies to the Municipalities), one-off costs and non-controllable costs (such as the Bureau's licence fee). This is the **current recurring controllable cash opex (CC)**;

(b) **Step 2** – roll-forward the company's base-level cost from 2016, as derived in step 1 (with 2016 actual UAE National staff training costs also excluded), to the start of RC1 period (i.e., 2018). The opex consultant's final report included a separate allowance for staff training costs of UAE Nationals during RC1. Therefore, the actual 2016 UAE Nationals staff training costs as reported in the 2016 SBAs were stripped out in Step 2 and not included as part of the roll-forward of the company's base level costs from 2016 to 2018;

(c) **Step 3** - starting with the rolled-forward costs from step 2, develop opex projections through to the end of RC1 (i.e., 2018-2021) based on the top-down approach with high-level estimates of both the cost-volume relationship and the expected productivity improvements - **top-down cost projections (TCP)**;

For both steps 2 and 3, similar to PC5, the consultant assumed increases of 0.70% for electricity and 0.85% for both water and wastewater in the corresponding opex for each 1% increase in demand growth. In addition, the consultant assumed real efficiency gains of 3%-4% (PC5: 3%-4%) a year. These assumptions are based on the sector companies' experience over 2010-2016, as well as evidence from other countries. The demand growth is measured in terms of:

(i) TRANSCO – average growth in units transmitted, peak demand and network length;

(ii) AADC and ADDC – average growth in units distributed, customer numbers and network length; and

(iii) ADSSC - average growth in daily flow, customer numbers and network length.

(d) **Step 4** - establish efficient level of base year (i.e. 2016) costs using detailed bottom-up benchmarks for efficient costs - **bottom-up efficient cost (BEC)**;

(e) **Step 5** – starting with efficient level of base year costs from step 4, develop projections of efficient opex to the end of RC1 period based on a detailed bottom-up assessment of costs. This is the **bottom-up efficient cost projection (BECP)**. These projections are based on comparator benchmarks and a bottom-up assessment of the cost-volume relationship using cost drivers for specific costs, while other costs are assumed to be fixed over time. An annual frontier-shift efficiency assumption of 1% per annum is also included in the BECP;

(f) **Step 6** – develop projections of reasonable, controllable opex over the RC1 period. This is done by considering the TCP and BECP and adding any specific opex allowances that results from additional activities (such as VAT, DSM, resource resilience) to both TCP and BECP that were not undertaken in 2016 but are anticipated to occur in RC1. In the case where opex savings can be made, these are subtracted from both the TCP and BECP - for example:

(i) Savings from initiatives that are currently under development such as Strategic Tunnel Enhancement Program (STEP) for ADSSC and digital transformation of customer service for the distribution companies; or

(ii) Savings from consented unlicensed activities that will share some of the distribution companies' existing costs such as billing services for Municipalities undertaken by the distribution companies.

In addition, a transition-path for the company from its expected opex-level at the start of RC1 – based on the TCP from step 3 (including additional allowances/cost savings) – towards the efficient cost-level based on BECP from step 5 (again, including additional opex allowances/cost savings). This is the **proposed cost path (PCP)**.

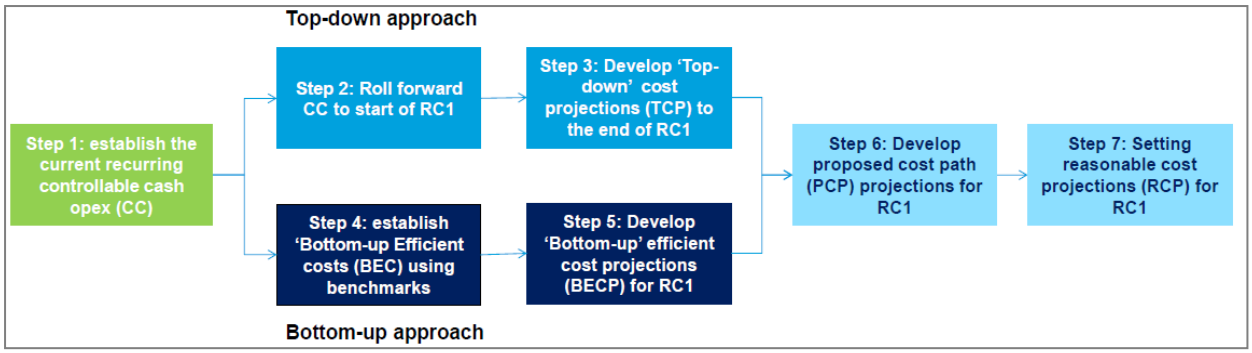
For all companies, the PCP projections have been based on a linear catch-up rate of 15% per annum starting from the second year of RC1. In turn, this will close 45% of the gap between TCP and BECP by the end of RC1 period (2021).

This may require further consideration to reflect the extent to which the 3%-4% per annum real productivity gain may be surpassed; and

(g) **Step 7** – set the projections of reasonable total opex for RC1 by adding non-controllable **opex** to the opex projections from step 6 - termed **reasonable cost projection (RCP)**. For RC1, no additional non-controllable opex has been added, by the consultant, so the PCP is equal to the RCP.

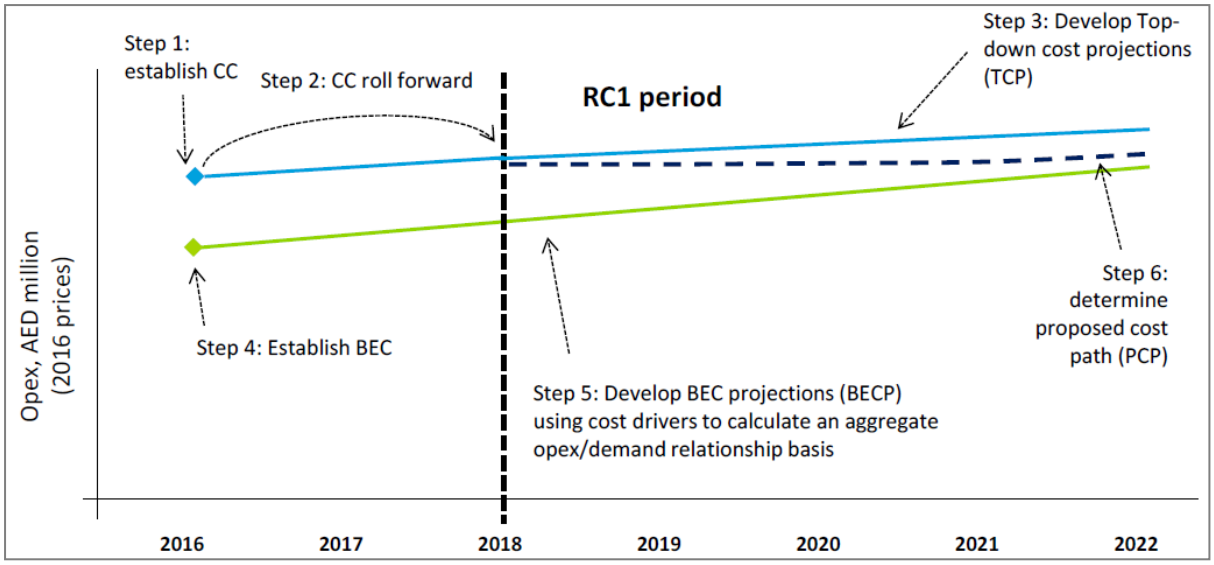
4.8 The opex consultant's methodology is further illustrated in **Figure 4.2** and **Figure 4.3**. The consultant's opex projections use the audited 2016 actual costs as the base-level and are expressed in 2016 prices.

Figure 4.2: Consultant's seven-step methodology to RC1 opex projections



Notes: Deloitte's Draft Report, January 2017

Figure 4.3: Consultant's approach to RC1 opex projections



Source: Deloitte's Final Report, June 2017
Notes: For illustration purposes only and not drawn to scale.

Responses and assessment

4.9 Our consultant's final opex report and addendum addressed ADWEA and licensees' responses in detail. Key issues from these responses are summarised as follows:

(a) Respondents, including ADWEA consultant's (EY) report on opex, raised a number of concerns on our consultant's methodology for opex projections and

use of international benchmarks in assessment of the companies' efficient level of opex. ADWEA consultant's report argued that the network companies are efficient when compared with other companies in MENA region. Further, ADWEA consultant included an econometric analysis on operating expenditure suggesting the use of other methodologies such as data envelopment analysis (DEA);

(b) The respondents expressed concerns on lower amount of allowances recommended in the RC1 draft proposals, particularly for Emiratisation and Nationals training. ADWEA group shared that it was formulating detailed plans for greater attraction, training, development and retention of the UAE National staff, seeking the Bureau's full support in form of additional allowances as provided during PC5. The licensees also highlighted that lower actual opex and resulting savings in recent years were due to Government's short term directions to reduce costs, which cannot be sustained over medium to long term;

(c) For TRANSCO's water pumping and substation costs where metering and billing arrangements do not exist, ADWEA group agreed with our opex consultant's proposal of no opex allowance until these arrangements are put in place. For other sites where AADC and ADDC billed TRANSCO based on 2016 tariff as reflected in TRANSCO's 2016 actual costs, ADWEA group though welcomed additional allowance to reflect tariff increases for 2017 but did not agree that the inflation indexation of opex allowance during the RC1 period alone will fully cover any further tariff increases during such period;

(d) ADWEA group argued that GCCIA costs are externally set and approved by the board of the GCCIA, comprising of all member states representatives including the UAE; therefore, these costs should be allowed under price controls for TRANSCO on a pass-through basis; and

(e) In a meeting on 17 October 2017, ADWEA requested additional allowance for cost of working capital required to implement VAT.

4.10 Our assessment of above issue is as follows:

(a) While ADWEA consultant's report could have provided important value addition to the process, this report was provided to the Bureau without prior engagement, consultation and information, in turn without robust inputs. Such inputs could have been more useful before or at the start of our opex consultant's work and avoided conflicting views from ADWEA group who previously supported the use of same methodology using benchmarks and external consultant, as used in PC5. Nevertheless, we considered this feedback and note that - perhaps constrained by the limited scope and time - ADWEA consultant's report provided undeveloped methodology and statistically failing regression equation as also acknowledged by ADWEA consultant itself. ADWEA consultant proposed a significantly different methodology from the one developed and used by the Bureau for PC5 and RC1 on licensees' demands and with their full support. ADWEA's consultant did not seem to have reviewed the companies' position to date.

(b) It should be noted that the RC1 draft proposals were based on the Bureau consultant's draft opex report which was based on the Licensees' 2015 actual

opex and also did not include allowances for certain costs, pending submission of information and justification from the companies. The Bureau consultant's recommendations in the final opex report (used in these final proposals) are updated to take account of 2016 actual opex and provide higher allowances for aforementioned costs. Further, the Bureau consultant's recommendations on future opex allowances provide sufficient and specific funding for Emiratisation based on the licensees' own assumptions for future Emiratisation rates. Furthermore, our proposed approach to adjust such allowances on an annual basis for the actual Emiratisation achieved provides additional flexibility and incentives for the sector, addressing their concerns.

(c) We appreciate ADWEA group's support on our proposals for water pumping and substation costs where metering and billing arrangements do not exist and we look forward to TRANSCO's coordination with AADC, ADDC and ADWEC to put these arrangements in place during the RC1 period. We agree with ADWEA group that the inflation indexation of opex allowance alone may not fully cover any further tariff increases during RC1 period. Accordingly, relevant component of the network companies' opex allowance will be indexed against the actual tariff increase (net of any inflation indexation) to allow recovery of additional cost impact due to further tariff revisions during the RC1 period through annual opex adjustment mechanism.

(d) We note that the consultant did not include any allowance in the opex projections for GCCIA costs, since TRANSCO did not provide information on GCCIA annual accounts, any dividends that might be paid to ADWEA and invoices paid by TRANSCO for GCCIA costs. If TRANSCO satisfies these requirements during the RC1 period, these costs (net of dividend) will be allowed through annual opex adjustment mechanism.

(e) We note ADWEA's request and will be willing to consider allowance for cost of working capital when analysis and justification is received to robustly support the need and magnitude of such costs. This allowance can be provided through annual opex adjustments, if necessary.

4.11 We would also highlight that:

(a) Acknowledging the limitations of the benchmarking exercise, the Bureau's opex consultant applied the benchmarking results after recognising the differences between comparators and the licensees as well as between the licensees themselves. Given the limitations of this analysis, the benchmarking used by the Bureau's opex consultant has only resulted in adjustments to the base year opex where companies were below the average benchmarks. This is a relatively conservative approach as in many other jurisdictions regulators often compare companies to the top quartile rather than the average. Further, the Bureau's consultant adjusted only approximately half of the efficiency gap in BEC. Finally, the PCP projections, as explained above, close 45% of the gap between TCP and BECP by the end of RC1 period. Notwithstanding its limitations, the benchmarking analysis indicates specific areas where companies may be able to improve, such as enhanced staff productivity and overall staff requirements; and

(b) Our opex consultant reviewed additional comments from ADWEA and network companies on the final opex report and issued an addendum to the final opex report, responding to these comments. This addendum concludes that the companies and ADWEA's consultant did not provide any new information or compelling justification to change Deloitte's recommendations in the final opex report.

Treatment of specific costs

4.12 The Bureau's RC1 opex consultant also proposed, in its final report, various options for the treatment of certain specific costs in its opex projections, as summarised below:

(a) **Emiratisation and training costs** – for each business, the consultant included additional allowances for Emiratisation costs based on the Emiratisation rate assumed in the companies' 2016 AIS forecasts. Further, as the companies have explained the need for training of their UAE National staff, the RC1 opex projections include separate allowances for direct training of Nationals staff.

(b) **Allowance for additional capabilities** – for all network companies, the consultant included a specific opex allowance for ongoing costs associated with value added tax (VAT) activities, expected to be introduced from 2018. The consultant also included a specific opex allowance for the additional organisational activities (such as DSM for AADC and ADDC and resource resilience for critical functions in TRANSCO) based on discussion with the companies.

(c) **Real price effects on staff costs** – the consultant included an additional allowance for real increases in staff costs over the RC1 period in its opex projections assuming a 2% real unit cost increase in staff costs.

(d) **Mega developments** – for AADC, ADDC and ADSSC, the consultant included a specific opex allowance for additional costs arising from the transfer of mega-development infrastructure to the companies, based on discussions with, and data from, the companies.

(e) **Allowance for private tankering services for AADC, ADDC and ADSSC** – the consultant did not include opex allowance for costs of managing private tankering services because this additional responsibility is likely to be self-funding as per the regulatory framework under discussion.

(f) **Allowance for TRANSCO for Liwa Aquifier Recharge Scheme (LARS)** – the consultant's included additional opex allowances for TRANSCO's water business for LARS.

(g) **Bureau licence fee** – the consultant excluded this cost from the opex projections assuming a pass-through treatment for this cost through MAR (see Section 2).

(h) **Water pumping and substation costs** – the consultant did not include additional allowances for the water pumping and substation energy costs for TRANSCO in its final opex report, where the electricity metering and billing arrangements do not exist at this stage. For other sites, the consultant's use of 2016 audited actual costs from SBAs (which also include these costs) in the final

opex report automatically captured the required allowances. In addition, our opex consultant also provided additional allowance for increase in electricity tariff charged to the network companies during 2017.

(i) **Cost of billing services** – for ADSSC, the consultant initially included in its draft opex report a specific opex allowance for costs that the distribution companies would charge to ADSSC for billing services. On the other side, the efficiencies (savings) expected to arise for the distribution companies from sharing existing costs with the new activities were reflected in their price control allowance in the draft proposals. However, the consultant excluded these specific allowances and savings from the final report projection due to uncertainties on the scope and timing of these services, as suggested by the distribution companies.

(j) **GCC grid cost** – for TRANSCO, the consultant did not include any allowance in the opex projections for GCC grid costs, since TRANSCO did not provide information on GCCIA annual accounts, any dividends that might be paid to ADWEA and invoices paid by TRANSCO for GCCIA costs.

4.13 Based on the responses to the RC1 draft proposals and the opex consultant's interim, draft and final reports, the following approach has been applied to the treatment of certain specific costs. In cases where the allowances are based on certain assumptions, we shall make an adjustment for actual out-turn values of relevant parameters achieved by the businesses during each year of the RC1 period, similar to PC5. Such adjustments are explained and illustrated in the opex consultant's final opex report. The requirement introduced in PC5 for the companies to provide audited information on the items required to make such adjustments as part of the Price Control Returns (PCRs) and/or Separate Business Accounts (SBAs) each year will continue. If the additional capabilities are not developed, the Bureau will remove/reduce the allowances for the relevant specific costs.

Allowance for Emiratisation and training costs

4.14 Consistent with PC5, the RC1 opex projections include separate allowances for Emiratisation and direct training of the companies' all UAE National staff, as listed in Notes: **Table 4.1** and **Table 4.2**, respectively. The assumptions used by the opex consultant for calculating the additional allowance for Emiratisation, are listed in the consultant's final opex report, in terms of:

(a) total number of full-time employees (FTEs) – either calculated by the opex consultant or provided by the company in its 2016 AIS, whichever is lower;

(b) Emiratisation rate (number of UAE National FTEs as a proportion of total FTEs); and

(c) additional cost of the UAE National FTEs as compared to expatriate FTEs.

4.15 These allowances are based on estimates of the difference between UAE National and Expat staff costs, average training course cost and the number of UAE National staff for RC1 as assessed by the opex consultant. The training costs for the existing UAE National staff already included in 2016 actual costs were therefore excluded from 2016 cost base used to develop the projections, as described in step 2 above.

Table 4.1: Emiratisation allowances included in RC1 cost allowance

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	2.60	3.90	2.50	2.80
	Water	1.20	1.90	1.20	1.30
	Total	3.80	5.80	3.70	4.10
ADDC	Electricity	10.10	12.90	15.60	15.40
	Water	6.60	8.40	10.20	10.10
	Total	16.70	21.30	25.80	25.50
TRANSCO	Electricity	-	-	-	-
	Water	-	-	-	-
	Total	-	-	-	-
ADSSC	Total	0.60	1.20	1.80	2.40
Total		**21.10**	**28.30**	**31.30**	**32.00**

Notes: TRANSCO's Emiratisation rate, as reported in the 2016 AIS, is below the actual rate achieved in 2016, therefore Emiratisation allowance is set to zero.

Table 4.2: Direct training allowances included in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	20.40	20.60	20.40	20.50
	Water	9.80	9.80	9.60	9.60
	Total	30.20	30.40	30.00	30.10
ADDC	Electricity	16.90	17.10	17.20	17.00
	Water	11.10	11.20	11.30	11.20
	Total	28.00	28.30	28.50	28.20
TRANSCO	Electricity	8.70	8.80	8.80	8.70
	Water	6.10	6.10	6.00	6.00
	Total	14.80	14.90	14.80	14.70
ADSSC	Total	21.40	21.20	21.10	20.90
Total		**94.40**	**94.80**	**94.40**	**93.90**

Allowance for additional capabilities

4.16 PC5 included specific opex allowances for additional staff resources to build capacity in areas such as demand side management, change management, risk management, tariff affairs and others. However, only ADSSC hired staff against this allowance, while the distribution companies could not hire required staff for various reasons – mainly due to the new organisation structure not receiving external approvals. Consequently, these additional allowances were clawed-back from AADC and ADDC through annual opex adjustments during the PC5 period. For RC1, the Bureau's opex consultant has reinstated the allowance for distribution companies based on latest information and justifications and included allowances for other activities such as VAT implementation and resource resilience for critical functions for TRANSCO. The resulting allowances are listed in **Table 4.3**.

Table 4.3: Additional capabilities allowances in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	3.40	3.40	3.40	3.40
	Water	2.00	2.00	2.00	2.10
	Total	5.40	5.40	5.40	5.50
ADDC	Electricity	4.50	4.50	4.50	4.50
	Water	3.10	3.10	3.10	3.20

	Total	7.60	7.60	7.60	7.70
TRANSCO	Electricity	28.30	28.30	28.30	28.30
	Water	14.40	14.40	14.40	14.40
	Total	42.70	42.70	42.70	42.70
ADSSC	Total	1.80	1.80	1.80	1.80
Total		**57.50**	**57.50**	**57.50**	**57.70**

Notes: The additional capabilities allowance for TRANSCO does not include LARS related allowance, since these are separately summarised in Table 4.6 and paragraph preceding that table.

Real price effects on staff costs

4.17 The opex consultant included an additional allowance for real increases in staff costs over the RC1 period in its opex projections, assuming a 2% real unit cost increase in staff basic salaries. The resulting allowances are listed below in **Table 4.4**.

Table 4.4: Real price effects on staff costs included in RC1 opex projections

AED million, 2016 prices		**2018**	**2019**	**2020**	**2021**
AADC	Electricity	2.40	3.70	4.90	6.20
	Water	1.20	1.70	2.30	2.90
	Total	3.60	5.40	7.20	9.10
ADDC	Electricity	2.60	4.00	5.40	6.70
	Water	1.70	2.60	3.50	4.40
	Total	4.30	6.60	8.90	11.10
TRANSCO	Electricity	3.10	4.80	6.40	8.00
	Water	3.40	5.10	6.80	8.50
	Total	6.50	9.90	13.20	16.50
ADSSC	Total	2.20	3.30	4.40	5.50
Total		**16.60**	**25.20**	**33.70**	**42.20**

Allowance for mega development assets

4.18 The opex consultant estimated specific allowances in their final opex report for AADC, ADDC and ADSSC based on the companies' estimates of network length and the timing of the transfer of such assets to the companies, as follows:

Table 4.5: Mega development allowances included in RC1 opex projections

AED million, 2016 prices		**2018**	**2019**	**2020**	**2021**
AADC	Electricity	3.20	3.20	3.20	3.20
	Water	1.80	1.80	1.80	1.80
	Total	5.00	5.00	5.00	5.00
ADDC	Electricity	25.10	27.60	30.00	32.40
	Water	14.90	15.70	16.60	17.50
	Total	40.00	43.30	46.60	49.90
ADSSC	Total	18.60	29.50	40.40	43.80
Total		**63.60**	**77.80**	**92.00**	**98.70**

4.19 These allowances will be subject to adjustment annually for any deviation between the actual size and timing of assets transferred and the assumption used for the allowance, using the opex-per-kilometre benchmark recommended by the consultant. In case the companies take over only the operational control of such assets without transfer of ownership, only 50% of the set allowance less any remuneration from developer or third

parties will be provided until the time the companies take ownership of the assets. This is consistent with our approach for PC5 and incentivises the companies to take asset ownership as soon as possible.

Allowance for tankering services for AADC, ADDC and ADSSC

4.20 AADC, ADDC and ADSSC are likely to be entrusted with additional responsibility for the management of tankering services, in order to improve quality for customers using these services. At present, these services are directly procured and paid by the customers. Consequently, the Bureau, the distribution companies and ADSSC together with ADWEA are developing a management framework and the Bureau is currently consulting with the stakeholders on the regulatory framework. Subject to final deliberations on the regulatory framework, our preliminary assessment shows that no additional allowance will be required for this additional responsibility:

(a) Costs of water and wastewater collection, and payments to tanker service providers either (i) for transporting water from the distribution companies' water stations to the customers, or (ii) for the haulage of wastewater from customers to treatment reception points, will be paid by the customer to the tanker service provider; and

(b) distribution companies' and ADSSC's costs of managing this activity, based on the companies' efficient requirement for new staff and systems or outsource of such management activity to a third party will be recovered via registration and permit renewal fees to be charged to tanker service providers. In turn, the providers will recover these, in an appropriate manner, through their charges to end customers.

Allowance for TRANSCO for Liwa Aquifer Recharge Scheme

4.21 As part of a strategic Government initiative to ensure that there is security of water supply during emergency situations, TRANSCO will own and operate the underground aquifer facility that is currently under construction at Liwa. Accordingly, based on opex consultant's final report, we have included an additional opex allowance in our final proposals for TRANSCO's own costs for operating and maintaining its storage facility as listed in **Table 4.6**. The outsource costs relating to this activity will separately be allowed through annual opex adjustments during the RC1 period for efficient actual costs procured through a competitive tendering.

Table 4.6: LARS allowances included in RC1 opex projections

AED million, 2016 prices		**2018**	**2019**	**2020**	**2021**
TRANSCO – water	Own costs	8.2	8.2	8.2	8.2
	Outsource costs	-	-	-	-
Total		**8.2**	**8.2**	**8.2**	**8.2**

Water pumping and substation costs

4.22 For PC5, the consultant included an additional allowance for TRANSCO's electricity consumption costs for Qidfa pumping station. However, TRANSCO has yet to incur these costs during the PC5 period. Accordingly, the allowances are clawed back through annual opex adjustments during the PC5 period. TRANSCO is currently in discussion with the distribution companies and ADWEC to develop arrangements for metering and

billing to TRANSCO for all water pumping and substations in Abu Dhabi and outside. Accordingly, no allowance for these costs has been provided in RC1, pending finalisation of these arrangements and availability of information from TRANSCO. However, these final proposals include allowances for all network companies including TRANSCO for the sites where metering and billing arrangements exist.

Cost of billing services by distribution companies to ADSSC

4.23 The distribution companies have started providing billing services to the Municipalities, and are in process of finalising the arrangements for similar services to ADSSC, as an unregulated activity. The consultant has reviewed the distribution companies' costs on billing services in order to calculate:

(a) the reduction in distribution companies' existing costs for their licensed businesses from allocating some costs to Municipalities and ADSSC; and

(b) the corresponding allowance for ADSSC in its price control (approximately AED 48-112 per customer bill).

4.24 The distribution companies' charges and the subsequent opex allowance for ADSSC were reflected in their price control allowances in opex consultant's draft report and RC1 draft proposals. However, the opex consultant's final report excluded these specific allowance for ADSSC and related savings for AADC and ADDC from the allowances due to uncertainties on the scope and timing of these services, as suggested by the distribution companies (resulting in higher opex allowances for RC1 for AADC and ADDC and lower allowances for ADSSC in the RC1 final proposals compared to the draft proposals). These costs and savings will separately be allowed through annual opex adjustments during the RC1 period on distribution companies' commencement of billing services to ADSSC. However, distribution companies' savings from billing services to Municipalities are reflected in their allowances in these final proposals (discussed in **Table 4.9** below).

GCC grid cost

4.25 The Bureau agreed in principle to allow recovery of TRANSCO's contributions to the GCCIA's annual operating budget through price controls, and requested further clarifications before allowing these costs in TRANSCO's price control allowance. The Bureau also requested TRANSCO to provide the amount of ADWEA's return from GCCIA. In the Bureau's view, this should be returned to the sector because it is the sector that bear such opex once it is allowed in TRANSCO's price controls. Accordingly, TRANSCO needs to provide both requisite clarifications to the Bureau and necessary information to include an allowance in the price controls or MAR. Pending this, no opex allowance is included in the final proposals.

ADWEA recharges

4.26 ADWEA cost recharges to AADC, ADDC and TRANSCO have been treated by the opex consultant in the same manner as the network companies' other costs. This involves including ADWEA recharges in full in the base cost-levels. Accordingly, the allowances for ADWEA recharges will grow with demand and are subject to the same efficiency savings, in line with companies' other costs.

Pumping energy cost increases due to electricity tariff

4.27 The opex consultant's final report has included additional allowance for ADDC, ADSSC and TRANSCO pumping station costs for the increase in energy costs resulting from the electricity tariff increase in the Emirate for 2017. As stated earlier, the relevant component of the network companies' opex allowance will be indexed against the actual tariff increase (net of any inflation indexation) to allow recovery of additional cost impact due to further tariff revisions during the RC1 period through annual opex adjustment mechanism].

Table 4.7: Allowance for electricity tariff increase in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
ADDC	Water/Total	1.90	1.90	1.90	1.90
ADSSC	Total	1.60	1.70	1.70	1.70
TRANSCO	Water/Total	13.70	14.20	14.70	15.20
Total		**17.20**	**17.80**	**18.30**	**18.80**

Other costs

4.28 Pending further discussions with the network licensees and/or justification and impact estimation, we have not included any separate allowances (other than those already funded through inclusion in the base level, demand related adjustments, revenue driver adjustment mechanism, or other specific allowances) for the following cost items or issues:

(a) AADC and ADDC: Savings from billing services to ADSSC (discussed above), Advanced Meter Reading (AMR), recycled water responsibilities (since a separate price control will be set for this activity in future);

(b) ADSSC: customer billing services from AADC and ADDC and costs associated with additional FTEs proposed under the government policy (Absher) initiative; and

(c) TRANSCO: GCCIA related charges, water pumping and substation costs where metering and billing arrangements do not exist at this stage, apprenticeship (as this has been suspended for RC1 and is under review) and the costs associated with the programme management office.

Total allowances for specific costs

4.29 **Table 4.8** presents the total allowances for the specific costs, discussed above, for each business included in the consultant's final opex report. These total allowances will range between AED 278 million and AED 351 million a year over the RC1 period. These allowances are dominated by ADDC (average AED 113 million a year) and TRANSCO (average AED 92 million a year), followed by ADSSC (AED 63 million a year) and AADC (AED 51 million a year).

Table 4.8: Total allowances for specific costs included in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	32.00	34.80	34.40	36.10
	Water	16.00	17.20	16.90	17.70
	Total	48.00	52.00	51.30	53.80
ADDC	Electricity	59.20	66.10	72.70	76.00
	Water	39.30	42.90	46.60	48.30
	Total	98.50	109.00	119.30	124.30
TRANSCO	Electricity	40.10	41.90	43.50	45.00
	Water	45.80	48.00	50.10	52.30
	Total	85.90	89.90	93.60	97.30
ADSSC	Total	46.20	58.70	71.20	76.10
Total		**278.60**	**309.60**	**335.40**	**351.50**

Notes: There may be differences of AED 0.1 million in the total in this table compared to Deloitte final opex report due to rounding off.

Cost savings

4.30 There are a number of initiatives that will result in opex savings to the companies during the RC1 period such as:

a) Operation and maintenance of street lighting is transferring from distribution companies to the Municipalities;

b) Efficiencies that will arise for the distribution companies from sharing existing billing costs with the distribution companies' unlicensed services to the Municipalities;

c) ADSSC's Strategic Tunnel Enhancement Program (STEP); and

d) Distribution companies' customer service transformation or digitisation.

4.31 **Table 4.9** presents the cost savings from the above initiatives for each business as per the consultant's final opex report. The total savings are about AED 111 million a year over the RC1 period, dominated by ADSSC (AED 50 million a year) and ADDC (AED 47 million a year), followed by AADC (AED 13 million a year).

Table 4.9: Cost savings adjusted in RC1 opex projections

AED million, 2016 prices			2018	2019	2020	2021
Street lighting O&M	AADC	Electricity	7.60	7.60	7.60	7.60
	ADDC	Electricity	22.00	22.00	22.00	22.00
	Total		29.60	29.60	29.60	29.60
Billing services to the Municipalities	AADC	Electricity	1.70	1.70	1.70	1.70
		Water	1.00	1.00	1.00	1.00
		Total	2.70	2.70	2.70	2.70
	ADDC	Electricity	8.80	8.80	8.80	8.80
		Water	7.30	7.30	7.30	7.30
		Total	16.10	16.10	16.10	16.10
	Total		18.80	18.80	18.80	18.80
Customer service transformation	AADC	Electricity	1.80	1.80	1.80	1.80
		Water	1.10	1.10	1.10	1.10
		Total	2.90	2.90	2.90	2.90
	ADDC	Electricity	6.30	6.30	6.30	6.30
		Water	2.80	2.80	2.80	2.80
		Total	9.10	9.10	9.10	9.10
	Total		12.00	12.00	12.00	12.00
STEP	ADSSC	Total	-4.50	58.20	71.90	76.20
	Total		-4.50	58.20	71.90	76.20
Total	AADC	Electricity	11.10	11.10	11.10	11.10
		Water	2.10	2.10	2.10	2.10
		Total	13.20	13.20	13.20	13.20
	ADDC	Electricity	37.10	37.10	37.10	37.10
		Water	10.10	10.10	10.10	10.10
		Total	47.20	47.20	47.20	47.20
	ADSSC	Total	-4.50	58.20	71.90	76.20
Total			**55.90**	**118.60**	**132.30**	**136.60**

Supply of recycled water

4.32 The Government has directed to transfer supply of recycled water to the distribution companies. The distribution companies will provide this service as a separate licensed activity with its own separate price control. While the new recycled water businesses are expected to start from 1 January 2018, their price controls will be set when all information regarding the relevant assets, capex and opex are available and assessed. The Bureau will set these new price controls separately and after the conclusion of the current price control review.

Operating cost projections

Companies' future opex projections

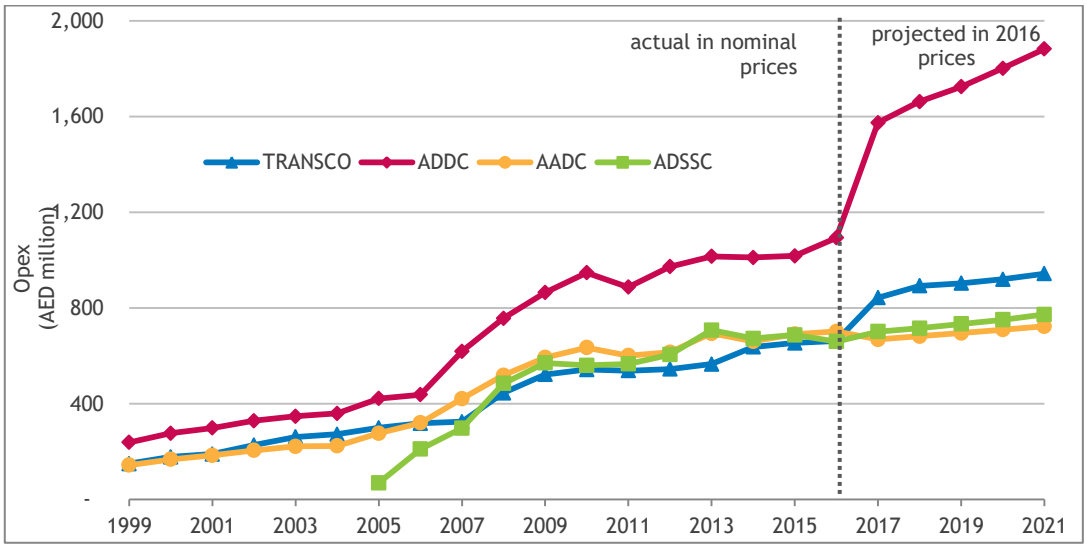
4.33 **Table 4.10** and **Figure 4.4** present the companies' actual opex to date and opex projections for future years including RC1 period (2018-2021) from their 2016 AIS submissions in 2016 prices (unless stated otherwise).

Table 4.10: Companies' RC1 opex forecasts

AED million, 2016 prices		2015	2016	2017	2018	2019	2020	2021
AADC	Electricity	481	476	454	463	472	481	491
	Water	238	226	214	219	223	227	232
	Total	719	702	668	681	695	709	723
ADDC	Electricity	626	669	925	978	1,014	1,061	1,109
	Water	432	424	649	684	710	741	773
	Total	1,058	1,093	1,574	1,662	1,724	1,801	1,882
TRANSCO	Electricity	366	353	453	437	446	456	474
	Water	313	309	390	455	457	463	469
	Total	680	662	843	892	903	919	943
ADSSC	Total	714	659	701	715	733	750	772
Total		**3,171**	**3,116**	**3,785**	**3,950**	**4,055**	**4,180**	**4,320**

Source: 2015-2016 actuals from the companies 2016 SBAs. 2017-2021 estimate from the companies 2016 AIS submissions.

Figure 4.4: Companies' 2018-2021 opex forecasts



Source: 1999-2015 actual opex as per companies' SBAs. 2016-2021 opex forecasts as per companies' 2016 AIS submissions.
Notes: Actual opex for 1999-2015 is in nominal prices; projected opex for future years is in 2016 prices.

4.34 The main trends in the companies' forecasts are as follows, though some companies show significant increases the reasons for which are not obvious:

(a) The four companies' **aggregate annual opex** is projected to increase from around AED 3.1 billion to 4.3 billion in 2016 prices from 2016 to 2021 at an average annual rate of 7% a year (cumulative increase by 39%). The company-specific trends up to 2021 are:

(i) AADC – increased by 0.6% a year on average or cumulative 3% to AED 723 million;

(ii) ADDC – increased by 11.5% a year on average or cumulative 72.2% to AED 1,882 million;

(iii) TRANSCO – increased by 7.3% a year or cumulative 42.4% to AED 943 million; and

(iv) ADSSC – increased by 3.2% a year or cumulative 17.1% to AED 772 million.

(b) **Annual staff costs** increase from AED 1.9 billion to 2.6 billion over 2016-2021 in 2016 prices at an average rate of 7.1% p.a. (cumulative increase by 41%) and remain the largest or major part of opex, accounting for overall 60% of total opex.

RC1 draft proposals

4.35 The opex consultant's initial recommendations for the RC1 opex projections in the draft report which were used in the RC1 draft proposals are reproduced in **Table 4.11**. The projections indicated an aggregate opex of about AED 2.9 billion a year for the four network companies in 2018 decreasing at an average rate of 1.4% per annum to AED 2.8 billion by 2021 (in 2016 prices).

Table 4.11: Consultant's initial RC1 opex projections – draft proposals

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	407	394	381	369
	Water	189	185	181	178
	Total	595	580	562	547
ADDC	Electricity	517	505	494	486
	Water	310	306	302	300
	Total	827	810	796	787
TRANSCO	Electricity	358	361	356	351
	Water	344	349	351	353
	Total	702	710	707	704
ADSSC	Total	793	779	768	755
Total		**2,917**	**2,879**	**2,833**	**2,792**

Source: Deloitte's draft Report, January 2017.
Notes: Totals may not match the sum of amounts in a column due to rounding off.

Consultant's final opex projections

4.36 The opex consultant's final recommendations in the final opex report for the RC1 opex allowances including all specific costs discussed above are summarised in **Table 4.12**. The projections indicate an aggregate opex of AED 3.2 billion for the four network companies in 2018 decreasing at an average rate of 1.4% per annum to AED 3.1 billion by 2021. We have adopted these projections in developing these RC1 final proposals.

Table 4.12: Consultant's final RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	480	469	455	444
	Water	230	228	225	223
	Total	710	698	680	667
ADDC	Electricity	645	636	629	620
	Water	423	425	427	428
	Total	1,067	1,061	1,056	1,048
TRANSCO	Electricity	370	372	369	366
	Water	360	363	366	370
	Total	729	735	735	736
ADSSC	Total	697	636	626	617
Total		**3,203**	**3,128**	**3,096**	**3,068**

Source: Deloitte's final Report, June 2017 except for ADDC where the source is Deloitte's addendum to the final report dated August 2017.
Notes: Totals may not match the sum of amounts in a column due to rounding off.

Assessment of consultant's opex projections

Comparison against RC1 draft proposals

4.37 **Table 4.13** compares the consultant's final opex projections adopted in these final proposals against initial opex projections (adopted in draft proposals) in terms of average annual opex for RC1. Clearly, for the reasons summarised below, the final opex projections are significantly higher than those in the draft proposals in 2016 prices:

(a) Aggregate opex for the four companies in these final proposals is higher than the draft proposals by about AED 265 million or 9% on average over the RC1 period.

(b) For individual companies, the final opex projections imply an increase by 4% to 31% on average against the draft proposals except for ADSSC where projections decreased by 17%.

Table 4.13: RC1 final opex projections – comparison against draft proposals

AED million, 2016 prices	**RC1 draft proposals average**	**RC1 final proposals average**	**Difference**	**Difference (%)**
AADC	571	688	118	21%
ADDC	805	1,058	253	31%
TRANSCO	706	734	28	4%
ADSSC	774	644	-130	-17%
Total	**2,855**	**3,124**	**269**	**9%**

Notes: Totals may not match the sum of amounts in a column due to rounding off.

4.38 However, these significant differences are explained by the interim nature of the opex consultant's projections at the draft proposals stage and by the following main changes in the final opex projections as compared to those used in the draft proposals:

(a) use of 2016 actual costs as the base level;

(b) exclusion of billing service costs for ADSSC and corresponding savings for AADC and ADDC from the projections; and

(c) inclusion of significant amounts for specific cost allowances on receipt of further information and clarifications from the companies, particularly from:

(i) AADC and ADDC for Emiratisation;

(ii) TRANSCO for resource resilience; and

(iii) all network companies for UAE National staff training, mega developments and additional capabilities.

Comparison against companies' opex forecasts

4.39 As the comparison between **Table 4.10** and **Table 4.12** indicates, the consultant's final opex projections for the RC1 period (2018-2021) are significantly lower than the companies' 2016 AIS opex forecasts for this period. Most notably, in 2016 prices:

(a) opex consultant's estimated aggregate opex for the four companies (AED 3.1-3.2 billion) are lower than the companies' forecasts (AED 4.0-4.3 billion) by AED 0.9-1.1 billion or, on average by AED 1 billion or 24%; and

(b) the consultant's final opex projections imply a reduction of AED 13 million or 2% for AADC, AED 709 million or 40% for ADDC, AED 181 million or 20% for TRANSCO and AED 99 million or 13% for ADSSC, against the individual companies' forecasts, due to the following cost reductions or increases reflected in the opex consultant's projections but not in the companies' forecasts:

(i) reductions in general relating to target overall opex efficiency (3% to 4%) and efficient staffing levels – companies' projections did not include any efficiency savings;

(ii) reduction for AADC and ADDC in particular relating to the savings from billing services to Municipalities, O&M cost of street lighting and customer service transformation, and for ADSSC relating to STEP;

(iii) no additional energy costs for water pumping and substation where metering and billing arrangements do not exist for TRANSCO.

Comparison against companies' 2016 actual opex

4.40 **Table 4.14** compares (in real 2016 prices) the final opex projections for RC1 in terms of average opex over the period against the companies' 2016 actual opex and highlights important expected trends:

(a) for AADC, the RC1 projections assume an opex decrease from 2016 by 2%, mainly by including cost savings from street lighting responsibilities transferring to Municipalities and billing services to Municipalities;

(b) for ADDC, the RC1 projections assume an opex decrease from 2016 by 3% (for reasons similar to those stated above for AADC);

(c) for TRANSCO, the projections assume 11% increase in opex from 2016 due to additional allowances included for resource resilience and LARS;

(d) for ADSSC, the projections assume an opex decrease of 2% in opex from 2016 (mainly because of STEP savings reflected in the projections); and

(e) on an aggregate basis, projections indicate almost no change in costs from 2016.

Table 4.14: RC1 final opex projections – comparison against 2016 actuals

AED million, 2016 prices	2016 actual opex	RC1 final proposals average	Difference	Difference (%)
AADC	702	688	-13	-2%
ADDC	1,093	1,058	-35	-3%
TRANSCO	662	734	71	11%
ADSSC	659	644	-15	-2%
Total	**3,116**	**3,124**	**8**	**0%**

Comparison against 2017 price control allowances

4.41 **Table 4.15** compares (in real 2016 prices) the final opex projections for RC1 in terms of average opex over the period against the PC5 allowance for 2017 opex (the last year of PC5). This comparison highlights the following:

(a) the RC1 opex projections show a decrease in opex allowance for the network companies (except AADC) by 9% to 29% mainly due to savings and pumping costs excluded from TRANSCO projections; and

(b) on aggregate, this gives a decrease of AED 603 million or 16% for all four network companies.

Table 4.15: RC1 final opex – comparison against 2017 price control allowance

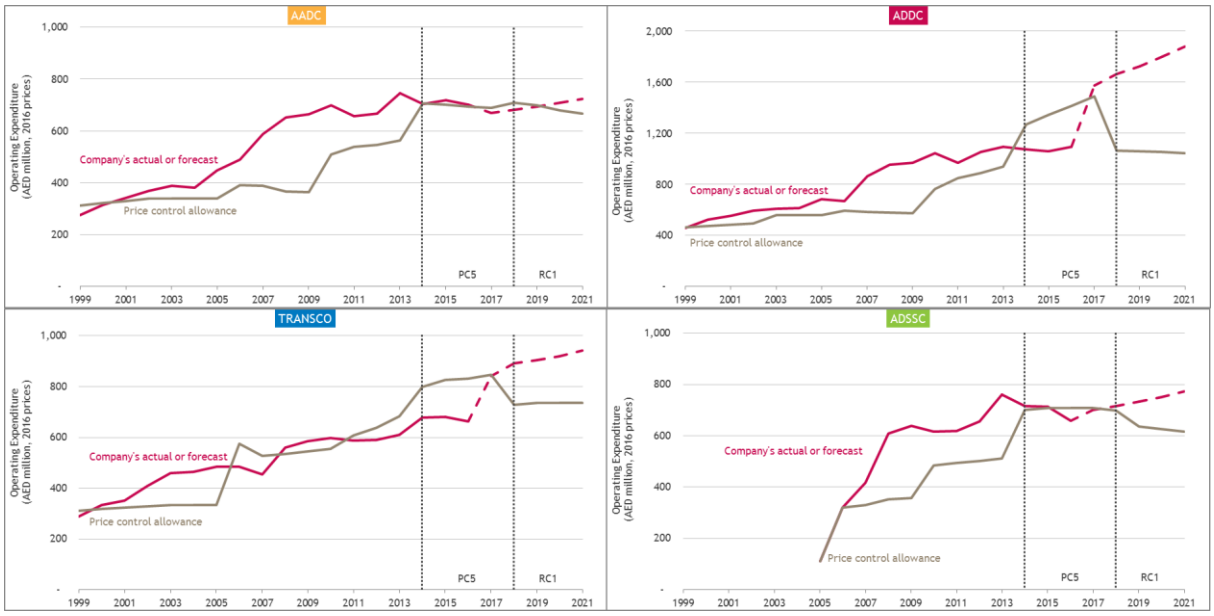
AED million, 2016 prices	2017 PC5 allowance	RC1 final proposals average	Difference	Difference (%)
AADC	688	688	0	0%
ADDC	1,485	1,058	-427	-29%
TRANSCO	846	734	-113	-13%
ADSSC	708	644	-64	-9%
Total	**3,727**	**3,124**	**-603**	**-16%**

Summary of comparisons

4.42 The following charts present the above comparative analysis, the overall trends for the price control opex allowances and the companies' actual opex expressed in 2016 prices.

4.43 As these charts show, the proposed opex allowances for RC1 are generally marginally lower than the companies' 2016 actual opex by around 2%-3%, except for TRANSCO where these are 11% higher for the reasons stated above. This is significantly lower than their 2016 AIS forecasts in real terms because of both the exclusion of certain costs and the expected cost savings or efficiency gains and pending inclusion of certain specific cost allowances in future upon submission of required information from companies.

Figure 4.5: Final RC1 opex projections for network companies (2016 prices)



Final proposals

4.44 The Bureau has adopted in these final proposals the consultant's opex projections for RC1 from its final report of June 2017 as set out in **Table 4.12** above in 2016 prices and reproduced in **Table 4.16** below in 2018 prices.

Table 4.16: RC1 opex projections – final proposals

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	498	487	472	461
	Water	239	237	233	231
	Total	736	724	706	692
ADDC	Electricity	669	660	653	643
	Water	439	441	443	444
	Total	1,108	1,101	1,096	1,088
TRANSCO	Electricity	384	386	383	380
	Water	374	377	380	384
	Total	757	763	762	764
ADSSC	Total	724	660	650	641
Total		**3,325**	**3,247**	**3,213**	**3,184**

Notes: Allowances converted into 2018 prices using estimate UAE CPI of 108.00.

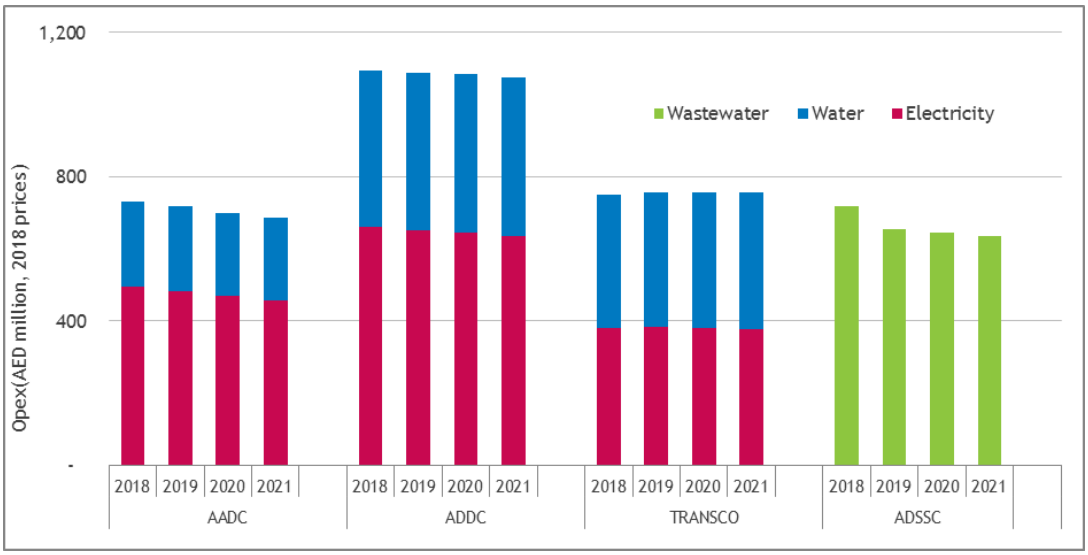
4.45 The following chart presents the above projections, highlighting:

(a) the profile of opex allowances over the RC1 period in real prices;

(b) the dominance of opex accounted for by ADDC (average AED 1,098 million p.a.), followed by TRANSCO (average AED 762 million p.a.), AADC (average AED 714 million p.a.) and ADSSC (average AED 668 million p.a.); and

(c) the higher opex accounted for by the electricity businesses than water businesses for AADC, ADDC and TRANSCO.

Figure 4.6: RC1 opex projections – final proposals



4.46 The RC1 opex projections presented in these final proposals:

(a) include provisional cost allowances for Emiratisation, direct staff training, mega developments based on the estimates, subject to annual adjustments for outturn results during the relevant year of the RC1 period;

(b) exclude the Bureau's licence fees given the pass-through treatment for RC1;

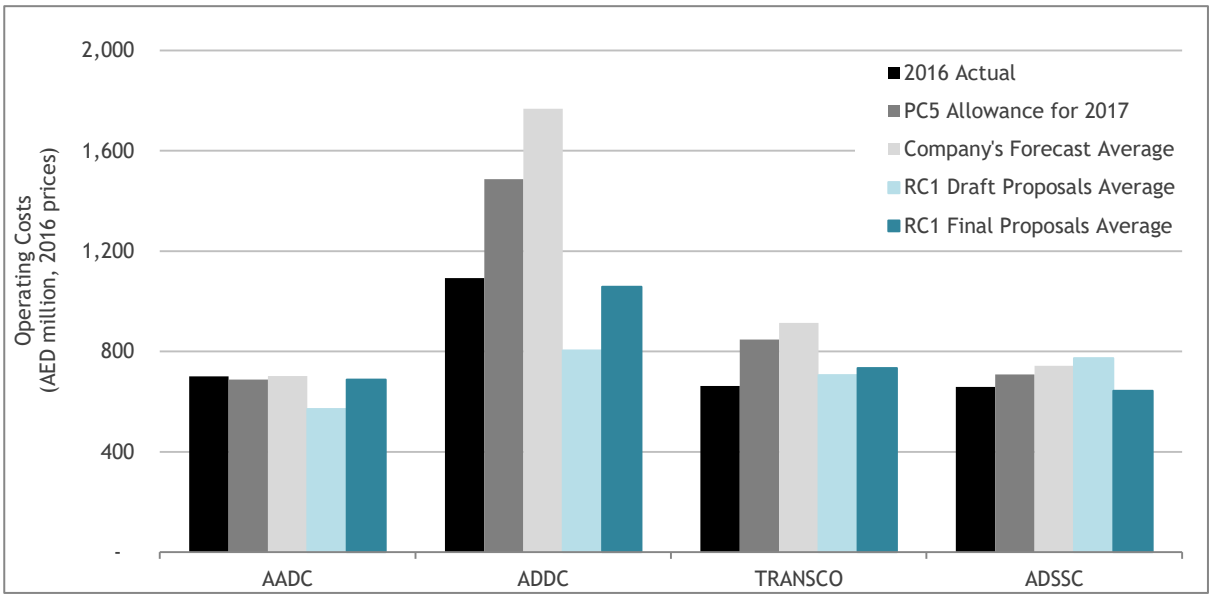
(c) include allowances for additional capabilities (DSM, resource resilience and VAT) and LARS that are subject to proof of hiring of staff for these activities and functions;

(d) presently do not include additional opex allowances for (i) water pumping and substation energy costs where metering and billing arrangements do not exist and GCCIA costs for TRANSCO and (ii) costs for distribution companies billing services to ADSSC and corresponding savings for distribution companies. These allowances will be provided upon receiving and assessing the required information and justification from companies or commencement of services; and

(e) include opex savings from various initiatives such as transfer of operation and maintenance of street lighting from distribution companies to Municipalities, distribution companies' billing services to Municipalities, customer service transformation or digitisation and commissioning of ADSSC's STEP project.

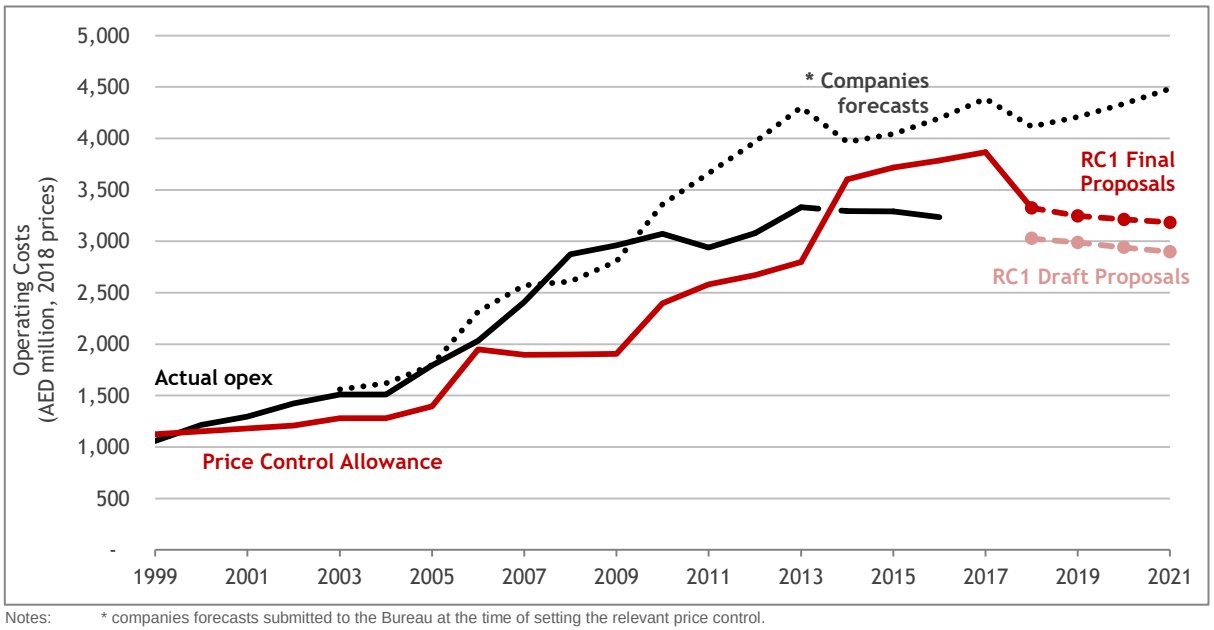
4.47 As **4.1** below summarises the above comparative analysis of our final RC1 opex projection average over the RC1 period in 2016 prices against the four comparator figures (i.e., 2016 actual opex, PC5 allowance for 2017, company's forecast average, and RC1 draft proposal average). As discussed above, our final proposals are higher than the RC1 draft proposals by AED 279 million p.a. (2016 prices) or 9% but lower than the network licensees' forecasts by 24% on average over the RC1 period for the four companies.

Figure 4.7: RC1 final opex projections – comparison by company



4.1 The above comparison is presented on an aggregate level for all the four companies in 2018 prices in the following chart:

Figure 4.8: RC1 final opex projections – comparison on aggregate level



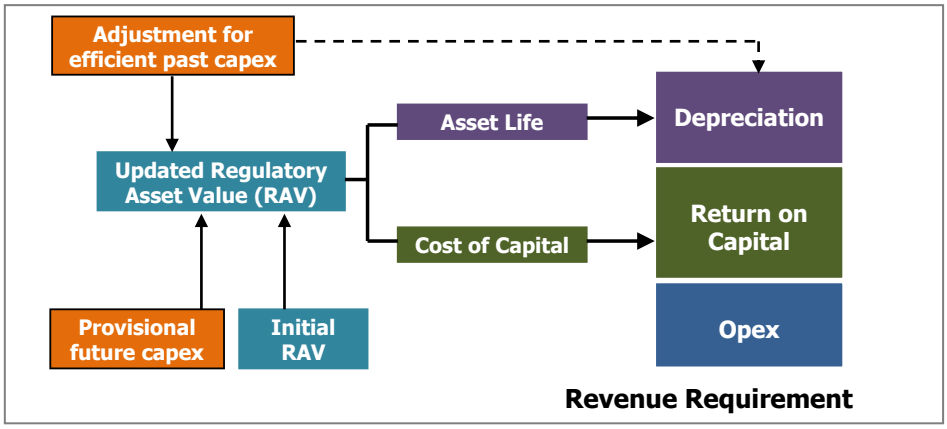
Notes: * companies forecasts submitted to the Bureau at the time of setting the relevant price control.

5. Capital expenditure

Introduction

5.1 Capex is the most significant input to the price control calculations and directly affects two of the three building-blocks of the required revenue; namely, regulatory depreciation and return on capital allowances, with the efficient capex added to the RAVs over time. The capex processes from planning through procurement to execution provide significant opportunities to improve sector efficiency in relation to both meeting new demands as well as replacing or improving existing network infrastructure. Given such significance, the capex has been accorded serious and careful consideration in the price control reviews.

Figure 5.1: Capex in price control calculations



5.2 Under the ex-post regime used for the previous price control reviews, provisional allowances for future capex are incorporated into the price controls to fund capex while smoothing revenue over time (without indicating the Bureau's views of the efficient level of capex). Necessary financial adjustments are then made at the subsequent price control review for the difference between the provisional capex allowance and the actual efficient capex (taking account of financing costs). Capex efficiency has been assessed, predominantly by process scoring methodology against the high-level criteria established since 1999.

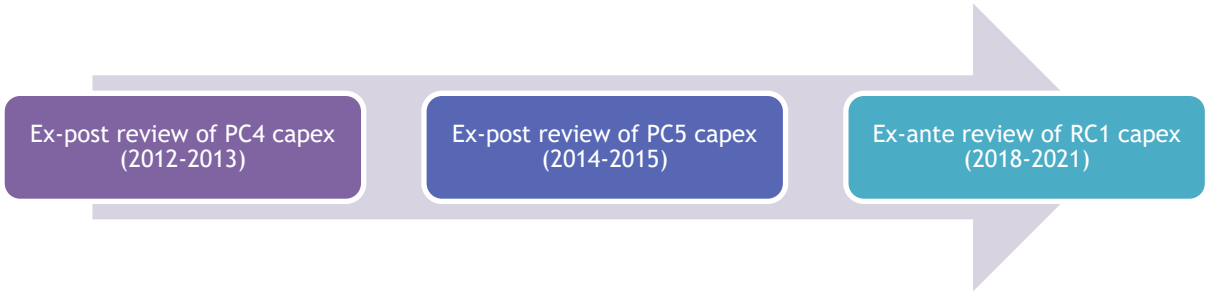
5.3 Capex undertaken from PC1 through to PC4 (2010-2011) was dealt with at the previous price control reviews through ex-post capex reviews. This Section 5 describes the review of the remaining capex, in line with the licensees' suggestions, as follows:

(a) Ex-post capex efficiency reviews for PC4 and PC5: To ensure timely review and minimise time lags to actual efficient capex compensation, we undertook efficiency assessment of capex incurred during PC4 (2012-2013) and PC5 (2014-2015) in coordination with the licensees during 2015-2016 and issued the final efficiency assessment reports in June 2016 and January 2017, respectively.

(b) Ex-ante review to provide capex allowances for RC1: To address the limitations of the ex-post approach, we have introduced a forward-looking ex-ante approach to capex assessment at this review. We had extensive engagements in 2016 with

licenses through workshops to develop framework, principles and timetable and then detailed review to assess all capex projects. This review has now been concluded with the issuance of our decision in February 2017 to the companies setting out the ex-ante capex allowances for the RC1 period.

Figure 5.2: Assessment of past and future capex at this review



5.4 The application of the above approach to capex over each price control period to date is summarised in **Table 5.1**.

Table 5.1: Treatment of capex in price controls

Treatment	PC1 capex	PC2 capex	PC3 capex	PC4 capex	PC5 capex	RC1 capex
Provisional capex allowances	Included in PC2	Included in PC2	Included in PC3	Included in PC4	Included in PC5	No provisional allowance in RC1
Firm capex allowance	NA	NA	NA	NA	NA	Included in RC1
Capex efficiency review	Undertaken by us in 2004	Undertaken by independent consultants in 2007	Undertaken by independent consultants in 2011-2012	2010-2011 capex reviewed by independent consultants in 2012-2013; 2012-2013 capex reviewed by Bureau in 2015-2016	2014-2015 capex review carried out by Bureau in 2016 2016-2017 capex review by Bureau planned for 2018	Ex-ante capex review carried out by us in 2016-2017; Interim review planned for 2020-2021 capex allowances in 2019; Ex-post capex reviews to be undertaken in future
Adjustment for efficient capex	Made in PC3	Made in PC4	Made in PC5	Adjustment for 2010-2011 made in PC5. Adjustment for 2012-2013 being made in RC1(if the companies' accept the Bureau's draft derogation, the entire adjustment for unduly earned financing costs will be made in 2017 MAR)	Adjustment for 2014-2015 being made in RC1 (if the companies' accept the Bureau's draft derogation, the entire adjustment for unduly earned financing costs will be made in 2017 MAR) Interim adjustment for 2016-2017 to be considered during RC1 or at RC2 review	Interim adjustment to be considered during RC1; Ex-post review adjustments to be made at RC2 or later

Notes: Discussion about the treatment of PC1 capex and PC2 capex does not apply to ADSSC which was established in 2005.
For ADSSC, treatment of capex spent over its first control period 2005-2009 is the same as described here for PC3 capex for other network companies.
NA stands for "not applicable".

Treatment of PC4 and PC5 capex

Draft proposals

5.5 The efficiency of capex for the first two years of PC4 period (2010 – 2011) was assessed and reflected when the PC5 controls were set. Our previous RC1 consultation papers

and draft proposals summarised the arrangements agreed for the last two years of PC4 (2012-2013) and the first two years of PC5 (2014-2015).

PC4 ex-post capex assessment

5.6 At the 2009 control review, provisional capex allowances of about AED 32.2 billion (in 2018 prices) for 2012-2013 were incorporated into PC4 controls for the network companies. In comparison, these companies actually spent AED 20.8 billion (in 2018 prices), or AED 11.4 billion lower than their provisional allowances.

5.7 To keep the capex review more effective and timely, the Bureau conducted an ex-post efficiency assessment of PC4 capex (2012-2013) during 2015-2016 using the process-scoring methodology adopted for the PC3 assessment and closely working with the companies. In June 2016, the Bureau presented its final efficiency assessment reports to the companies. The efficiency ranged from 89.01% to 94.00% (see **Table 5.2**).

Table 5.2: PC4 (2012-2013) and PC5 (2014-2015) - capex efficiency scores

	PC4 Capex		PC5 capex	
	Electricity	Water / Wastewater	Electricity	Water / Wastewater
AADC	92.38%	91.58%	91.02%	92.69%
ADDC	89.08%	89.01%	88.38%	90.65%
TRANSCO	93.67%	92.97%	94.98%	90.90%
ADSSC		94.00%		91.23%

5.8 In the RC1 draft proposals, we calculated the companies' efficient capex spent during 2012-2013 by applying the efficiency scores to actual capex for these years. In aggregate, the network companies had efficient capex of AED 19.2 billion, which was AED 13.0 billion lower than the provisional allowance of AED 32.2 billion – see table below reproduced from draft proposals in 2018 prices.

Table 5.3: PC4 (2012-2013) additional (shortfall) efficient – draft / final proposals

AED million, 2018 prices		2012	2013	Total
AADC	Electricity	(677)	239	(438)
	Water	39	294	332
	Total	(639)	533	(106)
ADDC	Electricity	(822)	(450)	(1,272)
	Water	(303)	88	(215)
	Total	(1,124)	(362)	(1,487)
TRANSCO	Electricity	(4,939)	(3,002)	(7,941)
	Water	(181)	(2,136)	(2,317)
	Total	(5,120)	(5,138)	(10,258)
ADSSC	Total	91	(1,213)	(1,122)
Total		**(6,792)**	**(6,180)**	**(12,972)**

PC5 ex-post capex assessment

5.9 At the 2013 price control review, provisional capex allowances of AED 22.1 billion (in 2018 prices) for PC5 period were incorporated into the PC5 controls for the four

companies. In comparison, these companies actually spent AED 12.0 billion (in 2018 prices), or AED 10.1 billion lower than their provisional allowances.

5.10 In response to the companies' suggestion for a more timely review, the PC5 capex review was brought forward such that 2014-2015 capex was reviewed in 2016 with the RAV efficiency adjustments to be made at this price control review. In September 2016, in consultation with the sector, we finalised the methodology for this capex review taking into consideration the lessons-learned and challenges faced during the PC4 capex review, as well as the companies' comments on PC4 capex review methodology. Following completion of our assessment and additional evidence from the companies, we issued our draft and final reports in November 2016 and January 2017, respectively. Overall, the companies' efficiency scores ranged from 88.38% to 94.98% (see **Table 5.2**).

5.11 The network companies had efficient capex of AED 11.1 billion, which is half of the provisional AED 22.1 billion allowance – see the following table reproduced from the draft proposals in 2018 prices.

Table 5.4: PC5 (2014-2015) additional (shortfall) efficient – daft / final proposals

AED million, 2018 prices		2014	2015	Total
AADC	Electricity	(527)	(598)	(1,125)
	Water	(117)	(229)	(346)
	Total	(644)	(827)	(1,471)
ADDC	Electricity	(2,147)	(2,363)	(4,510)
	Water	39	(306)	(267)
	Total	(2,108)	(2,669)	(4,777)
TRANSCO	Electricity	(57)	(1,244)	(1,301)
	Water	(1,883)	(1,721)	(3,604)
	Total	(1,940)	(2,965)	(4,905)
ADSSC	Total	429	(359)	71
Total		**(4,262)**	**(6,819)**	**(11,081)**

Responses

5.12 ADWEA group raised the following points in relation to both the ex-post capex reviews:

(a) ADWEA group expressed concerns about the methodology and process adopted by the Bureau for ex-post capex efficiency reviews since 1999 and sought re-opening of the past reviews to refund AED 7.5 billion (in 2018 prices) disallowed being inefficient by the Bureau in the price controls since 1999. The group suggested developing bonus/penalty based incentives to drive capital efficiency similar to other incentives. It highlighted a number of reasons for capex underspending in recent years against provisional capex allowances in the price controls but agreed to adjust price controls for the underspending. However, it also suggested adjusting the unpaid subsidy of AED 7.5 billion (in nominal prices) for 2014-2016 against the price control adjustment for capex underspending.

(b) While the group recognised the Bureau's engagement and transparency via consultations, meetings, workshops and opportunities for feedback, it argued that

the Bureau did not fully address concerns and did not address the concerns on the methodology, process and results and made only limited adjustments in the final reports. While the companies agreed to proceed to the PC5 ex-post capex review on the Bureau's assurance that the concerns from PC4 ex-post capex review will be addressed in PC5 ex-post capex review, the companies are unable to accept the final reports for the latest (PC5) ex-post capex review.

(c) ADWEA group highlighted its concerns about the lack of explicit acknowledgement for exogenous factors and knowledge gap on variation orders.

(d) The group clarified that the issue which underlies its concerns is not necessarily with whether RSB uses internal resources or external consultants for ex-post review but with the methodology, approach and execution.

(e) ADWEA group recognised the regulatory improvements by the Bureau in terms of frequency of capex review and suggested further efforts to improve process through annual feedback of observations and process gap recommendations.

(f) ADWEA suggested to apply 2010-2011 capex efficiency scores to PC4 (2012-2013) and PC5 (2014-2017) capex to calculate actual efficient capex instead of recently determined efficiency scores for 2012-2015 capex and planned reviews for 2016 and 2017 during RC1. ADWEA's main argument in support of this suggestion was that the network companies have made significant improvements in their capital delivery processes since 2011 through adoption of best industry practices, therefore lower scores since then do not appear realistic.

5.13 ADSSC made the following comments:

(a) ADSSC believed that the methodology adopted for the 2012-2013 capex efficiency assessment was a step forward compared to the previous assessments. However, it stressed that the Bureau should thoroughly study the resulting capex adjustments and its impact on the business in future. It also claimed that the assessment has subjective inconsistencies that undermine the process validity.

(b) ADSSC provided details and reasons on its underspending on 2015 and expressed its interest to explain other under-spending if the proportion of under-spend relating to ADSSC and detailed breakdown is provided. It suggested a caution and requested further explanation and careful study regarding removal of under-spend from the RAV.

Assessment

5.14 We respond to the points raised by ADWEA group as follows:

(a) As discussed in Section 2, we do not agree with the suggestion to re-open the capex reviews undertaken since 1999 and refund the previously assessed inefficient capex via price controls. This is because these reviews and results were agreed with the licensees at the time and incorporated into price controls and licences upon their formal acceptance in accordance with the Law. This is also against the standard regulatory practices and the Bureau's statutory duties to ensure economic and efficient sector, and creates wrong precedence and

significant regulatory uncertainties for future. We also note while our earlier suggestion to remove inflation from RAV and depreciation was to only change a previously used approach for future without clawing back the MAR from past, ADWEA considered it a re-opener of the regulatory contract and opposed it. Accordingly, group's positions on these two matters are clearly inconsistent and unsustainable. While we are willing to work with the sector to develop a performance incentive for asset management to drive capex efficiency further (as discussed in Section 8), we do not consider such an incentive is a suitable, cost-reflective substitute for capex assessment. Section 2 discusses in detail ADWEA's suggestion for price control adjustment for unpaid subsidy for 2014-2016 and the Bureau's rationale against such adjustment.

We welcome ADWEA group's acknowledgement of our extensive engagement and transparency on both PC4 and PC5 ex-post capex assessments and acceptance of the PC4 ex-post capex assessment. We emphasised that we took account of all information and feedback received from the licensees while assessing the capex efficiency. The Bureau provided ample time for the licensees to furnish further evidence and address any information gaps identified in our Draft Efficiency Assessment Report (DEAR), which could possibly support changes to the efficiency scores. During that time, the Bureau's team met with the companies to discuss the matter further and provide explanation regarding the expected feedback to fill in the gaps. We believe that sufficient clarification was provided in the meeting and the way forward with respect to the submission of the required additional evidence was agreed and when relevant further evidence was submitted, the scores were adjusted accordingly in the Final Efficiency Assessment Reports (FEAR). However, our efficiency results may not however necessarily meet the companies' expectations as these results were based on objective assessment of the information received. The assessment was carried out in accordance with the methodology which was developed taking account of the lessons learned and improvements identified in the previous assessments and which was agreed with licensees. We have not received to date (other than the ADWEA group's response to the RC1 draft proposals) any responses from the companies that identify any specific error in the Bureau's final reports on PC5 ex-post capex assessment.

(b) The exogenous factors and variation orders were given due considerations in developing and applying the methodology for ex-post capex assessments, as explained in our draft and final reports on such assessments. However, we believe that the approach adopted in the capital efficiency assessment process is pragmatic and follows all the principles agreed to date including those at the senior management level. Sufficient allowance has been made for any "external / Abu Dhabi" factors that the Bureau view as being outside sector's control or not directly reconcilable with the reasonable practices adopted by the sector companies.

(c) We welcome ADWEA group's clarification on its earlier explicit concerns about the use of the Bureau's internal resources as compared to external consultants (whose use was discontinued on the companies' own suggestion in the past). While the ex-post capex assessment for PC5 (2014-2015) has been based on an

improved methodology as acknowledged by the licensees and now concluded, we look forward to working with the licensees and receiving specific suggestions to develop the methodology and execution approach further for future capex assessments.

(d) We look forward to receiving specific details on the group's suggestion for annual feedback system to better understand the proposal and, if suitable, consider suitable changes to the future ex-post capex reviews (which we have been undertaking every two years now) and ex-ante capex reviews (first of which is now planned for 2018-2019).

(e) We do not agree to extend PC4 (2010-2011) capex efficiency scores to PC4-PC5 (2012-2015) and to PC5 (2016-2017) capex as the former were themselves based on PC3 (2006-2009) capex review whose scores were also adjusted upward significantly to allow time for companies and shareholder to improve capex processes. This was done as one-off adjustment and not to be repeated – refer to our PC5 final proposals. We do not believe the efficiency scores derived in such a manner for capex dated back as earlier as 2006 are reflective of the efficiency of 2015 or 2016 capex and provide appropriate signal to the companies to improve efficiency after 15-17 years of sector restructuring.

5.15 Our response to ADSSC's comments is as follows:

(a) We welcome ADSSC's recognition that the methodology has improved from previous assessments. As mentioned above, we considered all comments and information provided by companies in our capex assessments and are willing to work with the licensees to further improve the methodology for future assessments. We have incorporated the capex assessment results into price control calculations in these final proposals (see Section 6) but note that the financial impact is significantly less in case of ADSSC. We are however willing to work with ADSSC (and other licensees) to improve their business processes so that they deliver more efficient capex for the benefits of all stakeholders.

(b) We also welcome ADSSC's willingness to explain the capex under-spending. In this regard, we refer to ADSSC's submission during PC5 review on capex forecasts for PC5 period and our PC5 final proposals for explanation of the PC5 provisional capex allowances and refer to ADSSC's actual capex spent during PC5 whose details are provided in ADSSC's audited SBAs and AIS. Further details on its capex forecasts and actuals should be available within ADSSC to investigate the reasons for under-spending or over-forecasting. We are willing to work with ADSSC to help undertake such a study, which would facilitate improvements in the relevant aspects of the company's business processes. We also note that the capex differential between provisional and actual efficient capex in case of ADSSC is relatively less significant for PC4 and is minimal for PC5 as compared to other companies (see **Table 5.3** and **Table 5.4**).

Final proposals

5.16 We have not found any compelling justification for a change to our draft proposals on ex-post capex assessments and have accordingly retained the amounts of the PC4 and PC5

additional (shortfall) efficient capex for 2012-2013 and 2014-2015 as proposed in the draft proposals and shown in **Table 5.3** and **Table 5.4** above, respectively. These amounts have been clawed-back via appropriate adjustments to the companies' RAVs in Section 6, inclusive of the time value of money and financing costs unduly earned or foregone.

5.17 We plan to conduct an ex-post capex review for 2016-2017 in 2018 to close PC5 capex and will engage with the companies in 2018 to further improve and finalise the process scoring methodology for this review.

Treatment of future capex

Draft proposals

5.18 Given the stakeholders' suggestion and the deficiencies of the ex-post approach used to date for capex reviews, our earlier consultation papers suggested moving towards an ex-ante capex review approach for assessing future capex.

5.19 Accordingly, the Bureau shared an action plan for implementing the revised regulatory regime for capex to complete an ex-ante review to set firm capex allowances for RC1 period at this review and to undertake regular ex-ante and ex-post capex reviews and make MAR adjustments for firm future capex allowances and ex-post actual efficient capex.

5.20 We suggested the revised regulatory regime to work as follows:

(a) allow firm capex (not provisional) in the price controls – based on ex-ante reviews covering need-case, optioneering, design and budget for each project above a materiality threshold (e.g 2%-5% of annual capex); and

(b) conduct regular ex-post capex reviews to approve any change in allowed capex in the price controls – limited to projects with significant (e.g 10%) deviation from the approved capex with the possibility of sharing additional costs/savings between companies and customers.

5.21 During 2016, we undertook extensive engagements with the companies: two workshops to develop and agree the framework and timeline for ex-ante capex review; developed and refined information requirement templates; reviewed companies' submission on capex spend profile and business cases, conducted meetings with the individual companies to further explain our approach and bridge information gaps; reviewed companies' further information and feedback and presented our final assessment. The Bureau issued its final assessment and decision in February 2017 setting out the capex allowances for RC1 period and reproduced from draft proposals in 2018 prices, as summarised below.

Table 5.5: RC1 Capex allowances – draft / final proposals

AED million, 2018 prices		2018	2019	2020	2021	Total
AADC	Electricity	771	544	196	130	1,641
	Water	294	157	66	43	560
	Total	1,065	701	262	173	2,201
ADDC	Electricity	541	210	38	8	797
	Water	605	431	251	195	1,482
	Total	1,146	640	290	204	2,280
TRANSCO	Electricity	1,006	742	323	345	2,416
	Water	201	168	151	75	596
	Total	1,207	911	475	420	3,012
ADSSC	Total	1,444	1,289	1,016	948	4,697
Total		**4,862**	**3,541**	**2,042**	**1,744**	**12,1**89

Note: The conversion from nominal prices to 2018 prices is based on assumed 108.00 CPI value for 2017 and actual CPI values in table 3.4.

5.22 In the RC1 draft proposals, we highlighted that:

(a) The companies were not able to provide sufficient information to allow the process to be implemented as planned. As a result, the capex allowances for RC1 are significantly lower than the allowances that the Bureau made at the previous price control reviews.

(b) Nonetheless, the above ex-ante capex review and allowances for RC1 should not stop the companies from undertaking capital projects or schemes that are not submitted to or approved by the Bureau but are required to meet customer demands, security standards or Government directives. These projects will however be subject to full ex-post capex review in future and the companies will be remunerated at the next price control review for actual efficient capex spending on these projects or schemes. This is in contrast to the capex schemes that have been submitted and approved as part of the ex-ante review, which will be subject to a limited ex-post capex review only if their scope or actual expenditure changes significantly from the schemes or budgets approved by the Bureau. In case of ADSSC, any new ISTP or investment in treatment plant should have the Bureau's prior approval.

(c) Given the companies' performance during the first ex-ante capex review, the Bureau has agreed with the companies to provide further flexibility by planning an interim ex-ante review in 2019 of the last two years of RC1 period (2020-2021) and if necessary resetting the ex-ante allowances for 2020-2021 capex.

Responses

5.23 While ADWEA group supported the transition towards the ex-ante approach to capex treatment in principle and note the proposed RC1 capex allowances, the group raised the following concerns and queries:

(a) The group highlighted the challenges of transition to an ex-ante capex regime, the need to fund sufficient capex required for network expansion and repair / replacement and the lower RC1 capex allowances than PC5 allowances due to the uncertainty and information unavailability for later years of RC1 period.

(b) ADWEA group welcomed an ex-post capex review after two years but sought clarification on the meaning / scope of “limited” ex-post review and suggested annual ex-ante capex review.

(c) In support of its suggestion for market tested capex to roll actual capex into the RAV, the group referred to a regulatory mechanism in Australia that allows such rolling after a period where the company can retain any benefits of lower actual capex than benchmark capex but should also absorb any additional costs above the benchmark.

(d) Companies’ submission might not have met the Bureau’s expectation because the Bureau did not provide “very detailed guidance” and “a suitably long implementation period” to enable the companies to understand, implement and comply with an entirely new process. The ex-ante process is a major change for the sector and all parties should be responsible for the effective process. This initiative failed because the Bureau was not able to approve the companies’ project need statements due to the Bureau’s own failure to provide sufficiently detailed requirement.

(e) ADWEA group questioned how it would be able to undertake capital projects (that are not approved to be included in RC1 capex allowances) to satisfy customers demands or Government directives given the level of RC1 capex allowances and the prohibition from raising additional funds.

(f) ADWEA group welcomed the Bureau’s agreement that the capital approvals process should not duplicate the roles and bureaucracy and requested the Bureau’s proposals to achieve this objective.

(g) ADWEA sought further clarity on the treatment of future capex as follows:

  (i) whether the materiality threshold would apply to the capital spend of individual companies, or to the sector as a whole;

  (ii) if projects without ex-ante approval, including running and below-threshold projects, will be subject to an efficiency assessment;

  (iii) when actual spend values will replace ex-ante values – its working assumption is that this will be RC2;

  (iv) whether the difference between ex-ante and actual values will be retained/borne by the companies;

  (v) if ex-post efficiency assessments would apply to ex-ante approved projects that are delivered with either a change in scope or at a cost that varies by more than 10% of the approved amount; and

  (vi) with regard to the ex-ante projects submitted to the Bureau, both the number of these project approved by RSB, and the value of these approved projects.

(h) Overall, the ADWEA group claimed that it did not agree with the ex-ante capex amounts allowed and included in the RC1 MAR. It added that the capital allowances in the RC1 MAR calculations would cause a shortfall of AED 1.4 billion in the capital funding of the sector, based on the capital requirements

submitted by licensees to ADWEA. It is on this basis that it concludes that it does not accept the RC1 capex forecasts given in the draft proposals.

5.24 ADSSC also made a number of critical comments:

(a) ADSSC did not consider moving towards ex-ante capex approach successful and argued that it was due to the Bureau's unrealistic expectations about what information is available and not due to insufficient information provided by the companies. Accordingly, it suggested further discussions and analysis are required for this transition to succeed, including a well-defined process between the stakeholders (ADSSC, DoF, ECO), a clear mechanism to measure the outputs and to determine the sufficient capex to achieve the requirements, and consistent reporting format for ex-ante assessment across the companies.

(b) ADSSC rejected the Bureau's proposed position that ADSSC requires the Bureau's prior approval of funding for additional treatment capacity.

Assessment

5.25 The Bureau welcomes the stakeholders' continued support for transition towards the ex-ante capex regime in principle. Our assessment of ADWEA group's specific comments is as follows:

(a) We agree with ADWEA group that the transition to ex-ante regime has been challenging and has resulted in lower RC1 capex allowances than PC5 capex allowances. However, this has been due to the generally low number of applications particularly in the later years of RC1, as well as a significant lack of information and justification from the companies for the projects which we did receive applications for. This highlighted a lack of longer term planning and the need for significant improvements in companies' capex planning, approval and procurement processes. We also note that RC1 capex allowances are firm requiring limited ex-post capex review (and hence subject to limited risks for companies) whereas PC5 allowances were firm requiring full ex-post capex review (with higher risks for companies). Therefore, a direct comparison between their magnitudes is not suitable.

(b) We appreciate ADWEA group's support for ex-post capex review after two years. We again clarify that the ex-post review of the new capex projects, which have been already approved for RC1 ex-ante allowances, would be limited in that a review of a project will be required if the scope or actual expenditure on the project changes significantly from that approved in the RC1 ex-ante review. The suggestion for annual capex review has been discussed in detail in the previous consultation papers particularly the considerations to avoid micromanagement and regulatory burden. The latest ex-ante capex review conducted over a year with significant resources further confirms the non-suitability of annual review. Therefore, the Bureau's plan is to undertake ex-ante capex in alternative years to provide the sector with enough time to prepare and manage these capex reviews. However, we have also accepted the companies' suggestion to undertake ex-post efficiency review of capex incurred during RC1 on an annual basis to minimise the time lag between the year of capex incurred and the year of review

and to minimise the magnitude of adjustment to MAR. Accordingly, 2018 capex will be reviewed in 2019 for consideration to adjust MAR for 2020, 2019 capex will be reviewed in 2020 for 2021 MAR adjustment and so on, through a derogation. We have also agreed with ADWEA group to seek the help of external consultant in ex-post capex reviews either as assistance and advice to the Bureau or as part of panel comprising the Bureau and licensee representatives.

(c) We are willing to consider ADWEA group's suggestion for further developing ex-ante capex regime taking into consideration the regulatory approaches elsewhere. However, the companies should understand the risk-efficiency incentive balance and robust information requirements of such regulatory approaches, which we understand the companies are not currently willing or able to accept as indicated by majority of their comments and concerns. Accordingly, we need a consistent, coherent and clearly-set out proposal from ADWEA group for developing the ex-ante regime further.

(d) We do not agree with ADWEA group's assertions regarding lack of sufficient guidance or time provided for ex-ante capex review. As explained above, we undertook this review spanned over a year through numerous one-to-one meetings and sector-wide workshops, updated information templates and opportunities for companies to review, comment and provide information. It is important to highlight that the companies strongly suggested moving towards the ex-ante capex review at the previous reviews. The ex-ante review undertaken showed that the companies were not sufficiently ready. However, to address the concerns about price control funding for additional capex required, we have proposed an interim ex-ante capex review in 2019 for potential revision in capex for ex-ante allowances for 2020-2021 period of RC1. Accordingly, the Bureau will consult with the network licensees during 2018 on any refinements and changes required to the approach for such review.

(e) We do not agree that the RC1 ex-ante review initiative was a failure. This initiative was justified after using ex-post capex review for five price controls and necessary to address regulatory and Government's requirements as well as licensees' concerns. The review has highlighted the areas of improvements in the companies' planning and other capex processes, which should result in more robust capex efficiency for the benefits of licensees and customers in future. The RC1 ex-ante capex review was the first of its kind review in the sector and network companies made efforts of varying degrees to respond. We have just started the journey of transition from ex-post capex regime to ex-ante regime and have not yet seen the full impact that this transfer will have. However, when delivered, it has the potential to revolutionise capex investment and drive significant efficiency into the companies in order for them to gain from its in-built incentives and reduce risks for ex-post efficiency adjustments. The ex-ante capex review is also consistent with framework and objectives of the capital investment planning (CIP) regime recently introduced by the Government for its entities and infrastructure projects.

(f) With regards to ADWEA group's concerns about capital funding, we have provided sufficient capex allowances for all running and justified new capex projects and have not prohibited licensees from raising additional funds from

Government and other sources. ADWEA should approach Government and DoF for any funding requirements or removal of prohibition to use other funding sources. From the price control perspective, the total funding from revenues according to the RC1 draft proposals was around AED 8.6 billion for the four network companies, which is greater than the licensees' annual opex and capex requirements. In the RC1 final proposals, the projected revenue has increased further, so this increase with the interim ex-ante capex review should address any remaining concerns of ADWEA group. In any case, the regulatory regime designed to allow recovery of all efficient capex with reasonable return on ex-ante or ex-post basis should provide strong business case for any capex funding from conventional sources.

(g) On the proposals to avoid duplication of roles and bureaucracy, we based on companies' and ECO's feedback developed the information templates to align with budget suggestions to ECO. However, we note that the companies submitted their capex budgets in 2016 and 2017 (as was the case in the previous years) to ECO without any engagement with the Bureau. Accordingly, we would appreciate receiving a proposal and commitment from the companies to address this concern in future.

(h) The materiality threshold ADWEA group referred to was removed from the process following consultation with the companies. The final agreed ex-ante process assessed all scheme applications irrespective of spend. We also reaffirm that schemes with ex-ante approval will be subject to ex-post review if either the scope of work changes or the cost deviates from the ex-ante allowance by more than 10%. All projects without an ex-ante approval, including any that are already underway, will be subject to an ex-post efficiency assessment.

As mentioned earlier, the RC1 capex allowances will be adjusted at the next price control review or at the interim ex-ante capex review in 2019 against the actual efficient or updated ex-ante allowances, respectively. We also sought proposals from the sector on suitable arrangements for sharing savings or additional costs from projects with ex-ante approval with an unchanged scope that are delivered within 10% variance. Unfortunately, no proposals were provided and we will review such proposals once submitted.

(i) Although ADWEA group has suggested that the RC1 capital allowance in the draft proposal would cause an AED 1.4 billion shortfall in the sector funding, the evidence provided to us does not support this view. We are unaware of any submissions from licensees to ADWEA, and if such submission and the values therein are confirmed. Furthermore, we are unclear as to why licensees have intentionally shared information with ADWEA, which differs from that shared with us. We find this concerning as we engaged extensively with the sector in order to obtain the most accurate possible capital forecasts for the RC1 period. Therefore, we strongly reject the view that any difference between the average MARs for PC5 and RC1 is a "shortfall." The Bureau carried out an overall impact assessment of its draft proposals to illustrate how the PC5 average MARs is different than the RC1 average MARs based on a seven-step process as explained in the draft proposals. The average impact based on the information provided to the Bureau was about AED 1.2 billion per year. This difference of

around AED 1.2 billion per year stems from the evidence provided by the companies during the ex-ante capex review. In any case, we expect that this difference will narrow as the sector provides more information and visibility for the interim ex-ante review due in 2019.

5.26 On ADSSC's concerns on ex-ante review, we refer to our assessment above on similar points raised by ADWEA group. In relation to ADSSC's specific comment about any additional treatment capacity, we note that the Bureau's prior approval is required if ADSSC would like to ensure that the payments or costs for any ISTP or additional treatment capacity are considered for remuneration through the price controls on a pass-through basis or capex allowances.

5.27 In its meetings with ECO, the Bureau:

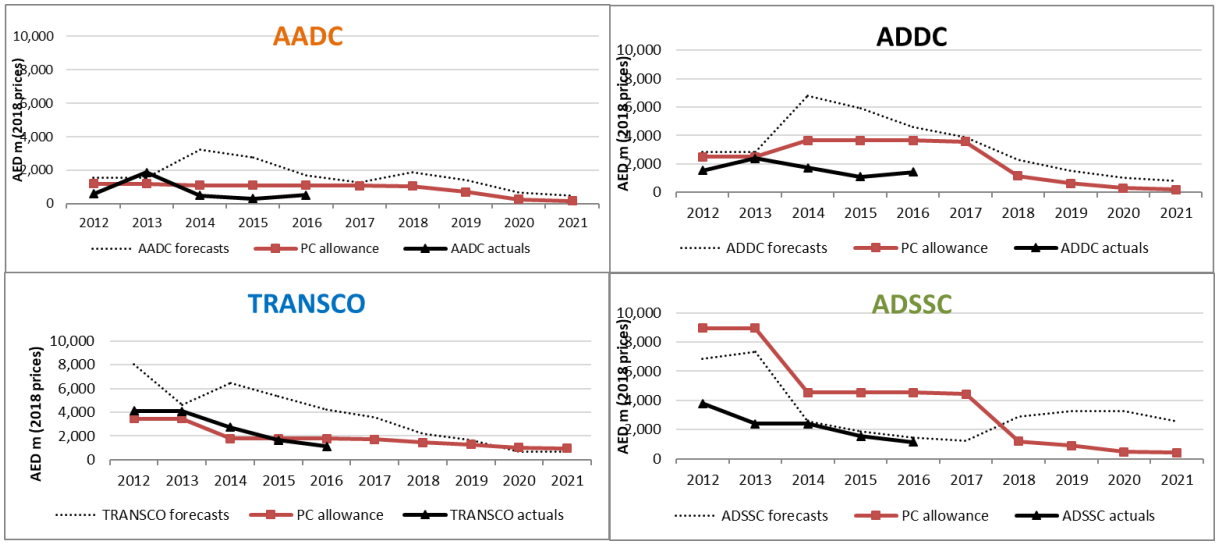
(a) clarified that price controls and tariffs are set on a forward-looking basis for the year(s) to come, they always reflect forecasts of efficient costs and cannot be based on actual costs given that the actual costs cannot be known in advance. The Bureau advised that the sector needs to improve its capex forecasting to avoid significant fluctuations in tariffs from one period to another and the gap between economic / efficient costs and actual costs.

(b) explained the reasons why annual capex reviews are not feasible and that the experience with the sector in this regard was not impressive and does not warrant such a frequency with the example that the latest extensive ex-ante review required one year for completion. Furthermore, this exercise will increase the burden on both the regulator and the sector. Consequently, the Bureau planned for ex-ante reviews to be carried out each in alternative years to allow for better management of these capex reviews within the sector However, we have also accepted the companies' suggestion to undertake ex-post efficiency review (with the help of external consultant) of capex incurred during RC1 on an annual basis to minimise the time lag between the year of capex incurred and the year of review and to minimise the magnitude of adjustment to MAR. Accordingly, 2018 capex will be reviewed in 2019 for consideration to adjust MAR for 2020, 2019 capex will be reviewed in 2020 for 2021 MAR adjustment and so on, through a derogation.

Comparison against previous capex actuals and forecasts

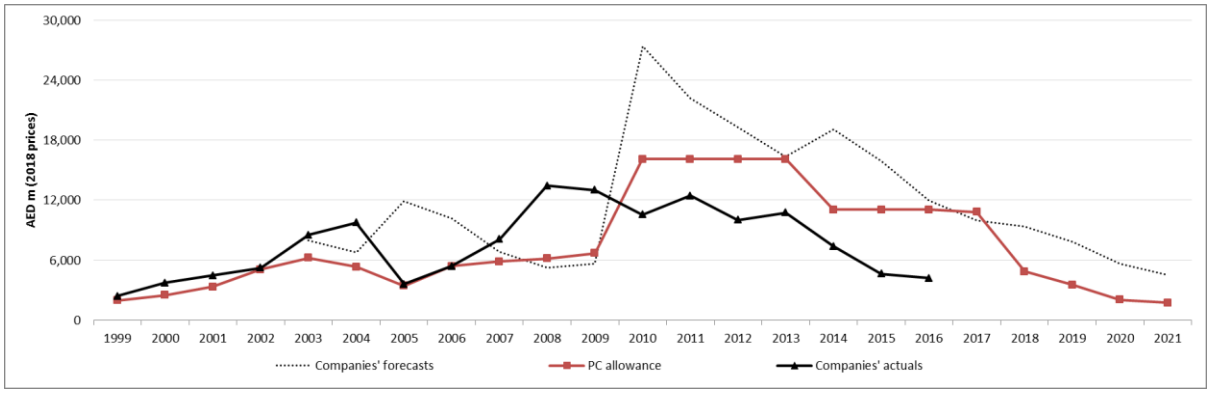
5.28 **Figure 5.3** below compares the individual companies' price control capex allowance since 2012 to RC1 period with companies' forecast and actual capex separately.

Figure 5.3: Capex allowances v companies' forecast and actual capex – by company



5.29 **Figure 5.4** below compares the companies' price control capex allowance since 1999 to RC1 period with companies' forecast and actual capex on an aggregate level for all the four companies combined.

Figure 5.4: Capex allowances v companies' forecast and actual capex – aggregate



5.30 Both **Figures 5.3 and 5.4** show the companies' significant under-spending against their own forecasts and price control allowances in recent years. This is in contrast to the trend until around 2009 when the companies generally showed significant over-spending.

Final proposals

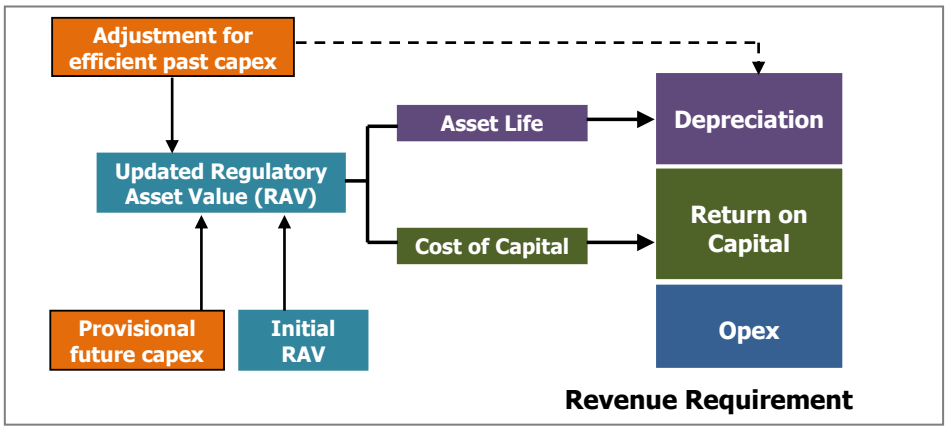
5.31 Our proposals in relation to the future capex remain the same as in the draft proposals, as set out in **Table 5.5** above and **paragraph 5.22** above.

6. Financial issues

Introduction

6.1 The revenue allowed in the price controls enables the network companies to finance their opex and capex. Since capex relates to assets that have an economic life of many years, it is appropriate to allow for the recovery of these costs over an extended period of time. This is achieved by allowing these costs to be capitalised, and added to the Regulatory Asset Value (RAV) with an annual allowance for depreciation to allow recovery of these costs. It is also appropriate to allow the company to earn a return, or cost of capital, on the RAV, in order to provide return to their fund providers. Depreciation and return allowances are two of the three key building-blocks used to establish the overall level of core price control revenue.

Figure 6.1: Financial issues in price control calculations



6.2 The Bureau's previous RC1 consultation papers discussed in detail the financing of operating and capital expenditures and the calculation of the overall level of price control revenue at this review. The Bureau's RC1 draft proposals raised issues in relation to the removal of inflation from regulatory depreciation and RAV, extension of the asset life assumptions for price controls, and the setting of the allowed rate of return for RC1.

6.3 For the asset life assumptions, the RC1 draft proposals were based on the Bureau's asset life consultant's (Deloitte) draft report issued in February 2017. Since then, the consultant has issued its final report in June 2017, presented this report to the sector in July 2017, and issued addendum to this report (being issued to ADWEA and licensees with these final proposals), taking account of the comments on draft and final reports and further information and justifications provided by the companies.

6.4 Building on the evidence from both overseas and local and regional sources, we suggested a real cost of capital of 4.2% in the RC1 draft proposals.

6.5 In addition to the formal comments from ADWEA and the network companies, we received ADWEA consultant's (EY) report in July 2017 and further comments from ADWEA and DoF at the meeting on 28 August 2017 on WACC and removal of inflation indexation from depreciation and RAV. We also met with ADWEA on 17 October 2017 and clarified via letters dated 26 October 2017 to ADWEA and ADSSC issues relating to

the removal of inflation indexation and the application of PC4-PC5 capex financing cost adjustment to the 2017 MAR rather than the MARs over the RC1 period.

6.6 This Section 6 summarises the key responses and concerns on the draft proposals on the financial issues and presents our assessment and final proposals on these issues and our calculations of updated RAVs for RC1. Most of the responses and the Bureau's assessment of responses on the financial issues are discussed in detail in Section 2. These issues include inflation indexation of depreciation and RAV, extended asset life assumptions and WACC.

Regulatory depreciation

Draft proposals

6.7 In the RC1 draft proposals, we proposed:

(a) removing inflation indexation from the RAV and the regulatory depreciation allowance from 1999 (or 2005 in case of ADSSC) for MAR for 2018 onwards without any retrospective adjustments to or claw back of MAR for any previous year – based on the argument that regulatory depreciation allowance being provided for return of capital or recovery of original investment should not be indexed against inflation (while return on capital allowance will remain inflation protected via annual inflation indexation of MAR); and

(b) continuing with a straight-line method for regulatory depreciation as per the price control approach to date but using the extended asset life assumptions for new assets proposed by the Bureau's asset life consultant as set out in the table below.

Table 6.1: Asset life assumptions for price controls

Business		**PC1-PC5**		**RC1 draft proposals / Bureau's consultant draft recommendations**		**RC1 final proposals / Bureau's consultant final recommendations**	
		Initial RAV	All capex	**Pre-2018 capex**	**Post-2018 capex**	**Pre-2018 capex**	**Post-2018 capex**
AADC	Electricity	19.25	30	30	40	30	40
	Water	33.59	30	30	55	30	40
ADDC	Electricity	22.45	30	30	40	30	40
	Water	14.80	30	30	55	30	40
TRANSCO	Electricity	25.26	30	30	55	30	40
	Water	18.07	30	30	55	30	40
ADSSC		**13.64**	**50**	**50**	**65**	**50**	**60**

6.8 While the impact of extended life assumption on network companies' MAR over RC1 period was minimal (less than AED 100 million a year in aggregate for the four companies), the draft proposals highlighted the following impact of the removal of inflation from depreciation and RAV for the four network companies:

(a) an aggregate decrease in the average MAR by AED 2.1 billion a year over the RC1 period, with the most impact on TRANSCO's electricity MAR;

(b) an aggregate decrease in 2018 opening RAV by around AED 11 billion, representing the difference between (i) 2018 opening RAV in 2014 prices as reported in PC5 final proposals, and (b) 2018 opening RAV in nominal prices; and

(c) after removal of inflation and adjustment for the ex-post efficient capex review, the companies' 2015 RAV (AED 79 billion, in nominal prices) declined to a level lower than the 2015 net book value of property plant and equipment (AED 93.4 billion, nominal prices) as reported in the companies' 2015 SBAs.

Responses

Removal of inflation indexation from RAV and regulatory depreciation

6.9 The respondents to the draft proposals refuted the proposals for removal of inflation indexation from depreciation allowance as also discussed in section 2. In summary:

(a) The respondents preferred continuing with inflation indexation of RAV and depreciation to ensure consistency of approach with previous price controls set by the Bureau (PC1 to PC5) and with other regulators, particularly the UK and Australia which have similar CPI-X regulatory regimes. The respondents argued that this change along with other adjustments will significantly reduce companies MAR, turning the companies into losses which is very unusual for a regulated business and is likely to severely and adversely impact the long-term investors' confidence, in turn, the success of privatisation model achieved so far in Abu Dhabi.

(b) ADWEA's consultant report on inflation indexation of depreciation and RAV recommended continuation of PC5 approach of providing inflation indexation citing following justifications:

(i) Referring to the bank loan example quoted in the RC1 draft proposals, the ADWEA consultant report argued that inflation protection on principal amount of a bank loan in addition to the rate of return is provided, though based on an estimate of inflation where bank carries the risk of the difference between estimate and actual inflation. Further, the report argued that such indexation is embedded into the interest rate therefore there is no separate indexation of principal amount. As discussed in section 2, the report concluded, with the use of sample calculations, that the Bureau's proposed approach to inflation compensation at RC1 could lead to significant under or over-compensation to the companies, depending on the value of inflation.;

(ii) Inflation indexation is provided by a number of other regulators in other jurisdiction to the regulated businesses including state-owned entities such as Irish gas and electricity regulator, the Commission of Energy Regulation (CER)'s December 2016 decision paper for ESB Network Limited 2016-2020 revenue controls and Australian regulator IPART's June 2016 determination for Sydney Water Corporation revenue control for water, wastewater and other services.

(c) Both ADSSC and ADWEA group stressed the need for the Bureau to provide merits of changing the previous approach that provided inflation indexation and reasoning why the Bureau believes the new proposal is more appropriate and why the reasons for new proposals were not considered in the past over such long period i.e PC1 to PC5 that continued providing inflation indexation of depreciation and RAV.

(d) At the meeting between DoF, ADWEA and the Bureau on 28 August 2017, DoF suggested the Bureau to consider the adverse impact the Bureau's proposals for removal information from depreciation on the companies' cash flows, particularly in context that DoF neither provides funding nor allows ADWEA to borrow money from banks.

Extended asset life assumptions

6.10 The Bureau's asset life consultant has described and addressed ADWEA and licensees' responses in detail in its final report and addendum. Key issues from these responses are summarised as follows:

(a) ADWEA group in general supported the review of asset life assumptions, with the proviso that any extension in asset life should be both technically justified and financially beneficial to Abu Dhabi. Section 2 sets out ADWEA's detailed comments;

(b) Arguing on the objective and scope of the asset life assumption review, respondents expressed concerns that:

(i) The prime objective of this study was to reduce the MAR; and

(ii) The Bureau's consultant was proposing extension in actual useful life of the assets but without complementing such extension with higher opex allowances for repair and maintenance of assets to cater for the extended lives.

(c) While ADSSC accepted the need for the sector to operate under the most appropriate asset lives that reflect the management, operations and performance of network company assets, yet it expressed its concerns on lack of technical/engineering input into the study and stressed the need to duly consider Abu Dhabi environmental factors that affect the asset's lifecycle. ADSSC considered that the current useful life assumptions remain appropriate.

(d) The respondents reiterated their preference for the continued use of straight-line method for regulatory depreciation.

Assessment

Removal of inflation indexation from RAV and regulatory depreciation

6.11 Our assessment of the respondents' responses on removing inflation from depreciation is as follows:

(a) We note that the companies' main argument against our proposals for removal of inflation from depreciation and RAV is confined to the consistency of RC1 with

previous price controls set by the Bureau and with other regulators and significant adverse impact on the companies MAR and RAV, but without any compelling economic justification (except for the analysis in ADWEA consultant's report) to reject our proposals;

(b) On the ADWEA consultant's report:

(i) We do not agree with the argument that principal amount of a bank loan is also indexed for inflation. Even if accepted for the sake of argument, the example quoted in the RC1 draft proposals relating to capital cost recovery (CCR) charge under the power and water purchase agreements (PWPAs) and the sewerage treatment agreements (STAs) in the sector - where CCR provides return on and return of capital (using nominal WACC) is not inflated for indexation while other components of the PWPA/STA costs are indexed – does not support this view; However, we note ADWEA consultant's worked example demonstrating that removal of inflation indexation from depreciation and RAV will mean the licensees will not be able to earn the rate of return or WACC allowed in the price controls, though the example did not provide calculation over the whole life of asset; and

(ii) We note ADWEA consultant's examples of regulators in other jurisdictions with similar price control regime and ownership structure as in Abu Dhabi who provide inflation indexation of depreciation. As discussed in the RC1 draft proposals, ADWEA previously recognised that regulatory regime in Abu Dhabi provides separate funding for replacement capex. We therefore concluded that the reference to certain regulators in the UK and Australia (where separate funding for replacement capex is not provided explicitly) may not be appropriate.

(c) The previous approach of allowing deprecation indexation was based on the CPI-X regulatory model taken from other jurisdictions such as the UK. However, this does not mean the regulatory model should remain static and should not be altered and/or improved over time. A greater transparency to the Bureau over the sector's funding arrangements and return calculation (gained through Bureau's recent project on developing proposals for calculation of ADWEA's return to Government) and call for rationalisation of sector costs from both the Government (due to growing subsidy) and customers (some paying cost reflective tariffs from 1 January 2015) were the main triggers for a holistic review of the regulatory regime and assessment of adequacy and relevance of various allowances provided under the regime.

(d) We note DoF's suggestion and updates on capital funding arrangements for ADWEA group.

6.12 Nonetheless, as described in Section 2, we have decided not to implement our suggestion to remove inflation from depreciation and RAV in these final proposals based on the following key considerations:

(a) ADWEA consultant's report conclusion (based on worked example) that removal of inflation indexation from depreciation and RAV will mean the licensees will not be able to earn the rate of return or WACC allowed in the price controls;

(b) Our statutory duties to ensure consistency and financial health of licensees; and

(c) The adverse impact on the licensees' cash flows over RC1 period.

Extended asset life assumptions

6.13 Our assessment of the respondents key comments on asset life assumption review is as follows:

(a) We note and appreciate the network companies' general support for review of asset life assumption. The Bureau consultant's final report and addendum to the final report set out technical and financial benefits of the extended asset life assumptions to Abu Dhabi, mainly to align the price control assumptions to technical, accounting and actual lives observed in practice and to reduce overall costs to the companies, customers and Government. Section 2 sets out our detailed assessment of ADWEA's comments.

(b) It was disappointing to note respondents' persistent misunderstanding of the objective and scope of asset life assumption review. We reiterate that objective and scope of this review was for the Bureau's consultant to recommend updates in asset life assumption used in the price controls considering the technological advancements and improvements in companies' procedures for asset design, installation, operation and maintenance since inception, when the existing asset life assumptions were first set. The Bureau consultant's work did not involve proposing extension in actual useful life of assets whether through further improvements in asset procurement and management procedures (which could have increased maintenance opex) or technology (which might have impacted the capex requirements). Therefore, the consultant's recommendations do not impact the actual operation and maintenance costs of the companies. Further, the companies seemed to struggle recognising that the two components of MAR are impacted differently with increase in asset life assumption used in the price controls. While an increase in the asset life assumption decreases annual depreciation component of the MAR, it increases the return component, resulting in only a minimal or negligible net impact on the total MAR over the RC1 period as evidenced from results presented in the RC1 draft proposals (less than AED 100 million per year over RC1 period, though the impact will likely to gradually increase over longer term as more new capex is incurred and subject to extended life assumption in price controls).

(c) As explained in the Bureau consultant's final report on asset life assumption review and addendum, the consultant employed technical experts who developed a comprehensive and sound methodology in consultation with the companies for the review, undertook site visits, held meetings with the companies and actively contributed to this this work stream throughout this study. Accordingly, ADSSC's concerns were adequately addressed.

Consultant's assessment of asset life assumptions

6.14 For the asset life assumptions, the Bureau's RC1 draft proposals were based on its asset life consultant's draft report issued in February 2017. Since then, the consultant has issued its final report in June 2017, taking account of the companies' comments on draft assets life review report and further information and justifications provided by the companies. The consultant also presented the final asset life review report in a workshop with the sector on 6 July 2017. On the companies' request, the Bureau allowed another final opportunity for Licensees to provide additional comments and information/justifications to our asset life review consultant for updates in the final recommendations, if any. The companies then provided additional comments on this final report, which our consultant reviewed and issued an addendum to the final report responding to these comments. This addendum (being issued to ADWEA and Licensees with these final proposals) concludes that the companies did not provide any new information or compelling justification to change our consultant's recommendations in the final report. As detailed in its final report issued in June 2017, the consultant applied a triangulation approach for assessment of asset life assumptions:

(a) **International best practice and benchmarks**: The consultant, in coordination with the companies, categorised the companies' fixed asset register (FAR) in accordance with asset function and technical life and mapped the same with the best practice asset categories to the extent possible. The consultant compiled a detailed list of benchmarks giving due consideration to the local operating environment.

(b) **Company capabilities regarding the asset lifecycle management**: Since the companies' management of asset can have an impact on the asset lives, the consultant evaluated the various phases that surround the asset lifecycle through review of the companies' policies and procedures and inspection of assets during site visits - particularly reviewing the companies' practices with respect to asset specification and design, construction, maintenance and refurbishment.

(c) **Current asset condition and performance**: The consultant assessed the asset condition and performance through meetings with representatives of the network companies and site visits. The consultant also assessed the capabilities and effort that the companies put in practice to understand the asset condition and performance and how this information is used in the asset lifecycle management decisions.

6.15 Taking account of the above, the consultant recommended to:

(a) Continue using straight-line method and weighted average asset life assumption for each price control business to calculate depreciation allowance in the MAR, for simplicity and consistency with the Bureau's past practice and with other regulators;

(b) Increase the asset life by (i) 10 years for water, wastewater and electricity businesses of the network companies during RC1, (ii) another 5 years for ADSSC, 10 years for electricity business of TRANSCO and 15 years for water businesses of AADC, ADDC and TRANSCO and none for electricity business for AADC and ADDC during next price control review (RC2); and

(c) Apply the proposed increase in asset life assumption only on new assets (i.e capex from 2018 onwards). This is based on consultant's assessment of existing asset's condition, the companies' enhanced capabilities and maturity in recent past.

6.16 The consultant's recommendations pertaining to later price control reviews (RC2) will be formally consulted, discussed and agreed with the sector through the usual price control consultation process. The consultant's recommended asset life assumptions for new assets for RC1 are summarised in **Table 6.1** above.

Final proposals

6.17 In view of the above, we suggest in these final proposals:

(a) continuing with inflation indexation of the RAV and the depreciation allowance taking into consideration:

(i) our statutory duties under Law No. 2 (as amended) to act consistently and ensure financial health of the companies;

(ii) ADWEA consultant's report demonstrating with worked example that the companies will not get full amount of allowed return without providing inflation on depreciation; and

(iii) the adverse impact on the licensees' cash flows over the RC1 period;

(b) continuing with the straight-line method for regulatory depreciation but using the consultant's final recommendations on extended life assumptions for new assets of 40 years for electricity and water businesses and 60 years for wastewater businesses.

Calculation of regulatory depreciation for RC1

6.18 As explained in the draft proposals, we have updated the Excel-based model developed at the previous review to create the "***RC1 Depreciation Model***". This calculates, for each business separately, the depreciation on all allowed investments to date. This is done by separately calculating and adding depreciation on:

(a) the initial RAV set for 1999 for AADC, ADDC and TRANSCO and for 2005 for ADSSC;

(b) each annual efficient capex determined to date i.e. during PC1, PC2, PC3, PC4 and PC5 periods (excluding 2016 and 2017);

(c) each annual provisional capex during the PC5 period for which efficiency review has not been completed (i.e. 2016 and 2017); and

(d) the foregone financing costs in relation to PC1 efficient capex previously added to the RAV.

The depreciation on RC1 ex-ante capex allowance is calculated separately in the main price control financial model.

6.19 **Table 6.2** below shows the total capex depreciation to date in 2018 prices, for each business in 2018 prices in respect of initial RAVs, efficient capex for each price control period from PC1 to PC5 (excluding 2016 and 2017), along with provisional capex for PC5 (2016 and 2017 only). These depreciation projections in the final proposals are higher – in terms of annual average for the four network companies, combined – by AED 1.4 billion from the estimates in the draft proposals (in nominal prices) due to withdrawal of our earlier proposal to remove inflation from depreciation and RAV.

6.20 Notably, the depreciation for ADSSC is lower in 2019 to 2021 than for 2018. This is because the initial (2005) RAV becomes almost fully depreciated in 2019 (in line with the initial RAV asset life shown in **Table 6.1** above).

Table 6.2: Depreciation on initial RAV and on capex to date (excluding RC1 capex)

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	475	437	437	437
	Water	177	177	177	177
ADDC	Electricity	1,172	1,172	1,172	1,027
	Water	314	314	314	314
TRANSCO	Electricity	1,854	1,854	1,854	1,854
	Water	901	901	901	901
ADSSC	Total	975	502	428	428
Total		**5,868**	**5,356**	**5,282**	**5,137**

6.21 **Table 6.2** above excludes depreciation in respect of the ex-ante RC1 capex. Instead, this is calculated in the main price control financial model shown in **Table 6.3** below. See Section 7 for details on the main price control financial model and Annexes A and B for line-by-line descriptions of RC1 Depreciation Model and the main price control financial model, respectively.

Table 6.3: Depreciation on RC1 ex-ante capex

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	10	26	35	39
	Water	4	9	12	13
ADDC	Electricity	7	16	19	20
	Water	8	21	29	35
TRANSCO	Electricity	13	34	48	56
	Water	3	7	11	14
ADSSC	Total	12	35	54	70
Total		**55**	**148**	**209**	**248**

6.22 **Table 6.4** below presents the total annual depreciation for each business on all assets, namely the initial RAV, efficient capex for PC1-PC5 periods, and the provisional capex for the remaining PC5 years (2016-2017) and the RC1 period. Each amount in this table is the sum of corresponding amounts shown in **Table 6.2** and **Table 6.3** above. On average over the RC1 period, the total depreciation allowance for the four companies in the final proposals (about AED 5.6 billion a year) is higher than that in the RC1 draft proposals (about AED 4.2 billion a year) by about AED 1.4 billion a year or 33%, mainly due to the reinstated inflation indexation of RAV and depreciation.

Table 6.4: Total depreciation for RC1 calculations – final proposals

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	485	463	472	476
	Water	180	186	189	190
ADDC	Electricity	1,178	1,188	1,191	1,046
	Water	322	335	343	349
TRANSCO	Electricity	1,867	1,888	1,902	1,910
	Water	904	908	912	915
ADSSC	Total	987	537	482	498
Total		**5,922**	**5,505**	**5,491**	**5,385**

Updating RAVs

Draft proposals

6.23 The earlier consultation papers stated our intent, for updating companies' RAVs at this price control review, is to use an approach similar to that adopted during previous price controls. This will entail:

(a) aligning the previous provisional capex allowances of PC4 (2012-2013) and PC5 (2014-2015) periods against the actual efficient capex;

(b) adding the firm capex allowances resulting from the RC1 ex-ante capex review; and

(c) remunerating as additional revenue over the RC1 period, the financing costs of the differences between the efficient and provisional capex for PC4 and PC5.

6.24 The draft proposals suggested calculation of the opening and closing RAVs for each year of RC1 as follows:

(a) the opening RAV for 2018 (the first year of the RC1 control period) is derived from the 2017 closing RAV calculated by:

(i) removing inflation from the depreciation allowances from 1999-onwards; and

(ii) adding the difference between efficient and provisional capex for PC4 and PC5 (2014 and 2015 only), net of accumulated depreciation from the time such capex was spent until the end of 2017; and

(b) for RC1, the RAVs are calculated by adding RC1 ex-ante capex allowance and subtracting the estimated regulatory depreciation for each year of the price control period.

Responses

6.25 Apart from their refusal to accept the removal of inflation from regulatory depreciation and RAV which are discussed earlier in this section, the network companies generally responded positively to the above arrangements with the following suggestions:

(a) ADWEA group cited a number of reasons for underspending of capex during PC4 (2012-2013) and PC5 (2014-2015). As discussed in Section 2, ADWEA suggested making the entire adjustment for unduly earned financing costs relating to PC4 (2012-2013) and PC5 (2014-2015) capex to the 2017 MAR, rather than the revenues over the RC1 period (the latter being the approach adopted at the previous price control reviews). ADWEA's argument to support this suggestion was that over-statement of network companies' MARs due to capex under-spending against the price control provisional allowances has primarily impacted the Government subsidy given that all the customers in most part of the period 2012-2015 were on subsidised tariffs. Given that a number of customer classes will likely to be paying cost-reflective tariffs during the RC1 period and onwards, a part of the benefit of this revenue adjustment, if made in the RC1, will unduly flow to the customers (through lower cost reflective tariffs) whose tariff was not impacted/overstated due to higher MAR during 2012-2015. Further, ADWEA preferred such adjustment to the 2017 MAR in order to offset the unpaid subsidy for 2014-2016 so as to close all related issues as soon as possible before the start of RC1. In response to our draft derogations (discussed in Sections 1 and 2 and below), ADWEA on behalf of AADC, ADDC and TRANSCO suggested to (i) apply PC4 (2010-2011) capex efficiency scores to the PC4 (2012-2013) and PC5 (2014-2015) capex, (ii) extend the adjustment to 2017 MAR for unduly earned financing costs pertaining to PC4-PC5 capex to also take into account 2016 capex (instead of just 2012-2015 capex, as earlier proposed and reflected in the Bureau's draft derogations of 25 October 2017), (iii) retrospectively apply to 2017 MAR another final adjustment for 2017 capex when known in the same manner as 2016 capex, and (iv) apply a different calculation method than RC1 or earlier price controls for calculation of such adjustment in 2017 prices;

(b) For future ex-post review of capex incurred in subsequent years (2016 onwards), ADWEA suggested annual adjustment in the price controls to avoid significant adjustment at the end of price control period. ADWEA group proposed that such adjustments should be made where the positive or negative variance between provisional allowance and actual capex exceeds 20%;

(c) As discussed in Sections 1 and 2, ADWEA and DoF sought upward adjustment to the MAR for un-paid subsidy of AED 7.5 billion not received by ADWEA from DoF during 2014-2016; and

(d) Since return calculation based on mid-year RAV (average of opening and closing RAV) deducts the deprecation value before return is calculated, ADWEA consultant's report on inflation indexation of depreciation argued that this approach has resulted in under-compensation of the return amount to the companies. ADWEA consultant suggested applying real WACC on the combined total of the current cost accounting (CCA) opening asset value and annual indexation adjustments but before deducting depreciation.

Assessment

6.26 We welcome companies' general support for the current arrangements for updating RAVs. Our assessment of companies' suggestions is as follows:

(a) We note ADWEA's suggestions and arguments to make entire adjustments of unduly earned financing cost relating to PC4 (2012-2013) and PC5 (2014-2015) capex to the 2017 MAR. We also note that the impact of adjustment on total MARs remains the same in NPV terms whether the entire adjustment is made in 2017 MAR or spread over RC1 and the reasons for causing the benefits for such adjustments to accrue to subsidy. ADWEA's suggestions are not acceptable for a number of reasons: (i) as explained in Sections 2 and 5, the efficiency scores previously applied to the PC4 (2010-2011) capex are not reflective of the efficiency assessment results for PC4 (2012-2013) and PC5 (2014-2015) capex, (ii) the adjustment for unduly earned financing costs during PC4 (2012-2013) and PC5 (2014-2015) capex in 2017 MAR is an exceptional event and is not to be repeated for future years, (iii) efficiency reviews of 2016-2017 capex has not been completed at this stage, (iv) the subsidised tariffs for all customers prevailed only until 2014, and (v) ADWEA group has neither used the same calculation method as used at the previous and current price control reviews for such purposes nor provided / explained its calculations. This is a biased approach that will show lower downward adjustment for unduly earned financing costs than the approach used in the previous reviews for higher upward adjustment for foregone financing costs;

(b) Respondents' general preference for annual adjustments to RAV and MAR for ex-post review of capex for 2016 onwards is discussed in detail in Sections 2 and 5;

(c) ADWEA and DoF's suggestion for upward adjustment to MAR for unpaid subsidy is discussed in Sections 1 and 2. We however highlight that that we do not consider such an adjustment relevant to the price control calculations which are based on standard building-block approach to costs, consistent with the previous price control reviews, and we have agreed with DoF to discuss this issue further outside the RC1 consultation. However, this issue may not exist or remain relevant if the adjustment of unduly earned finance costs for PC4 (2012-2013) and PC5 (2014-2015) capex is made to 2017 MAR; and

(d) We do not agree with ADWEA consultant's arguments against return calculation based on mid-year RAV. This approach is based on assumption that the annual capex spent by the companies is equally spread across the year. The approach is reasonably robust, coherent with assumption applied in deprecation allowance calculation and has consistently been applied to the price control calculations since inception. We highlight that ADWEA and licensees have insisted on consistency in approaches to previous price control reviews. Further, CCA approach referred in ADWEA consultant's report as followed in other jurisdictions, typically entails updating RAVs using licensees 'regulatory accounts' that are prepared on current cost basis instead of historical costs. Since the SBAs of network companies in Abu Dhabi are prepared on historical cost basis, aligned

and consistent with their statutory accounts, the Bureau does not use CCA approach.

Final proposals

6.27 In light of above discussions, the Bureau continues its approach for calculation of return based on mid-year RAVs and calculation of the opening and closing RAVs for each year of RC1 as follows:

(a) the opening RAV for 2018 (the first year of the RC1 control period) is derived from the 2017 closing RAV calculated at the last review by adding the difference between efficient and provisional capex for PC4 (2012-2013 only) and PC5 (2014-2015 only), net of accumulated depreciation from the time such capex was spent until the end of 2017; and

(b) for RC1, the RAVs are calculated by adding RC1 ex-ante capex allowance and subtracting the estimated regulatory depreciation for each year of the price control period to and from the opening RAVs.

6.28 Accepting ADWEA's suggestion, we offered each licensee a derogation on 26 October 2017 (for their acceptance by 30 October 2017) to make the entire revenue adjustment for unduly earned financing costs relating to PC4 (2012-2013) and PC5 (2014-2015) capex underspending to the 2017 MAR (rather than to the MAR over RC1 period). We have agreed to these adjustments as an exceptional case given the magnitude of adjustments, the fact that these relate to the period of mostly subsidised customer tariffs, and that only a limited time is left for companies to close their accounts for 2017. While ADSSC expressed willingness to accept the proposed derogation for consistency with other licensees, ADWEA's response of 5 November 2017 and TRANSCO's response of 2 November 2017 did not confirm unconditional acceptance of such derogations and proposed new major changes including extension to cover 2016 and 2017 capex, and use of different calculation methodology and efficiency scores. We have therefore not issued any derogation to the licensees. To retain the flexibility offered via the proposed derogations, these final proposals contain all details with the assumption that derogations are not accepted by all licensees to apply such adjustment to the 2017 MAR. However, if AADC, ADDC and TRANSCO accept the derogations, these final proposals also contain revised MAR profiles, notified values ('a' and 'b') and X-factors for the RC1 period assuming derogations are accepted and issued. Accordingly, these final proposals offer the licensees two options with separate draft licence modifications (in relation to the charge restrictions conditions schedule of the respective licences) and financial models being issued with these final proposals for each option:

a) Option 1: RC1 final proposals without derogations to apply adjustment for PC4-PC5 capex financing costs to 2017 MAR (i.e such adjustment to apply over RC1 period) resulting in lower MAR over RC1 period (AED 9 billion in 2018 prices in total)

b) Option 2: RC1 final proposals with derogations to apply adjustment for PC4-PC5 capex financing costs to 2017 MAR (i.e such adjustments then do not apply over RC1 period) resulting in higher MAR over RC1 period.

6.29 **Annex A** sets out the detailed calculations of the updated RAVs and describes these calculations on a line-by-line basis. These calculations cover both the two options discussed earlier in Section 2 - with and without 2017 MAR adjustment derogation.

Updating RAVs for PC4 and PC5 additional efficient capex

6.30 As agreed at the previous price control reviews, the additional efficient PC4 (2012-2013) and PC5 (2014-2015) capex over and above the provisional PC4 and PC5 capex allowances (i.e., the amounts in Table 5.3 and Table 5.4, respectively) needs to be rolled into the RAVs. However, as discussed earlier, the foregone or unduly-earned financing costs (both depreciation and return on capital) relating to the PC4 and PC5 capex is proposed to be remunerated over the RC1 period (rather than added to the RAVs). These financing costs relate to the period between (a) the time when the PC4 and PC5 capex was undertaken, and (b) the time when it will be financed.

6.31 **Annex A** to this paper shows how this has been done for each business of AADC, ADDC and TRANSCO separately and ADSSC in **Annexes A.1 through A.7**. The format of tables and calculations in each of these Annexes is standardised and has been described on a line-by-line basis in **Annex A**. The results of this calculation are summarised in **Table 6.5** below.

Table 6.5: Updated RAVs and unduly earned financing costs for PC4 and PC5 capex

AED million		NPV of PC4 and PC5 capex foregone (unduly earned) financing costs		Opening 2018 RAVs from last review	Opening 2018 RAVs updated from last review	Opening 2018 value of PC4 and PC5 additional efficient capex	Opening 2018 RAVs updated for efficient PC4 and PC5 capex
		(Added to RC1 revenue in option 1)	(Added to 2017 MAR in option 2)			(Added to RAV)	
		2018 prices	2017 prices	2014 prices	2018 prices	2018 prices	2018 prices
AADC	Electricity	(558)	(547)	9,482	10,487	(1,363)	9,124
	Water	53	52	3,251	3,596	(32)	3,564
ADDC	Electricity	(1,863)	(1,825)	23,610	26,112	(5,116)	20,996
	Water	(176)	(173)	6,452	7,136	(418)	6,717
TRANSCO	Electricity	(4,118)	(4,032)	38,818	42,932	(7,776)	35,156
	Water	(2,012)	(1,970)	21,795	24,105	(5,204)	18,901
ADSSC	Total	(350)	(343)	18,717	20,701	(964)	19,737
Total		**(9,025)**	**(8,837)**	**122,125**	**135,069**	**(20,873)**	**114,196**

Notes: In this table, PC4 and PC5 refer to years 2012-2013 and 2014-2015 for which the capex has been subject to recent ex-post efficiency assessments – see Section 5.

6.32 The total NPV of adjustments, up to 2018, for unduly-earned financing costs from PC4 and PC5 capex, for all businesses, amounts to AED 9.0 billion (in 2018 prices). In the price control calculations (presented in Section 7), this NPV amount is spread over the companies' revenue requirements for the RC1 period. **Annex A** shows how this has been done for each business of the network companies.

6.33 As discussed above, if the licensees accept the proposed derogations (option 2) to make entire revenue adjustments for unduly earned financing costs pertaining to PC4 and PC5 capex to the 2017 MAR, this adjustment will then not be made in RC1 revenues and the revised set of notified values as described in Section 7 will apply to RC1.

6.34 The total opening 2018 RAV for all the businesses has decreased from about AED 122.1 billion in 2014 prices from the last price control review to about AED 114.2 billion in 2018 prices. This decrease in RAV by about AED 7.9 billion reflects the adjustment of a negative figure (AED 20.9 billion) for the depreciated value of aggregate PC4 and PC5 underspent efficient capex compared to the provisional allowances for respective periods discussed in Section 5, partly offset by the change in price basis from 2014 prices to 2018 prices (i.e. due to CPI inflation).

Updating RAVs for RC1 ex-ante capex

6.35 **Annexes A-1 to A-7** to this paper also show the updating of RAVs for the ex-ante RC1 capex for each business. **Table 6.6** summarises the results of this updating of RAVs.

6.36 The total RAV for all the businesses decreases from about AED 114.2 billion from the start of 2018 to AED 107.7 billion by the end of 2021 (after adjustments for RC1 ex-ante capex). The RAVs shown in **Table 6.6** are used as inputs to the RC1 price control calculations in Section 7. Due to inflation indexation of RAV, the aggregate RAV is now higher than in the draft proposals (AED 90.3 billion) by AED 19.4 billion, or 19.3%, by the end of 2021.

Table 6.6: Opening RAVs updated for RC1 ex-ante capex

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	9,124	9,410	9,492	9,215
	Water	3,564	3,677	3,648	3,526
ADDC	Electricity	20,996	20,359	19,381	18,228
	Water	6,717	7,000	7,096	7,004
TRANSCO	Electricity	35,156	34,296	33,149	31,571
	Water	18,901	18,199	17,459	16,698
ADSSC	Total	19,737	20,194	20,946	21,481
Total		**114,196**	**113,135**	**111,171**	**107,723**

Cost of capital

Draft proposals

6.37 In the RC1 draft proposals, we agreed (further to consultation with both ADWEA and DoF during 2016-2017) to set the allowed rate of return for RC1 in terms of real WACC based on the approach used in the previous price control reviews. Accordingly, in line with the approach used previously, we used data and evidence from the overseas regulatory decisions and proposals, cross-checked against the information available for local and regional estimates and calculated the real cost of capital in the range of 2.3% to 6.2% (with a mid-point of 4.2%) as summarised in **Table 6.7** below. We therefore suggested a real cost of capital of 4.2%.

Table 6.7: Bureau's cost of capital calculations - draft proposals

	Low	High	Mid-Point Average
Risk-free rate (real)	0.36%	1.50%	0.93%
Debt premium	1.10%	3.64%	2.37%
Cost-of-debt (real)	1.46%	5.14%	3.30%
Equity Risk Premium	4.50%	7.40%	5.95%
Equity Beta	0.60	0.90	0.75
Cost-of-equity (real)	3.06%	8.16%	5.39%
Gearing	45.00%	65.00%	55.00%
Cost of capital (real)	**2.34%**	**6.20%**	**4.24%**

Responses

6.38 ADWEA group's response dated 10 June 2017 adjusted Bureau's proposed real WACC range to 7.2%-7.5%, and ADWEA group consultant's report in July 2017 estimated a real WACC range of 4.6%-6.2%. ADSSC did not provide comments on the WACC.

ADWEA group's response

6.39 In its response to the RC1 draft proposals dated 10 June 2017, ADWEA group questioned the way in which international data was used by Bureau in the WACC calculation, specifically in relation to:

(a) Use of individual components of the WACC rather than using the WACC calculations as a whole;

(b) No adjustment in the debt or equity risk premium to reflect differing risk environments; and

(c) No consideration of the debt restrictions imposed on ADWEA group.

6.40 ADWEA group therefore adjusted the international data contained in the RC1 draft proposals to calculate a real WACC range of 3.3%-8.9%, with a mid-point WACC of 6.1% and further adjusted the mid-point WACC of 6.1% for a risk-free rate of 2.2%, based on 10-year US Treasury bonds yield, to calculate a real WACC of 7.5% as summarised in **Table 6.8** below.

Table 6.8: ADWEA group – WACC calculations based on international benchmarks

	Low	High	Mid-Point Average	Adjusted Mid-Point Average
Risk-free rate (real)	1.00%	0.47%		2.2%
Debt premium	2.10%	3.64%		
Cost-of-debt (real)	3.10%	4.10%		
Equity Risk Premium	4.00%	7.40%		
Equity Beta	0.60	1.30		
Cost-of-equity (real)	3.4%	10.10%		
Gearing	45.00%	20.00%		
Cost of capital (real)	**3.3%**	**8.9%**	**6.1%**	**7.5%**

6.41 Using local and regional data included in the RC1 draft proposals and an inflation of 2.5%, ADWEA group calculated a real WACC range of 7.2%-7.5% as summarised in **Table 6.9** below.

Table 6.9: ADWEA group – WACC calculations based on regional benchmarks

	Low			High		
	Low	High	Mid-point	Low	High	Mid-point
Cost of debt (nominal)				5.00%	8.00%	
Cost of equity (nominal)				11.0%	13.6%	
Cost-of-debt (real)				3.10%	4.10%	
Gearing				20%%	60%	
Cost of capital (nominal)	6.9%	12.48%	9.7%	9.8%%	10.2%	10.0%
Inflation			2.5%			2.5%
Cost of capital (real)			**7.2%**	**3.3%**	**8.9%**	**7.5%**

ADWEA's consultant (EY) report

6.42 ADWEA's consultant estimated a WACC range of 4.6%-6.2% as per the calculations summarised in **Table 6.10** below.

Table 6.10: ADWEA's consultant – cost of capital calculations

	Low	High	Mid-Point Average
Risk-free rate	1.50%	1.00%	1.25%
Country risk premium	1.20%	0.60%	0.90%
Cost-of-debt (real)	3.00%	5.00%	4.00%
Equity risk premium	5.00%	6.50%	5.75%
Asset beta	0.35	0.45	0.40
Equity beta	0.58	0.90	0.74
Cost-of-equity (real)	5.62%	7.45%	6.54%
Gearing	40.00%	50.00%	45%
Cost of capital (real)	**4.57%**	**6.39%**	**5.39%**

6.43 ADWEA's consultant used (a) a country risk premium in WACC calculations (b) the risk free rate range (1.1%-1.5%) based on the long term (20-25 year) historical averages of US Treasury Inflation Protected Securities (TIPS) and 11 overseas regulatory precedents (c) a gearing of 40%-50% citing the lower gearing in ADWEA group and the corporate tax as the reasons for higher leverage in overseas jurisdictions and (d) the low values of risk-free rate and CRP to estimate high scenario for WACC and vice-versa.

Meeting with DoF and ADWEA

6.44 At the meeting on 28 August 2017, DoF suggested for the Bureau to commission an independent assessment of WACC for RC1.

Assessment

Assessment of ADWEA group's response

6.45 The Bureau welcomed ADWEA group's acceptance of the overall approach used for WACC estimation. Our views on the way the international data is or should be used are as follows:

(a) We highlight that the methodology of using individual components to determine WACC has been consistent, agreed by the sector and applied in all previous price control reviews to date. As such, the Bureau does not accept using the calculated WACC as whole to arrive at real WACC.

(b) Our WACC calculations have heavily drawn on the overseas regulatory proposals and decisions of similar businesses in UK (including Northern Ireland and Australia) and then crossed checked with local and regional data. We therefore, disagree with ADWEA group that our methodology does not adjust for differing risk environments.

(c) In respect of debt restrictions on ADWEA group, we note that using no gearing (implied by actual banks loan based gearing of ADWEA or licensees) as suggested by ADWEA group is inconsistent with the Bureau's statutory duties to ensure efficiency in the sector, and with the market approach for WACC agreed and supported by the sector, ADWEA and DoF for RC1 - as acknowledged by ADWEA group's response and followed in ADWEA group own consultant's report for WACC estimation. In line with our statutory duties to promote efficiency, in estimating the WACC for price controls, we consider an optimal capital structure based on our analysis of prevailing market conditions and on benchmarks from overseas regulatory decisions.

6.46 In the WACC calculation using international data, we note that ADWEA group used a similar equity risk premium to the Bureau's proposed range of equity risk premium in the RC1 draft proposals. ADWEA group's adjusted real WACC range of 7.2%-7.5% is based on a higher risk-free rate range, higher debt premium, higher equity beta and a lower gearing than optimal or justified levels, as explained below and as amended by the Bureau in **Table 6.11**.

(a) In respect of the risk-free rate:

(i) ADWEA group ignored all values equal to and below 0.45% in the international benchmarks. However, we believe these cannot be considered as outliers since these occurred frequently in data from Australian regulatory proposals. The only outlier is 0.08%. The correct range is therefore 0.36%-1.50%. There was a typo in Table 6.13 of the RC1 draft proposals in respect of the risk-free rate data for AER and IPART where the values of 0.45% and 1.07% not being outliers should not have been marked with an asterisk (*). This correction however does not affect the WACC results in the RC1 draft proposals;

(ii) ADWEA group used a low value of risk-free rate to estimate high scenario for WACC and high rate to estimate low scenario for WACC; and

(iii) Correcting ADWEA group's range of risk-free rate to include lower values that are not outliers and to switch the use of low and high values of risk-free rate (i.e. **0.36% and 1.50%)** for respective scenarios for WACC would affect results of ADWEA's WACC calculations as shown in **Table 6.11**.

(b) Four out of the five latest UK regulatory proposals provide for lower debt premium values than 2.1% used by ADWEA group. ADWEA group did not provide any supporting evidence to justify the use of higher figure of 2.1% and ignoring the lower figures. ADWEA group's response is also inconsistent with ADWEA group's own consultant report data that point to a debt premium range of **2.1%-2.5%** (floatation costs included). We note this is within the Bureau's proposed range for debt premium in the RC1 draft proposals and accordingly this has been used in ADWEA group's cost of capital amended by the Bureau in **Table 6.11**.

(c) For the equity beta, ADWEA group used one of the outliers excluded by the Bureau from overseas regulatory proposals and decisions. We highlight that it is unusual for a regulated utility to have a beta of more than unity (1.00) and hence such values for equity beta were excluded as outliers by the Bureau. We also highlight that ADWEA group's consultant report contains an analysis of 14 comparator companies across US, UK and Australia, which estimated an equity beta estimate of 0.58 to 0.90, which is fully in line with the Bureau's proposed range in the RC1 draft proposals. Accordingly, an equity beta range of **0.58 to 0.90** has been used in ADWEA group's cost of capital amended calculations in **Table 6.11**

(d) Although ADWEA group used a similar equity risk premium range (4.00%-7.40%) to the RC1 draft proposals (4.50%-7.40%), ADWEA group used the lower end of the range from an overseas regulatory precedent for the low scenario in contrast to the average of this range used by the Bureau for its lower scenario. Accordingly, the Bureau used the range of **4.50%-7.40%**, which is more in line with ADWEA group consultant's range of 5.00%-6.50%.

(e) As highlighted previously, to satisfy the Bureau's statutory duty to ensure efficiency in the sector, we have always used a gearing that is optimal or closer to optimal. We note that at least 66% of the capital for the network companies come from interest-free shareholder loans. If these were all assumed to be equivalent to debt, then this would imply a gearing level of 66%. Accordingly, using 66% as gearing with null cost of debt would produce a lower WACC than proposed in the RC1 draft proposals. However, we do not support using solely actual capital structure or costs and accordingly use the Bureau's RC1 draft proposals range of **45%-65%** in **Table 6.11**.

6.47 ADWEA group further adjusted the risk-free rate by using a nominal rate of 2.2% based on US 10-year Treasury bond yield as summarised in **Table 6.8** above. However, to be used in real WACC calculations, the risk-free rate should first be converted into real terms. This nominal risk-free rate of 2.2% would become negative when converted into real rate using a 2.5%-3% inflation estimate from ADWEA group's response or its consultant report and would result in an even lower WACC than what ADWEA argued for.

6.48 In respect of ADWEA group's adjusted real WACC range of 7.2%-7.5% using local and regional data, we again highlight the agreed methodology of using individual components to determine WACC as consistently applied in all previous price control reviews to date. As such, the Bureau does not accept using the calculated WACC as whole to arrive at real WACC.

6.49 If we adjust ADWEA's WACC calculations summarised in **Table 6.8** above to reflect the estimates appropriately from ADWEA group, its consultant's report and the RC1 draft proposals as explained above, it would produce a lower real WACC range of 2.74%-5.46% or a mid-point average of 4.1% as summarised in the **Table 6.11** below.

Table 6.11: ADWEA group's cost of capital –Bureau's amendments

	Low	High	Mid-Point Average
Risk-free rate (real)	0.36%	1.50%	0.93%
Debt premium	2.10%	2.50%	2.30%
Cost-of-debt (real)	2.46%	4.00%	3.23%
Equity Risk Premium	4.50%	7.40%	5.95%
Equity Beta	0.58	0.90	0.74
Cost-of-equity (real)	2.97%	8.16%	5.33%
Gearing	45%	65%	55%
Cost of capital (real)	**2.74%**	**5.46%**	**4.1%**

Assessment of ADWEA group's consultant report

6.50 ADWEA group's consultant in its report introduced a concept of country risk premium into the WACC calculations. The report also used a higher risk-free rate range and lower gearing in relation to the RC1 draft proposals, though we note that ADWEA group's consultant estimates of equity beta and equity risk premium fall within the Bureau's proposed range in the RC1 draft proposals.

6.51 In our view, ADWEA group's consultant has effectively used a different methodology by adding a country risk premium (CRP) in the WACC calculations. We disagree with this approach as:

(a) This is inconsistent with the approach and methodology agreed by ADWEA, DoF and all licensees, and applied in all price controls to date;

(b) None of the WACC calculations used by the overseas regulators or sourced from the local market, as quoted by us and ADWEA group, indicate any evidence about the use of a CRP;

(c) Any CRP is already reflected within the prevailing risk-free rates and market premium levels for both debt and equity in the relevant markets. It is pertinent to note here the overseas regulators in the UK and other comparable jurisdictions assume a minimum investment credit rating (BBB- or Baa3) while estimating WACC for their licensees. Our licensees being owned by the Government of Abu Dhabi (with a long-term rating of AA) are expected to have even lower WACC in practice. However, we have not made any adjustment to overseas WACC estimates for this;

(d) ADWEA group's consultant selectively used a range of 1%-1.5% for real risk-free rate, based on long term average yield of US TIPS and 11 overseas regulatory precedents but excluding low estimates which occur frequently and are clearly not outliers. After including the non-outliers, the correct range is **0.45%-1.50%**. The Bureau used latest 13 overseas data points and cross-checked with 10 local and regional precedents in the RC1 draft proposals as against ADWEA group's consultant which only used 11 overseas data points; and

(e) Aligned with the RC1 draft proposals and previous price control reviews approach, the more relevant averaging period for the risk-free rate based on the US TIPS is 5 years. As mentioned in ADWEA group's consultant report, this would provide a risk-free rate range of 0.21%-0.94%, which would lead to a lower real WACC than the one calculated in the RC1 draft proposals.

6.52 In respect of gearing, we disagree with the range used by ADWEA group's consultant for the following reasons:

(a) ADWEA group's consultant used a lower gearing range of 40%-50% than suggested by data in its own report from 14 comparator companies (40%-70%) from UK, US and Australia and 11 overseas regulatory precedents (50%-65%). A more accurate and comparable range therefore for gearing would be **50%-65%**;

(b) We do not agree that the corporate tax is the sole reason for higher gearing in practice. ADWEA consultant has failed to explain why we see in practice high gearing in the UAE and regional countries which do not levy any corporate taxes on businesses. The optimal level of costs and risks from debt financing and resulting debt as a cheaper source of funding also explain debt financing and high gearing even in tax-free jurisdictions such as Abu Dhabi. This is evidenced by actual capital and project financing structures in the sector, Abu Dhabi, the UAE and region where gearing of around 80% or above is usual;

(c) We also note that the gearing level, based on classification of shareholder loans as debt, for network companies in the sector itself is 66% or above; and

(d) Finally, economic regulators including the Bureau are required by their statutory duties to ensure efficiency and do not rely exclusively on actual gearing of the regulated companies. They also seek to promote and incentivise optimal gearing levels through their regulatory decisions. For this reason, we consider that our proposal for 55% gearing is reasonable and achievable. It provides an economic signal for the licensees to improve the efficiency of their capital structure over RC1 in the similar manner as our approach to opex projections.

6.53 ADWEA group's consultant has used the low values of risk-free rate and CRP to estimate high scenario for equity risk premium in the WACC calculations and vice-versa. This has been justified by ADWEA group consultant on the basis that risk-free rates are inversely related to equity risk premiums and the ranges should therefore be switched. However, the Bureau does not agree with this as this is not a common practice among regulators for developing 'high' and 'low' ranges for the WACC components. Accordingly, if the 'high' and 'low' ranges for the risk-free rate and the CRP were switched, the estimated WACC would range would be lower.

6.54 Based on analysis of the evidence included in the ADWEA group's consultant report, our assessment suggests that the data presented in the report could lead to different ranges to the ones used in the estimated real WACC by ADWEA group's consultant, which would then provide a lower calculated real WACC than included in the RC1 draft proposals. For example:

(a) The range for the risk-free rate could be **0.45%-1.50%** from 11 overseas regulatory precedents or 0.21%-0.94% based on 5-year historical average of US TIPS or a combination of both.

(b) The range of debt premium of 2%-2.4% evidenced in ADWEA group's consultant report point to a range of **2.1%-2.5%** (floatation costs included). This along with the different range of risk-free rate would provide a lower cost of debt than the Bureau's range in the RC1 draft proposals.

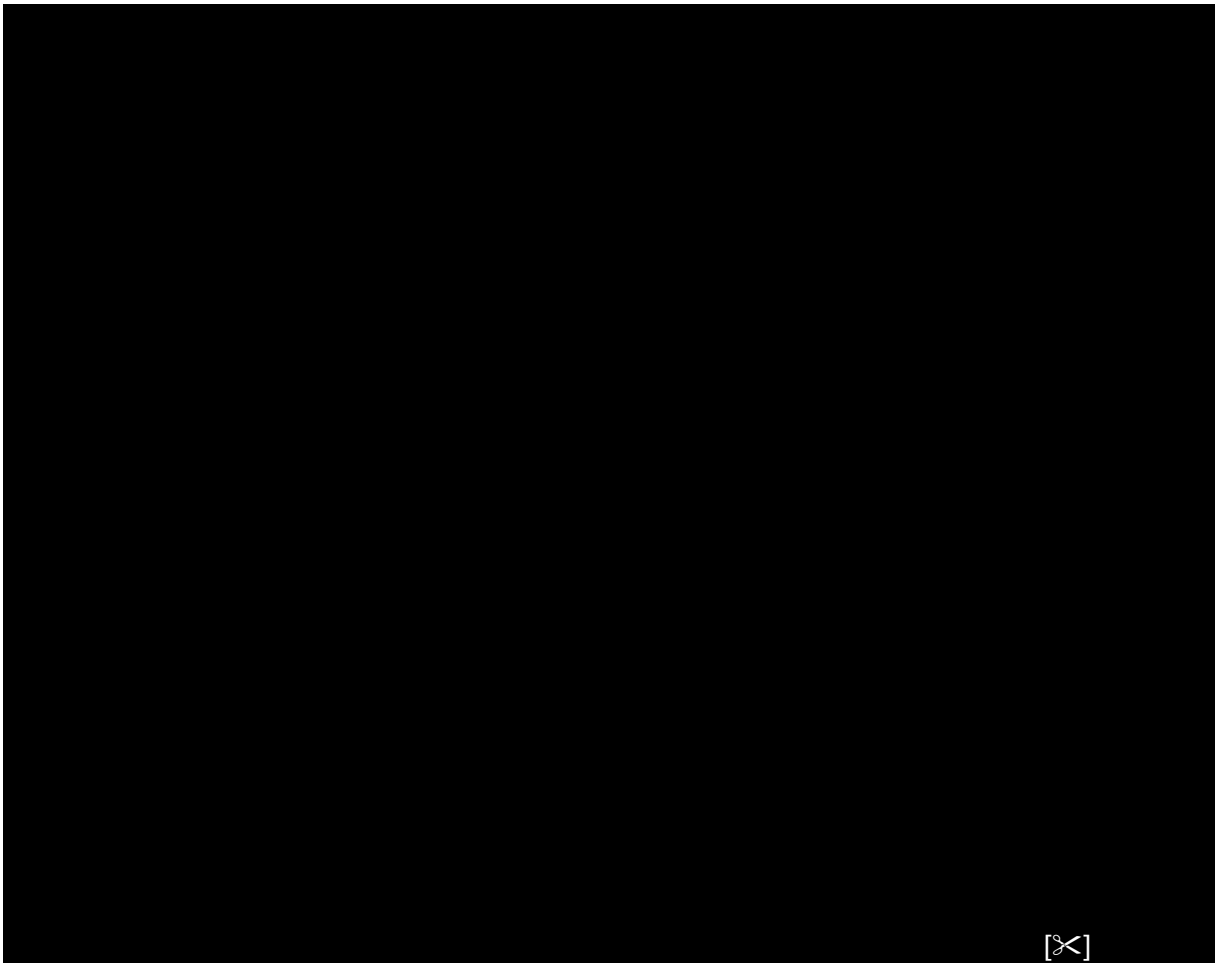
6.55 Using the Bureau's methodology with more accurate and comparable ranges for gearing, debt premium and risk-free rate, ADWEA group's consultant real WACC would be amended to a range of 2.95%-5.17% or a mid-point of 4.1% as summarised in **Table 6.12** below.

Table 6.12: ADWEA consultant's cost of capital – Bureau amended calculations

	Low	High	Mid-Point Average
Risk-free rate (real)	0.45%	1.50%	0.98%
Country Risk Premium	NA	NA	NA
Debt Premium	2.10%	2.50%	2.30%
Cost-of-debt (real)	2.55%	4.00%	3.28%
Equity Risk Premium	5.00%	6.50%	5.75%
Equity Beta	0.58	0.90	0.74
Cost-of-equity (real)	3.35%	7.35%	5.35%
Gearing	50.00%	65.00%	57.50%
Cost of capital (real)	**2.95%**	**5.17%**	**4.06%**

6.56 We therefore consider that there is no evidence presented by ADWEA group or its consultant to support the ranges for the real WACC estimated by the ADWEA group (7.2%-7.5%), or its consultant (4.6%-6.2%).

[✂]



Bureau's consultant (Deloitte) assessment

6.61 At the meeting between DoF, ADWEA group and the Bureau on 28 August 2017, DoF highlighted the importance of arriving at an appropriate and reasonable real WACC in the RC1 final proposals. The Bureau highlighted its duty to allow a reasonable WACC / return in the price controls, taking the interest of all stakeholders, including shareholders and customers. Acknowledging the Bureau's role in determining reasonable WACC for price controls, DoF suggested for the Bureau to hire an independent consultant for an assessment of the real WACC for RC1. Considering ADWEA group consultant's report as well as DoF's suggestion, the Bureau commissioned Deloitte to advise on the cost of capital issues for the RC1 period.

6.62 Accordingly, the independent consultant commissioned by the Bureau (Deloitte) undertook the review of ADWEA group consultant's (EY) WACC report, Bureau's WACC calculation in the RC1 draft proposals, and the respective methodologies to estimate the WACC. The independent consultant also presented additional benchmarks which the Bureau could consider in its WACC calculations.

6.63 The key findings from Deloitte's WACC report, which is being made available to DoF, ADWEA and licensees along with the RC1 final proposals, are summarised below:

(a) ADWEA group's consultant (EY) follows a different methodology of estimating WACC than the methodology applied by the Bureau (and other regulators) in the

price controls. The methodologies differ in that the ADWEA group consultant applies an 'international investor's approach', whereas the Bureau methodology is more closely focused on alignment with regulatory precedents in Abu Dhabi and elsewhere and providing consistency over time.

(b) The 'international investor's approach' reflects the risk faced by a marginal investor in a global market with relatively free capital flows. Under this approach, Country Risk Premium (CRP) is an explicit component in WACC calculations. The Bureau and other regulators approach do not use CRP as an explicit input, rather it is linked to credit ratings of a country and is embedded in prevailing risk-free rate, cost of debt and cost of equity. The estimates for the individual cost elements in the WACC calculation cannot therefore be directly compared. There is precedent for both methodologies to be used in estimating a cost of capital range and in Deloitte's view, both methodologies can be used to provide robust estimates for the WACC.

(c) Deloitte highlights a number of issues in the ADWEA consultant's WACC calculation. According to Deloitte high and low values of WACC are not representative as the high end of risk-free rate and CRP values are used for the low end of their WACC estimates and vice versa. Furthermore, the EY report has disregarded many atypically lower benchmarks, but higher benchmarks have rarely been excluded. On the other hand, the outlier analysis performed by the Bureau appears to be more balanced. Atypical values, both on the higher and lower end of the spectrum are typically considered outliers and as such have been disregarded by the Bureau. This is likely to lead to more balanced overall WACC estimate. The issue of inconsistent outlier analysis and selective approach arises with respect to a number of WACC components in the ADWEA group consultant's report as outlined below:

(i) **Risk-free rate** - For the risk-free, a highest range of 1.1% to 1.5% is proposed by ADWEA group's consultant. Upon further consideration of all the data/evidence included in ADWEA group consultant's report, Deloitte suggests that a more relevant and appropriate range for the risk-free rate is **0.28% to 0.97%**.

(ii) **Equity Risk Premium** - Although the ERP estimates in the ADWEA group consultant's report lies within the range proposed by the Bureau in the RC1 draft proposals, ADWEA group's consultant has ignored ERP estimates above 6.5% and all estimates below 5.0% in their report. After considering atypically low and high estimates, the appropriate ERP range according to Deloitte is **4.0% to 7.4%**.

(iii) **Equity Beta** - With regards to equity beta, ADWEA group consultant's report appears to agree that usually regulated utilities are likely to have equity beta of less than one. Both Deloitte and ADWEA group's consultant proposed equity beta ranges which lie within/are similar to the Bureau's equity beta ranges in RC1 draft proposals. Based on additional data analysis, Deloitte proposes an equity beta range of **0.60 to 0.93**.

(iv) **Cost of Debt** - ADWEA group consultant's report derives the proposed cost of debt (3%-5%) by citing a number of sources, namely UAE and

GCC bond markets, network companies' spreads, EIBOR rates, and US bond markets. Deloitte highlights that the estimates from the UAE and GCC bond market have largely been ignored by ADWEA group's consultant, which also considered the actual cost of debt by the network companies - as pointed out by Deloitte, this may not necessarily reflect an efficient financing structure. Furthermore, use of US bond market spreads in ADWEA group consultant's report may overstate the actual average spreads as the period used is heavily influenced by the financial crisis. After considering the above and the transactions costs suggested in ADWEA group consultant's report, Deloitte proposed an alternative range of **2.0% to 4.0%** for the return on debt.

(v) **Gearing** - ADWEA group consultant's report selects a gearing range of 40% to 50%, based on the argument that comparator companies in the US, UK and Australia have likely adopted higher gearing levels due to the prevalence of corporate tax in such jurisdictions – but as highlighted by Deloitte without producing any conclusive evidence to support this tax argument. However, gearing levels of IPPs or IWPPs in the Middle East are typically in the 70%-80% range. Furthermore, Deloitte notes that the actual gearing of network companies may not reflect an efficient capital structure or an optimal gearing level. Regulatory decisions normally take into consideration efficient levels of borrowing, and use notional gearing when determining the regulated cost of capital, namely to promote efficiency and protect end-users – an approach consistent with the one used by the Bureau. Deloitte also noted that the network companies have a gearing levels of 66% or above in 2016 when shareholder loans are considered equivalent to debt as per their latest (2016) audited SBAs. Based on all the evidence (including from additional regulatory decisions), Deloitte considers that a gearing level in the range of **45% to 65%** is appropriate and consistent with international regulatory decisions.

(vi) **Country Risk Premium (CRP) added to UK and Australian risk-free rates** - ADWEA group consultant's report has considered benchmarks from the UK and Australia to estimate the risk-free rates and at the same time added to such risk-free rate the UAE specific CRP that reflects a country risk relative to the US. Deloitte notes that adding the CRP relative to US to the risk-free rates from the UK and Australia is likely to overstate the UAE specific WACC. Given that the risk-free rates in ADWEA group consultant's report mimic the long term historical average yields of US TIPS, a more suitable CRP range to add to such estimates of US risk-free rates is the Damodaran's CRP, as referred in ADWEA group consultant's and Deloitte's WACC report, estimate of **0.57% to 0.71%**. Deloitte also highlights (as mentioned above) that CRP is typically not included by regulators as an explicit component for WACC estimation. For example, the UK Regulators Network (UKRN), which comprises thirteen UK regulators, does not include the CRP in its 'standard component analysis' for WACC estimation.

6.64 Based on above, Deloitte revised the ranges for each of the WACC components estimated by ADWEA group's consultant. Using ADWEA group consultant's methodology, an amended WACC range of 2.69%-5.60% – with a mid-point WACC of 4.18% – has been calculated by Deloitte as summarised in **Table 6.14**

Table 6.14: ADWEA consultant's cost of capital – Deloitte amended calculations

	Low	High	Mid-Point Average
Risk-free rate (real)	0.28%	0.97%	0.63%
Country Risk Premium	0.57%	0.71%	0.64%
Cost-of-debt (real)	2.00%	4.00%	3.00%
Equity Risk Premium	4.00%	7.40%	5.70%
Equity Beta	0.60	0.93	0.77
Cost-of-equity (real)	3.25%	8.56%	5.63%
Gearing	45.00%	65.00%	55.00%
Cost of capital (real)	**2.69%**	**5.60%**	**4.18%**

6.65 Deloitte reviewed, in addition, the approach used and WACC estimated by the Bureau in the RC1 draft proposals. Deloitte notes that the WACC calculated by the Bureau in the RC1 draft proposals is developed by referencing recent regulatory overseas decisions. Additional examples of the cost of capital from regulatory decisions (see **Table 6.15** below) have been presented by Deloitte for the Bureau's consideration in developing the RC1 final proposals.

6.66 Deloitte notes that the Bureau, in its WACC calculations, produces a range for each of the WACC components by:

(a) taking the high and low figures for each parameter from the regulatory precedents, enabling them to calculate a mid-point for each parameter; and

(b) based on low, high, and mid-point average for each parameter, calculating the corresponding low, high and mid-point cost of debt, cost of equity, and cost of capital.

(c) as part of this process, parameters may be rounded to the nearest decimal place and a number of outlier decisions are excluded from the analysis. Deloitte indicates that atypical values, both on the higher and lower end of the spectrum, are duly disregarded by the Bureau, which is likely to lead to a more balanced overall WACC estimate.

6.67 Deloitte presented additional examples of the regulatory decisions as summarised in **Table 6.15** below:

Table 6.15: Additional examples of overseas regulatory decisions

(real terms)	UK			Northern Ireland		Australia		Republic of Ireland		
	CMA Bristol Water	Ofgem RIIO-ED1 slow-track	Ofwat TTT	UR GD17 - PNGL	UR GD17 - FE	TER	AER JEN	CER PC4	CER IRC2	CER PR4
	Oct-15	Nov-14	Aug-15	Sep-16	Sep-16	Apr-15	May-16	Aug-17	Dec-16	Dec-15
Risk-free rate	1.25%	1.30%	N/A	1.25%	1.25%	1.81%	0.60%	1.90%	2.00%	1.90%
Equity risk premium	5.25%	5.25%	N/A	5.00%	5.00%	6.00%	6.50%	4.75%	4.75%	4.75%
Equity beta	0.85	0.9	N/A	0.77	0.77	0.65	0.7	0.93	0.82	0.89
Debt premium	1.36%	N/A	N/A	N/A	N/A	N/A	2.63%	1.00%	1.00%	1.00%
Cost of debt	2.61%	2.60%	N/A	2.36%	2.45%	4.26%	3.235	2.50%	3.00%	2.90%
Cost of equity	5.73%	6.00%	N/A	5.30%	5.30%	8.26%	7.50%	7.22%	0.067	6.86%
Gearing	62.50%	65.00%	N/A	55.00%	55.00%	60.00%	60.00%	55.00%	45%	55.00%
Cost of capital	3.78%	3.76%	2.50%	4.26%	4.32%	5.37%	6.37%	4.63%	5.05%	4.74%

Sources:

1) UKRN (2016), 'Cost of Capital – Annual Update Report: 2015-16'
2) Ofgem (2014), 'RIIO-ED1: Final determinations for the slow-track electricity distribution companies'
3) Cepa (2015), 'Thames Tideway Tunnel – Cost of capital'
4) UR (2016), 'Price Control for Northern Ireland's Gas Distribution Networks GD17'
5) Tasmanian Economic Regulator (2015), '2015 Price Determination Investigation – Regulated water and Sewerage Services in Tasmania'
6) AER (2016), 'Final Decision Jemena distribution determination 2016 to 2020'
7) CER (2017), 'Decision on October 2017 to September 2022 Distribution Revenue for Gas Networks Ireland'
8) CER (2016), 'Irish Water Second Revenue Control 2017-2018'
9) CER (2015), 'Decision on TSO and TAO Transmission Revenue for 2016 to 2020'

Notes:

1) N/A denotes that this information is not provided.
2) These parameters have been converted from nominal to real figures based on the reported forecast inflation figures given in the relevant regulator's publication. This is in-line with RSB's methodology.
3) The cost of debt for PC4 is calculated as the debt premium plus a reference bond yield of 1.5%, instead of the risk-free rate.

6.68 Deloitte revised the Bureau's WACC calculations in RC1 draft proposals using the above additional overseas regulatory decisions, and suggested a revised range of 2.30% to 6.77% for the WACC, with a mid-point of 4.50%, as summarised in **Table 6.16** below:

Table 6.16: Bureau's cost of capital – Deloitte amended calculations

	Low	High	Mid-Point Average
Risk-free rate (real)	0.36%	2.00%	1.18%
Debt premium	1.00%	3.64%	2.32%
Cost-of-debt (real)	1.36%	5.64%	3.50%
Equity Risk Premium	4.50%	7.40%	5.95%
Equity Beta	0.60	0.93	0.77
Cost-of-equity (real)	3.06%	8.88%	5.73%
Gearing	45.00%	65.00%	55.00%
Cost of capital (real)	**2.30%**	**6.77%**	**4.50%**

6.69 Based on Deloitte's revised ranges of WACC components above, ADWEA group's consultant methodology leads to a real WACC estimate of 4.18% and the Bureau's approach using the additional evidence produces a real WACC estimate of 4.50%.

6.70 The mid-point of each methodology is relatively similar covering a WACC estimate from 4.18% to 4.50%. In Deloitte's view, while it is for the Bureau to make a final determination on the appropriate WACC level, 4.18% to 4.50% is a reasonable range to draw the actual WACC to be used for the RC1 final proposals.

Final proposals

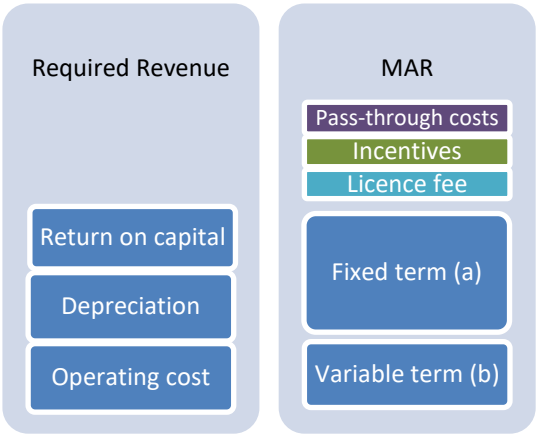
6.71 For these final proposals, we have accepted the independent consultant's updated real WACC estimate of **4.50%** in the RC1, which is based on the Bureau's methodology used to date and takes into consideration latest overseas regulatory proposals and estimates.

7. Price control calculations

Introduction

7.1 The calculations of price control revenue involve using allowances for operating costs, regulatory depreciation and returns, together with present value calculations, to derive the companies' own or core price control revenues (i.e. revenue requirement excluding pass-through costs). We then use these core price control revenues to determine base values for the new price controls, which will be included in new price control conditions in the licences for the four network companies. Once the new price control arrangements are put in place, this level of base revenue will be subject to cost pass-through terms (see Section 3), and incentive arrangements (see Section 8), allowing the determination of total price control revenue.

Figure 7.1: Building blocks of revenue requirement



7.2 This Section 7 describes the overall framework for price control calculations used in these final proposals. Earlier sections discuss and set out various inputs required for these calculations. This section describes the price control calculations in detail and sets out the results and implications. We are issuing two financial models to the companies (RC1 Financial Model to update the RAVs and calibrate the notified values and RC1 Depreciation Model referred to in Section 6) alongside these final proposals. **Annexes A** and **B** set out the main calculations from the RC1 Financial Model and line-by-line description of these calculations by reference to the model.

Framework for price control calculations

7.3 Setting the price controls means determining the values of the fixed term 'a' and the coefficient of revenue driver 'b' in the MAR formula, and the value of the X-factor. In these final proposals, the Bureau has used the following framework for its price control calculations, which with few differences, which is consistent with the one used at the previous price control review.

NPV approach

7.4 The revenue requirement for each year of the control period (sufficient to finance a reasonably efficient business) is calculated using the "building block approach":

Required revenue = Opex + Depreciation + Return on capital + PC4 and PC5 additional efficient capex financing costs foregone

where:

(a) Operating expenditure (opex) refers to operating costs excluding depreciation.

(b) Depreciation is calculated using a straight-line method and an assumed average asset life separately in respect of the initial RAV (at the time of first control setting) and each year's capex during PC1 to PC5 and extended life for capex during RC1.

(c) Return on capital in any year is calculated by multiplying the mid-year average of opening and closing RAVs in that year by the cost of capital. For each year, the closing RAV is determined by adding the efficient capex incurred in that year to, and subtracting the depreciation from, the opening RAV.

(d) NPV of the foregone financing costs in respect of the additional efficient PC4 and PC5 capex, are applied to the NPV of the required revenue over the RC1 period.

7.5 The projected MAR for each year of the control period is calculated using the revenue driver projections, appropriate weightings for the fixed and variable terms, and an appropriate 'X' factor.

7.6 The values of 'a' and 'b' are then calculated by setting the NPV of the projected MARs equal to the NPV of required revenues over the control period using the estimated cost of capital as the discount rate:

NPV of projected annual MARs = NPV of required revenues

All calculations are carried out excluding the effect of inflation for future years. For the purpose of these calculations, pass-through costs, licence fee and Q and K terms are excluded.

Financial models

7.7 We have developed a Microsoft Excel based financial model to carry out the RC1 price control calculations (referred to as the "***RC1 Financial Model***") leading to determination of the notified values "a" and "b" for each company or business. The same model also includes the calculations discussed in Section 6 relating to efficient PC4 and PC5 capex and related foregone financing costs and updating of RAVs for such capex as well as ex-ante RC1 capex.

7.8 As discussed in Section 6, another separate Excel based model (the ***RC1 Depreciation Model***) has also been developed to calculate annual depreciation on the initial RAV (i.e. RAV at the time of first price control setting) and on subsequent efficient or provisional capex for each year up to 2017. The RC1 Financial Model takes the total depreciation on RAV and capex to date (in 2018 prices) directly from this RC1 Depreciation Model.

7.9 The RC1 Financial Model is substantially the same as the models used at the previous price control reviews. At this review, all calculations are carried out in real, 2018 prices. The discount rate used in the present value or NPV calculation is the real cost of capital of 4.5%. The NPV of costs is calculated on a mid-year basis.

7.10 As discussed earlier, if the licenses accept the Bureau's draft derogation to apply the entire adjustment for unduly earned financing costs relating to PC4 and PC5 capex to the 2017 MAR (option 2), this adjustment will not then be made in RC1, which in turn will increase the MAR over the RC1 period. Accordingly, we are providing the companies with separate versions of the financial models for both option 1 and option 2 giving the flexibility to the companies to accept the offered derogation, or not.

Differences from previous price control calculation

7.11 The price control calculations are broadly consistent with the approach used in the previous price controls, except for the following modifications:

(a) In case of AADC, ADDC and TRANSCO, only one revenue driver with 15% weighting in the MAR is used in RC1 compared to the two revenue drivers with overall weighting of 20% in the MAR in previous price control, with no change for ADSSC;

(b) A non-zero 'X' factor has been used in RC1 to appropriately profile the MAR for each business to minimise step change in the annual MAR from PC5 to RC1. The 'X' factor was set at zero in the previous price controls resulting in flat MAR profile during the price control period. We have assessed various factors including network MAR, generation and production costs, forecast demands, and planned ex-post and ex-ante capex reviews, which impact the total sector costs, customer tariffs and Government subsidy in deciding the X factors in the RC1 final proposals. This is to ensure a robust balance between various impacts but with neutral impact on network MARs in NPV terms over RC1 period. Accordingly, the notified value 'a' and 'b' are subject to annual indexation against CPI-X in the RC1, similar to PC5, but with non-zero X factor for electricity businesses in RC1.

Price control calculations

7.12 **Annex B** to this paper presents detailed price control calculations for each business (extracted from the relevant spreadsheets of the RC1 Financial Model) separately in seven sub-annexes, namely **Annexes B.1 through B.7.** These calculations are presented in a standard format for all businesses. They are explained in **Annex B** with reference to "Line" numbers used in these Annexes and in the RC1 Financial Model. These annexes present calculations for both options as discussed in Sections 1, 2 and 6 as follows:

a) Option 1: RC1 final proposals without derogations to apply adjustment for PC4 PC5 capex financing costs (AED 9 billion in 2018 prices in total) to 2017 MAR (i.e such adjustment will apply over RC1 period) resulting in lower MAR over RC1 period; and

b) Option 2: RC1 final proposals with derogations to apply adjustment for PC4 PC5 capex financing costs (AED 8.8 billion in 2017 prices in total) to 2017 MAR (i.e such adjustments will then not apply over RC1 period) resulting in higher MAR over RC1 period.

Option 1 – if 2017 MAR adjustment derogations are not accepted

Notified values

7.13 Based on these price control calculations, the Bureau's final proposals for the notified values are summarised in **Table 7.1** below assuming the 2017 MAR adjustment derogation are not accepted by the companies. The notified values given in this table (to the accuracy to decimal places expressed therein) will be those used to calculate MARs when the price controls are implemented.

Table 7.1: Notified values for RC1 – final proposals (option 1)

2018 prices		X	a		b	
AADC	Electricity	10%	1,198.82	AEDm	1,375.46	AED / customer account
	Water	0%	507.41	AEDm	930.52	AED / customer account
ADDC	Electricity	10%	2,134.28	AEDm	943.21	AED / customer account
	Water	0%	887.31	AEDm	486.28	AED / customer account
TRANSCO	Electricity	10%	2,590.07	AEDm	0.5040	Fills / kWh
	Water	0%	1,296.81	AEDm	0.7280	AED / TIG
ADSSC		0%	1,824.17	AEDm	0.6926	AED / m^3 wastewater treated

Notes: These notified values for 2018 are based on an assumed UAE CPI of 108.00 (base year 2014 = 100) for 2017. These will be subject to an adjustment for actual UAE CPI for 2017.

7.14 These notified values are for 2018 expressed in 2018 prices based on the assumed UAE CPI of 108.00 (base year 2014 = 100). The adjustment for actual inflation for 2017 will be carried out upon its availability during 2018 i.e., during the RC1 period itself via the Price Control Return (PCR) process. Since we have not made adjustments in the RC1 final proposals (compared to the RC1 draft proposals) to remove inflation indexation of depreciation and RAV, we have not split the notified value "a" into two portions. Accordingly, the full values of "a" and "b" will be subject to CPI-X indexation in the same way as we have applied under the price controls to date (as shown in the proposed structure of MAR for RC1 in Section 3).

Projected MARs

7.15 **Table 7.2** presents the projected MAR in respect of "own" costs (i.e., excluding pass-through costs, if applicable, licence fee, Q and K terms) for each business for 2018-2021 assuming the 2017 MAR adjustment derogations are not accepted by the companies.

7.16 In total, the four network companies' MAR (excluding pass-through costs) is expected to be AED 12.2 billion in 2018 reaching around AED 10.5 billion by 2021. For the three water and electricity network companies, the aggregate MAR is projected to be in average around AED 9.2 billion over the RC1 period.

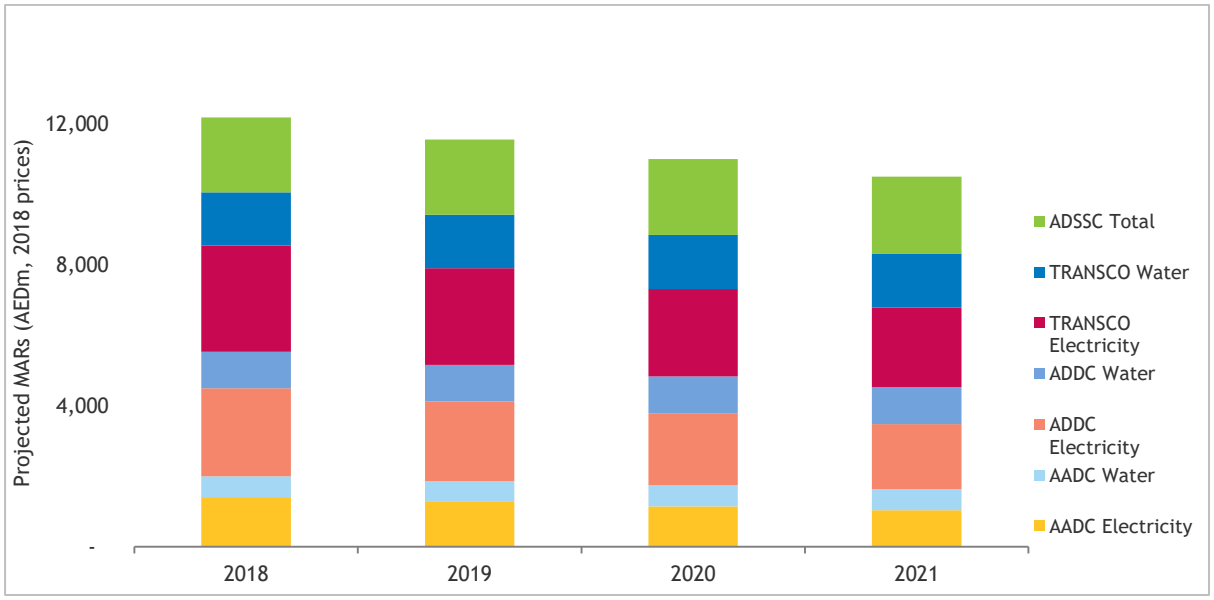
Table 7.2: Projected MAR over RC1 period – final proposals (option 1)

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	1,406	1,268	1,144	1,032
	Water	593	596	598	601
ADDC	Electricity	2,495	2,256	2,040	1,846
	Water	1,037	1,042	1,046	1,051
TRANSCO	Electricity	3,012	2,735	2,483	2,254
	Water	1,515	1,522	1,530	1,537
ADSSC	Total	2,117	2,136	2,158	2,178
Total		**12,175**	**11,556**	**11,000**	**10,500**

7.17 For the four companies combined, the projected 2018 MAR is lower by AED 5.2 billion (or 30%) in real prices, as compared to the actual 2016 MAR of AED 17.4 billion in 2018 prices. This MAR comparison excludes performance bonuses and penalties, correction factor, pass-through costs, other financial adjustments and licence fee derogation.

7.18 **Figure 7.2** presents the projected MAR profile for each company over the RC1 period, indicating that TRANSCO accounts for a large share of the companies' total MAR:

Figure 7.2: Projected MARs over RC1 period (option 1)



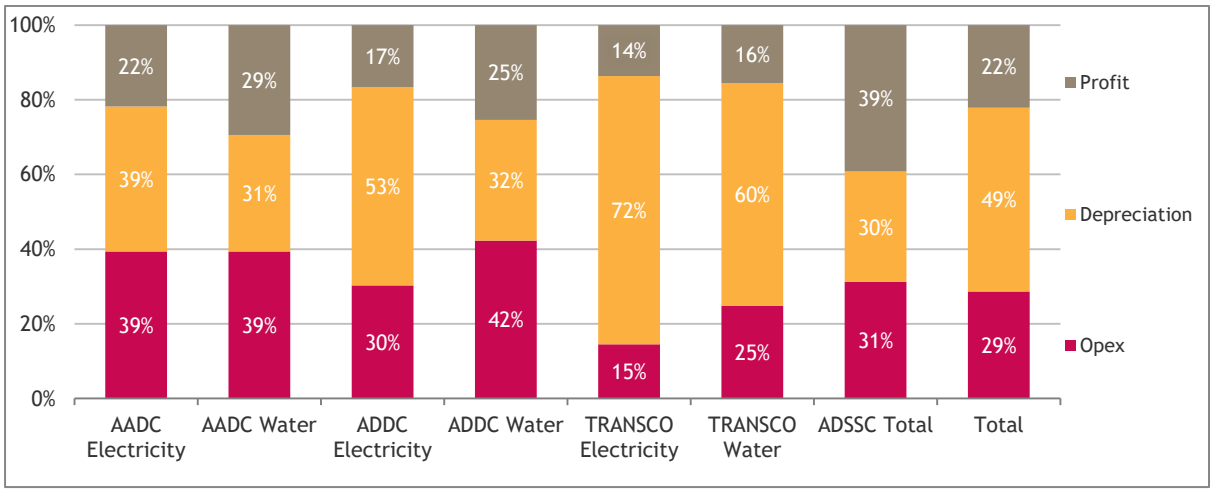
Analysis of final proposals

Constituents of projected MARs

7.19 **Figure 7.3** below presents the percentage breakdown of total revenue (excluding pass-through costs) into projected opex, depreciation and profits in NPV terms for each company. For this purpose, the PC4 and PC5 capex related foregone (unduly earned) financing costs have been treated as part of the profits.

7.20 This figure shows that capital cost related components (i.e. depreciation and return on capital) account for a significant proportion of the revenue for each company (around 58% to 85%), compared to opex which accounts for only 15% to 42% of revenue.

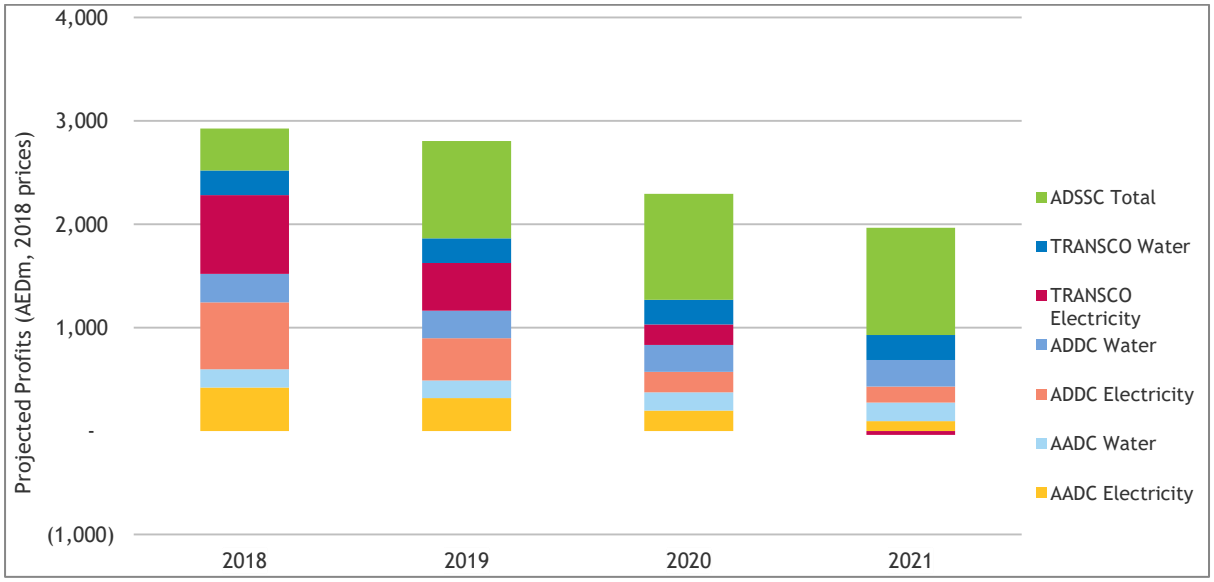
Figure 7.3: Constituents of MARs (excluding pass-through costs) (option 1)



Projected Profits

7.21 **Figure 7.4** shows the profile of projected profit (or more precisely, the return on capital) based on projected MAR and opex as well as depreciation allowed in the price controls.

Figure 7.4: Projected profits over the RC1 period (using regulatory depreciation) (option 1)



7.22 Overall, the total profits for the four companies are expected to be of the order of AED 2.5 billion in 2018 prices a year on average over the RC1 period. The average projected profit for each company over RC1 period is as follows (2018 prices):

(a) AADC: about AED 435 million per annum

(b) ADDC: about AED 617 million per annum

(c) ADSSC: about AED 853 million per annum

(d) TRANSCO: about AED 584 million per annum

7.23 Typically, the regulatory depreciation is higher than the companies' accounting depreciation recorded in the SBAs for a number of reasons including higher value of RAVs than NBV of assets and differences in regulatory and accounting asset useful life assumptions. This means **Figure 7.4** above shows lower amount of projected profits than those expected to be reported in the companies' SBAs based on accounting depreciation. Therefore, we have presented in **Figure 7.5** the profile of projected profits considering accounting depreciation to show profits the companies are likely to report in their SBAs.

7.24 Overall, the total profits for the four companies are expected to be of the order of AED 3.4 billion in 2018 prices a year on average over the RC1 period. The average projected profit (including financial adjustments mentioned earlier) for each company over RC1 period is as follows (2018 prices):

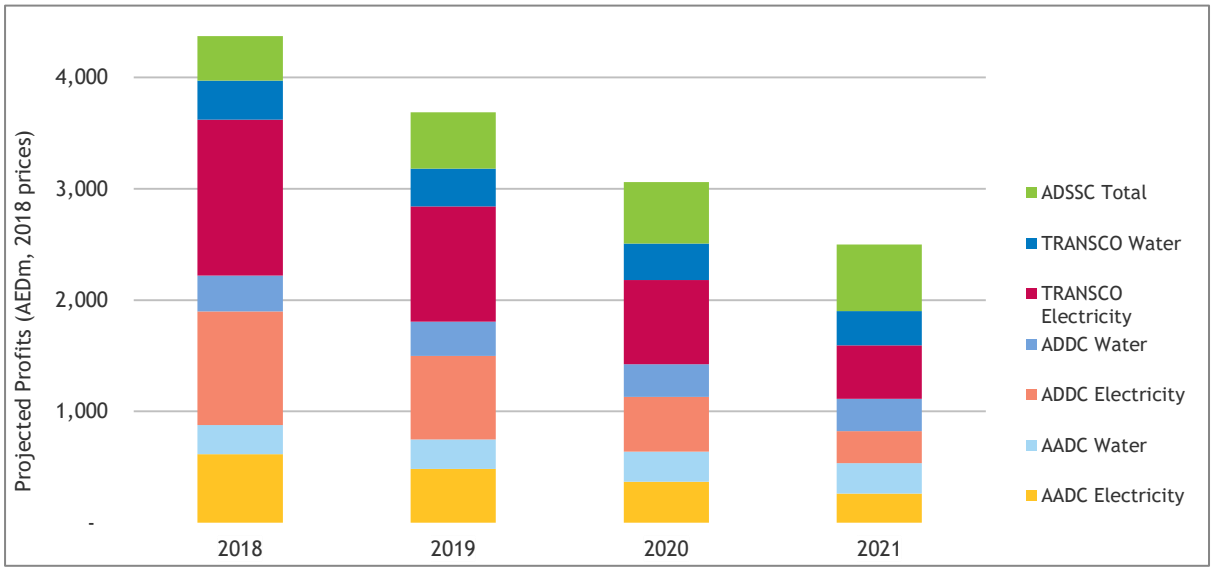
(a) AADC: about AED 700 million per annum

(b) ADDC: about AED 942 million per annum

(c) ADSSC: about AED 514 million per annum

(d) TRANSCO: about AED 1,249 million per annum

Figure 7.5: Projected profits over the RC1 period (using accounting depreciation) (option 1)



7.25 The combined average accounting profit over the RC1 period is expected to be approximately AED 4.2 billion a year lower than the accounting profits collectively achieved by the four companies in 2016 (AED 7.6 billion). The decrease in profits is mainly due to negative adjustment for unduly earned financing costs relating to PC4 and PC5 capex in RC1, lower ex-ante allowances and a lower WACC applied to RC1.

7.26 When comparing such lower profits against profits observed or estimated for PC4 and PC5 periods, we should keep in view significantly high MARs (in turn profits) due to higher provisional capex allowances than justified by the actual spending during these periods. This has been highlighted by the Bureau to the network companies during annual performance review meetings and presentations during 2015-2017 following the receipt and review of their 2014, 2015 and 2016 SBAs. Accordingly, the average profits and return over (a) PC5 and RC1 combined (AED 6.9 billion or 7.1%) , or (b) PC4, PC5 and RC1 combined (AED 6.3 billion or 6.7%) give a more balanced view of the companies' profitability over longer term as shown in the following table.

Table 7.3: Average projected profits and return (option 1)

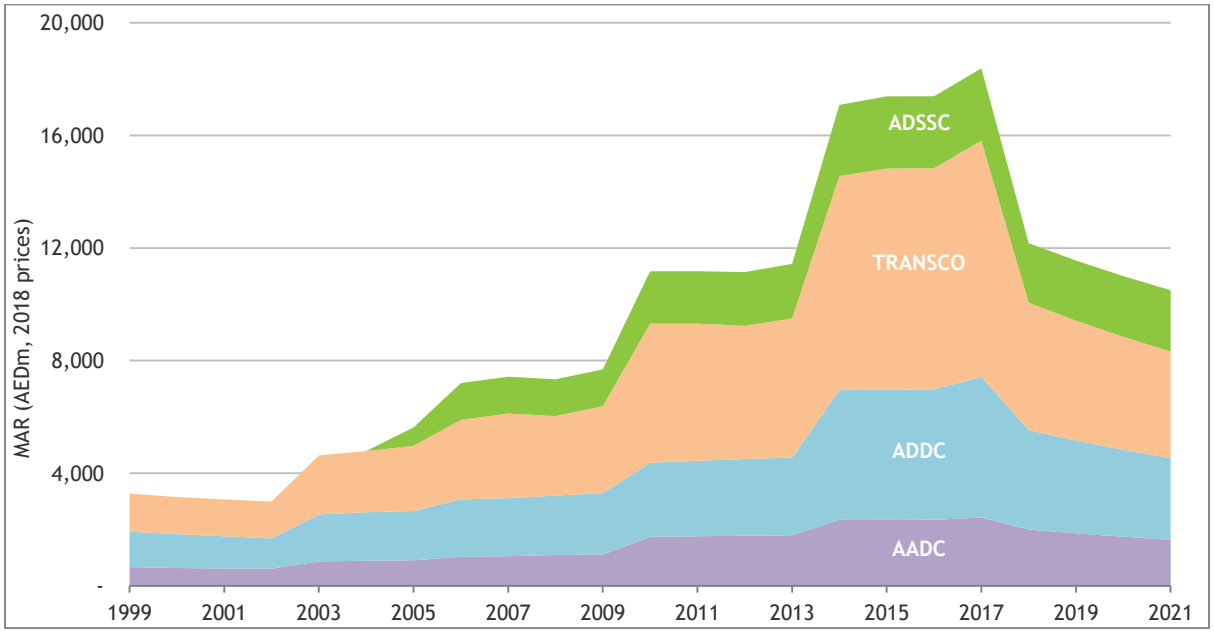
2018 prices		Average over each price control			Average over combined	
		PC4	PC5	RC1	PC5 and RC1	PC4,PC5 and RC1
AADC	AED million	744	1,228	700	964	890
	%	8.0%	12.8%	7.1%	9.9%	9.3%
ADDC	AED million	1,051	2,504	942	1,723	1,499
	%	5.4%	11.7%	4.3%	8.0%	7.2%
TRANSCO	AED million	2,749	5,599	1,249	3,424	3,199
	%	5.8%	11.8%	2.9%	7.6%	7.0%
ADSSC	AED million	666	1,079	514	797	753
	%	4.8%	5.1%	2.4%	3.7%	4.0%
Total	AED million	5,209	10,410	3,405	6,907	6,341
	%	**5.8%**	**10.5%**	**3.5%**	**7.1%**	**6.7%**

Notes: Average profits and return over PC4 are actuals based on the companies' 2010 to 2013 SBAs. Average for PC5 is based on actuals for 2014-2016 from SBAs and the Bureau's estimate for 2017 based on 2017 MAR and Opex allowances in PC5 and accounting deprecation from the companies' 2016 AIS.

Projected trends for MAR

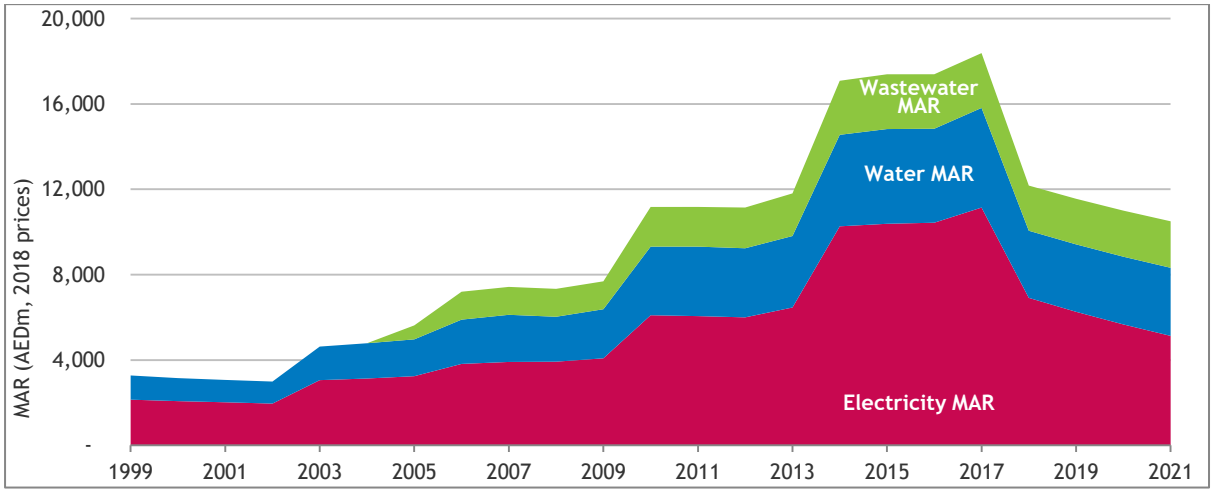
7.27 The following chart shows the projected MAR profile for each company over the RC1 period, indicating significant decreases from previous years in real terms and TRANSCO's continuing large share of the MAR.

Figure 7.6 : Projected MARs over RC1 period - by company (option 1)



7.28 The following chart shows the total MARs for water, wastewater and electricity, indicating electricity's continuing domination of the sector costs:

Figure 7.7: Projected MARs over RC1period - by sector (option 1)



Effect of Final Proposals on sector costs

7.29 **Figures 7.8**, **7.9** and **7.10** show the expected effect of these final proposals on the total price-controlled costs and unit costs for electricity, water and wastewater, respectively (in 2018 prices). The MAR per unit has been calculated using units transmitted for electricity and water businesses (in fils/kWh and AED/TIG, respectively) and units treated for sewerage business (in AED/m^3).

Figure 7.8: Projected trend of price-controlled MAR – electricity (option 1)

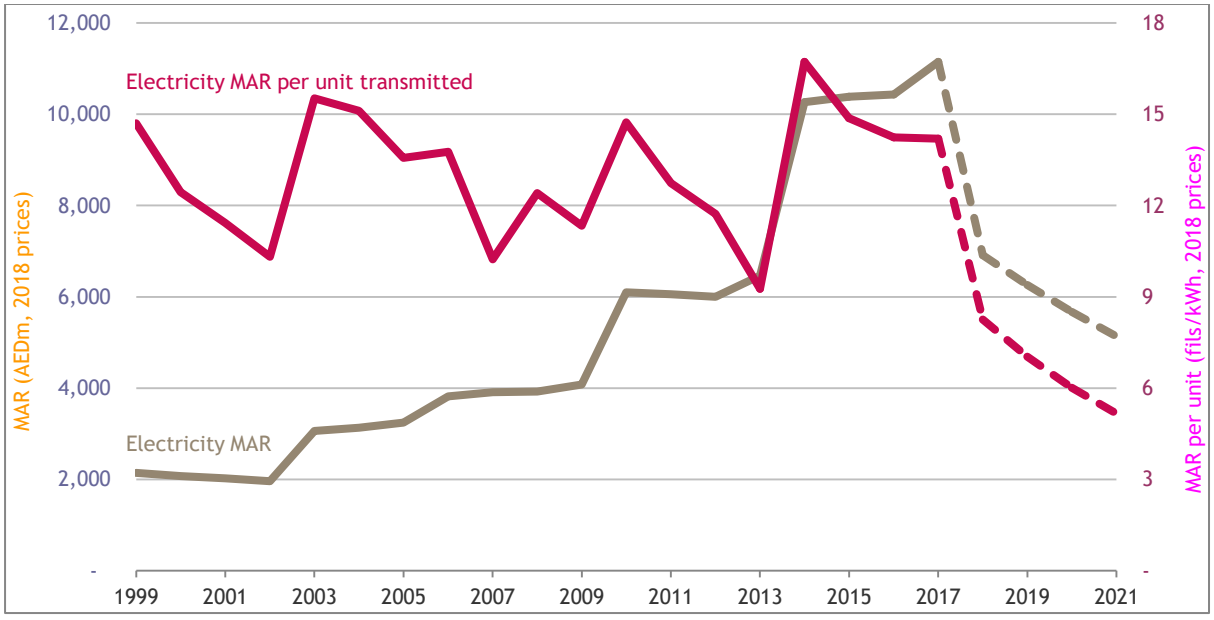


Figure 7.9: Projected trend of price-controlled MAR – water (option 1)

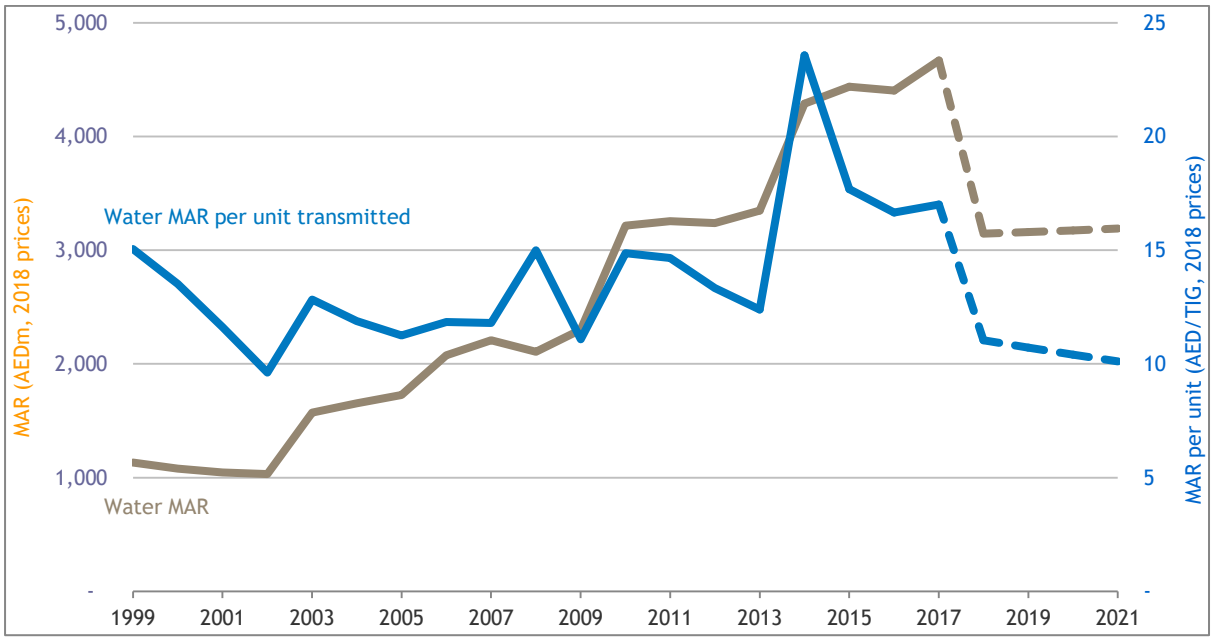
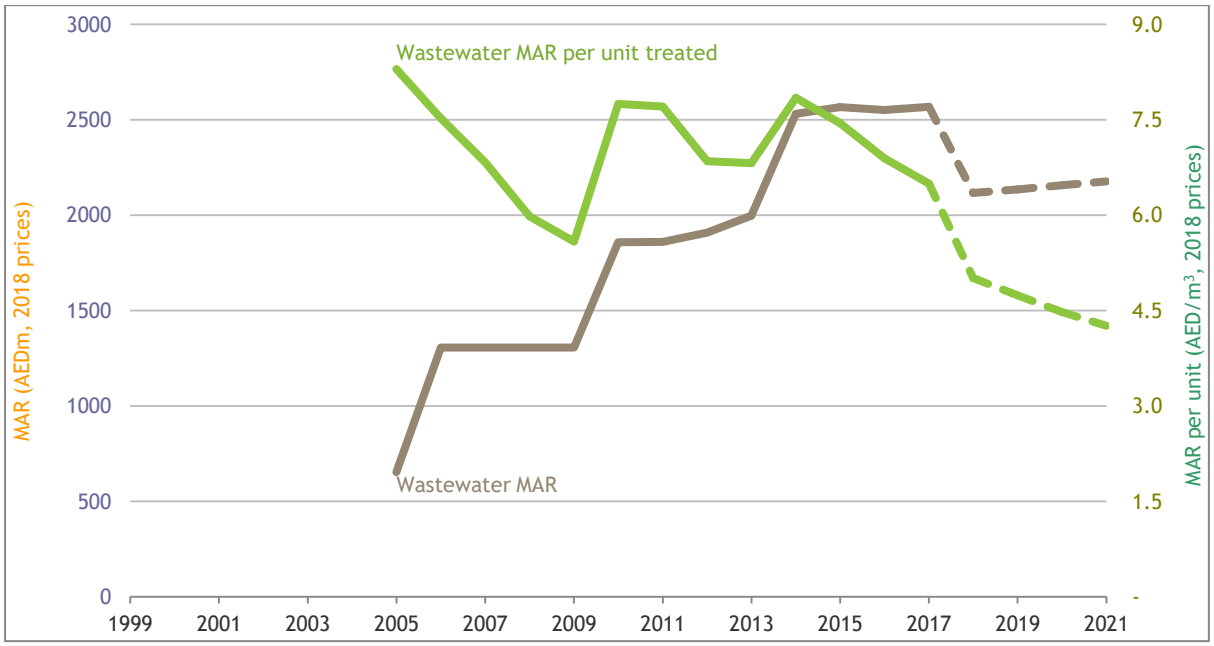


Figure 7.10: Projected trend of price-controlled MAR – wastewater (option 1)



7.30 These charts indicate that the annual MARs are expected to decline in real terms. This decline in total MAR and the projected increase in demand means that the final proposals are expected to result in a declining trend for the unit cost for electricity, water and wastewater businesses. This shows that:

(a) ***For electricity:*** while the total MAR for AADC, ADDC and TRANSCO (excluding pass-through costs) is expected to increase by 139% from 1999 to 2021 (in real terms), the MAR per unit transmitted is expected to be around 5.2 fils/kWh in 2021, lower by 65% than that in 1999 (in 2018 prices);

(b) ***For water:*** while the total MAR for AADC, ADDC and TRANSCO (excluding pass-through costs) is expected to increase by about 181% from 1999 to 2021 (in real terms), the MAR per unit transmitted is expected to be 9.7 AED/TIG in 2021, lower by 36% than in 1999 (in 2018 prices); and

(c) ***For wastewater:*** while the total MAR for ADSSC (excluding any pass-through costs) is expected to increase by 67% from 2005 (annualised) to 2021 (in real terms), the MAR per unit treated is expected to be 4.3 AED/m^3 in 2021, lower by 49% than in 2005 (in 2018 prices).

Comparison against 2016 actual MARs

7.31 **Table 7.4** compares the projected MARs for RC1 against the 2016 actual MARs. This comparison excludes performance bonuses and penalties, correction factor, pass-through costs and other financial adjustments or derogations.

7.32 As previously highlighted, the total 2018 projected MAR is lower than the 2016 actual MAR by AED 5.2 billion (or 30%) in real terms. The projected MARs continue to decrease over the RC1 period. By 2021, the total projected MAR is less than the total 2016 actual MAR by AED 6.9 billion (in 2018 prices) or 40%.

7.33 Similarly, MAR per unit transmitted or treated is projected to decline in 2018 prices from 2016 as follows:

(a) Electricity: decline by about 9.1 fils/kWh or 64% by 2021;

(b) Water: decline by about 7.0 AED/TIG or 42% by 2021; and

(c) Wastewater: decline by approximately 2.6 AED/m^3 or 38% by 2021.

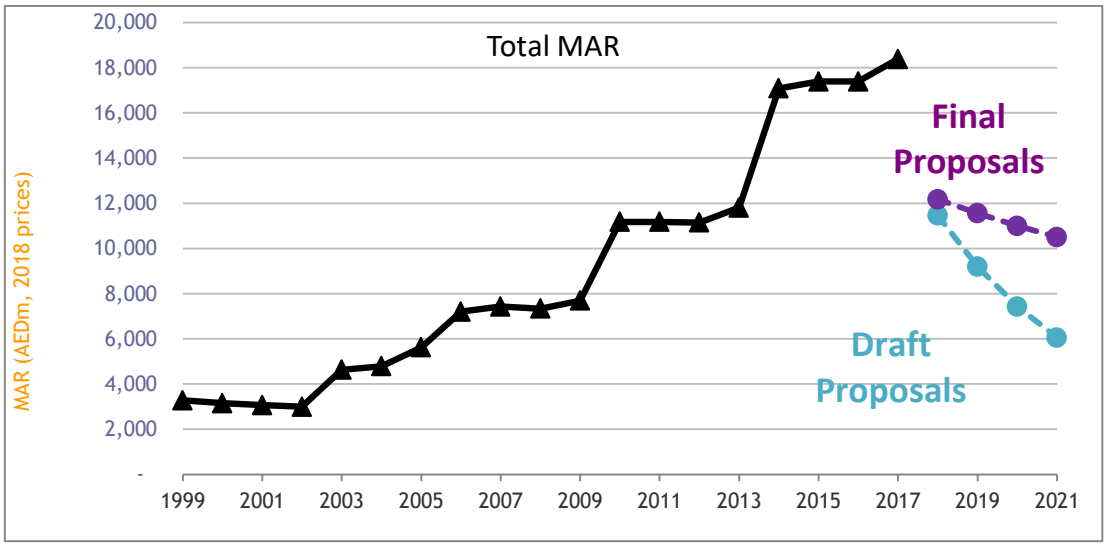
Table 7.4: Comparison of RC1 projected MARs against 2016 actual MARs (option 1)

AED million		**2016 actual MAR**		**2018 MAR (2018 prices)**		**2021 MAR (2018 prices)**	
		2016 prices	2018 prices	MAR	% increase from 2018	MAR	% increase from 2016
AADC	Electricity	1,734	1,799	1,406	-22%	1,032	-43%
	Water	526	546	593	9%	601	10%
ADDC	Electricity	3,460	3,591	2,495	-31%	1,846	-49%
	Water	1,007	1,045	1,037	-1%	1,051	1%
TRANSCO	Electricity	4,861	5,045	3,012	-40%	2,254	-55%
	Water	2,710	2,813	1,515	-46%	1,537	-45%
ADSSC	Total	2,459	2,552	2,117	-17%	2,178	-15%
Total		**16,757**	**17,391**	**12,175**	**-30%**	**10,500**	**-40%**

Comparison against draft proposals

7.34 **Figure 7.11** below compares the total MAR for RC1 projected in these final proposals against that in the draft proposals:

Figure 7.11: Total projected MAR - final v draft proposals (option 1)



7.35 The table below shows that the RC1 final proposals represent increases in total annual MAR by about AED 2.8 billion (2018 prices) or about 32%, compared to the RC1 draft proposals, addressing the companies concerns (discussed in **Sections 2 and 6**) on significantly lower MARs proposed in RC1 draft proposals.

Table 7.5: Average annual projected MARs for RC1 – final v draft proposals (option 1)

AED million, 2018 prices		Draft Proposals	Final Proposals	Increase in Final proposals	% Increase
AADC	Electricity	926	1,213	286	31%
	Water	452	597	145	32%
ADDC	Electricity	1,547	2,159	613	40%
	Water	764	1,044	280	37%
TRANSCO	Electricity	1,733	2,621	888	51%
	Water	1,114	1,526	412	37%
ADSSC	Total	2,000	2,147	147	7%
Total		**8,537**	**11,308**	**2,770**	**32%**

Comparison against PC4 and PC5 average MARs

7.36 **Table 7.6** compares the projected average MAR for the four network companies during RC1 period against corresponding average MARs during PC4 and PC5 periods in 2018 prices. This comparison excludes performance bonuses and penalties, correction factor, pass-through costs and other financial adjustments or derogations.

7.37 In 2018 prices, the average total MAR for the four network companies during RC1 period is comparable or slightly higher than the average total MAR during PC4. As the table shows, the average total MAR for the four network companies increased in 2018 prices by AED 6.4 billion or 57% from PC4 to PC5 due to high or over-forecast provisional capex allowances in PC5. Accordingly, the average MARs in RC1 are lower than the PC5 average total MAR, as expected, due to the following main reasons:

(a) Capex efficiency adjustment and under spending of PC4 and PC5 capex than provisional allowances (discussed in Sections 5 and 6);

(b) Financing costs foregone (discussed in Section 6);

(c) Lower opex allowances (discussed in Section 4);

(d) Lower WACC (4.5% compared to 5.5% allowed in PC5, see Section 6); and

(e) Lower ex-ante allowances for RC1 than the provisional allowances in PC5, as discussed in Section 5. We expect the companies will spend more during RC1 period than the current ex-ante allowances for RC1 and hence expect upward adjustments to MAR in future subject to efficiency review.

Table 7.6: Comparison of projected RC1 and PC4-PC5 average MARs (option 1)

AED million, 2018 prices		Average MARs			PC4 Vs RC1		PC5 Vs RC1	
		PC4	PC5	RC1	Difference AED million	Difference %	Difference AED million	Difference %
AADC	Electricity	1,274	1,815	1,213	-62	-5%	-602	-33%
	Water	489	547	597	108	22%	50	9%
ADDC	Electricity	1,783	3,659	2,159	376	21%	-1,500	-41%
	Water	910	1,057	1,044	134	15%	-13	-1%
TRANSCO	Electricity	3,029	5,083	2,621	-408	-13%	-2,462	-48%
	Water	1,830	2,845	1,526	-304	-17%	-1,319	-46%
ADSSC	Total	1,885	2,555	2,147	262	14%	-407	-16%
Total		**11,200**	**17,562**	**11,308**	**107**	**1%**	**-6,254**	**-36%**

Option 2 - if 2017 MAR adjustment derogations are accepted

Notified values and projected MARs

7.38 As discussed earlier, if the companies' accept the Bureau's offered derogation for entire adjustment of unduly earned financing costs in relation to PC4 (2012-2013) and PC5 (2014-2015) capex in 2017 MAR, instead of RC1 revenue, then the notified values ('a' and 'b') and projected MAR in respect of "own" costs and for each business for electricity, water and wastewater for 2018-2021 will significantly increase from option 1 as follows:

Table 7.7: Notified values for RC1 – final proposals (option 2)

2018 prices		X	a		b	
AADC	Electricity	10%	1,348.45	AEDm	1,547.14	AED / customer account
	Water	0%	495.13	AEDm	908.00	AED / customer account
ADDC	Electricity	10%	2,633.72	AEDm	1,163.94	AED / customer account
	Water	0%	928.17	AEDm	508.67	AED / customer account
TRANSCO	Electricity	10%	3,693.71	AEDm	0.7188	Fills / kWh
	Water	0%	1,763.20	AEDm	0.9898	AED / TIG
ADSSC		0%	1,905.37	AEDm	0.7235	AED / m3 wastewater treated

Notes: These notified values for 2018 are based on an assumed UAE CPI of 108.00 (base year 2014 = 100) for 2017. These will be subject to an adjustment for actual UAE CPI for 2017.

7.39 These notified values are for 2018 expressed in 2018 prices based on the assumed UAE CPI of 108.00 (base year 2014 = 100).

7.40 **Table 7.2** presents the projected MAR in respect of "own" costs (i.e., excluding pass-through costs, if applicable, licence fee, Q and K terms) for each business for 2018-2021:

Table 7.8: Projected MAR over RC1 period – final proposals (option 2)

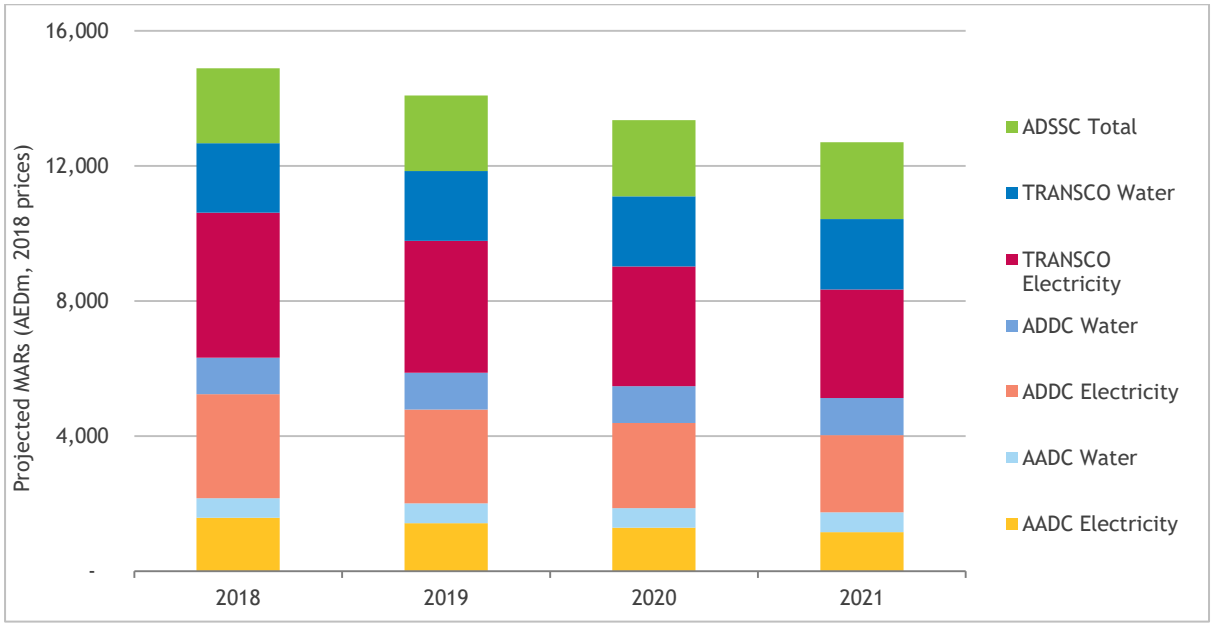
AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	1,581	1,427	1,287	1,161
	Water	579	581	584	587
ADDC	Electricity	3,079	2,784	2,518	2,277
	Water	1,085	1,090	1,094	1,100
TRANSCO	Electricity	4,296	3,900	3,541	3,214
	Water	2,060	2,070	2,080	2,090
ADSSC	Total	2,211	2,232	2,254	2,275
Total		**14,890**	**14,083**	**13,358**	**12,705**

7.41 In total, the four network companies' MAR (excluding pass-through costs) with 2017 derogation is expected to be AED 14.9 billion in 2018 reaching around AED 12.7 billion by 2021. For the three water and electricity network companies, the aggregate MAR is projected to be on average around AED 11.5 billion over the RC1 period.

7.42 For the four companies combined, the projected 2018 MAR is lower by AED 2.5 billion (or 14%) in real prices, as compared to the actual 2016 MAR of AED 17.4 billion in 2018 prices.

7.43 **Figure 7.2** presents the projected MAR profile for each company over the RC1 period under option 2, indicating that TRANSCO continues to account for a large share of the companies' total MAR:

Figure 7.12: Projected MARs over RC1 period (option 2)

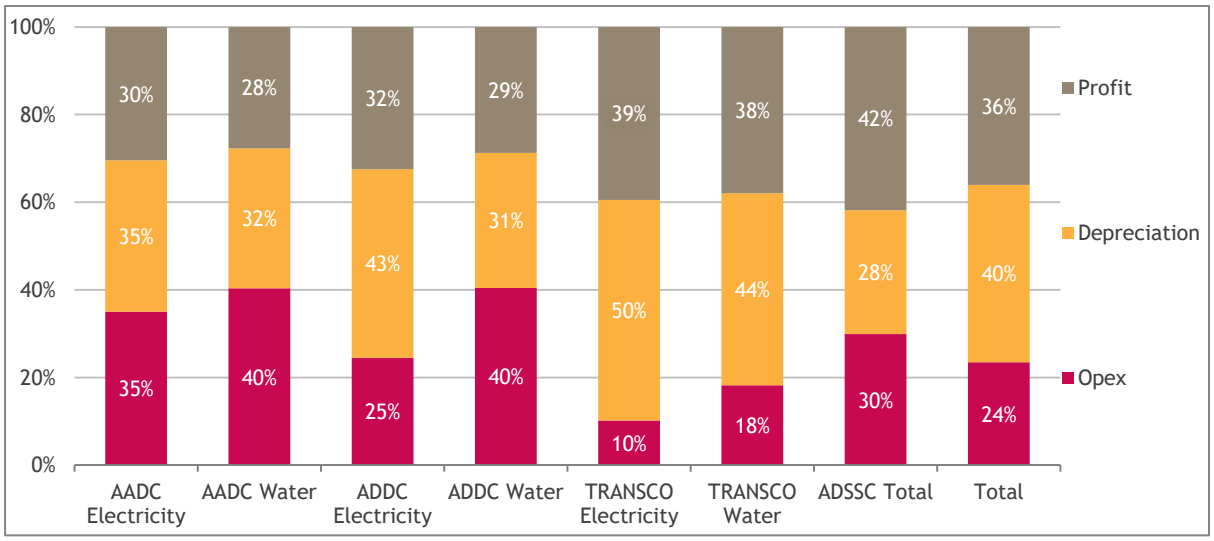


Constituents of projected MARs

7.44 **Figure 7.13** below presents the percentage breakdown of total revenue (excluding pass-through costs) into projected opex, depreciation and profits in NPV terms for each company under option 2.

7.45 This figure shows that capital cost related components (i.e. depreciation and return on capital) account for a significant proportion of the revenue for each company (around 60% to 90%), compared to opex which accounts for only 10% to 40% of revenue.

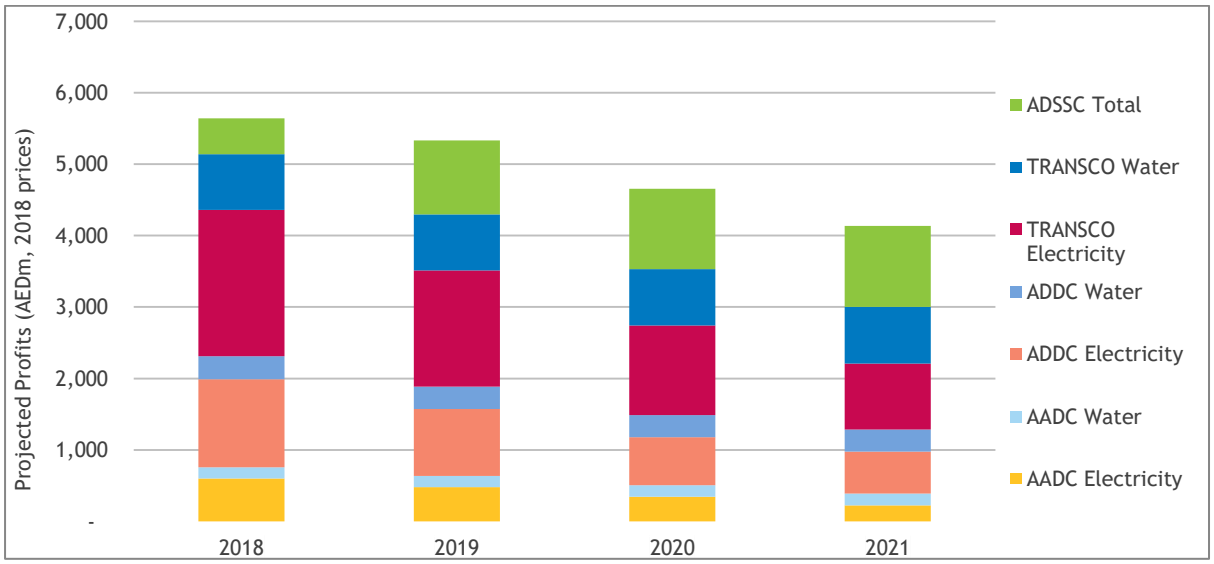
Figure 7.13: Constituents of MARs (option 2)



Projected Profits

7.46 **Figure 7.4** shows the profile of projected profit (or more precisely, the return on capital) based on projected MAR and opex as well as depreciation allowed in the price controls.

Figure 7.14: Projected profits over RC1 period (using regulatory depreciation) (option 2)



7.47 Overall, the total profits for the four companies are expected to be of the order of AED 4.9 billion in 2018 prices a year on average over the RC1 period. The average projected profit for each company over RC1 period is as follows (2018 prices):

(a) AADC: about AED 572 million per annum

(b) ADDC: about AED 1,171 million per annum

(c) ADSSC: about AED 949 million per annum

(d) TRANSCO: about AED 2,250 million per annum

7.48 **Figure 7.15** presents the profile of projected profits considering accounting depreciation to show profits the companies are likely to report in their SBAs. Overall, the total profits for the four companies are expected to be of the order of AED 5.9 billion in 2018 prices a year on average over the RC1 period. The average projected profit for each company over RC1 period is as follows (2018 prices):

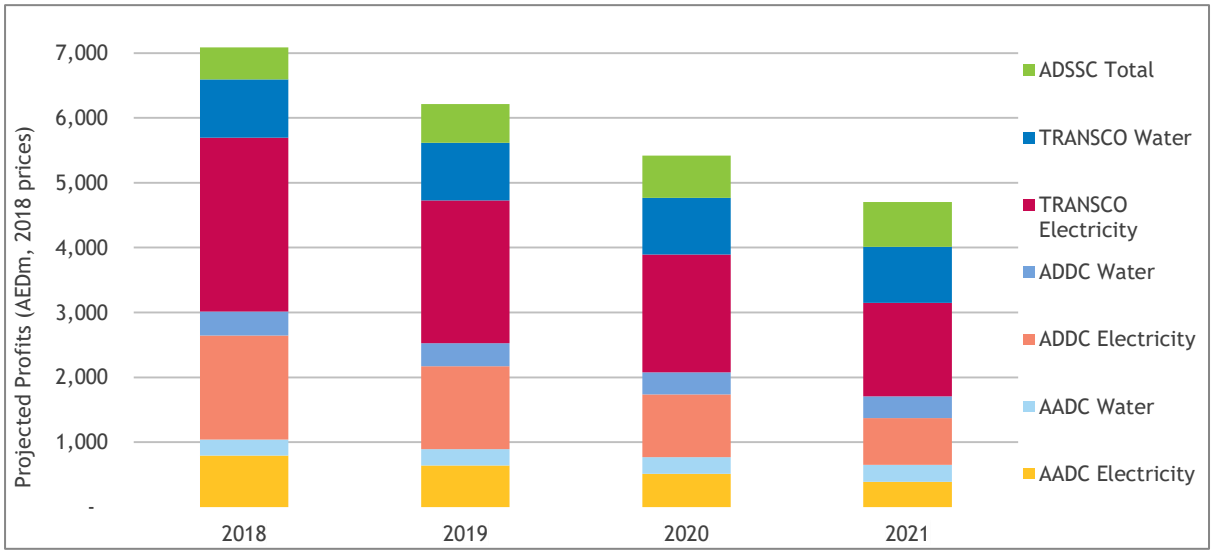
(e) AADC: about AED 837 million per annum

(f) ADDC: about AED 1,495 million per annum

(g) ADSSC: about AED 610 million per annum

(h) TRANSCO: about AED 2,914 million per annum

Figure 7.15: Projected profits over RC1 period (using accounting depreciation) (option 2)



7.49 The combined average accounting profit over the RC1 period is expected to be approximately AED 1.7 billion a year lower than the accounting profits collectively achieved by the four companies in 2016 (AED 7.6 billion) – the companies are likely to report losses in 2017 if the entire adjustment for unduly earned financing cost pertaining to PC4 and PC5 capex is made in 2017 MAR. The decrease in RC1 profits compared to 2016 (and earlier years of PC4 and PC5 period) is mainly due to negative adjustment relating to PC4 and PC5 capex in RC1 RAV, lower ex-ante allowances and a lower WACC applied to RC1.

7.50 When comparing such lower profits against profits observed or estimated for PC4 and PC5 periods (until 2016), we should keep in view significantly high MARs (in turn profits) due to higher provisional capex allowances than justified by the actual spending during these periods. The average profits and return over (a) PC5 and RC1 combined (AED 7.0

billion or 7.2%) , or (b) PC4, PC5 and RC1 combined (AED 6.4 billion or 6.7%) give a more balanced view of the companies' profitability over longer term as shown in the following table.

Table 7.9: Average projected profits and return (option 2)

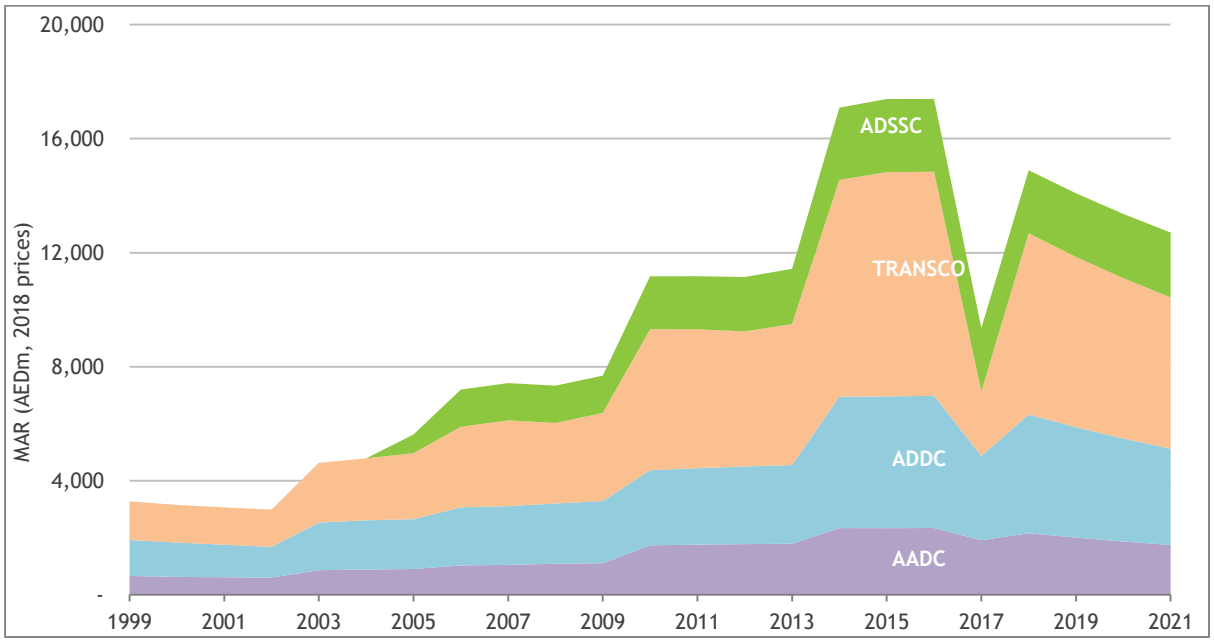
2018 prices		Average over each price control			Average over combined	
		PC4	PC5	RC1	PC5 and RC1	PC4,PC5 and RC1
AADC	AED million	744	1,101	837	969	894
	%	8.0%	11.5%	8.4%	10.0%	9.4%
ADDC	AED million	1,051	1,994	1,495	1,745	1,514
	%	5.4%	9.3%	6.8%	8.1%	7.2%
TRANSCO	AED million	2,749	4,067	2,914	3,490	3,243
	%	5.8%	8.6%	7.0%	7.7%	7.1%
ADSSC	AED million	666	992	610	801	756
	%	4.8%	4.7%	2.8%	3.8%	4.0%
Total	AED million	**5,209**	**8,154**	**5,856**	**7,005**	**6,406**
	%	**5.8%**	**8.2%**	**6.1%**	**7.2%**	**6.7%**

Notes: Average profits and return over PC4 are actuals based on the companies' 2010 to 2013 SBAs. Average for PC5 is based on actuals for 2014-2016 from SBAs and the Bureau's estimate for 2017 based on 2017 MAR (after adjustment of unduly earned financing costs relating to PC4-PC5 capex) and Opex allowances in PC5 and accounting deprecation from the companies' 2016 AIS.

Projected trends for MAR

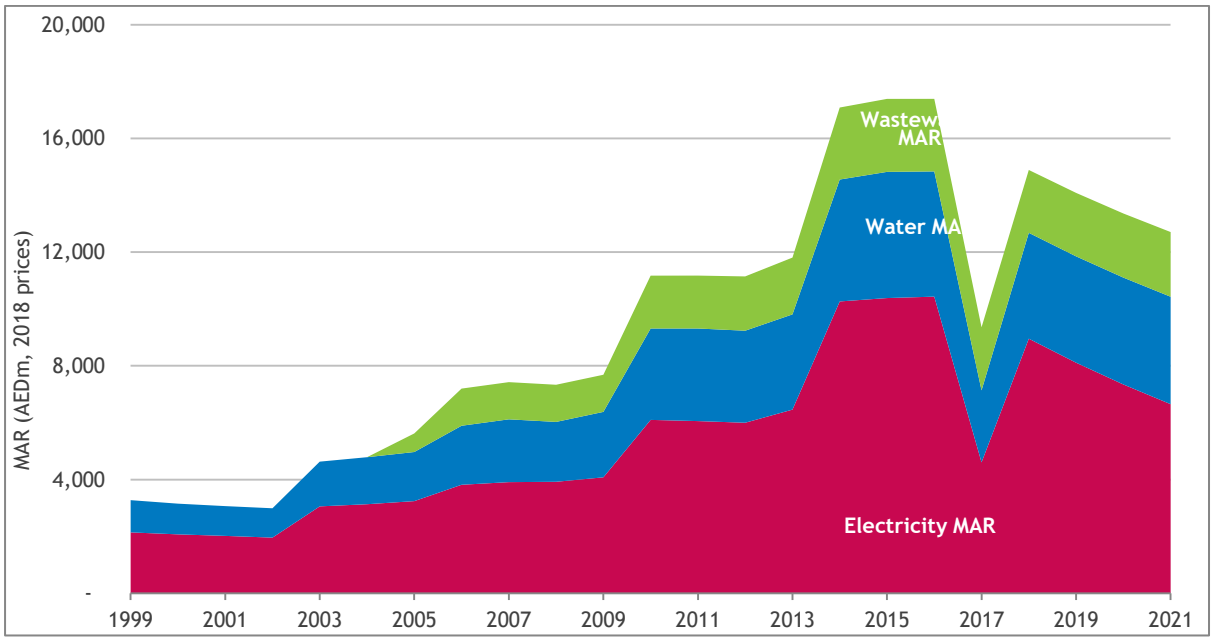
7.51 The following chart shows the projected MAR profile for each company over the RC1 period, indicating significant decreases from previous years in real terms and TRANSCO's continuing large share of the MAR.

Figure 7.16 : Projected MARs derogation over RC1 period - by company (option 2)



7.52 The following chart shows the total MARs for water, wastewater and electricity, indicating electricity's continuing domination of the sector costs:

Figure 7.17: Projected MARs over RC1 period - by sector (option 2)



Effect of Final Proposals on sector costs

7.53 **Figures 7.18**, **7.19** and **7.20** show the expected effect of these final proposals on the total price-controlled costs and unit costs for electricity, water and wastewater, respectively (in 2018 prices). The MAR per unit has been calculated using units transmitted for electricity and water businesses (in fils/kWh and AED/TIG, respectively) and units treated for sewerage business (in AED/m^3).

Figure 7.18: Projected trend of price-controlled MAR – electricity (option 2)

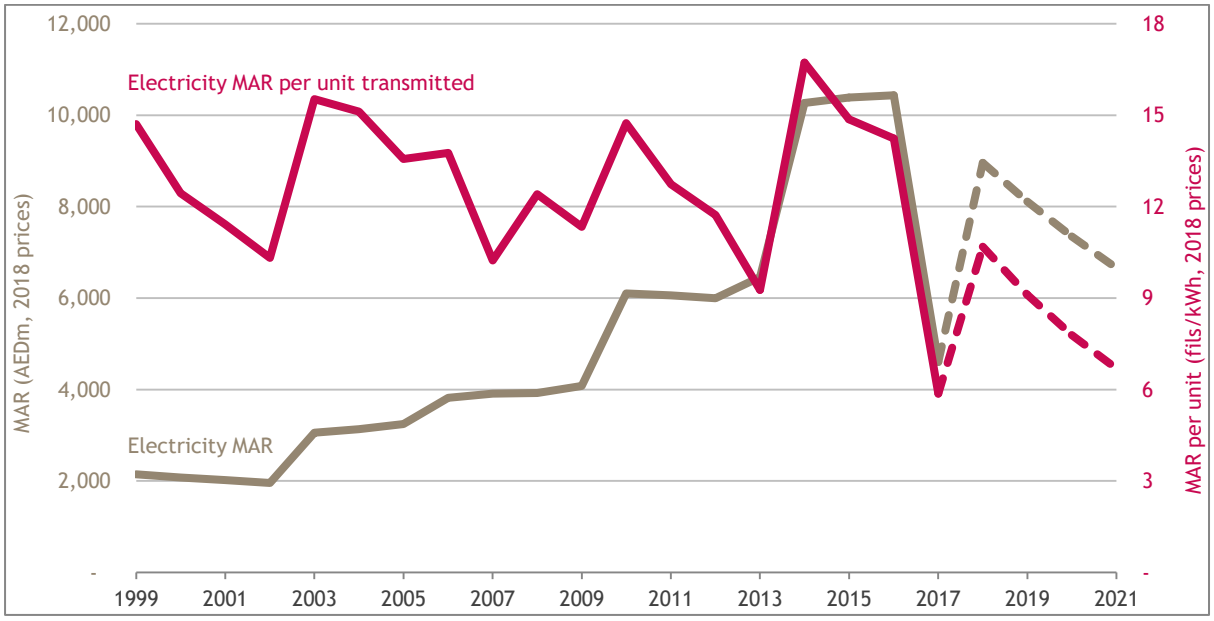


Figure 7.19: Projected trend of price-controlled MAR – water (option 2)

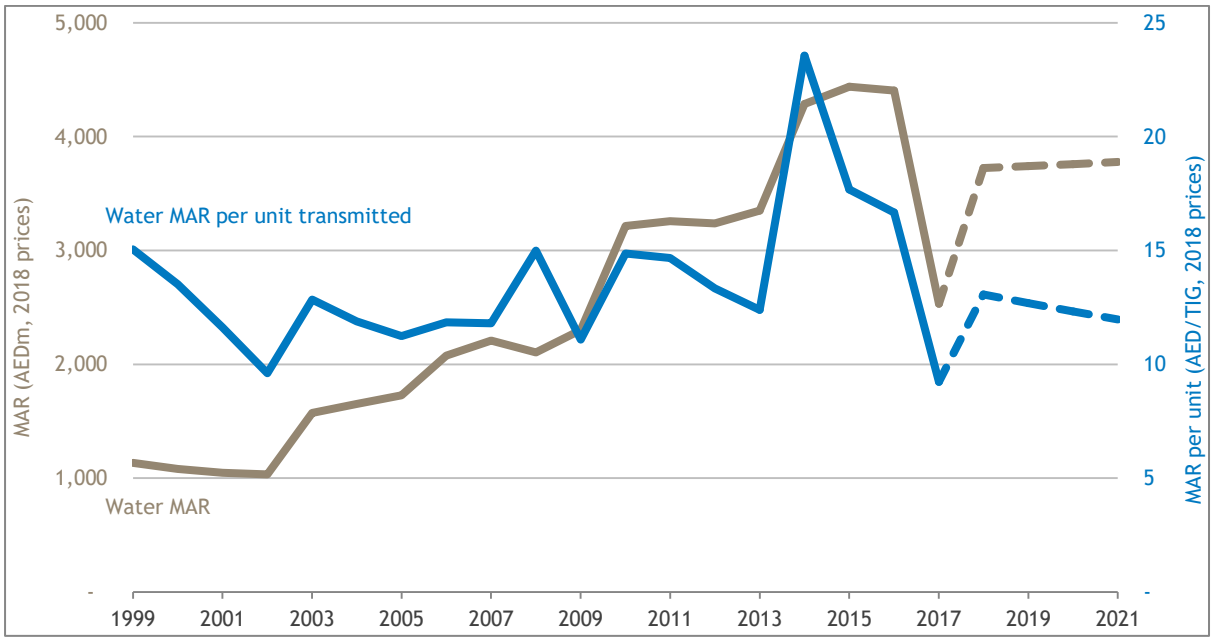
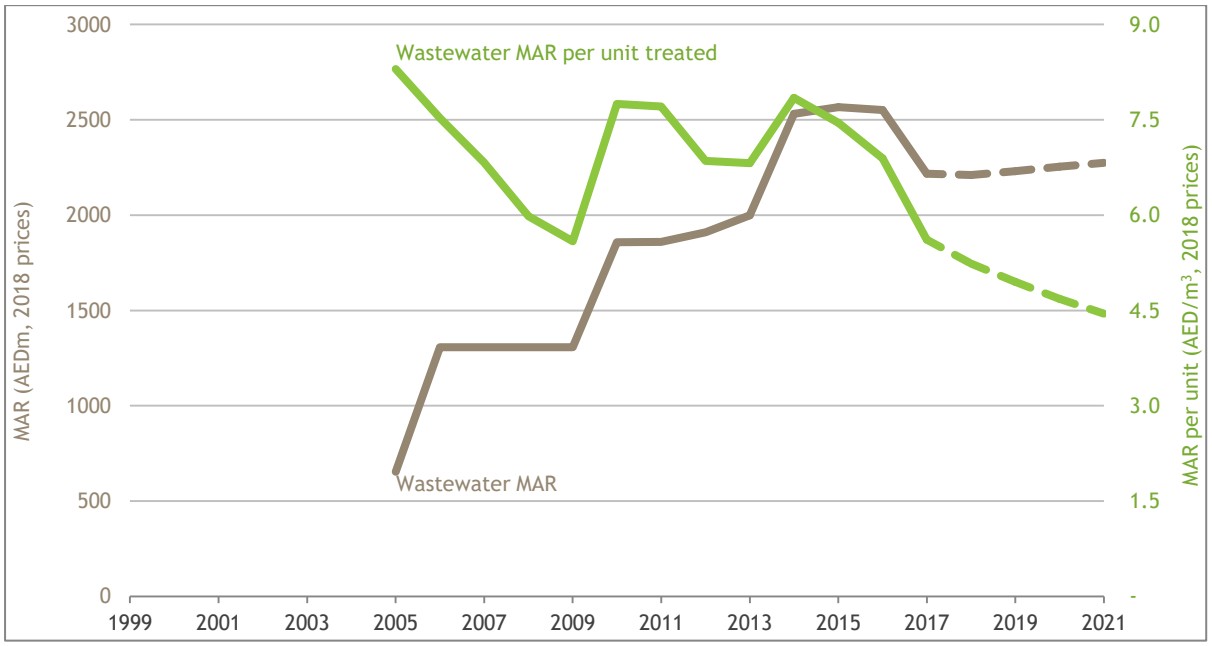


Figure 7.20: Projected trend of price-controlled MAR – wastewater (option 2)



7.54 These charts indicate that the annual MARs are expected to decline in real terms under option 2 as in option 1. This decline in total MAR and the projected increase in demand means that the final proposals are expected to result in a declining trend for the unit cost for electricity, water and wastewater businesses. This shows that:

(d) ***For electricity:*** while the total MAR for AADC, ADDC and TRANSCO (excluding pass-through costs) is expected to increase by 210% from 1999 to 2021 (in real terms), the MAR per unit transmitted is expected to be around 6.7 fils/kWh in 2021, lower by 55% than that in 1999 (in 2018 prices);

(e) ***For water:*** while the total MAR for AADC, ADDC and TRANSCO (excluding pass-through costs) is expected to increase by about 233% from 1999 to 2021 (in real terms), the MAR per unit transmitted is expected to be 11.4 AED/TIG in 2021, lower by 24% than in 1999 (in 2018 prices); and

(f) ***For wastewater:*** while the total MAR for ADSSC (excluding any pass-through costs) is expected to increase by 74% from 2005 (annualised) to 2021 (in real terms), the MAR per unit treated is expected to be 4.5 AED/m^3 in 2021, lower by 46% than in 2005 (in 2018 prices).

Comparison against 2016 actual MARs

7.55 **Table 7.4** compares the projected MARs for RC1 with derogation against the 2016 actual MARs. This comparison excludes performance bonuses and penalties, correction factor, pass-through costs and other financial adjustments or derogations.

7.56 As previously highlighted, the total 2018 projected MAR is lower than the 2016 actual MAR by AED 2.5 billion (or 14%) in real terms. The projected MARs continue to decrease over the RC1 period. By 2021, the total projected MAR is less than the total 2016 actual MAR by AED 4.7 billion (in 2018 prices) or 27%.

7.57 Similarly, MAR per unit transmitted or treated is projected to decline in 2018 prices from 2016 as follows:

(a) Electricity: decline by about 7.6 fils/kWh or 53% by 2021;

(b) Water: decline by about 5.2 AED/TIG or 31% by 2021; and

(c) Wastewater: decline by approximately 2.4 AED/m^3 or 35% by 2021.

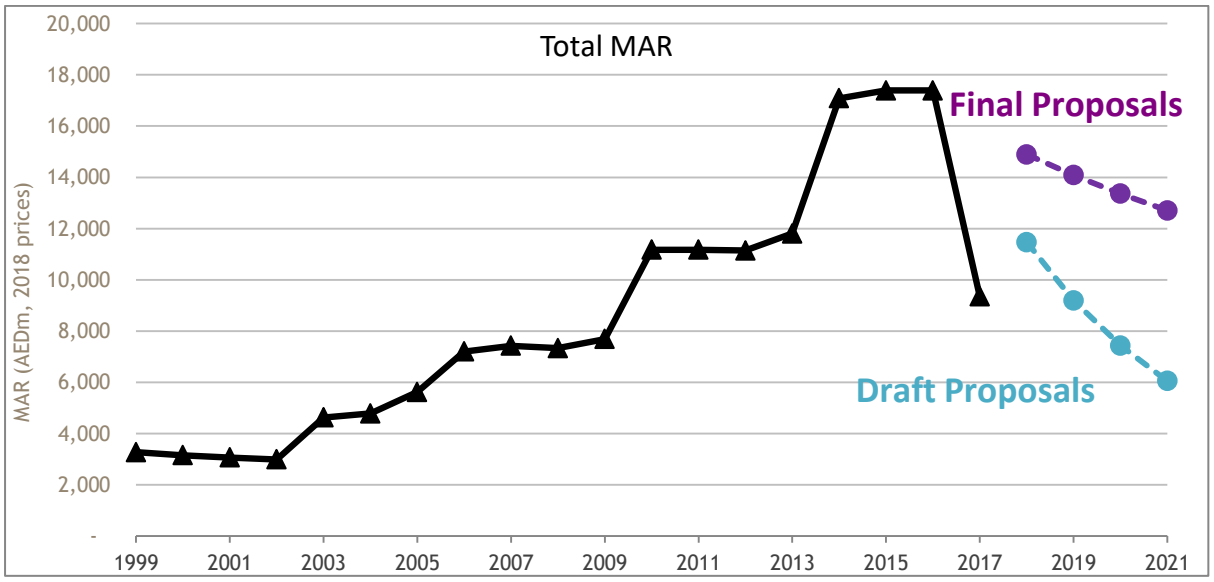
Table 7.10: Comparison of RC1 projected MAR against 2016 actuals (option 2)

AED million		2016 actual MAR		2018 MAR (2018 prices)		2021 MAR (2018 prices)	
		2016 prices	2018 prices	MAR	% increase from 2018	MAR	% increase from 2016
AADC	Electricity	1,734	1,799	1,581	-12%	1,161	-35%
	Water	526	546	579	6%	587	7%
ADDC	Electricity	3,460	3,591	3,079	-14%	2,277	-37%
	Water	1,007	1,045	1,085	4%	1,100	5%
TRANSCO	Electricity	4,861	5,045	4,296	-15%	3,214	-36%
	Water	2,710	2,813	2,060	-27%	2,090	-26%
ADSSC	Total	2,459	2,552	2,211	-13%	2,275	-11%
Total		**16,757**	**17,391**	**14,890**	**-14%**	**12,705**	**-27%**

Comparison against draft proposals

7.58 **Figure 7.11** below compares the total MAR for RC1 with derogation projected in these final proposals against that in the draft proposals:

Figure 7.21: Total projected MAR - final v draft proposals (option 2)



7.59 The table below shows that the RC1 final proposals represent increases in total annual MAR by about AED 5.2 billion (2018 prices) or about 61%, compared to the RC1 draft proposals, addressing the companies concerns (disused in **Sections 2 and 6**) on significantly lower MARs proposed in RC1 draft proposals.

Table 7.11: Average annual projected MARs for RC1 – final v draft proposals (option 2)

AED million, 2018 prices		Draft Proposals	Final Proposals with derogation	Increase in Final proposals with derogation	% Increase
AADC	Electricity	926	1,364	438	47%
	Water	452	583	130	29%
ADDC	Electricity	1,547	2,665	1,118	72%
	Water	764	1,092	328	43%
TRANSCO	Electricity	1,733	3,738	2,005	116%
	Water	1,114	2,075	961	86%
ADSSC	Total	2,000	2,243	243	12%
Total		**8,537**	**13,759**	**5,222**	**61%**

Comparison against PC4 and PC5 average MARs

7.60 **Table 7.6** compares the projected average MAR with derogation for the four network companies during RC1 period against corresponding average MARs during PC4 and PC5 periods in 2018 prices.

Table 7.12: Comparison of projected RC1 and PC4-PC5 average MARs (option 2)

AED million, 2018 prices		Average MARs			PC4 Vs RC1		PC5 Vs RC1	
		PC4	PC5	RC1	Difference AED million	Difference %	Difference AED million	Difference %
AADC	Electricity	1,274	1,676	1,364	90	7%	-312	-19%
	Water	489	560	583	94	19%	22	4%
ADDC	Electricity	1,783	3,193	2,665	882	49%	-529	-17%
	Water	910	1,013	1,092	182	20%	79	8%
TRANSCO	Electricity	3,029	4,054	3,738	709	23%	-316	-8%
	Water	1,830	2,342	2,075	245	13%	-267	-11%
ADSSC	Total	1,885	2,467	2,243	357	19%	-224	-9%
Total		**11,200**	**15,305**	**13,759**	**2,559**	**23%**	**-1,546**	**-10%**

7.61 In 2018 prices, the average total MAR for the four network companies during RC1 period is higher than the average total MAR during PC4. The average total MAR for the four network companies increased in 2018 prices by AED 4.1 billion or 37% from PC4 to PC5 due to high or over-forecast provisional capex allowances in PC5. Accordingly, the average MAR in RC1 are lower than the PC5 average MAR generally for individual businesses and in total for the companies, as expected, due to the following main reasons:

(a) Capex efficiency adjustment and under spending of PC4 and PC5 capex than provisional allowances (discussed in Sections 5 and 6);

(b) Lower opex allowances (discussed in Section 4);

(c) Lower WACC (4.5% compared to 5.5% allowed in PC5, see Section 6); and

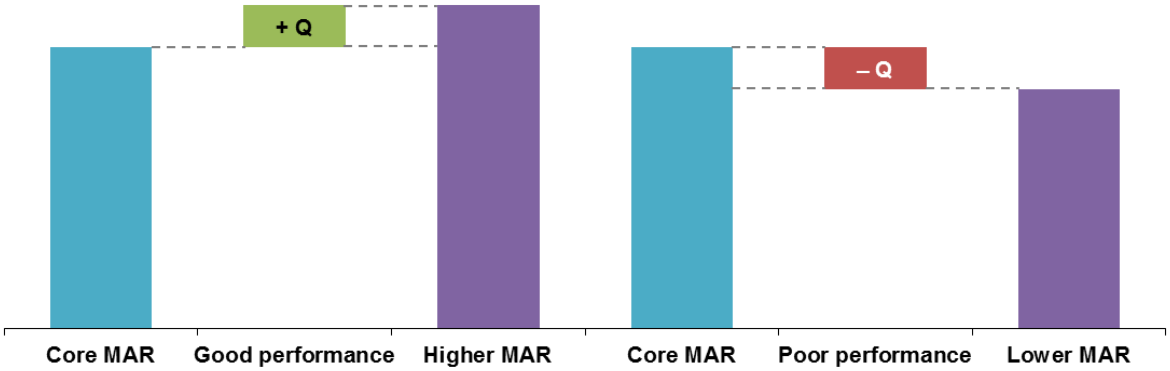
(d) Lower ex-ante allowances for RC1 than the provisional allowances in PC5, as discussed in Section 5. We expect the companies will spend more during RC1 period than the current ex-ante allowances for RC1 and hence expect upward adjustments to MAR in future subject to efficiency review.

8. Incentives

Introduction

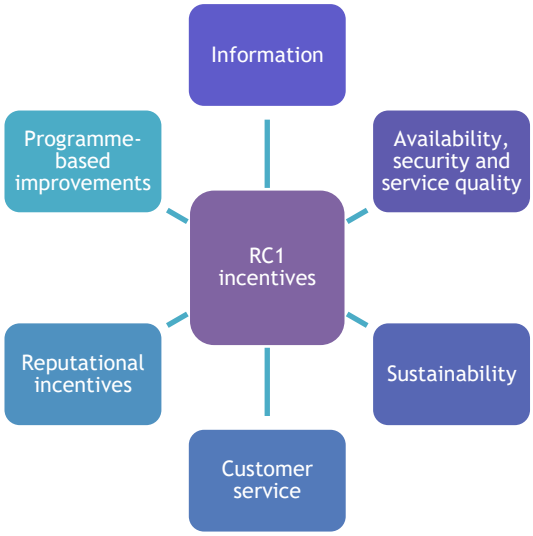
8.1 Price controls for network companies include a Performance Incentive Scheme (PIS) designed to encourage appropriate quality of service, outputs and performance. Companies are rewarded and penalised for improved and deteriorating performances respectively on an annual basis against pre-defined performance indicators. This financial reward or penalty is applied through upward or downward adjustment to MAR via Q factor, often following verification of performance by an independent Technical Assessor (TA).

Figure 8.1: Performance incentive scheme



8.2 In earlier consultation papers, we proposed maintaining this approach to performance incentives in broad terms within RC1 and proposed certain specific incentives and changes in six areas of performance.

Figure 8.2: Six areas of incentives for RC1



8.3 This Section 8 summarises ADWEA group and ADSSC responses to the RC1 draft proposals, on the overall approach and key design aspects of the incentives, our assessment of their responses, and our final proposals for individual performance incentives for the RC1 period. The more comprehensive summary of the stakeholders' detailed comments for each specific incentive, together with our response, is included in **Annexes C** to **G** (being issued to the network companies with the RC1 final proposals). This section then follows with the final proposals on the details of the proposed calibration of incentive schemes and the proposed magnitude of respective incentives.

Overall approach and proposed incentives

Draft proposals

8.4 In the RC1 draft proposals, we proposed to:

(a) maintain the existing PC5 three priority areas for incentives; namely, provision of high quality information; quality, security and availability of supply; and end user efficiency;

(b) expand the incentives framework to two new areas: (i) customer services, and (ii) sustainability, particularly to introduce a new incentive for timely HSE reporting, and develop a new DSM incentive;

(c) on incentives design:

(i) use absolute targets (instead of relative targets) where pragmatic and dead-bands of performance (i.e. performance range without any bonus or penalty) where suitable;

(ii) apply penalty-only incentives to limited, specific areas where companies have statutory duties, and both bonus and penalty in all other cases; and

(iii) issue RIGs for incentives where deemed appropriate, following consultation with the relevant licensees;

(d) include individual incentives for each of the five priority areas identified above (refer to **Table 8.2** for further details); and

(e) explore whether and how programme-based incentives can be developed for important areas such as asset management not covered by proposed individual incentives.

Responses

8.5 ADWEA group agreed in principle with performance incentives, generally agreed with the principles and structure of the majority of the existing incentives and some of the new incentives, and proposed amendments to or withdrawal of the other incentives. ADSSC agreed with the principles of the recycled water quality incentive, but opposed continuing the biosolids incentive and the introduction of other new incentives. ADWEA group's and ADSSC's key comments on incentives are set out below.

Overall approach and design of incentives

8.6 ADWEA group had the following comments on the overall approach and design of incentives:

(a) It proposed a cap on incentives, individually and in total, so that that new incentives do not simply increase the total value at risk for the sector. ADWEA group also highlighted that, subject to an acceptable level of funding for the RC1 period in the final proposals, incentives should then be proportional to the amount of profit recorded by the network companies, and not based on the MAR. It concluded to suggest a total cap of +/-3% of total profit on all agreed financial incentives in any one year.

(b) It reiterated its lack of support for penalty-only incentives and added that if it was not satisfied with the overall level of funding, it reserved the right to reject all penalties within the incentives. Further, it could consider arrangements that involve only bonuses for improved performance.

(c) For certain metrics, the Bureau did not provide full or sufficient detail, in particular the lack of incentive rate against many incentives, for ADWEA group to form a comprehensive view about the proposed incentive.

(d) Any RIGs should be consulted on and agreed before implementation.

8.7 ADSSC opposed the introduction of penalty-only incentives without any reward, for better performance, which it considered punitive and not beneficial for the sector.

Proposed incentives

8.8 In relation to incentives for the provision of timely and the TA arrangements:

(a) ADWEA group did not support incentives for timely submission of information; and

(b) It expressed significant concerns about the TA arrangements, in particular its independence, and supported the identification of areas of further improvement by the TA (and the possible provision of incentives to complete the improvements), but did not support the linking of those improvements with the submission dates, as this would drive undesirable behaviour to create minor and easily achieved improvements. It therefore suggested dealing with the TA assessment of areas of improvement as a separate, individual incentive.

8.9 On the incentives for availability, security and quality of supply:

(a) ADWEA group's key comments and suggestions were to:

(i) Exclude Bromate failures from the water quality performance assessment (WQPA) incentive;

(ii) Introduce an appropriate absolute target for the incentive on removal of timed water supply (and apply only to AADC) and appropriate dead-bands for the interface metering incentive (both water and electricity);

(iii) Redefine the water security of supply incentive as the percentage of annual unsupplied quantities of water (as notified from distribution companies) in relation to the total annual supplied quantities;

(iv) Withdraw the non-revenue water to avoid dual penalty in case DoF implements a similar incentive by reducing the subsidy if certain targets of non-revenue water are exceeded;

(v) Ensure that the targets for SAIDI and SAIFI incentives are aligned with the Government's latest directions;

(vi) Base the distribution losses incentive on validated meter reads only, and exclude RASCO from the incentive as RASCO is expected to be closed down;

(vii) Review the value of lost load (VOLL) estimate and target for the unsupplied energy, as a target of 100% is not consistent with international best practice, economically efficient or technically appropriate;

(viii) Introduce a dead-band for the system despatch costs incentive, and implement the incentive later (than 2019);

(ix) Withdraw the incentives on:

- Water meter penetration, which is no longer necessary given the introduction of the incentive for non-revenue water; and
- By-pass of ground storage tanks, as this matter is already covered and incentivised through the water supply regulations;

(b) ADSSC indicated that:

(i) The targets for the recycled water quality incentive should be reviewed, and certain parameters (e.g. residual chlorine) should be excluded from the assessment; and

(ii) The biosolids incentive should not be continued as there is no market for biosolids in the Emirate.

8.10 On the incentives for sustainability:

(a) ADWEA group indicated that it had limited control over critical factors of the DSM incentive, and that it had no licence obligation on DSM; and

(b) Both ADWEA group and ADSSC opposed strongly the introduction of the health, safety and environment (HSE) incentive, highlighting in particularly that this area is already covered by the incident reporting regulation (IRR) and overseen by OSHAD, and that the financial incentive is not appropriate.

8.11 In relation to the incentives for customer services:

(a) ADWEA group highlighted some concerns about the customer complaints incentive definition (e.g. focussed only on duration of complaints, factors outside the companies' controls such as tariff setting and increased number of complaints following tariff changes), and indicated that the sector is already incentivised in this area; and

(b) ADSSC also highlighted concerns with the customer complaints incentive's focus only on the speed of closing complaints.

8.12 On reputational incentives:

(a) ADWEA group supported introducing only one incentive between unsupplied energy and system minutes loss, to avoid redundancy and regulatory burden;

(b) Both ADWEA group and ADSSC opposed the introduction of the financial ratios incentive. ADWEA group in particular highlighted that the ratios suggested would not provide meaningful results, there were no targets to the ratios, and the information to calculate them was already available to the Bureau. ADSSC however recognised that it would be beneficial being able to benchmark finance metrics with other companies in the sector; and

(c) Both ADWEA group and ADSSC strongly opposed the introduction of the business continuity management (BCM) incentive, highlighting duplication of obligations in this area.

8.13 ADWEA group suggested that a new incentive on capital efficiency should replace the Bureau's existing capital efficiency assessment process.

8.14 In relation to improvement programs, TRANSCO's letter dated 10 April 2017 highlighted its support and the importance of these programs, especially to promote improvements in areas such as asset management. In a meeting with the Bureau on 3 August 2017, TRANSCO summarised its work on benchmarking its asset management activities and its views on how this could be expanded to an improvement program incentive. TRANSCO also sought the Bureau's support for the development of an incentive to design and deliver the improvement programme, and to consider how capex and opex related with the subsequent implementation of these programs could be dealt with within the regulatory framework.

Assessment

8.15 The Bureau welcomes the general support for performance incentives. Below is our response to the key comments raised by ADWEA group and ADSSC. The comprehensive summary of the comments received on incentives, our detailed assessment and the details of our final proposals on incentives are included in **Annexes C** to **G**.

Overall approach and design of incentives

8.16 In relation to the ADWEA group's comments on approach and design of incentives, we note that:

(a) As set out in Section 2, we do not agree that incentive caps should be based on profits, since we do not regulate profits but revenues, reported profits can be manipulated for various considerations thereby diluting the effectiveness of incentives, and more importantly profit-based approach will not be consistent with price controls' approach to date that has been the key demand of stakeholders at this renew. We agree with ADWEA group suggestion to limit the financial risk (to the network companies and to customers) from an increased number of

incentives and, consistent with the arrangements in PC3, propose an overall cap on incentives of 4% of the annual MAR for the respective price controlled business. This will be in addition to the cap of 0.5% of the annual MAR for each individual incentive. We will review the effect of the proposed overall cap over future years to consider any change to future price controls.

(b) We consider that penalty-only incentives could be a useful tool to highlight the importance and promote performance of specific areas where statutory requirements exist but where performance has proved volatile over time. We also note that there were only two penalty-only incentives in the draft proposals: provision of information and HSE. However, considering the general negative reaction from the sector and the need for further improvements in information submission, we have reconsidered this issue and our final proposal is to maintain the current arrangements and apply both financial bonus and penalty to all incentives.

(c) We note that we included within the RC1 draft proposals all the details for each individual incentive, and that **Table 8.4** in the draft proposals detailed the incentive rate for each proposed incentive. The financial details related with the incentives proposed in the RC1 draft proposals were also included in a separate tab of the respective financial model, which we shared with the network companies. Notwithstanding, the updated incentive details are again included in these final proposals, namely in this section, in **Annexes C to G**, and in the financial model.

(d) In relation to RIGs, we note that we always consult with the companies on the RIGs before issuing them in accordance with the licences. Nonetheless, these RIGs do not need to be agreed prior to its implementation. In any case, the Bureau is committed to transparency and will consider any written views on issued RIGs and RAGs or their amendments.

8.17 In relation to ADSSC's concern about penalty-only incentives, our final proposal is to include for each incentive both a penalty and a bonus, as set out above.

Proposed incentives – Information and Technical Assessor

8.18 In relation to the responses about the specific incentives for the provision of timely and high quality information and the TA arrangements, we note that:

(a) These incentives have played a key role in improving and maintaining good performance in terms of timely submission of information in previous years, and we believe that there is still scope for improvements in the quality of the submitted information. Given ADWEA group's support for keep incentivising the improvements recommended by the TA, we propose to monitor performance in relation to timely submission, and will put the incentive in abeyance for this particular aspect if the companies continuously perform and provide the submission on time.

(b) As explained in more detail in **Annex C**, we fully support the TA independence. We welcome the support for incentivising the identification of areas of further improvement by the TA (and the provision of incentives to complete the

improvements). We do not see necessary to design a separate incentive for the TA recommendations, as these are already covered in the existing incentive.

(c) We therefore do not propose any change to these incentives, except to withdraw the RC1 draft proposal to apply a penalty only. Our final proposal is to include a financial bonus and a financial penalty for this incentive.

Proposed incentives – Availability, security and quality of supply

8.19 On the incentives for availability, security and quality of supply:

(a) With regards to ADWEA group's responses, we propose the following:

(i) Maintaining the WQPA incentive unchanged (except for updating the respective incentive rate) – This area is governed by the Water Quality Regulations, and any changes in these regulations, including in relation to the treatment of Bromate, will be consulted and agreed before implementation, and will effect into this incentive accordingly;

(ii) We agree with ADWEA group to introduce appropriate absolute targets for the incentive on removal of timed water supply, and an appropriate dead-band for the incentive on interface metering (both water and electricity), and refer to Annex D for further details. Given that ADDC's performance on interface metering is already over 98%, we also agree to apply the financial incentive only to AADC, and maintain this incentive only for monitoring purposes in the case of ADDC (effectively making this a reputational incentive for ADDC);

(iii) We agree with TRANSCO's suggestions for the water security of supply incentive. Accordingly, we have redefined the performance metric as the percentage of annual unsupplied quantities of water (as notified from distribution companies) in relation to the total annual supplied quantities;

(iv) We will introduce the incentive for non-revenue water for RC1. However, to avoid dual penalty, this incentive will be withdrawn should DoF and ADWEA implement the Bureau's subsidy payment reforms contemplating no subsidy for water units not supplied due to unavoidable losses. This withdrawal would be subject to the Bureau's confirmation and appropriate notification to distribution companies;

(v) We updated the targets for the SAIDI and SAIFI incentives, based on the latest information provided by the companies, to align them with the Government's latest targets;

(vi) Maintaining the electricity distribution losses incentive based on validated meter reads only – therefore withdrawing the draft proposal for also considering meter reads from automated meters. We however keep including RASCO in the incentive, as this way the relevant units will be accounted for while RASCO is operational, and RASCO will naturally cease to have any effect on this incentive when it is closed down;

(vii) Maintaining the unsupplied energy incentive unchanged (except for updating the incentive rate). We note that there are exceptional events

which are excluded from the incentive, and consider that using the VOLL is consistent with international best practice and will provide important investment signals to TRANSCO;

(viii) Maintaining 1 January 2019 as the effective implementation date for the system despatch costs incentive. We understand that back-casting is now implemented, and the new unit commitment model already commissioned. There should be therefore nothing preventing the calculation of this performance metric, which was initially planned to be implemented in 2015, and note the importance of monitoring appropriately this area. We also do not consider a dead-band necessary, and recall that this incentive is based on improving year-on-year performance, and thus expect TRANSCO to be able to meet the targets for the first few years;

(ix) We do not agree with ADWEA group's suggestion for withdrawing the incentives on:

- Water meter penetration – We note that the level of metering is not exclusively related to water loss reduction, and thus the Bureau does not support removing this incentive;
- By-pass of ground storage tanks – We consider that the incentive may be useful in monitoring and promoting performance in this requirement. We note that currently this requirement is not monitored, and consider this approach reasonable and flexible for distribution companies. We will however roll forward the introduction of this incentive to 2020 (instead of 2018) in order to allow the distribution companies time to make the necessary arrangements;

(b) In relation to the feedback from ADSSC on incentives, we note that:

(i) The gold, silver, and bronze targets for the recycled water quality incentive mentioned by ADSSC applied to the reputational version of this incentive, which we withdrew in the RC1 draft proposals following ADSSC's lack of support for reputational incentives. We maintain in these final proposals the financial incentive as set out in the draft proposals with a target of 95%;

(ii) ADSSC did not present any new information to support removing the biosolids incentive. We reiterate that this is an important area where we have not seen progress over the last years and therefore maintain the incentive, but we modify the incentive targets for the RC1 period (in relation to PC5) to appropriate levels (considering the lack of progress during PC5).

Proposed incentives – Sustainability

8.20 On the incentives for sustainability, we consider that:

(a) Distribution companies have a key role in DSM as they are the entities responsible for supply of water and electricity, have direct interactions with customers and own information and systems related to consumption, metering,

and billing. We also note that the distribution companies have licence obligations on efficient use of water and electricity, which includes DSM.

(b) Given the sector's strong opposition to incentives for HSE, we withdraw the HSE incentive from the RC1 final proposals. We will pursuit other regulatory instruments to ensure performance and compliance in this important area, namely through the IRR.

Proposed incentives – Customer services

8.21 In relation to the incentives for customer services:

(a) We acknowledge that customer complaints is only one aspect of customer services, and will work with the sector over the RC1 period in order to improve, promote performance and potentially develop other areas of customer satisfaction. We also note that there is a classification of complaints, which considers complexity and severity, and which effectively means that this incentive does not cover only the duration of complaints. We also note that the incentive covers the areas of complaints controllable by the licensees. We therefore maintain this incentive unchanged from the draft proposals;

Proposed incentives – Reputational incentives

8.22 On reputational incentives, we consider that:

(a) To avoid potential redundancy and minimise burden, as claimed by ADWEA group, and given that we are maintaining the unsupplied energy incentive in this area, we propose to withdraw the system minutes loss incentive;

(b) In relation to the financial ratios incentive, we do not agree that the suggested ratios do not provide meaningful tool/results. These are widely used in performance and financial health monitoring of the companies elsewhere in the world including by the credit rating agencies as quoted by ADWEA. We do not consider that setting out targets is necessary at this stage, but may be useful in future, and will keep monitoring them. We also consider and have explained before that introducing these financial ratios will aid improving transparent monitoring of financial performance and health of the sector companies, and embracing the best corporate governance practices. We therefore propose to maintain this incentive unchanged from the draft proposals. However, we may review the matter in future to further enhance the coverage, refine the financial ratios and introduce targets; and

(c) Given the opposition from the sector and this being a relatively new area, we withdraw the proposed BCM incentive, and will keep monitoring performance in this area and assess if an incentive may be appropriate to promote performance in future.

Capital efficiency incentive

8.23 As discussed in Section 2, we do not agree that an incentive (as suggested by ADWEA group) would appropriately promote and reflect capital efficiency – given the amounts at stake – or that such incentive would be consistent with international best practice. We

therefore do not propose to introduce and incentive in this area. We are open however to discuss incentives for improving capex forecasting and asset management as part of the improvement programme incentives to complement and support the companies' performance in regulatory reviews of the capex efficiency.

Improvement programme incentives

8.24 In relation to improvement programs, we welcome TRANSCO initiative in this area, and as mentioned in the RC1 draft proposals, we agree that these programme incentives may be useful in driving/promoting improvements in the sector.

8.25 We are therefore open to engage with the companies to explore opportunities to further enhance programme-based incentives during the RC1 period. Developing an improvement work program starts by identifying the gaps in the current practices and covers technical, economic and organisational aspects, including staff competencies, training and development. The programme then should define KPIs, reporting mechanisms and design of potential incentives, and finally draw the roadmap for improvements to achieve specific targets and implementation. Such an approach could apply in asset management, capex forecasting, risk management, carbon accounting, business continuity and smart grids.

8.26 We will consider introducing the proposals from the sector for such programmes and related incentives – following consultation and agreement with the sector – during the RC1 period as follows:

(a) Detail of the programmes and incentives should be developed by the sector in coordination with the Bureau, including where necessary the development of appropriate RIGs.

(b) Where formula-based measures for developed incentives are agreed, the arrangements set out further below in this section would apply and an incentive scheme may be implemented through licence modification or derogation.

(c) Where appropriate, the recovery of costs of actual implementation of improvements if not fully funded by the incentive payments could be considered through wider opex and capex funding arrangements (e.g. ex-ante reviews and/or opex annual adjustments).

Incentives for demand forecasting

8.27 As indicated previously, the Bureau has now concluded the project to review and recommend improvements in the demand forecasting arrangements in the sector. As part of this project, the Bureau's consultant final reports recommended a number of KPIs for demand forecasting, including financial KPIs, which can be used to monitor and incentivise the sector companies' performance in demand forecasting.

8.28 While the details for these KPIs are defined in the demand forecasting final reports, we understand that the sector needs to conduct some work in this area before these KPIs, and related financial incentives, can be fully implemented. Once the work necessary to implement the KPIs as per the demand forecasting final report recommendations is

completed, we will propose a licence modification to enable the introduction of the respective incentives during the RC1 period.

Summary of changes to proposed incentives

8.29 **Table 8.1** below summarises all the responses from the sector to the RC1 draft proposals on incentives and our changes in the RC1 final proposals on these incentives compared to both the existing PC5 arrangements and the RC1 draft proposals.

Table 8.1: Incentives – Summary of sector comments and changes in RC1 final proposals

S.No.	Individual incentive	Relevant businesses	Existing or new incentive	Key comments from sector	Key changes from PC5 and RC1 draft proposals
Annex C – Provision of high quality information					
C.1	SBAs / PCRs	All	Existing	Oppose penalty only; Oppose incentives for provision of information; TA independence	Now bonus and penalty incentive
C2	AIS	All	Existing		
Annex D – Availability, security and quality of supply					
D.1	Water quality	Water	Existing	Bromate should be excluded	None
D.2	Removal of timed supply	AADC and ADDC Water	Existing	Apply absolute targets; Incentive should not apply to AADC	Financial incentive for AADC, reputational for ADDC; Absolute targets
D.3 & D.11	Interface metering	Water, Electricity	Existing	Apply dead band	Dead-bands introduced
D.4	Water meter penetration	AADC and ADDC Water	Revised	Incentive should be removed given introduction of NRW	Unchanged form draft proposals; Incentive renamed from PC5
D.5	Security of supply	TRANSCO Water	Existing	No control over output; Metric should be based on notified unsupplied quantities	Absolute target based on supplied quantities; Metric based on notified unsupplied quantities;
D.6	Non-revenue water	AADC and ADDC Water	New	Some elements of NRW outside control; Potential double penalisation with DoF	Agreed to make incentive reputational if the Bureau's subsidy payment reforms proposals is implemented
D.7	By-pass of ground storage tanks	AADC and ADDC Water	New	Incentive not necessary; Survey is burdensome	Implementation is in 2020;
D.8	SAIDI	AADC and ADDC Electricity	Existing	Capex and opex funding needs; Align to updated Government targets	Targets reviewed to align with Government latest targets
D.9	SAIFI				
D.10	Distribution loss reduction	AADC and ADDC Electricity	Existing	System and resource constraints in the absence of AMR	AMR removed; Includes units in distribution network points;
D.11	Interface metering	Electricity	Existing	Apply dead band	Dead bands
D.12	Unsupplied energy	TRANSCO Electricity	Existing	100% target is not reasonable; VOLL estimated is not appropriate	Incentive renamed from PC5; Penalty based on VOLL, bonus only if no unsupplied energy (change from PC5)
D.13	System despatch costs	TRANSCO Electricity	New	Apply dead-band required; Postpone introduction	None
D.14	Biosolids reuse	Wastewater	Existing	No market for biosolids	Targets revised from PC5
D.15	Recycled water quality compliance	Wastewater	New	Targets should be reviewed	None

Annex E – Sustainability					
E.1 & E.2	Demand side management	AADC and ADDC, Water and Electricity	New	Limited control; No licence obligation	None
E.3	HSE reporting	All	New	Not appropriate; Covered by IRR and OSHAD	Withdrawn
Annex F – Customer Services					
F.1	Customer complaints	AADC, ADDC, ADSSC	New		None
Annex G – Reputational and monitored KPIs					
G.1 & G.2	Transmission system availability	TRANSCO Water and Electricity	Existing	None	Removed financial incentive (change from PC5)
G.3	Financial performance ratios	All	New	Ratios are not meaningful results; Apply targets	None
G.4	Business continuity management	All	New	Duplication of obligations	Withdrawn
G.5	System minutes loss	TRANSCO Electricity	New	Should be removed if unsupplied energy is maintained	Withdrawn
Incentives proposed by the sector					
	Capital efficiency (ADWEA group)	All	New	New incentive proposed by ADWEA to replace capex efficiency reviews	Not appropriate;; Incentive not introduced;

Final proposals

8.30 Our RC1 final proposals on incentives are the following:

(a) Apply incentives listed in **Table 8.2** for the RC1 period in the following priority areas; (i) provision of high quality information, (ii) quality, security and availability of supply, (iii) end use efficiency/sustainability (all common to PC5), and (iv) customer services;

(b) Introduce reputational incentives, which do not include any financial bonus and/or penalty;

(c) Issue RIGs for incentives where deemed appropriate, following consultation with the relevant licensees;

(d) Ensure that (i) RIGs for the TA appointment, PCRs and AIS are in place and updated as necessary;

(e) Maintain the cap on individual incentives at 0.5% of the MAR, and introduce an overall incentives cap of 4% of the company's annual MAR. Maintain also the use of dead-bands of performance where suitable, and the use of absolute targets where appropriate and pragmatic.

(f) Develop programme-based incentives proposed by the sector for implementation in the RC1 period, for areas such as asset management, capex forecasting, carbon accounting, risk management, BCM and smart grids;

(g) Develop and implement, following consultation and agreement, incentives for demand forecasting during the RC1 period.

8.31 **Table 8.2** below summarises all the RC1 final proposals specific incentives for each key area, indicating for each business the existing ("✓" symbol) and new ("☑" symbol) incentives. **Annexes C-G** are being issued to the network companies with this document to describe the individual incentives briefly discussed in this section.

Table 8.2: Incentives in the RC1 final proposals

	AADC (E)	AADC (W)	ADDC (E)	ADDC (W)	TRANSCO (E)	TRANSCO (W)	ADSSC
Information[1]							
SBAs (including PCRs as per new RAGs)	✓	✓	✓	✓	✓	✓	✓
AIS	✓	✓	✓	✓	✓	✓	✓
Availability, security and service quality							
Water quality		✓		✓		✓	
Removal of timed water supply		✓		✓			
Interface metering	✓	✓	✓	✓	✓	✓	
Water meter penetration		✓		✓			
Security of supply						✓	
Non-revenue water		☑		☑			
Bypass of ground storage tanks		☑		☑			
SAIDI	✓		✓				
SAIFI	✓		✓				
Distribution loss reduction	✓		✓				
Unsupplied energy					✓		
System despatch costs					☑		
Biosolids reuse							✓
Recycled water quality compliance							☑
Sustainability							
Demand side management [2]	☑	☑	☑	☑			
Customer service							
Customer complaints	☑	☑	☑	☑			☑
Reputational and monitored KPIs							
Transmission system availability					✓	✓	
Financial performance ratios	☑	☑	☑	☑	☑	☑	☑
Number of existing incentives for RC1	6	6	6	6	5	6	3
Number of new financial incentives for RC1	2	4	2	4	1	0	2
Number of new reputational incentives for RC1	1	1	1	1	1[3]	1[3]	1
Total number of incentives for RC1	**9**	**11**	**9**	**11**	**7**	**7**	**6**
Total number of existing incentives for PC5	7	7	7	7	5	6	3

Notes: (1) Information incentive penalties will only be triggered following repeated and consecutive failure to comply (two or more consecutive years)
(2) The currently existing DSM strategy and action plan incentive applies only during the PC5 period (up to the end of 2017), and will be replaced by the new proposed DSM incentive.
(3) In addition, transmission system availability, a financial incentive under PC5, is now a reputational incentive.
"✓" represents an incentive introduced prior to RC1; "☑" represents a new incentive introduced in RC1.

Incentive mechanisms and caps on financial impact

8.32 The RC1 final proposals for incentives include the following possible types of financial incentives and outputs:

(a) Formula-based incentives for performance against metrics specified as part of this price control review (the majority of incentives proposed) – The formulas, targets and incentives are incorporated into the licence, and where applicable more detailed definitions and reporting arrangements are set out in RIGs. The TA arrangements and the incentive rates defined in this document apply to these incentives;

(b) incentives for specific end-use efficiency initiatives, following the Bureau's assessment of DSM initiatives business cases - The Bureau may set an additional incentive payments for each initiative, and efficient costs would be recovered through the price control process (e.g. ex-ante reviews and/or opex annual adjustments); and

(c) incentives that are identified at a high level – for example for demand forecasting, or improvement programs incentives (e.g. asset management) – but where the detailed specification or underlying data will require further development, and may be introduced during RC1 or the next price control period.

8.33 The next sub-sections detail further the operation of incentive mechanisms and the targets and incentive rates applied to each incentive.

Operation of incentive mechanism

8.34 The incentive schemes for RC1 will operate in the same manner as in the current price controls. The financial reward or penalty will be provided via the "Q" term in the MAR formula to adjust the company's allowed revenue upward or downward. The term Q_t, the performance adjustment for year t, will be calculated in AED terms as follows:

$$Q_t = Q1_t + Q2_t + Q3_t + \ldots + QN_t$$

where $Q1_t$ …. QN_t are the revenue adjustments in respect of the incentive indicators 1, 2, …., N, respectively.

8.35 As at present, MAR will be adjusted via the Q term in the year "t" for performance on incentive indicators based on:

(a) for information incentives:

(i) company's information submission (except for AIS) in year "t-1"; or

(ii) company's AIS in year "t-2";

(b) for all other incentives: company's performance in year "t-2". In the case of the DSM incentive, the company's performance is monitored annually, but is only assessed in the last year of the RC1 period for a financial bonus or penalty.

8.36 This will allow time to verify a company's performance or submission and to discuss and address any issues before the financial bonus or penalty is calculated and applied.

8.37 This mechanism and timeline are illustrated in the table below. The information submission in year "t-1" (or AIS submission in year "t-2") may relate to the previous year "t-2" (ie, SBAs), or to the current year "t-2" (ie, AIS) but in all cases results in the application of the Q term to MAR in year "t". With regard to the performance indicators (eg, system availability, SAIDI and SAIFI), a company's performance on the indicator in year "t-2" will be verified by the TA in year "t-1" to determine the value of Q term that will apply to MAR in year "t".

Table 8.3: Operation of incentive schemes

Year	t-2	t-1	t
SBA submission incentives		Submission	Q applies to MAR
AIS submission incentive	Submission		Q applies to MAR
Performance indicator incentives	Performance	Verification	Q applies to MAR

8.38 The following sub-sections describe the Bureau's proposed general formulae to determine the Q terms for various incentives for the RC1 period. These formulae are structured so that, for symmetric incentives, the Q term will automatically take a positive sign if a reward is required (i.e. actual performance is better than the target) and a negative sign if a penalty is required (i.e. actual performance is below the target). Methods and formulae to assess a company's performance and calculate the relevant performance indicator are described in **Annexes C to G**. These methods and formulae can be further clarified and refined by the Bureau in Regulatory Instructions and Guidelines (RIGs) to be issued and modified from time to time following consultation with the respective licensees.

Q terms for information incentives

8.39 For information incentives relating to the SBAs and AIS, the value of the Q term will be determined as follows based on the timeliness of submission and, where applicable, the completion of the TA's recommendations for improvement from the previous year:

(a) For any delay in submission beyond the target date in any year, the company will receive a penalty calculated as follows:

Q = - Incentive rate x Number of months of delay from target date x (1 + TA ratio)

(b) The maximum penalty for any submission will be capped by a delay of 6 months. That is, the maximum penalty will be:

Q = - 6 x Incentive rate x (1 + TA ratio)

(c) For any submission on or before the target date in any year, the company will receive a lump-sum reward calculated as follows:

Q = 6 x Incentive rate x (1 - TA ratio)

(d) Here, the TA ratio means the ratio between the number of TA's previous year recommendations not completed and the total number of TA's previous year recommendation.

(e) These schemes are symmetric, with the maximum lump sum reward matching the maximum level of penalty (ignoring the TA ratio).

Q terms for other performance incentives

8.40 For other performance indicators (other than information incentives), the penalty or reward in a year will generally be of the following form, where a performance indicator with a lower value than the target is considered a better performance (eg, SAIFI, SAIDI, transmission or distribution losses):

Q = Incentive Rate x [(Target performance – Actual performance)/ Target Performance] x 100

8.41 However, for performance indicators where a higher value than the targets is considered better performance (eg, DSM), the signs in the above formula for Q will be reversed. That is:

Q = Incentive Rate x [(Actual performance – Target performance)/ Target Performance] x 100

8.42 The multiplicative factor of 100 shows that deviation in actual performance from target will be assessed as a percentage of target performance and that the incentive rate will be expressed in AED per 1% deviation in performance from the target. In certain cases (such as interface metering incentives), actual performance would be assessed against an absolute target (of 100% interface metering) and the factor of 100 will not be required.

8.43 In some cases, the deviation in performance from the target is measured in percentage points rather than percentage. The formula for Q term will then not involve a target performance in the denominator and the incentive rate will be expressed in AED per 1 percentage point of deviation.

8.44 For unsupplied energy, the incentive rate is the value of lost load (VOLL).

Performance targets and incentive rates

Performance targets for incentives

8.45 **Table 8.4** below lists the proposed targets for all incentives which will be incorporated into the network companies' licences at this price control review.

8.46 A number of points are worth noting here:

(a) In the case of information incentives, these targets are in the form of a specific date by which an information submission is required. A delay beyond the target date will trigger a financial penalty and a submission before the target date will trigger a financial bonus, which will be calculated on a monthly basis. However, the bonus and penalty will also depend on the compliance of information submission with licences and RIGs and on the TA ratio.

(b) For many other incentives, the performance target for a year is generally based on the company's actual performance in the preceding year as verified by the TA.

(i) In these cases, company's actual performance in 2017 would be verified under the PC5 arrangement and can be used to set the target for 2018.

(ii) In two cases where we have proposed a new incentive either because the actual performance in the preceding year was not measured according to the new definitions or to enable more time for the companies to prepare,

the first year of the incentive is delayed. This is the case with the incentives for system despatch costs and by-pass of ground storage tanks, for which 2019 and 2020 (respectively) will be the first year when the performance will be subject to incentives and the performance in the previous year (2018 or 2019) will only be verified by TA to set the respective target.

(c) There are also a number of incentives where performance targets are proposed in absolute terms rather than based on the previous year performance. Such incentives are applied from the first year of RC1 period (ie, 2018).

(d) We propose for a number of incentives a dead-band for performance where a company will not be subject to any bonus or penalty.

Table 8.4: Performance targets for RC1 incentives – Final proposals

	Target / dead-band	First year of performance against incentive
Information (Annex C)		
SBAs (including PCRs)	30 April	2018
AIS	31 October	2018
Availability, security and service quality (Annex D)		
Water quality	4.6-4.8 (dead-band)	2018
Removal of timed water supply	98% (for 2018) and 99.5% (for 2019-2021)	2018
Interface metering	0.95-0.96 / 0.90-0.92 (dead-bands for electricity / water)	2018
Distribution losses (E)	Previous year performance	2018
Water meter penetration	Previous year performance	2018
Security of supply	0.05% of supplied water	2018
Non-revenue water	10%-15% (dead-band) to 10%-12% glide path	2018
By-pass of ground storage tanks	Previous year performance	2020
SAIDI	Previous year performance/glide path target	2018
SAIFI	Previous year performance /glide path target	2018
Unsupplied energy	zero unsupplied energy	2018
System despatch costs	Previous year performance	2019
Biosolids reuse	85% of previous year performance	2018
Recycled water quality compliance	94%-96% (dead-band)	2018
Sustainability (Annex E)		
Demand side management	6%-10% (dead-band)	2018
Customer services (Annex F)		
Customer complaints	Average performance in 2017 and 2018	2019
Reputational and monitored KPIs (Annex G)		
Transmission system availability	NA	2018
Financial performance ratios	NA	2018

Overall approach on calculating incentive rates

8.47 The incentive rates for most financial incentives related indicators proposed for this price control review (the exception being unsupplied energy and SAIDI/SAIFI) have been calculated using the following approach, which is similar to that used at previous price control reviews:

(a) First, determine the total amount "at risk" (the maximum penalty or reward) for each incentive as 0.50% of average forecast core MAR (excluding the pass-through costs) for the RC1 period.

(b) Second, the incentive rate for each indicator is derived by dividing the amount calculated above by a scheme calibration assumption as follows:

(i) For information submission incentives: 6 month delay;

(ii) Water quality incentive: 4% deviation;

(iii) DSM incentive: 4 percentage points deviation for bonus, 2 percentage points deviation for penalty;

(iv) Non-revenue water incentive and recycled water quality compliance incentive: 5 percentage points deviation;

(v) Biosolids reuse incentive: 15 percentage points deviation;

(vi) Interface metering: 10 percentage points deviation for water, and 4 for percentage points deviation electricity;

(vii) Bypass of ground storage tanks, and HSE reporting incentives: 10% deviation;

(viii) Customer complaints: 5 day deviation; and

(ix) For all other incentives: 20% improvement on the target performance.

8.48 Note that the above assumptions are purely hypothetical and used only for the purpose of the initial calibration of the scheme and play no further role in the implementation of the incentive schemes.

Calculation of incentive rates

8.49 **Table 8.5** shows:

(a) the average MAR forecast for each business for the RC1 period;

(b) the amount 'at stake' for each incentive based on 0.50% of this average MAR forecast; and

(c) the incentive rate for each indicator (rounded off appropriately) calculated by dividing the amount at stake by the calibration assumption.

8.50 As expected, the incentive rates vary significantly from business to business, reflecting the size (or MAR) of each business. Further, for any business, the actual incentive rate will depend on the targets set and the particularities of the incentive scheme.

8.51 The existing/new incentives and the new incentive rates proposed for RC1 in these draft proposals will take effect as follows:

(a) Existing indicators will continue to be subject to the existing incentive rates as long as the performance year (for performance indicators) or submission year (for information timeliness incentives) falls within the PC5 period (i.e. up to 2017). These indicators will however be subject to the new RC1 incentive rates as

calculated in **Table 8.5** when the performance or submission year falls during the RC1 period (i.e. 2018-2021).

(b) The new incentives or indicators will take effect from the first performance or submission year (2018 or 2019) as listed in **Table 8.4** above and their incentive rates will apply to adjust MAR in 2020 or later as per the timeline shown in **Table 8.3**.

Table 8.5: Incentive rates – final proposals

		Calibration assumption		AADC (E)	AADC (W)	ADDC (E)	ADDC (W)	TRANSCO (E)	TRANSCO (W)	ADSSC
Average RC1 MAR	AED million			1,364	583	2,665	1,092	3,738	2,075	2,243
Amount at stake	AED million	0.5%	of MAR	6.82	2.91	13.32	5.46	18.69	10.37	11.21
Provision of high quality information										
SBAs (PCRs), AIS	AED / month	6	months	1,137,000	486,000	2,221,000	910,000	3,115,000	1,729,000	1,869,000
Availability, quality and security of supply										
Water quality (WQPA)	AED / 1%	4	% deviation		728,000		1,365,000		2,594,000	
Removal timed water supply (penalty)	AED / 1ppt	8	ppt deviation		364,000					
Interface metering	AED / 1ppt	4	ppt deviation	1,705,000	728,000	3,331,000	1,365,000	4,672,000	2,594,000	
Water meter penetration	AED / 1%	20	% deviation		146,000		273,000			
Security of supply	AED / 0.01ppt	0.5	ppt deviation						2,075,000	
Non-revenue water	AED / 1ppt	5	ppt deviation		583,000		1,092,000			
By-pass of ground storage tanks	AED / 1%	10	% deviation		291,000		546,000			
SAIDI / SAIFI	AED	0.5%	of MAR	6,821,000		13,323,000				
Distribution loss reduction	AED / 1%	20	% deviation	341,000		666,000				
Unsupplied energy (penalty)	AED / kWh	VOLL	28 AED/kWh					28 AED/kWh		
System despatch costs	AED / 1%	20	% deviation					934,000		
Biosolids reuse	AED / 1ppt	15	ppt deviation							748,000
Recycled water quality compliance	AED / 1ppt	4	ppt deviation							2,803,000
Sustainability										
DSM *	AED / 1ppt	2	ppt deviation	13,641,000	5,827,000	26,646,000	10,922,000			
Customer services										
Customer complaints	AED / Day	5	days deviation	1,364,000	583,000	2,665,000	1,092,000			2,243,000

Notes: As discussed earlier, the incentive rates will increase with the increase in RC1 MAR if the companies accept the Bureau's draft derogation to make entire revenue adjustment for unduly earned financing costs relating to PC4 and PC5 capex in 2017 MAR. * Financial cap for the DSM incentive is 2% of the MAR.

Detailed design of individual incentives

8.52 **Annexes C-G** are being issued to the network companies with this document to describe the individual incentives briefly discussed in this section along with the rationale and considerations to support our final proposals on their detailed design.

8.53 The following table lists these individual incentives that we propose for RC1 based on the discussion in this section. The table also specify for each incentive:

(a) the annex which contains the details on the incentive;

(b) the businesses which the incentive relate to;

(c) whether the incentive is a new or existing one; and

(d) the main change(s) we propose to the incentive if it is a PC5 existing one.

Table 8.6: Incentives for RC1 – Summary of Bureau's final proposals

S.No.	Individual incentive	Relevant businesses	Existing or new incentive	Main change from existing PC5 incentive
Annex C – Provision of high quality information				
C.1	SBAs / PCRs	All	Existing	None
C.2	AIS	All	Existing	None
Annex D – Availability, security and quality of supply				
D.1	Water quality	Water	Existing	None
D.2	Removal of timed supply	AADC and ADDC Water	Existing	Absolute target introduced; Reputational incentive for ADDC;
D.3	Interface metering	Water	Existing	Dead-band introduced
D.4	Water meter penetration	AADC and ADDC Water	Revised	Incentive renamed
D.5	Security of supply	TRANSCO Water	Existing	Metric based on notified unsupplied quantities; Target set with reference to annual supplied quantities;
D.6	Non-revenue water	AADC and ADDC Water	New	New incentive
D.7	By-pass of ground storage tanks	AADC and ADDC Water	New	New incentive
D.8	SAIDI	AADC and ADDC Electricity	Existing	Targets reviewed
D.9	SAIFI	AADC and ADDC Electricity	Existing	Targets reviewed
D.10	Distribution loss reduction	AADC and ADDC Electricity	Existing	Updated methodology
D.11	Interface metering	Electricity	Existing	None
D.12	Unsupplied energy	TRANSCO Electricity	Existing	Incentive renamed, penalty based on VOLL, bonus only if no unsupplied energy
D.13	System despatch costs	TRANSCO Electricity	New	New incentive
D.14	Biosolids reuse	Wastewater	Existing	Targets reviewed
D.15	Recycled water quality compliance	Wastewater	New	New incentive
Annex E – Sustainability				
E.1 & E.2	Demand side management	AADC and ADDC, Water and Electricity	New	New incentive
Annex F – Customer Services				
F.1	Customer complaints	AADC, ADDC, ADSSC		New incentive
Annex G – Reputational and monitored KPIs				
G.1 & G.2	Transmission system availability	TRANSCO Water and Electricity	Existing	Removed financial incentive
G.3	Financial performance ratios	All	New	New incentive

Annex A: Updating RAVs

Introduction

A.1 This **Annex A** to the final proposals for RC1 describes and sets out the updating of the opening 2018 RAVs projected at the last price control reviews taking account of:

(a) additional efficient PC4 capex (2012 and 2013 only) over and above the provisional PC4 capex allowances in PC4 controls for all the four network companies (AADC, ADDC, ADSSC and TRANSCO);

(b) additional efficient PC5 capex (2014 and 2015 only) over and above the provisional PC5 capex allowances in PC5 controls for all the four network companies; and

(c) ex-ante capex allowances for RC1 period for all the four companies.

A.2 ***Annexes A.1 through A.7*** show how this has been done for each of the electricity and water businesses of AADC, ADDC, TRANSCO, and ADSSC. The format of tables and calculations in each of these Annexes is standardised. The following paragraphs explain these calculations with reference to "Line" numbers used in these Annexes and in the ***RC1 Financial Model*** (a Microsoft Excel based computer model developed by the Bureau to carry out RC1 calculations).

A.3 The results of these calculations are summarised and discussed in Sections 6 and 7 of the document. Various assumptions and inputs used in these calculations (such as, UAE CPI, actual, efficient and provisional capex, efficiency scores, depreciation profile, and cost of capital) are described in Sections 3 through 6 of the document.

A.4 In this Annex A:

(a) **PC4 period** refers to 2010-2013 for four network companies but PC4 capex to be treated at this review includes capex relating to only 2012-2013;

(b) **PC5 period** refers to 2013-2017 but PC5 capex to be treated at this review includes capex relating to only 2014-2015.

(c) **RC1 period** refers to 2018-2021 for the network companies.

Updating RAVs for efficient PC4 and PC5 capex

A.5 Lines 1 through 31 of ***Annexes A.1 through A.7*** set out the updating of opening 2018 RAVs for additional efficient PC4 and PC5 capex for each of the water and electricity businesses of AADC, ADDC, TRANSCO, and ADSSC.

A.6 Line 1 shows the CPI data used for price base conversion.

A.7 Lines 2-8 contain the calculations of additional efficient PC4 and PC5 capex to be allowed in RC1:

(a) Line 2 shows the actual PC4 and PC5 capex in nominal terms as per the audited accounts

(b) Line 3 shows the relevant efficiency scores for PC4 and PC5 capex

(c) Line 4 show the efficient PC4 and PC5 capex based on these efficiency scores in nominal prices

(d) Line 5 show the efficient PC4 and PC5 capex in 2018 prices

(e) Line 6 shows the provisional PC4 and PC5 capex allowed in PC4 and PC5 controls in 2010 and 2014 terms, respectively

(f) Line 7 expresses these provisional PC4 and PC5 capex in 2018 prices, and

(g) Line 8 then calculates the additional efficient PC4 and PC5 capex (in 2018 prices) as the difference between efficient PC4 and PC5 capex (from Line 5) and provisional PC4 and PC5 capex (from Line 7). The results are shown in Section 5 of the paper.

A.8 Lines 9-11 show the calculation of depreciation foregone (in 2018 prices) during 2012-2015 on the additional efficient PC4 and PC5 capex, using the additional efficient PC4 and PC5 capex from Line 8 and average asset life assumption from Line 9. The depreciation so calculated in Line 11 is then used in Lines 12-15 to calculate the depreciated closing value of additional efficient PC4 and PC5 capex at the end of Line 15, which is to be added to the opening 2018 RAV, in 2018 prices (line 30).

A.9 Lines 12-18 show the calculation of return on capital foregone (in 2018 prices) during 2012-2015 on the efficient PC4 and PC5 capex, using the additional efficient PC4 and PC5 capex from Line 8 and the cost of capital used for PC4 and PC5 controls from Line 17. This return on capital (in 2018 prices) is calculated in Line 18 by applying the relevant cost of capital to the average of opening and closing values of the additional efficient capex for each year. The return on capital foregone so calculated (line 18) is to be added along with the depreciation foregone in Line 11 (2018 prices), in net present value (NPV) terms, to the required revenue over RC1 in the price control calculations in Annex B. This NPV is calculated in Line 27.

A.10 Lines 19-27 contain the calculation of NPV (in 2018 prices) at 1 January 2018 of total foregone financing costs on efficient PC4 and PC5 capex during 2012-2015. This is done by adding the depreciation foregone (from Line 11) and the return on capital foregone (from Line 18). The total financing costs foregone so calculated in Line 21 is then used to calculate the NPV of such costs in Line 27 as follows:

(a) Lines 22-24 calculate the present value of the sum of PC4 related costs at 1 January 2014 by using the PC4 cost of capital from Line 17 as the discount rate.

(b) Lines 25-27 calculate the present value of the sum of PC4 and PC5 related costs at 1 January 2018 by using the PC5 cost of capital from Line 17 as the discount rate.

A.11 The resulting NPV of the total foregone financing cost for each business is presented in section 7 of the paper. This NPV amount needs to be added to the required revenue for the RC1 period (see Section 7 of the paper and price control calculations in **Annex B**).

A.12 Lines 28-31 show how the depreciated closing value of additional efficient PC4 and PC5 capex over and above the provisional PC4 and PC5 allowances (from Line 15) has been

rolled forward into the initial 2018 RAV (in 2018 prices) from the PC5 calculations at the last price control review after conversion into 2018 prices (which already includes provisional PC4 and PC5 allowances). At the start of these calculations, Line 28 shows the 2018 opening RAV in 2014 prices (from PC5 financial model Line 31). Line 29 shows opening RAV in the new price control terms. Line 30 shows the adjustment of the opening 2018 RAV from PC5 calculations in 2018 prices, which is required for RC1 price control calculations in Section 7, **Annex B**. The opening 2018 RAVs so updated are listed in Section 6 of the paper.

Updating RAVs for ex-ante RC1 capex

A.13 ***Annexes A.1 through A.7*** to this paper also show the updating of RAVs for ex-ante RC1 capex for each of AADC, ADDC, ADSSC and TRANSCO (all figures are in 2018 prices).

A.14 Line 32 shows the new average asset life assumption for RC1 capex (see section 6 of the paper).

A.15 The beginning of Line 33 shows the RAV updated for efficient PC4 and PC5 capex from Line 31 (see section 6 of the paper).

A.16 Line 34 lists the ex-ante RC1 capex as shown in Section 5 of the paper.

A.17 Line 35 lists the total depreciation on RAV and all capex to date (excluding ex-ante RC1 capex) as calculated by the ***RC1 Depreciation Model*** and presented in Section 6 of the paper.

A.18 Line 36 calculates the depreciation on ex-ante RC1 capex as presented in Section 5 of the paper.

A.19 Line 37 calculates the total depreciation by adding Lines 35 and 36 (results shown in Section 6 of the paper).

A.20 Line 38 calculates the closing RAV for each year by adding the ex-ante RC1 capex (from Line 34) to, and deducting the total depreciation (from Line 37) from, the opening RAV for that year (from Line 33). The closing RAV in Line 38 for a year becomes the opening RAV for the next year in Line 33.

A.21 The updated opening RAVs for all businesses are listed in Section 6 of the paper.

Annex A.1: AADC electricity – Updating RAV (option 1)

Updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		347.84	1,238.08	245.55	179.36	-
3	Applied capex efficiency factor	%		92.38%	92.38%	91.02%	91.02%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		321.33	1,143.74	223.50	163.26	-
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices		361.49	1,278.18	247.04	176.32	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		900.00	900.00	700.00	700.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2018 prices		1,038.79	1,038.79	774.20	774.20	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2018 prices**		**-677.31**	**239.39**	**-527.15**	**-597.88**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2018 prices		-677.31	239.39	-527.15	-597.88	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2018 prices		**-11.29**	**-18.59**	**-23.38**	**-42.13**	**-52.10**	**-52.10**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2018 prices	0.00	-666.02	-408.05	-911.82	-1,467.56	-1,415.46
13	Additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-677.31	239.39	-527.15	-597.88		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-11.29	-18.59	-23.38	-42.13	-52.10	-52.10
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2018 prices	-666.02	-408.05	-911.82	-1,467.56	-1,415.46	**-1,363.36**
16	Average of Opening and Closing values	AEDm, 2018 prices	-333.01	-537.03	-659.93	-1,189.69	-1,441.51	-1,389.41
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2018 prices**	**-14.99**	**-24.17**	**-36.30**	**-65.43**	**-79.28**	**-76.42**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2018 prices	-11.29	-18.59	-23.38	-42.13	-52.10	-52.10
20	Return on capital foregone	AEDm, 2018 prices	-14.99	-24.17	-36.30	-65.43	-79.28	-76.42
21	Total financing costs foregone	AEDm, 2018 prices	-26.27	-42.75	-59.68	-107.57	-131.38	-128.52
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2018 prices	-28.07	-43.71				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-71.77				
25	Years from year mid point to 1 Jan 2018 (PC4 and PC5 capex)	AEDm, 2018 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 1 Jan 2018 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2018 prices		-88.91	-71.98	-122.97	-142.37	-132.00
27	**Accumulated NPV (@ 1 Jan 2018) of financing costs foregone**	**AEDm, 2018 prices**						**-558.24**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	9,482.39
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	10,487.46
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(1,363.36)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**9,124.09**

Updating RC1 RAVs for RC1 ex-ante Capex

	Updated RC1 RAVs including RC1 ex-ante Capex			RC1			
	AEDm, 2018 prices			**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**9,124.09**	**9,410.18**	**9,491.85**	**9,215.43**
34	RC1 ex-ante capex	AEDm, 2018 prices		771.00	544.43	195.60	129.56
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		475.27	436.68	436.68	436.68
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		9.64	26.08	35.33	39.40
37	**Total depreciation for RC1**	AEDm, 2018 prices		**484.91**	**462.76**	**472.01**	**476.08**
38	**Closing RAV**	AEDm, 2018 prices		**9,410.18**	**9,491.85**	**9,215.43**	**8,868.92**

Annex A.2: AADC water – Updating RAV (option 1)

Updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

			PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review		**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices	183.11	433.61	209.83	102.75	-
3	Applied capex efficiency factor	%	91.58%	91.58%	92.69%	92.69%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	167.69	397.10	194.50	95.24	-
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	188.65	443.78	214.98	102.86	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices	130.00	130.00	300.00	300.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2018 prices	150.05	150.05	331.80	331.80	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2018 prices**	**38.60**	**293.73**	**-116.82**	**-228.94**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2018 prices		38.60	293.73	-116.82	-228.94	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2018 prices		**0.64**	**6.18**	**9.13**	**3.37**	**-0.45**	**-0.45**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2018 prices	0.00	37.96	325.51	199.56	-32.75	-32.30
13	Additional efficient PC4 and PC5 capex	AEDm, 2018 prices	38.60	293.73	-116.82	-228.94		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2018 prices	0.64	6.18	9.13	3.37	-0.45	-0.45
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2018 prices	37.96	325.51	199.56	-32.75	-32.30	**-31.85**
16	Average of Opening and Closing values	AEDm, 2018 prices	18.98	181.73	262.53	83.41	-32.53	-32.08
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2018 prices**	**0.85**	**8.18**	**14.44**	**4.59**	**-1.79**	**-1.76**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2018 prices	0.64	6.18	9.13	3.37	-0.45	-0.45
20	Return on capital foregone	AEDm, 2018 prices	0.85	8.18	14.44	4.59	-1.79	-1.76
21	Total financing costs foregone	AEDm, 2018 prices	1.50	14.36	23.57	7.96	-2.24	-2.21
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2018 prices	1.60	14.68				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		16.28				
25	Years from year mid point to 1 Jan 2018 (PC4 and PC5 capex)	AEDm, 2018 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 1 Jan 2018 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2018 prices		20.17	28.43	9.09	-2.42	-2.27
27	**Accumulated NPV (@ 1 Jan 2018) of financing costs foregone**	**AEDm, 2018 prices**						**52.99**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	3,250.93
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	3,595.50
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(31.85)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**3,563.65**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex				RC1			
AEDm, 2018 prices				**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**3,563.65**	**3,677.39**	**3,648.17**	**3,525.66**
34	RC1 ex-ante capex	AEDm, 2018 prices		294.00	156.67	66.16	43.19
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		176.58	176.58	176.58	176.58
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		3.68	9.31	12.09	13.46
37	**Total depreciation for RC1**	AEDm, 2018 prices		**180.26**	**185.89**	**188.67**	**190.04**
38	**Closing RAV**	AEDm, 2018 prices		**3,677.39**	**3,648.17**	**3,525.66**	**3,378.80**

Annex A.3: ADDC electricity – Updating RAV (option 1)

Updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

			PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review		**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices	988.49	1,368.02	859.12	653.25	-
3	Applied capex efficiency factor	%	89.08%	89.08%	88.38%	88.38%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	880.55	1,218.63	759.29	577.35	-
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	990.58	1,361.88	839.27	623.53	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices	1,570.00	1,570.00	2,700.00	2,700.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2018 prices	1,812.12	1,812.12	2,986.18	2,986.18	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2018 prices**	**-821.53**	**-450.24**	**-2,146.91**	**-2,362.65**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2018 prices		-821.53	-450.24	-2146.91	-2362.65	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2018 prices		**-13.69**	**-34.89**	**-78.17**	**-153.33**	**-192.71**	**-192.71**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2018 prices	0.00	-807.84	-1,223.20	-3,291.93	-5,501.24	-5,308.53
13	Additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-821.53	-450.24	-2,146.91	-2,362.65		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-13.69	-34.89	-78.17	-153.33	-192.71	-192.71
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2018 prices	-807.84	-1,223.20	-3,291.93	-5,501.24	-5,308.53	**-5,115.82**
16	Average of Opening and Closing values	AEDm, 2018 prices	-403.92	-1,015.52	-2,257.56	-4,396.59	-5,404.89	-5,212.18
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2018 prices**	**-18.18**	**-45.70**	**-124.17**	**-241.81**	**-297.27**	**-286.67**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2018 prices	-13.69	-34.89	-78.17	-153.33	-192.71	-192.71
20	Return on capital foregone	AEDm, 2018 prices	-18.18	-45.70	-124.17	-241.81	-297.27	-286.67
21	Total financing costs foregone	AEDm, 2018 prices	-31.87	-80.59	-202.34	-395.15	-489.98	-479.38
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2018 prices	-34.04	-82.38				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-116.42				
25	Years from year mid point to 1 Jan 2018 (PC4 and PC5 capex)	AEDm, 2018 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 1 Jan 2018 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2018 prices		-144.23	-244.04	-451.74	-530.95	-492.39
27	**Accumulated NPV (@ 1 Jan 2018) of financing costs foregone**	**AEDm, 2018 prices**						**-1,863.35**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	23,609.73
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	26,112.20
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(5,115.82)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**20,996.38**

Updating RC1 RAVs for RC1 ex-ante Capex

	Updated RC1 RAVs including RC1 ex-ante Capex			RC1			
	AEDm, 2018 prices			**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**20,996.38**	**20,358.88**	**19,380.55**	**18,227.92**
34	RC1 ex-ante capex	AEDm, 2018 prices		541.00	209.55	38.35	8.45
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		1,171.73	1,171.73	1,171.73	1,026.62
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		6.76	16.14	19.24	19.83
37	**Total depreciation for RC1**	AEDm, 2018 prices		**1,178.50**	**1,187.88**	**1,190.98**	**1,046.45**
38	**Closing RAV**	AEDm, 2018 prices		**20,358.88**	**19,380.55**	**18,227.92**	**17,189.92**

Annex A.4: ADDC water – Updating RAV (option 1)

Updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		377.78	772.99	701.40	365.11	-
3	Applied capex efficiency factor	%		89.01%	89.01%	90.65%	90.65%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		336.26	688.04	635.81	330.97	-
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices		378.28	768.92	702.79	357.45	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		590.00	590.00	600.00	600.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2018 prices		680.99	680.99	663.60	663.60	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2018 prices**		**-302.71**	**87.93**	**39.19**	**-306.15**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2018 prices		-302.71	87.93	39.19	-306.15	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2018 prices		**-5.05**	**-8.62**	**-6.51**	**-10.96**	**-16.06**	**-16.06**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2018 prices	0.00	-297.66	-201.11	-155.41	-450.60	-434.55
13	Additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-302.71	87.93	39.19	-306.15		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-5.05	-8.62	-6.51	-10.96	-16.06	-16.06
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2018 prices	-297.66	-201.11	-155.41	-450.60	-434.55	**-418.49**
16	Average of Opening and Closing values	AEDm, 2018 prices	-148.83	-249.39	-178.26	-303.01	-442.57	-426.52
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2018 prices**	**-6.70**	**-11.22**	**-9.80**	**-16.67**	**-24.34**	**-23.46**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2018 prices	-5.05	-8.62	-6.51	-10.96	-16.06	-16.06
20	Return on capital foregone	AEDm, 2018 prices	-6.70	-11.22	-9.80	-16.67	-24.34	-23.46
21	Total financing costs foregone	AEDm, 2018 prices	-11.74	-19.85	-16.31	-27.62	-40.40	-39.52
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2018 prices	-12.54	-20.29				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-32.83				
25	Years from year mid point to 1 Jan 2018 (PC4 and PC5 capex)	AEDm, 2018 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 1 Jan 2018 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2018 prices		-40.67	-19.67	-31.58	-43.78	-40.59
27	**Accumulated NPV (@ 1 Jan 2018) of financing costs foregone**	**AEDm, 2018 prices**						**-176.29**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	6,451.75
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	7,135.59
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(418.49)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**6,717.10**

Updating RC1 RAVs for RC1 ex-ante Capex

	Updated RC1 RAVs including RC1 ex-ante Capex			RC1			
	AEDm, 2018 prices			**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**6,717.10**	**7,000.26**	**7,096.32**	**7,004.21**
34	RC1 ex-ante capex	AEDm, 2018 prices		605.00	430.84	251.21	195.28
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		314.28	314.28	314.28	314.28
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		7.56	20.51	29.04	34.62
37	**Total depreciation for RC1**	AEDm, 2018 prices		**321.84**	**334.79**	**343.31**	**348.90**
38	**Closing RAV**	AEDm, 2018 prices		**7,000.26**	**7,096.32**	**7,004.21**	**6,850.60**

Annex A.5: TRANSCO electricity – Updating RAV (option 1)

Updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

			PC4			PC5	
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review		**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices	1,041.32	2,898.97	2,368.50	1,267.26	-
3	Applied capex efficiency factor	%	93.67%	93.67%	94.98%	94.98%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	975.41	2,715.46	2,249.61	1,203.64	-
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	1,097.30	3,034.66	2,486.57	1,299.94	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices	5,230.00	5,230.00	2,300.00	2,300.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2018 prices	6,036.55	6,036.55	2,543.78	2,543.78	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2018 prices**	**-4,939.25**	**-3,001.89**	**-57.21**	**-1,243.85**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2018 prices		-4939.25	-3001.89	-57.21	-1243.85	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2018 prices		**-82.32**	**-214.67**	**-265.66**	**-287.34**	**-308.07**	**-308.07**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2018 prices	0.00	-4,856.93	-7,644.15	-7,435.70	-8,392.20	-8,084.13
13	Additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-4,939.25	-3,001.89	-57.21	-1,243.85		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-82.32	-214.67	-265.66	-287.34	-308.07	-308.07
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2018 prices	-4,856.93	-7,644.15	-7,435.70	-8,392.20	-8,084.13	**-7,776.06**
16	Average of Opening and Closing values	AEDm, 2018 prices	-2,428.46	-6,250.54	-7,539.92	-7,913.95	-8,238.17	-7,930.09
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2018 prices**	**-109.28**	**-281.27**	**-414.70**	**-435.27**	**-453.10**	**-436.16**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2018 prices	-82.32	-214.67	-265.66	-287.34	-308.07	-308.07
20	Return on capital foregone	AEDm, 2018 prices	-109.28	-281.27	-414.70	-435.27	-453.10	-436.16
21	Total financing costs foregone	AEDm, 2018 prices	-191.60	-495.95	-680.35	-722.61	-761.17	-744.23
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2018 prices	-204.68	-506.98				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-711.66				
25	Years from year mid point to 1 Jan 2018 (PC4 and PC5 capex)	AEDm, 2018 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 1 Jan 2018 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2018 prices		-881.63	-820.58	-826.10	-824.82	-764.42
27	**Accumulated NPV (@ 1 Jan 2018) of financing costs foregone**	**AEDm, 2018 prices**						**-4,117.55**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	38,817.76
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	42,932.18
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(7,776.06)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**35,156.12**

Updating RC1 RAVs for RC1 ex-ante Capex

	Updated RC1 RAVs including RC1 ex-ante Capex			RC1			
	AEDm, 2018 prices			**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**35,156.12**	**34,295.61**	**33,149.46**	**31,570.89**
34	RC1 ex-ante capex	AEDm, 2018 prices		1,006.00	742.23	323.12	344.56
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		1,853.94	1,853.94	1,853.94	1,853.94
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		12.58	34.43	47.74	56.09
37	**Total depreciation for RC1**	AEDm, 2018 prices		**1,866.52**	**1,888.37**	**1,901.69**	**1,910.03**
38	**Closing RAV**	AEDm, 2018 prices		**34,295.61**	**33,149.46**	**31,570.89**	**30,005.42**

Annex A.6: TRANSCO water – Updating RAV (option 1)

Updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

			PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review		**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices	2,619.27	754.79	107.47	274.98	-
3	Applied capex efficiency factor	%	92.97%	92.97%	90.90%	90.90%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	2,435.14	701.73	97.69	249.96	-
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	2,739.45	784.22	107.98	269.95	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices	2,530.00	2,530.00	1,800.00	1,800.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2018 prices	2,920.17	2,920.17	1,990.79	1,990.79	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2018 prices**	**-180.72**	**-2,135.95**	**-1,882.81**	**-1,720.84**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2018 prices		-180.72	-2135.95	-1882.81	-1720.84	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2018 prices		**-3.01**	**-41.62**	**-108.60**	**-168.66**	**-197.34**	**-197.34**
				0	0	0	0		

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2018 prices	0.00	-177.71	-2,272.03	-4,046.24	-5,598.41	-5,401.07
13	Additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-180.72	-2,135.95	-1,882.81	-1,720.84		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2018 prices	-3.01	-41.62	-108.60	-168.66	-197.34	-197.34
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2018 prices	-177.71	-2,272.03	-4,046.24	-5,598.41	-5,401.07	**-5,203.72**
16	Average of Opening and Closing values	AEDm, 2018 prices	-88.85	-1,224.87	-3,159.14	-4,822.32	-5,499.74	-5,302.40
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2018 prices**	**-4.00**	**-55.12**	**-173.75**	**-265.23**	**-302.49**	**-291.63**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2018 prices	-3.01	-41.62	-108.60	-168.66	-197.34	-197.34
20	Return on capital foregone	AEDm, 2018 prices	-4.00	-55.12	-173.75	-265.23	-302.49	-291.63
21	Total financing costs foregone	AEDm, 2018 prices	-7.01	-96.74	-282.35	-433.89	-499.83	-488.98
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2018 prices	-7.49	-98.90				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-106.38				
25	Years from year mid point to 1 Jan 2018 (PC4 and PC5 capex)	AEDm, 2018 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 1 Jan 2018 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2018 prices		-131.79	-340.55	-496.03	-541.63	-502.24
27	**Accumulated NPV (@ 1 Jan 2018) of financing costs foregone**	**AEDm, 2018 prices**						**-2,012.24**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	21,794.95
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	24,105.06
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(5,203.72)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**18,901.34**

Updating RC1 RAVs for RC1 ex-ante Capex

	Updated RC1 RAVs including RC1 ex-ante Capex			RC1			
	AEDm, 2018 prices			**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**18,901.34**	**18,198.68**	**17,458.83**	**16,698.04**
34	RC1 ex-ante capex	AEDm, 2018 prices		201.00	168.42	151.49	75.11
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		901.15	901.15	901.15	901.15
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		2.51	7.13	11.13	13.96
37	**Total depreciation for RC1**	AEDm, 2018 prices		**903.66**	**908.28**	**912.27**	**915.11**
38	**Closing RAV**	AEDm, 2018 prices		**18,198.68**	**17,458.83**	**16,698.04**	**15,858.04**

Annex A.7: ADSSC – Updating RAV (option 1)

Updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	CPI (2014 = 100) used in calculations	94.34	95.17	96.00	96.64	97.71	100.00	104.07	105.75	108.00
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			2012	2013	2014	2015	2016
2	Actual PC4 and PC5 capex	AEDm, nominal prices		3,360.29	2,141.90	2,180.73	1,432.15	-
3	Applied capex efficiency factor	%		94.00%	94.00%	91.23%	91.23%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		3,158.67	2,013.38	1,989.48	1,306.55	-
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices		3,553.40	2,250.05	2,199.05	1,411.07	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		3,000.00	3,000.00	1,600.00	1,600.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2018 prices		3,462.65	3,462.65	1,769.59	1,769.59	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2018 prices**		**90.75**	**-1,212.60**	**429.46**	**-358.51**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			2012	2013	2014	2015	2016	2017
9	Assumed average asset life for new investment - Pre-2018	years	50						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2018 prices		90.75	-1212.60	429.46	-358.51	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2018 prices		**0.91**	**-10.31**	**-18.14**	**-17.43**	**-21.02**	**-21.02**
				0	0	0	0		

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		2012	2013	2014	2015	2016	2017
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2018 prices	0.00	89.84	-1,112.45	-664.84	-1,005.92	-984.91
13	Additional efficient PC4 and PC5 capex	AEDm, 2018 prices	90.75	-1,212.60	429.46	-358.51		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2018 prices	0.91	-10.31	-18.14	-17.43	-21.02	-21.02
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2018 prices	89.84	-1,112.45	-664.84	-1,005.92	-984.91	**-963.89**
16	Average of Opening and Closing values	AEDm, 2018 prices	44.92	-511.30	-888.64	-835.38	-995.41	-974.40
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2018 prices**	**2.02**	**-23.01**	**-48.88**	**-45.95**	**-54.75**	**-53.59**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		2012	2013	2014	2015	2016	2017
19	Depreciation foregone	AEDm, 2018 prices	0.91	-10.31	-18.14	-17.43	-21.02	-21.02
20	Return on capital foregone	AEDm, 2018 prices	2.02	-23.01	-48.88	-45.95	-54.75	-53.59
21	Total financing costs foregone	AEDm, 2018 prices	2.93	-33.32	-67.02	-63.38	-75.77	-74.61
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2018 prices	3.13	-34.06				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-30.93				
25	Years from year mid point to 1 Jan 2018 (PC4 and PC5 capex)	AEDm, 2018 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 1 Jan 2018 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2018 prices		-38.32	-80.83	-72.46	-82.10	-76.63
27	**Accumulated NPV (@ 1 Jan 2018) of financing costs foregone**	**AEDm, 2018 prices**						**-350.34**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		2018
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	18,717.20
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	20,701.10
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(963.89)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**19,737.21**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex AEDm, 2018 prices			RC1 2018	2019	2020	2021
32	Assumed average asset life for new investment	years	60			
33	**Opening RAV**	**AEDm, 2018 prices**	**19,737.21**	**20,194.41**	**20,946.28**	**21,480.74**
34	RC1 ex-ante capex	AEDm, 2018 prices	1,444.00	1,288.61	1,016.34	948.25
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices	974.76	501.95	427.86	427.86
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices	12.03	34.81	54.01	70.38
37	**Total depreciation for RC1**	AEDm, 2018 prices	**986.79**	**536.75**	**481.88**	**498.25**
38	**Closing RAV**	AEDm, 2018 prices	**20,194.41**	**20,946.28**	**21,480.74**	**21,930.74**

Annex A.1: AADC electricity – Updating RAV (option 2)

Calculating foregone financing costs and updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		347.84	1,238.08	245.55	179.36	-
3	Applied capex efficiency factor	%		92.38%	92.38%	91.02%	91.02%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		321.33	1,143.74	223.50	163.26	-
5	Efficient PC4 and PC5 capex	AEDm, 2017 prices		353.96	1,251.58	241.90	172.65	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		900.00	900.00	700.00	700.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2017 prices		1,017.18	1,017.18	758.08	758.08	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2017 prices**		**-663.21**	**234.40**	**-516.18**	**-585.44**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2017 prices		-663.21	234.40	-516.18	-585.44	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2017 prices		**-11.05**	**-18.20**	**-22.90**	**-41.26**	**-51.01**	**-51.01**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2017 prices		0.00	-652.16	-399.56	-892.84	-1,437.02	-1,386.01
13	Additional efficient PC4 and PC5 capex	AEDm, 2017 prices		-663.21	234.40	-516.18	-585.44		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2017 prices		-11.05	-18.20	-22.90	-41.26	-51.01	-51.01
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2017 prices		-652.16	-399.56	-892.84	-1,437.02	-1,386.01	**-1,334.99**
16	Average of Opening and Closing values	AEDm, 2017 prices		-326.08	-525.86	-646.20	-1,164.93	-1,411.51	-1,360.50
17	Cost of capital (real)	%		4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2017 prices**		**-14.67**	**-23.66**	**-35.54**	**-64.07**	**-77.63**	**-74.83**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2017 prices		-11.05	-18.20	-22.90	-41.26	-51.01	-51.01
20	Return on capital foregone	AEDm, 2017 prices		-14.67	-23.66	-35.54	-64.07	-77.63	-74.83
21	Total financing costs foregone	AEDm, 2017 prices		-25.73	-41.86	-58.44	-105.33	-128.65	-125.84
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years		1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2017 prices		-27.48	-42.80				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2017 prices			-70.28				
25	Years from year mid point to 31 Dec 2017 (PC4 and PC5 capex)	AEDm, 2017 prices			4.50	3.50	2.50	1.50	0.50
26	NPV @ 31 Dec 2017 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2017 prices			-87.06	-70.48	-120.41	-139.41	-129.26
27	**Accumulated NPV (@ 31 Dec 2017) of financing costs foregone**	**AEDm, 2017 prices**							**-546.62**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)			**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices		9,482.39
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices		10,487.46
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices		(1,363.36)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**		**9,124.09**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex				RC1			
AEDm, 2018 prices				**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**9,124.09**	**9,410.18**	**9,491.85**	**9,215.43**
34	RC1 ex-ante capex	AEDm, 2018 prices		771.00	544.43	195.60	129.56
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		475.27	436.68	436.68	436.68
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		9.64	26.08	35.33	39.40
37	**Total depreciation for RC1**	AEDm, 2018 prices		**484.91**	**462.76**	**472.01**	**476.08**
38	**Closing RAV**	AEDm, 2018 prices		**9,410.18**	**9,491.85**	**9,215.43**	**8,868.92**

Annex A.2: AADC water – Updating RAV (option 2)

Calculating foregone financing costs and updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		183.11	433.61	209.83	102.75	-
3	Applied capex efficiency factor	%		91.58%	91.58%	92.69%	92.69%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		167.69	397.10	194.50	95.24	-
5	Efficient PC4 and PC5 capex	AEDm, 2017 prices		184.72	434.54	210.51	100.72	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		130.00	130.00	300.00	300.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2017 prices		146.93	146.93	324.89	324.89	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2017 prices**		**37.80**	**287.62**	**-114.38**	**-224.18**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2017 prices		37.80	287.62	-114.38	-224.18	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2017 prices		**0.63**	**6.05**	**8.94**	**3.30**	**-0.44**	**-0.44**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2017 prices	0.00	37.17	318.73	195.41	-32.07	-31.63
13	Additional efficient PC4 and PC5 capex	AEDm, 2017 prices	37.80	287.62	-114.38	-224.18		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2017 prices	0.63	6.05	8.94	3.30	-0.44	-0.44
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2017 prices	37.17	318.73	195.41	-32.07	-31.63	**-31.19**
16	Average of Opening and Closing values	AEDm, 2017 prices	18.58	177.95	257.07	81.67	-31.85	-31.41
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2017 prices**	**0.84**	**8.01**	**14.14**	**4.49**	**-1.75**	**-1.73**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2017 prices	0.63	6.05	8.94	3.30	-0.44	-0.44
20	Return on capital foregone	AEDm, 2017 prices	0.84	8.01	14.14	4.49	-1.75	-1.73
21	Total financing costs foregone	AEDm, 2017 prices	1.47	14.06	23.08	7.79	-2.19	-2.17
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2017 prices	1.57	14.37				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2017 prices		15.94				
25	Years from year mid point to 31 Dec 2017 (PC4 and PC5 capex)	AEDm, 2017 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 31 Dec 2017 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2017 prices		19.75	27.84	8.91	-2.37	-2.22
27	**Accumulated NPV (@ 31 Dec 2017) of financing costs foregone**	**AEDm, 2017 prices**						**51.89**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	3,250.93
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	3,595.50
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(31.85)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**3,563.65**

Updating RC1 RAVs for RC1 ex-ante Capex

	Updated RC1 RAVs including RC1 ex-ante Capex			RC1			
	AEDm, 2018 prices			**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**3,563.65**	**3,677.39**	**3,648.17**	**3,525.66**
34	RC1 ex-ante capex	AEDm, 2018 prices		294.00	156.67	66.16	43.19
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		176.58	176.58	176.58	176.58
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		3.68	9.31	12.09	13.46
37	**Total depreciation for RC1**	AEDm, 2018 prices		**180.26**	**185.89**	**188.67**	**190.04**
38	**Closing RAV**	AEDm, 2018 prices		**3,677.39**	**3,648.17**	**3,525.66**	**3,378.80**

Annex A.3: ADDC electricity – Updating RAV (option 2)

Calculating foregone financing costs and updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		988.49	1,368.02	859.12	653.25	-
3	Applied capex efficiency factor	%		89.08%	89.08%	88.38%	88.38%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		880.55	1,218.63	759.29	577.35	-
5	Efficient PC4 and PC5 capex	AEDm, 2017 prices		969.97	1,333.54	821.81	610.56	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		1,570.00	1,570.00	2,700.00	2,700.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2017 prices		1,774.41	1,774.41	2,924.04	2,924.04	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2017 prices**		**-804.44**	**-440.87**	**-2,102.23**	**-2,313.48**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2017 prices		-804.44	-440.87	-2102.23	-2313.48	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2017 prices		**-13.41**	**-34.16**	**-76.55**	**-150.14**	**-188.70**	**-188.70**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2017 prices		0.00	-791.03	-1,197.74	-3,223.42	-5,386.76	-5,198.06
13	Additional efficient PC4 and PC5 capex	AEDm, 2017 prices		-804.44	-440.87	-2,102.23	-2,313.48		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2017 prices		-13.41	-34.16	-76.55	-150.14	-188.70	-188.70
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2017 prices		-791.03	-1,197.74	-3,223.42	-5,386.76	-5,198.06	**-5,009.36**
16	Average of Opening and Closing values	AEDm, 2017 prices		-395.52	-994.39	-2,210.58	-4,305.09	-5,292.41	-5,103.71
17	Cost of capital (real)	%		4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2017 prices**		**-17.80**	**-44.75**	**-121.58**	**-236.78**	**-291.08**	**-280.70**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2017 prices		-13.41	-34.16	-76.55	-150.14	-188.70	-188.70
20	Return on capital foregone	AEDm, 2017 prices		-17.80	-44.75	-121.58	-236.78	-291.08	-280.70
21	Total financing costs foregone	AEDm, 2017 prices		-31.21	-78.91	-198.13	-386.92	-479.78	-469.40
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years		1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2017 prices		-33.34	-80.67				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2017 prices			-114.00				
25	Years from year mid point to 31 Dec 2017 (PC4 and PC5 capex)	AEDm, 2017 prices			4.50	3.50	2.50	1.50	0.50
26	NPV @ 31 Dec 2017 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2017 prices			-141.23	-238.96	-442.34	-519.91	-482.14
27	**Accumulated NPV (@ 31 Dec 2017) of financing costs foregone**	**AEDm, 2017 prices**							**-1,824.58**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)			**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices		23,609.73
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices		26,112.20
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices		(5,115.82)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**		**20,996.38**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex				RC1			
AEDm, 2018 prices				**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**20,996.38**	**20,358.88**	**19,380.55**	**18,227.92**
34	RC1 ex-ante capex	AEDm, 2018 prices		541.00	209.55	38.35	8.45
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		1,171.73	1,171.73	1,171.73	1,026.62
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		6.76	16.14	19.24	19.83
37	**Total depreciation for RC1**	AEDm, 2018 prices		**1,178.50**	**1,187.88**	**1,190.98**	**1,046.45**
38	**Closing RAV**	AEDm, 2018 prices		**20,358.88**	**19,380.55**	**18,227.92**	**17,189.92**

Annex A.4: ADDC water – Updating RAV (option 2)

Calculating foregone financing costs and updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		377.78	772.99	701.40	365.11	-
3	Applied capex efficiency factor	%		89.01%	89.01%	90.65%	90.65%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		336.26	688.04	635.81	330.97	-
5	Efficient PC4 and PC5 capex	AEDm, 2017 prices		370.41	752.91	688.16	350.01	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		590.00	590.00	600.00	600.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2017 prices		666.82	666.82	649.79	649.79	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2017 prices**		**-296.41**	**86.10**	**38.38**	**-299.78**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2017 prices		-296.41	86.10	38.38	-299.78	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2017 prices		**-4.94**	**-8.45**	**-6.37**	**-10.73**	**-15.72**	**-15.72**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2017 prices	0.00	-291.47	-196.93	-152.18	-441.23	-425.50
13	Additional efficient PC4 and PC5 capex	AEDm, 2017 prices	-296.41	86.10	38.38	-299.78		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2017 prices	-4.94	-8.45	-6.37	-10.73	-15.72	-15.72
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2017 prices	-291.47	-196.93	-152.18	-441.23	-425.50	**-409.78**
16	Average of Opening and Closing values	AEDm, 2017 prices	-145.73	-244.20	-174.55	-296.70	-433.37	-417.64
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2017 prices**	**-6.56**	**-10.99**	**-9.60**	**-16.32**	**-23.84**	**-22.97**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2017 prices	-4.94	-8.45	-6.37	-10.73	-15.72	-15.72
20	Return on capital foregone	AEDm, 2017 prices	-6.56	-10.99	-9.60	-16.32	-23.84	-22.97
21	Total financing costs foregone	AEDm, 2017 prices	-11.50	-19.43	-15.97	-27.05	-39.56	-38.69
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2017 prices	-12.28	-19.87				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2017 prices		-32.15				
25	Years from year mid point to 31 Dec 2017 (PC4 and PC5 capex)	AEDm, 2017 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 31 Dec 2017 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2017 prices		-39.83	-19.26	-30.92	-42.87	-39.74
27	**Accumulated NPV (@ 31 Dec 2017) of financing costs foregone**	**AEDm, 2017 prices**						**-172.62**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	6,451.75
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	7,135.59
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(418.49)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**6,717.10**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex				RC1			
AEDm, 2018 prices				**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**6,717.10**	**7,000.26**	**7,096.32**	**7,004.21**
34	RC1 ex-ante capex	AEDm, 2018 prices		605.00	430.84	251.21	195.28
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		314.28	314.28	314.28	314.28
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		7.56	20.51	29.04	34.62
37	**Total depreciation for RC1**	AEDm, 2018 prices		**321.84**	**334.79**	**343.31**	**348.90**
38	**Closing RAV**	AEDm, 2018 prices		**7,000.26**	**7,096.32**	**7,004.21**	**6,850.60**

Annex A.5: TRANSCO electricity – Updating RAV (option 2)

Calculating foregone financing costs and updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		1,041.32	2,898.97	2,368.50	1,267.26	-
3	Applied capex efficiency factor	%		93.67%	93.67%	94.98%	94.98%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		975.41	2,715.46	2,249.61	1,203.64	-
5	Efficient PC4 and PC5 capex	AEDm, 2017 prices		1,074.47	2,971.51	2,434.83	1,272.88	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		5,230.00	5,230.00	2,300.00	2,300.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2017 prices		5,910.93	5,910.93	2,490.85	2,490.85	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2017 prices**		**-4,836.46**	**-2,939.42**	**-56.02**	**-1,217.96**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2017 prices		-4836.46	-2939.42	-56.02	-1217.96	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2017 prices		**-80.61**	**-210.21**	**-260.13**	**-281.36**	**-301.66**	**-301.66**

	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2017 prices	0.00	-4,755.86	-7,485.07	-7,280.96	-8,217.56	-7,915.90
13	Additional efficient PC4 and PC5 capex	AEDm, 2017 prices	-4,836.46	-2,939.42	-56.02	-1,217.96		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2017 prices	-80.61	-210.21	-260.13	-281.36	-301.66	-301.66
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2017 prices	-4,755.86	-7,485.07	-7,280.96	-8,217.56	-7,915.90	**-7,614.24**
16	Average of Opening and Closing values	AEDm, 2017 prices	-2,377.93	-6,120.46	-7,383.02	-7,749.26	-8,066.73	-7,765.07
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2017 prices**	**-107.01**	**-275.42**	**-406.07**	**-426.21**	**-443.67**	**-427.08**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2017 prices	-80.61	-210.21	-260.13	-281.36	-301.66	-301.66
20	Return on capital foregone	AEDm, 2017 prices	-107.01	-275.42	-406.07	-426.21	-443.67	-427.08
21	Total financing costs foregone	AEDm, 2017 prices	-187.61	-485.63	-666.20	-707.57	-745.33	-728.74
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2017 prices	-200.42	-496.43				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2017 prices		-696.85				
25	Years from year mid point to 31 Dec 2017 (PC4 and PC5 capex)	AEDm, 2017 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 31 Dec 2017 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2017 prices		-863.28	-803.50	-808.91	-807.66	-748.51
27	**Accumulated NPV (@ 31 Dec 2017) of financing costs foregone**	**AEDm, 2017 prices**						**-4,031.87**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	38,817.76
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	42,932.18
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(7,776.06)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**35,156.12**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex			RC1			
AEDm, 2018 prices			**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40			
33	**Opening RAV**	**AEDm, 2018 prices**	**35,156.12**	**34,295.61**	**33,149.46**	**31,570.89**
34	RC1 ex-ante capex	AEDm, 2018 prices	1,006.00	742.23	323.12	344.56
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices	1,853.94	1,853.94	1,853.94	1,853.94
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices	12.58	34.43	47.74	56.09
37	**Total depreciation for RC1**	AEDm, 2018 prices	**1,866.52**	**1,888.37**	**1,901.69**	**1,910.03**
38	**Closing RAV**	AEDm, 2018 prices	**34,295.61**	**33,149.46**	**31,570.89**	**30,005.42**

Annex A.6: TRANSCO water – Updating RAV (option 2)

Calculating foregone financing costs and updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		2,619.27	754.79	107.47	274.98	-
3	Applied capex efficiency factor	%		92.97%	92.97%	90.90%	90.90%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		2,435.14	701.73	97.69	249.96	-
5	Efficient PC4 and PC5 capex	AEDm, 2017 prices		2,682.44	767.90	105.73	264.33	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		2,530.00	2,530.00	1,800.00	1,800.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2017 prices		2,859.40	2,859.40	1,949.36	1,949.36	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2017 prices**		**-176.96**	**-2,091.50**	**-1,843.63**	**-1,685.03**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	30						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2017 prices		-176.96	-2091.50	-1843.63	-1685.03	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2017 prices		**-2.95**	**-40.76**	**-106.34**	**-165.15**	**-193.24**	**-193.24**
				1	1	1	1		
	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2017 prices		0.00	-174.01	-2,224.75	-3,962.04	-5,481.91	-5,288.67
13	Additional efficient PC4 and PC5 capex	AEDm, 2017 prices		-176.96	-2,091.50	-1,843.63	-1,685.03		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2017 prices		-2.95	-40.76	-106.34	-165.15	-193.24	-193.24
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2017 prices		-174.01	-2,224.75	-3,962.04	-5,481.91	-5,288.67	**-5,095.44**
16	Average of Opening and Closing values	AEDm, 2017 prices		-87.01	-1,199.38	-3,093.39	-4,721.97	-5,385.29	-5,192.05
17	Cost of capital (real)	%		4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2017 prices**		**-3.92**	**-53.97**	**-170.14**	**-259.71**	**-296.19**	**-285.56**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2017 prices	-2.95	-40.76	-106.34	-165.15	-193.24	-193.24
20	Return on capital foregone	AEDm, 2017 prices	-3.92	-53.97	-170.14	-259.71	-296.19	-285.56
21	Total financing costs foregone	AEDm, 2017 prices	-6.86	-94.73	-276.48	-424.86	-489.43	-478.80
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2017 prices	-7.33	-96.84				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2017 prices		-104.17				
25	Years from year mid point to 31 Dec 2017 (PC4 and PC5 capex)	AEDm, 2017 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 31 Dec 2017 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2017 prices		-129.05	-333.46	-485.71	-530.36	-491.79
27	**Accumulated NPV (@ 31 Dec 2017) of financing costs foregone**	**AEDm, 2017 prices**						**-1,970.37**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	21,794.95
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	24,105.06
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(5,203.72)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**18,901.34**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex				RC1			
AEDm, 2018 prices				**2018**	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	40				
33	**Opening RAV**	**AEDm, 2018 prices**		**18,901.34**	**18,198.68**	**17,458.83**	**16,698.04**
34	RC1 ex-ante capex	AEDm, 2018 prices		201.00	168.42	151.49	75.11
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		901.15	901.15	901.15	901.15
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		2.51	7.13	11.13	13.96
37	**Total depreciation for RC1**	AEDm, 2018 prices		**903.66**	**908.28**	**912.27**	**915.11**
38	**Closing RAV**	AEDm, 2018 prices		**18,198.68**	**17,458.83**	**16,698.04**	**15,858.04**

Annex A.7: ADSSC – Updating RAV (option 2)

Calculating foregone financing costs and updating 2018 Opening RAV for PC4 and PC5 Efficient Capex

Line No.

	UAE CPI Assumptions	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**CPI (2014 = 100) used in calculations**	**94.34**	**95.17**	**96.00**	**96.64**	**97.71**	**100.00**	**104.07**	**105.75**	**108.00**
	Assumed in PC4	93.57			Assumed in PC5	97.65				

				PC4		PC5		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review			**2012**	**2013**	**2014**	**2015**	**2016**
2	Actual PC4 and PC5 capex	AEDm, nominal prices		3,360.29	2,141.90	2,180.73	1,432.15	-
3	Applied capex efficiency factor	%		94.00%	94.00%	91.23%	91.23%	-
4	Efficient PC4 and PC5 capex	AEDm, nominal prices		3,158.67	2,013.38	1,989.48	1,306.55	-
5	Efficient PC4 and PC5 capex	AEDm, 2017 prices		3,479.45	2,203.23	2,153.29	1,381.71	-
6	Provisional PC4 and PC5 capex	AEDm, PC4 2010 / PC5 2014 prices		3,000.00	3,000.00	1,600.00	1,600.00	-
7	Provisional PC4 and PC5 capex	AEDm, 2017 prices		3,390.59	3,390.59	1,732.76	1,732.76	-
8	**Additional efficient PC4 and PC5 capex to be allowed at RC1**	**AEDm, 2017 prices**		**88.86**	**-1,187.36**	**420.52**	**-351.05**	**0.00**

	Depreciation foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
9	Assumed average asset life for new investment - Pre-2018	years	50						
10	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, 2017 prices		88.86	-1187.36	420.52	-351.05	0.00	
11	**Depreciation on additional efficient PC4 and PC5 capex** (half-year depreciation for the first year of each annual capex)	AEDm, 2017 prices		**0.89**	**-10.10**	**-17.76**	**-17.07**	**-20.58**	**-20.58**
				1	1	1	1		
	Return on Capital foregone on Additional Efficient PC4 and PC5 Capex			**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
12	Additional efficient PC4 and PC5 capex - Opening value	AEDm, 2017 prices		0.00	87.97	-1,089.30	-651.01	-984.99	-964.41
13	Additional efficient PC4 and PC5 capex	AEDm, 2017 prices		88.86	-1,187.36	420.52	-351.05		
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, 2017 prices		0.89	-10.10	-17.76	-17.07	-20.58	-20.58
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, 2017 prices		87.97	-1,089.30	-651.01	-984.99	-964.41	**-943.83**
16	Average of Opening and Closing values	AEDm, 2017 prices		43.99	-500.66	-870.15	-818.00	-974.70	-954.12
17	Cost of capital (real)	%		4.50%	4.50%	5.50%	5.50%	5.50%	5.50%
18	**Return on capital foregone**	**AEDm, 2017 prices**		**1.98**	**-22.53**	**-47.86**	**-44.99**	**-53.61**	**-52.48**

	Financing Costs foregone on Additional Efficient PC4 and PC5 Capex		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
19	Depreciation foregone	AEDm, 2017 prices	0.89	-10.10	-17.76	-17.07	-20.58	-20.58
20	Return on capital foregone	AEDm, 2017 prices	1.98	-22.53	-47.86	-44.99	-53.61	-52.48
21	Total financing costs foregone	AEDm, 2017 prices	2.87	-32.63	-65.62	-62.06	-74.19	-73.06
22	Years from year mid point to 1 Jan 2014 (PC4 capex)	years	1.50	0.50				
23	NPV @ 1 Jan 2014 of financing costs foregone (PC4 capex)	AEDm, 2017 prices	3.06	-33.35				
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2017 prices		-30.29				
25	Years from year mid point to 31 Dec 2017 (PC4 and PC5 capex)	AEDm, 2017 prices		4.50	3.50	2.50	1.50	0.50
26	NPV @ 31 Dec 2017 of financing costs foregone (PC4 and PC5 capex)	AEDm, 2017 prices		-37.52	-79.15	-70.95	-80.39	-75.04
27	**Accumulated NPV (@ 31 Dec 2017) of financing costs foregone**	**AEDm, 2017 prices**						**-343.05**

	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)		**2018**
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2014 prices	18,717.20
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices	20,701.10
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, 2018 prices	(963.89)
31	**Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex**	**AEDm, 2018 prices**	**19,737.21**

Updating RC1 RAVs for RC1 ex-ante Capex

Updated RC1 RAVs including RC1 ex-ante Capex AEDm, 2018 prices				RC1			
				2018	**2019**	**2020**	**2021**
32	Assumed average asset life for new investment	years	60				
33	**Opening RAV**	**AEDm, 2018 prices**		**19,737.21**	**20,194.41**	**20,946.28**	**21,480.74**
34	RC1 ex-ante capex	AEDm, 2018 prices		1,444.00	1,288.61	1,016.34	948.25
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, 2018 prices		974.76	501.95	427.86	427.86
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, 2018 prices		12.03	34.81	54.01	70.38
37	**Total depreciation for RC1**	AEDm, 2018 prices		**986.79**	**536.75**	**481.88**	**498.25**
38	**Closing RAV**	AEDm, 2018 prices		**20,194.41**	**20,946.28**	**21,480.74**	**21,930.74**

Annex B: RC1 price control calculations

Introduction

B.1 This **Annex B** to the Final Proposals for RC1 comprises **Annexes B.1 through B.7** separately for the two options discussed in Sections 2, 6 and 7 (i.e with and without 2017 MAR adjustment derogation) and presents detailed price control calculations for each of the four network companies (i.e. AADC, ADDC, ADSSC and TRANSCO), separately for water and electricity businesses, where applicable. These calculations have been extracted from the relevant spread sheets of the ***RC1 Financial Model*** *(separately for with and without 2017 MAR adjustment derogation)* – a Microsoft Excel based computer model developed by the Bureau to carry out RC1 calculations. The results of these calculations are described in Section 7 of the paper. Various assumptions and inputs used in these calculations (such as, UAE CPI, revenue driver projections and weights, opex allowances, and cost of capital) are described in Sections 2 through 6 of the document.

B.2 The calculations in each of **Annexes B.1 through B.7** (separately for the two options – with and without 2017 MAR adjustment derogation) are presented in a standard format for all businesses. They are explained in the RC1 draft proposals with reference to "Line" numbers used in these Annexes and in the RC1 Financial Model.

B.3 The only differences from the RC1 draft proposals are that:

(a) These final proposals present two separate sets of **Annexes B.1 through B.7** for the two options discussed in Sections 2, 6 and 7 (i.e with and without 2017 MAR adjustment derogation);

(b) The depreciation allowances are used in 2018 prices to retain the inflation indexation of depreciation and RAVs as discussed in Sections 2, 3 and 6. Accordingly, the full value of notified value 'a' (instead of only a part of it, as proposed in the draft proposals) and 'b' will be subject to CPI-X indexation, as discussed in Sections 2, 3, 6 and 7;

(c) Lines 41A – 41D are added to show two financial indicators (implied annual profit and implied return on asset value) in accounting terms in addition to the financial indicators shown in lines 40 – 41 in regulatory terms:

(i) Line 41A shows the companies' estimate of accounting depreciation of fixed assets for 2018-2021 reported in their 2016 AISs;

(ii) Line 41B shows the estimate net book value (NBV) of the companies' fixed assets using 2016 actual NBV reported in 2016 SBAs as the starting point and adjusted for (1) estimated actual capex for future years (assumed to be equal to 2016 actual capex, reported in the 2016 SBAs) and accounting depreciation in line 41A;

(iii) Line 41C shows the estimate annual accounting profit, calculated by subtracting Line 1 (opex allowance) and Line 41A (accounting depreciation) from Line 34 (annual allowed revenue); and

(iv) Line 41D calculates the implied return on the year-end NBV in percentage terms by dividing Line 41C (estimate accounting annual profit) by Line 41B (year-end NBV).

Annex B.1: AADC electricity – RC1 calculations (option 1)

Appendix B.1: AADC Electricity - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		497.62	486.93	472.29	460.57
2	Opening RAV	AEDm		9,124.09	9,410.18	9,491.85	9,215.43
3	Closing RAV	AEDm		9,410.18	9,491.85	9,215.43	8,868.92
4	Mid-Year RAV	AEDm		9,267.14	9,451.02	9,353.64	9,042.17
5	Total depreciation for RC1	AEDm		484.91	462.76	472.01	476.08
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		150,353	153,089	155,653	158,048
8	Forecast for revenue driver 3	GWh		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	-558.24				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		10.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	497.62	486.93	472.29	460.57	1,760.49
16	Total depreciation for RC1	AEDm	484.91	462.76	472.01	476.08	1,738.49
17	Return on mid-year RAV	AEDm	417.02	425.30	420.91	406.90	1,531.92
18	Annual revenue requirement	AEDm	1,399.55	1,374.99	1,365.22	1,343.54	5,030.89
19	Discounted annual revenue requirement	AEDm	1,369.08	1,287.13	1,222.96	1,151.71	5,030.89
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					(558.24)
21	PV of revenue requirement (after foregone financing costs)	AEDm					**4,472.66**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**1,198.82**	1,078.94	971.05	873.94		
24		AEDm	1,198.82	1,078.94	971.05	873.94	3,801.75	
25		%	85%	85%	85%	85%	**85%**	
26	**Revenue driver 2**	Customer Accounts	150,353	153,089	155,653	158,048	**Constraints for Solver Run**	
27		AED / Customer	**1,375.46**	1,237.92	1,114.13	1,002.71		
28		AEDm	206.81	189.51	173.42	158.48	670.90	
29		%	15%	15%	15%	15%	**15%**	
30	**Revenue driver 3**	kWh	0	0	0	0		
31		fils / kWh	-	-	-	-		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - *X=0*)		1,215.09	1,218.33	1,221.38	1,224.22	4,472.66	
34	Annual revenue	AEDm	1,405.63	1,268.45	1,144.46	1,032.42	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	1,375.03	1,187.41	1,025.21	885.01	**4,472.66**	**0.00**
			1 - Run solver with *X=0*				**Target for Solver Run**	
			2 - Copy line 34 as values in line 34A					

	Results		**2018**
36	**X Factor**		**10.0**
37	**Fixed revenue term (a)**	**AED million**	**1,198.82**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**1,375.46**
39	**Co-efficient of variable revenue term (c)**	**fils / kWh metered**	**0.0000**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	423.10	318.76	200.16	95.77	259.45
41	Implied return on mid-point RAV	%	4.57%	3.37%	2.14%	1.06%	2.78%
41A	Accounting actual annual depreciation, RC1	AEDm	292.48	298.33	304.29	310.38	301.37
41B	Estimated NBV for RC1	AEDm	7641.79	7668.84	7649.17	7621.25	7645.26
41C	Estimated actual annual profit	AEDm	615.53	483.20	367.87	261.47	432.02
41D	Estimated actual return on year-end NBV	%	8.05%	6.30%	4.81%	3.43%	5.65%

Annex B.2: AADC water – RC1 calculations (option 1)

Appendix B.2: AADC Water - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		238.69	236.93	233.29	231.32
2	Opening RAV	AEDm		3,563.65	3,677.39	3,648.17	3,525.66
3	Closing RAV	AEDm		3,677.39	3,648.17	3,525.66	3,378.80
4	Mid-Year RAV	AEDm		3,620.52	3,662.78	3,586.92	3,452.23
5	Total depreciation for RC1	AEDm		180.26	185.89	188.67	190.04
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		91,917	94,775	97,823	101,072
8	Forecast for revenue driver 3	MIG		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	52.99				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	238.69	236.93	233.29	231.32	862.56
16	Total depreciation for RC1	AEDm	180.26	185.89	188.67	190.04	682.27
17	Return on mid-year RAV	AEDm	162.92	164.83	161.41	155.35	591.43
18	Annual revenue requirement	AEDm	581.87	587.64	583.38	576.71	2,136.26
19	Discounted annual revenue requirement	AEDm	569.20	550.09	522.59	494.37	2,136.26
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					52.99
21	PV of revenue requirement (after foregone financing costs)	AEDm					**2,189.25**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**507.41**	507.41	507.41	507.41		
24		AEDm	507.41	507.41	507.41	507.41	1,860.86	
25		%	86%	85%	85%	84%	**85%**	
26	**Revenue driver 2**	Customer Accounts	91,917	94,775	97,823	101,072	**Constraints for Solver Run**	
27		AED / Customer	**930.52**	930.52	930.52	930.52		
28		AEDm	85.53	88.19	91.03	94.05	328.39	
29		%	14%	15%	15%	16%	**15%**	
30	**Revenue driver 3**	TIG	0	0	0	0		
31		AED/TIG	-	-	-	-		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - $X=0$)		592.94	595.60	598.44	601.46	2,189.25	
34	Annual revenue	AEDm	592.94	595.60	598.44	601.46	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	580.04	557.55	536.08	515.59	**2,189.25**	**0.00**
			1 - Run solver with $X=0$				**Target for Solver Run**	
			2 - Copy line 34 as values in line 34A					

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**507.41**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**930.52**
39	**Co-efficient of variable revenue term (c)**	**AED / TIG metered**	**0.0000**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	174.00	172.79	176.47	180.10	175.84
41	Implied return on mid-point RAV	%	4.81%	4.72%	4.92%	5.22%	4.92%
41A	Accounting actual annual depreciation, RC1	AEDm	91.54	93.37	95.24	97.15	94.33
41B	Estimated NBV for RC1	AEDm	2027.74	1962.42	1887.46	1812.96	1922.64
41C	Estimated actual annual profit	AEDm	262.71	265.30	269.90	272.99	267.73
41D	Estimated actual return on year-end NBV	%	12.96%	13.52%	14.30%	15.06%	13.96%

Annex B.3: ADDC electricity – RC1 calculations (option 1)

Appendix B.3: ADDC Electricity - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		669.37	660.03	652.76	643.42
2	Opening RAV	AEDm		20,996.38	20,358.88	19,380.55	18,227.92
3	Closing RAV	AEDm		20,358.88	19,380.55	18,227.92	17,189.92
4	Mid-Year RAV	AEDm		20,677.63	19,869.71	18,804.23	17,708.92
5	Total depreciation for RC1	AEDm		1,178.50	1,187.88	1,190.98	1,046.45
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		382,583	395,056	407,934	421,233
8	Forecast for revenue driver 3	GWh		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	-1,863.35				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		10.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	669.37	660.03	652.76	643.42	2,408.96
16	Total depreciation for RC1	AEDm	1,178.50	1,187.88	1,190.98	1,046.45	4,228.74
17	Return on mid-year RAV	AEDm	930.49	894.14	846.19	796.90	3,188.38
18	Annual revenue requirement	AEDm	2,778.36	2,742.05	2,689.93	2,486.77	9,826.07
19	Discounted annual revenue requirement	AEDm	2,717.88	2,566.85	2,409.63	2,131.71	9,826.07
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-1,863.35
21	PV of revenue requirement (after foregone financing costs)	AEDm					**7,962.72**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**2,134.28**	1,920.85	1,728.77	1,555.89		
24		AEDm	2,134.28	1,920.85	1,728.77	1,555.89	6,768.31	
25		%	86%	85%	85%	84%	**85%**	
26	**Revenue driver 2**	Customer Accounts	382,583	395,056	407,934	421,233	**Constraints for Solver Run**	
27		AED / Customer	**943.21**	848.89	764.00	687.60		
28		AEDm	360.86	335.36	311.66	289.64	1,194.41	
29		%	14%	15%	15%	16%	**15%**	
30	**Revenue driver 3**	kWh	0	0	0	0		
31		fils / kWh	**1.0000**	0.9000	0.8100	0.7290		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - $X=0$)		2,156.29	2,166.42	2,176.88	2,187.68	7,962.72	
34	Annual revenue	AEDm	2,495.14	2,256.21	2,040.43	1,845.53	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	2,440.82	2,112.06	1,827.81	1,582.03	**7,962.72**	**0.00**
			1 - Run solver with $X=0$				**Target for Solver Run**	
			2 - Copy line 34 as values in line 34A					

	Results		**2018**
36	**X Factor**		**10.0**
37	**Fixed revenue term (a)**	**AED million**	**2,134.28**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**943.21**
39	**Co-efficient of variable revenue term (c)**	**fils / kWh metered**	**1.0000**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	647.27	408.31	196.69	155.66	351.98
41	Implied return on mid-point RAV	%	3.13%	2.05%	1.05%	0.88%	1.78%
41A	Accounting actual annual depreciation, RC1	AEDm	804.94	846.36	895.12	914.24	865.16
41B	Estimated NBV for RC1	AEDm	16,346.27	16,348.84	16,219.09	16,069.61	16245.95
41C	Estimated actual annual profit	AEDm	1,020.83	749.83	492.55	287.87	637.77
41D	Estimated actual return on year-end NBV	%	6.25%	4.59%	3.04%	1.79%	3.91%

Annex B.4: ADDC water – RC1 calculations (option 1)

Appendix B.4: ADDC Water - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		438.57	440.95	443.13	444.17
2	Opening RAV	AEDm		6,717.10	7,000.26	7,096.32	7,004.21
3	Closing RAV	AEDm		7,000.26	7,096.32	7,004.21	6,850.60
4	Mid-Year RAV	AEDm		6,858.68	7,048.29	7,050.27	6,927.41
5	Total depreciation for RC1	AEDm		321.84	334.79	343.31	348.90
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		308,535	317,279	326,982	337,330
8	Forecast for revenue driver 3	MIG		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	-176.29				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	438.57	440.95	443.13	444.17	1,619.51
16	Total depreciation for RC1	AEDm	321.84	334.79	343.31	348.90	1,234.85
17	Return on mid-year RAV	AEDm	308.64	317.17	317.26	311.73	1,150.26
18	Annual revenue requirement	AEDm	1,069.05	1,092.91	1,103.71	1,104.80	4,004.62
19	Discounted annual revenue requirement	AEDm	1,045.78	1,023.09	988.70	947.06	4,004.62
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-176.29
21	PV of revenue requirement (after foregone financing costs)	AEDm					**3,828.33**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**887.31**	887.31	887.31	887.31		
24		AEDm	887.31	887.31	887.31	887.31	3,254.08	
25		%	86%	85%	85%	84%	**85%**	
26	**Revenue driver 2**	Customer Accounts	308,535	317,279	326,982	337,330	**Constraints for Solver Run**	
27		AED / Customer	**486.28**	486.28	486.28	486.28		
28		AEDm	150.03	154.29	159.00	164.04	574.25	
29		%	14%	15%	15%	16%	**15%**	
30	**Revenue driver 3**	TIG	0	0	0	0		
31		AED/TIG	**1.0000**	1.0000	1.0000	1.0000		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - *X=0*)		1,037.34	1,041.60	1,046.31	1,051.35	3,828.33	
34	Annual revenue	AEDm	1,037.34	1,041.60	1,046.31	1,051.35	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	1,014.76	975.04	937.28	901.24	**3,828.33**	**0.00**

1 - Run solver with *X=0*
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**887.31**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**486.28**
39	**Co-efficient of variable revenue term (c)**	**AED / TIG metered**	**1.0000**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	276.94	265.85	259.87	258.28	265.23
41	Implied return on mid-point RAV	%	4.04%	3.77%	3.69%	3.73%	3.81%
41A	Accounting actual annual depreciation, RC1	AEDm	277.57	291.86	308.67	315.26	298.34
41B	Estimated NBV for RC1	AEDm	5135.23	5170.76	5189.46	5201.58	5174.26
41C	Estimated actual annual profit	AEDm	321.20	308.79	294.51	291.91	304.10
41D	Estimated actual return on year-end NBV	%	6.25%	5.97%	5.68%	5.61%	5.88%

Annex B.5: TRANSCO electricity – RC1 calculations (option 1)

Appendix B.5: TRANSCO Electricity - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		383.88	385.85	382.53	379.83
2	Opening RAV	AEDm		35,156.12	34,295.61	33,149.46	31,570.89
3	Closing RAV	AEDm		34,295.61	33,149.46	31,570.89	30,005.42
4	Mid-Year RAV	AEDm		34,725.86	33,722.53	32,360.17	30,788.15
5	Total depreciation for RC1	AEDm		1,866.52	1,888.37	1,901.69	1,910.03
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	GWh		83,780	89,033	94,286	99,540
8	Forecast for revenue driver 3	Peak demand (MW)		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	-4,117.55				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		10.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	383.88	385.85	382.53	379.83	1,404.98
16	Total depreciation for RC1	AEDm	1,866.52	1,888.37	1,901.69	1,910.03	6,934.46
17	Return on mid-year RAV	AEDm	1,562.66	1,517.51	1,456.21	1,385.47	5,441.32
18	Annual revenue requirement	AEDm	3,813.06	3,791.73	3,740.42	3,675.33	13,780.75
19	Discounted annual revenue requirement	AEDm	3,730.06	3,549.47	3,350.66	3,150.57	13,780.75
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-4,117.55
21	PV of revenue requirement (after foregone financing costs)	AEDm					**9,663.20**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**
22	**Revenue driver 1**		1.00	1.00	1.00	1.00	
23		AEDm	**2,590.07**	2,331.06	2,097.95	1,888.16	
24		AEDm	2,590.07	2,331.06	2,097.95	1,888.16	8,213.72
25		%	86%	85%	84%	84%	**85%**
26	**Revenue driver 2**	kWh	83,779,844,890	89,033,119,015	94,286,393,140	99,539,667,264	**Constraints for Solver Run**
27		fils / kWh	**0.5040**	0.4536	0.4083	0.3674	
28		AEDm	422.27	403.87	384.93	365.74	1,449.48
29		%	14%	15%	16%	16%	**15%**
30	**Revenue driver 3**	kW	0	0	0	0	
31		AED / kW	-	-	-	-	
32		AEDm	-	-	-	-	-
33		%	0%	0%	0%	0%	**0%**
		Variables for Solver Run					
34A	Annual revenue (non-profiled - *X=0*)		2,602.09	2,624.81	2,647.53	2,670.26	9,663.20
34	Annual revenue	AEDm	3,012.34	2,734.93	2,482.89	2,253.90	**TOTAL** Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	2,946.76	2,560.19	2,224.16	1,932.09	**9,663.20** **0.00**
							Target for Solver Run

1 - Run solver with *X=0*
2 - Copy line 34 as values in line 34A

	Results		**2018**
36	**X Factor**		**10.0**
37	**Fixed revenue term (a)**	**AED million**	**2,590.07**
38	**Co-efficient of variable revenue term (b)**	**fils / kWh**	**0.5040**
39	**Co-efficient of variable revenue term (c)**	**AED / kW**	**0.00**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	761.94	460.71	198.67	-35.96	346.34
41	Implied return on mid-point RAV	%	2.19%	1.37%	0.61%	-0.12%	1.01%
41A	Accounting actual annual depreciation, RC1	AEDm	1228.17	1314.51	1345.15	1395.81	1320.91
41B	Estimated NBV for RC1	AEDm	30615.31	30210.35	29774.75	29288.49	29972.22
41C	Estimated actual annual profit	AEDm	1,400.29	1,034.58	755.21	478.26	917.08
41D	Estimated actual return on year-end NBV	%	4.57%	3.42%	2.54%	1.63%	3.04%

Annex B.6: TRANSCO water – RC1 calculations (option 1)

Appendix B.6: TRANSCO Water - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		373.60	376.71	379.83	383.98
2	Opening RAV	AEDm		18,901.34	18,198.68	17,458.83	16,698.04
3	Closing RAV	AEDm		18,198.68	17,458.83	16,698.04	15,858.04
4	Mid-Year RAV	AEDm		18,550.01	17,828.75	17,078.43	16,278.04
5	Total depreciation for RC1	AEDm		903.66	908.28	912.27	915.11
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	MIG		299,598	309,814	320,029	330,244
8	Forecast for revenue driver 3	Peak demand (MIGD)		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	-2,012.24				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	373.60	376.71	379.83	383.98	1,387.52
16	Total depreciation for RC1	AEDm	903.66	908.28	912.27	915.11	3,335.89
17	Return on mid-year RAV	AEDm	834.75	802.29	768.53	732.51	2,883.98
18	Annual revenue requirement	AEDm	2,112.01	2,087.28	2,060.63	2,031.60	7,607.39
19	Discounted annual revenue requirement	AEDm	2,066.04	1,953.92	1,845.91	1,741.53	7,607.39
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-2,012.24
21	PV of revenue requirement (after foregone financing costs)	AEDm					**5,595.15**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**
22	**Revenue driver 1**		1.00	1.00	1.00	1.00	
23		AEDm	**1,296.81**	1,296.81	1,296.81	1,296.81	
24		AEDm	1,296.81	1,296.81	1,296.81	1,296.81	4,755.88
25		%	86%	85%	85%	84%	**85%**
26	**Revenue driver 2**	TIG	299,598,284	309,813,603	320,028,923	330,244,242	**Constraints for Solver Run**
27		AED/TIG	**0.7280**	0.7280	0.7280	0.7280	
28		AEDm	218.10	225.54	232.98	240.41	839.27
29		%	14%	15%	15%	16%	**15%**
30	**Revenue driver 3**	TIGD	0	0	0	0	
31		AED / TIGD	-	-	-	-	
32		AEDm	-	-	-	-	-
33		%	0%	0%	0%	0%	**0%**
		Variables for Solver Run					
34A	Annual revenue (non-profiled - *X=0*)		1,514.92	1,522.35	1,529.79	1,537.23	5,595.15
34	Annual revenue	AEDm	1,514.92	1,522.35	1,529.79	1,537.23	**TOTAL** Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	1,481.94	1,425.09	1,370.38	1,317.74	**5,595.15** **0.00**

1 - Run solver with *X=0*
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**1,296.81**
38	**Co-efficient of variable revenue term (b)**	**AED / TIG**	**0.7280**
39	**Co-efficient of variable revenue term (c)**	**AED / TIGD**	**0.00**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	237.66	237.36	237.69	238.14	237.71
41	Implied return on mid-point RAV	%	1.28%	1.33%	1.39%	1.46%	1.37%
41A	Accounting actual annual depreciation, RC1	AEDm	790.36	805.67	824.16	843.98	816.04
41B	Estimated NBV for RC1	AEDm	13,673.77	13,074.50	12,456.74	11,819.15	12756.04
41C	Estimated actual annual profit	AEDm	350.95	339.97	325.80	309.27	331.50
41D	Estimated actual return on year-end NBV	%	2.57%	2.60%	2.62%	2.62%	2.60%

Annex B.7: ADSSC – RC1 calculations (option 1)

Appendix B.7: ADSSC - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		723.64	659.51	649.65	640.62
2	Opening RAV	AEDm		19,737.21	20,194.41	20,946.28	21,480.74
3	Closing RAV	AEDm		20,194.41	20,946.28	21,480.74	21,930.74
4	Mid-Year RAV	AEDm		19,965.81	20,570.35	21,213.51	21,705.74
5	Total depreciation for RC1	AEDm		986.79	536.75	481.88	498.25
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	m3		422,083,318	450,845,765	481,635,659	511,011,886
8	Forecast for revenue driver 3	Customer Accounts		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	-350.34				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	723.64	659.51	649.65	640.62	2,456.37
16	Total depreciation for RC1	AEDm	986.79	536.75	481.88	498.25	2,326.55
17	Return on mid-year RAV	AEDm	898.46	925.67	954.61	976.76	3,437.86
18	Annual revenue requirement	AEDm	2,608.90	2,121.93	2,086.14	2,115.63	8,220.78
19	Discounted annual revenue requirement	AEDm	2,552.11	1,986.35	1,868.75	1,813.56	8,220.78
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-350.34
21	PV of revenue requirement (after foregone financing costs)	AEDm					**7,870.44**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**1,824.17**	1,824.17	1,824.17	1,824.17		
24		AEDm	1,824.17	1,824.17	1,824.17	1,824.17	6,689.87	
25		%	86%	85%	85%	84%	**85%**	
26	**Revenue driver 2**	m3	422,083,318	450,845,765	481,635,659	511,011,886	**Constraints for Solver Run**	
27		AED/m3	**0.6926**	0.6926	0.6926	0.6926		
28		AEDm	292.35	312.28	333.60	353.95	1,180.56	
29		%	14%	15%	15%	16%	**15%**	
30	**Revenue driver 3**	Customer Accounts	0	0	0	0		
31		AED / Customer	-	-	-	-		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - $X=0$)		2,116.52	2,136.44	2,157.77	2,178.12	7,870.44	
34	Annual revenue	AEDm	2,116.52	2,136.44	2,157.77	2,178.12	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2014**	AEDm	2,070.45	1,999.94	1,932.92	1,867.13	**7,870.44**	**0.00**
							Target for Solver Run	

1 - Run solver with $X=0$
2 - Copy line 34 as values in line 34A

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**1,824.17**
38	**Co-efficient of variable revenue term (b)**	**AED / m3**	**0.6926**
39	**Co-efficient of variable revenue term (c)**	**AED / Customer Account**	**0.00**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	406.08	940.18	1026.24	1039.24	852.94
41	Implied return on mid-point RAV	%	2.03%	4.57%	4.84%	4.79%	4.06%
41A	Accounting actual annual depreciation, RC1	AEDm	992.47	972.03	953.54	939.94	964.50
41B	Estimated NBV for RC1	AEDm	21318.20	21486.15	21672.58	21872.61	21587.39
41C	Estimated actual annual profit	AEDm	400.40	504.90	554.58	597.55	514.36
41D	Estimated actual return on year-end NBV	%	1.88%	2.35%	2.56%	2.73%	2.38%

Annex B.1: AADC electricity – RC1 calculations (option 2)

Appendix B.1: AADC Electricity - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		497.62	486.93	472.29	460.57
2	Opening RAV	AEDm		9,124.09	9,410.18	9,491.85	9,215.43
3	Closing RAV	AEDm		9,410.18	9,491.85	9,215.43	8,868.92
4	Mid-Year RAV	AEDm		9,267.14	9,451.02	9,353.64	9,042.17
5	Total depreciation for RC1	AEDm		484.91	462.76	472.01	476.08
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		150,353	153,089	155,653	158,048
8	Forecast for revenue driver 3	GWh		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	0.00				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		10.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	497.62	486.93	472.29	460.57	1,760.49
16	Total depreciation for RC1	AEDm	484.91	462.76	472.01	476.08	1,738.49
17	Return on mid-year RAV	AEDm	417.02	425.30	420.91	406.90	1,531.92
18	Annual revenue requirement	AEDm	1,399.55	1,374.99	1,365.22	1,343.54	5,030.89
19	Discounted annual revenue requirement	AEDm	1,369.08	1,287.13	1,222.96	1,151.71	5,030.89
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-
21	PV of revenue requirement (after foregone financing costs)	AEDm					**5,030.89**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**1,348.45**	1,213.60	1,092.24	983.02		
24		AEDm	1,348.45	1,213.60	1,092.24	983.02	4,276.25	
25		%	85%	85%	85%	85%	**85%**	
26	**Revenue driver 2**	Customer Accounts	150,353	153,089	155,653	158,048	**Constraints for Solver Run**	
27		AED / Customer	**1,547.14**	1,392.42	1,253.18	1,127.86		
28		AEDm	232.62	213.17	195.06	178.26	754.64	
29		%	15%	15%	15%	15%	**15%**	
30	**Revenue driver 3**	kWh	0	0	0	0		
31		fils / kWh	-	-	-	-		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - *X=0*)		1,366.74	1,370.40	1,373.82	1,377.01	5,030.89	
34	Annual revenue	AEDm	1,581.07	1,426.77	1,287.30	1,161.28	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	1,546.65	1,335.61	1,153.16	995.47	**5,030.89**	**0.00**

1 - Run solver with *X=0*
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		**2018**
36	**X Factor**		**10.0**
37	**Fixed revenue term (a)**	**AED million**	**1,348.45**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**1,547.14**
39	**Co-efficient of variable revenue term (c)**	**fils / kWh metered**	**0.0000**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	598.54	477.08	343.00	224.63	410.81
41	Implied return on mid-point RAV	%	6.46%	5.05%	3.67%	2.48%	4.41%
41A	Accounting actual annual depreciation, RC1	AEDm	292.48	298.33	304.29	310.38	301.37
41B	Estimated NBV for RC1	AEDm	7641.79	7668.84	7649.17	7621.25	7645.26
41C	Estimated actual annual profit	AEDm	790.97	641.52	510.72	390.33	583.38
41D	Estimated actual return on year-end NBV	%	10.35%	8.37%	6.68%	5.12%	7.63%

Annex B.2: AADC water – RC1 calculations (option 2)

Appendix B.2: AADC Water - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		238.69	236.93	233.29	231.32
2	Opening RAV	AEDm		3,563.65	3,677.39	3,648.17	3,525.66
3	Closing RAV	AEDm		3,677.39	3,648.17	3,525.66	3,378.80
4	Mid-Year RAV	AEDm		3,620.52	3,662.78	3,586.92	3,452.23
5	Total depreciation for RC1	AEDm		180.26	185.89	188.67	190.04
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		91,917	94,775	97,823	101,072
8	Forecast for revenue driver 3	MIG		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	0.00				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	238.69	236.93	233.29	231.32	862.56
16	Total depreciation for RC1	AEDm	180.26	185.89	188.67	190.04	682.27
17	Return on mid-year RAV	AEDm	162.92	164.83	161.41	155.35	591.43
18	Annual revenue requirement	AEDm	581.87	587.64	583.38	576.71	2,136.26
19	Discounted annual revenue requirement	AEDm	569.20	550.09	522.59	494.37	2,136.26
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					0.00
21	PV of revenue requirement (after foregone financing costs)	AEDm					**2,136.26**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**
22	**Revenue driver 1**		1.00	1.00	1.00	1.00	
23		AEDm	**495.13**	495.13	495.13	495.13	
24		AEDm	495.13	495.13	495.13	495.13	1,815.82
25		%	86%	85%	85%	84%	**85%**
26	**Revenue driver 2**	Customer Accounts	91,917	94,775	97,823	101,072	**Constraints for Solver Run**
27		AED / Customer	**908.00**	908.00	908.00	908.00	
28		AEDm	83.46	86.06	88.82	91.77	320.44
29		%	14%	15%	15%	16%	**15%**
30	**Revenue driver 3**	TIG	0	0	0	0	
31		AED/TIG	**0.5000**	0.5000	0.5000	0.5000	
32		AEDm	-	-	-	-	-
33		%	0%	0%	0%	0%	**0%**
		Variables for Solver Run					
34A	Annual revenue (non-profiled - *X=0*)		578.59	581.19	583.95	586.90	2,136.26
34	Annual revenue	AEDm	578.59	581.19	583.95	586.90	**TOTAL** Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	566.00	544.05	523.10	503.11	**2,136.26** **0.00**

1 - Run solver with *X=0*
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**495.13**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**908.00**
39	**Co-efficient of variable revenue term (c)**	**AED / TIG metered**	**0.5000**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	159.64	158.37	161.99	165.54	161.39
41	Implied return on mid-point RAV	%	4.41%	4.32%	4.52%	4.80%	4.51%
41A	Accounting actual annual depreciation, RC1	AEDm	91.54	93.37	95.24	97.15	94.33
41B	Estimated NBV for RC1	AEDm	2027.74	1962.42	1887.46	1812.96	1922.64
41C	Estimated actual annual profit	AEDm	248.36	250.89	255.42	258.44	253.27
41D	Estimated actual return on year-end NBV	%	12.25%	12.78%	13.53%	14.25%	13.20%

Annex B.3: ADDC electricity – RC1 calculations (option 2)

Appendix B.3: ADDC Electricity - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		669.37	660.03	652.76	643.42
2	Opening RAV	AEDm		20,996.38	20,358.88	19,380.55	18,227.92
3	Closing RAV	AEDm		20,358.88	19,380.55	18,227.92	17,189.92
4	Mid-Year RAV	AEDm		20,677.63	19,869.71	18,804.23	17,708.92
5	Total depreciation for RC1	AEDm		1,178.50	1,187.88	1,190.98	1,046.45
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		382,583	395,056	407,934	421,233
8	Forecast for revenue driver 3	GWh		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	0.00				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		10.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	669.37	660.03	652.76	643.42	2,408.96
16	Total depreciation for RC1	AEDm	1,178.50	1,187.88	1,190.98	1,046.45	4,228.74
17	Return on mid-year RAV	AEDm	930.49	894.14	846.19	796.90	3,188.38
18	Annual revenue requirement	AEDm	2,778.36	2,742.05	2,689.93	2,486.77	9,826.07
19	Discounted annual revenue requirement	AEDm	2,717.88	2,566.85	2,409.63	2,131.71	9,826.07
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					0.00
21	PV of revenue requirement (after foregone financing costs)	AEDm					**9,826.07**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**
22	**Revenue driver 1**		1.00	1.00	1.00	1.00	
23		AEDm	**2,633.72**	2,370.35	2,133.32	1,919.98	
24		AEDm	2,633.72	2,370.35	2,133.32	1,919.98	8,352.16
25		%	86%	85%	85%	84%	**85%**
26	**Revenue driver 2**	Customer Accounts	382,583	395,056	407,934	421,233	**Constraints for Solver Run**
27		AED / Customer	**1,163.94**	1,047.54	942.79	848.51	
28		AEDm	445.30	413.84	384.60	357.42	1,473.91
29		%	14%	15%	15%	16%	**15%**
30	**Revenue driver 3**	kWh	0	0	0	0	
31		fils / kWh	**1.0000**	0.9000	0.8100	0.7290	
32		AEDm	-	-	-	-	-
33		%	0%	0%	0%	0%	**0%**
		Variables for Solver Run					
34A	Annual revenue (non-profiled - $X=0$)		2,660.88	2,673.38	2,686.29	2,699.62	9,826.07
34	Annual revenue	AEDm	3,079.03	2,784.19	2,517.91	2,277.40	**TOTAL** Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	3,012.00	2,606.30	2,255.54	1,952.24	**9,826.07** **0.00**
			1 - Run solver with $X=0$				**Target for Solver Run**
			2 - Copy line 34 as values in line 34A				

	Results		**2018**
36	**X Factor**		**10.0**
37	**Fixed revenue term (a)**	**AED million**	**2,633.72**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**1,163.94**
39	**Co-efficient of variable revenue term (c)**	**fils / kWh metered**	**1.0000**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	1231.16	936.28	674.17	587.53	857.29
41	Implied return on mid-point RAV	%	5.95%	4.71%	3.59%	3.32%	4.39%
41A	Accounting actual annual depreciation, RC1	AEDm	804.94	846.36	895.12	914.24	865.16
41B	Estimated NBV for RC1	AEDm	16,346.27	16,348.84	16,219.09	16,069.61	16245.95
41C	Estimated actual annual profit	AEDm	1,604.72	1,277.80	970.03	719.74	1143.07
41D	Estimated actual return on year-end NBV	%	9.82%	7.82%	5.98%	4.48%	7.02%

Annex B.4: ADDC water – RC1 calculations (option 2)

Appendix B.4: ADDC Water - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		438.57	440.95	443.13	444.17
2	Opening RAV	AEDm		6,717.10	7,000.26	7,096.32	7,004.21
3	Closing RAV	AEDm		7,000.26	7,096.32	7,004.21	6,850.60
4	Mid-Year RAV	AEDm		6,858.68	7,048.29	7,050.27	6,927.41
5	Total depreciation for RC1	AEDm		321.84	334.79	343.31	348.90
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	Customer Accounts		308,535	317,279	326,982	337,330
8	Forecast for revenue driver 3	MIG		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	0.00				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	438.57	440.95	443.13	444.17	1,619.51
16	Total depreciation for RC1	AEDm	321.84	334.79	343.31	348.90	1,234.85
17	Return on mid-year RAV	AEDm	308.64	317.17	317.26	311.73	1,150.26
18	Annual revenue requirement	AEDm	1,069.05	1,092.91	1,103.71	1,104.80	4,004.62
19	Discounted annual revenue requirement	AEDm	1,045.78	1,023.09	988.70	947.06	4,004.62
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					0.00
21	PV of revenue requirement (after foregone financing costs)	AEDm					**4,004.62**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**928.17**	928.17	928.17	928.17		
24		AEDm	928.17	928.17	928.17	928.17	3,403.92	
25		%	86%	85%	85%	84%	**85%**	
26	**Revenue driver 2**	Customer Accounts	308,535	317,279	326,982	337,330	**Constraints for Solver Run**	
27		AED / Customer	**508.67**	508.67	508.67	508.67		
28		AEDm	156.94	161.39	166.33	171.59	600.69	
29		%	14%	15%	15%	16%	**15%**	
30	**Revenue driver 3**	TIG	0	0	0	0		
31		AED/TIG	**0.1250**	0.1250	0.1250	0.1250		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - $X=0$)		1,085.11	1,089.56	1,094.50	1,099.76	4,004.62	
34	Annual revenue	AEDm	1,085.11	1,089.56	1,094.50	1,099.76	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	1,061.49	1,019.94	980.44	942.74	**4,004.62**	**0.00**

1 - Run solver with $X=0$
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**928.17**
38	**Co-efficient of variable revenue term (b)**	**AED / Customer Account**	**508.67**
39	**Co-efficient of variable revenue term (c)**	**AED / TIG metered**	**0.1250**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	324.71	313.82	308.05	306.69	313.32
41	Implied return on mid-point RAV	%	4.73%	4.45%	4.37%	4.43%	4.50%
41A	Accounting actual annual depreciation, RC1	AEDm	277.57	291.86	308.67	315.26	298.34
41B	Estimated NBV for RC1	AEDm	5135.23	5170.76	5189.46	5201.58	5174.26
41C	Estimated actual annual profit	AEDm	368.97	356.75	342.69	340.32	352.18
41D	Estimated actual return on year-end NBV	%	7.19%	6.90%	6.60%	6.54%	6.81%

Annex B.5: TRANSCO electricity – RC1 calculations (option 2)

Appendix B.5: TRANSCO Electricity - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

	Inputs			RC1 2018	RC1 2019	RC1 2020	RC1 2021
1	Operating expenditure allowance	AEDm		383.88	385.85	382.53	379.83
2	Opening RAV	AEDm		35,156.12	34,295.61	33,149.46	31,570.89
3	Closing RAV	AEDm		34,295.61	33,149.46	31,570.89	30,005.42
4	Mid-Year RAV	AEDm		34,725.86	33,722.53	32,360.17	30,788.15
5	Total depreciation for RC1	AEDm		1,866.52	1,888.37	1,901.69	1,910.03
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	GWh		83,780	89,033	94,286	99,540
8	Forecast for revenue driver 3	Peak demand (MW)		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	0.00				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		10.00				

	RC1 Required Revenue Calculations		RC1 2018	RC1 2019	RC1 2020	RC1 2021	PV over RC1 Period at 1 January 2018
15	Operating expenditure allowance	AEDm	383.88	385.85	382.53	379.83	1,404.98
16	Total depreciation for RC1	AEDm	1,866.52	1,888.37	1,901.69	1,910.03	6,934.46
17	Return on mid-year RAV	AEDm	1,562.66	1,517.51	1,456.21	1,385.47	5,441.32
18	Annual revenue requirement	AEDm	3,813.06	3,791.73	3,740.42	3,675.33	13,780.75
19	Discounted annual revenue requirement	AEDm	3,730.06	3,549.47	3,350.66	3,150.57	13,780.75
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					0.00
21	PV of revenue requirement (after foregone financing costs)	AEDm					**13,780.75**

	RC1 Revenue Forecast and Profiling		2018	2019	2020	2021	PV Share in TOTAL
22	**Revenue driver 1**		1.00	1.00	1.00	1.00	
23		AEDm	**3,693.71**	3,324.34	2,991.91	2,692.72	
24		AEDm	3,693.71	3,324.34	2,991.91	2,692.72	11,713.64
25		%	86%	85%	84%	84%	**85%**
26	**Revenue driver 2**	kWh	83,779,844,890	89,033,119,015	94,286,393,140	99,539,667,264	**Constraints for Solver Run**
27		fils / kWh	**0.7188**	0.6469	0.5822	0.5240	
28		AEDm	602.20	575.96	548.95	521.58	2,067.11
29		%	14%	15%	16%	16%	**15%**
30	**Revenue driver 3**	kW	0	0	0	0	
31		AED / kW	-	-	-	-	
32		AEDm	-	-	-	-	-
33		%	0%	0%	0%	0%	**0%**
		Variables for Solver Run					
34A	Annual revenue (non-profiled - $X=0$)		3,710.85	3,743.26	3,775.67	3,808.07	13,780.75
34	Annual revenue	AEDm	4,295.91	3,900.30	3,540.86	3,214.30	**TOTAL** Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	4,202.40	3,651.10	3,171.89	2,755.37	**13,780.75** **0.00**

1 - Run solver with $X=0$
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		2018
36	**X Factor**		**10.0**
37	**Fixed revenue term (a)**	**AED million**	**3,693.71**
38	**Co-efficient of variable revenue term (b)**	**fils / kWh**	**0.7188**
39	**Co-efficient of variable revenue term (c)**	**AED / kW**	**0.00**

	Implied Financial Indicators		2018	2019	2020	2021	Average
40	Implied annual profit	AEDm	2045.52	1626.08	1256.64	924.44	1463.17
41	Implied return on mid-point RAV	%	5.89%	4.82%	3.88%	3.00%	4.40%
41A	Accounting actual annual depreciation, RC1	AEDm	1228.17	1314.51	1345.15	1395.81	1320.91
41B	Estimated NBV for RC1	AEDm	30615.31	30210.35	29774.75	29288.49	29972.22
41C	Estimated actual annual profit	AEDm	2,683.86	2,199.95	1,813.18	1,438.66	2033.91
41D	Estimated actual return on year-end NBV	%	8.77%	7.28%	6.09%	4.91%	6.76%

Annex B.6: TRANSCO water – RC1 calculations (option 2)

Appendix B.6: TRANSCO Water - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		373.60	376.71	379.83	383.98
2	Opening RAV	AEDm		18,901.34	18,198.68	17,458.83	16,698.04
3	Closing RAV	AEDm		18,198.68	17,458.83	16,698.04	15,858.04
4	Mid-Year RAV	AEDm		18,550.01	17,828.75	17,078.43	16,278.04
5	Total depreciation for RC1	AEDm		903.66	908.28	912.27	915.11
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	MIG		299,598	309,814	320,029	330,244
8	Forecast for revenue driver 3	Peak demand (MIGD)		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	0.00				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	373.60	376.71	379.83	383.98	1,387.52
16	Total depreciation for RC1	AEDm	903.66	908.28	912.27	915.11	3,335.89
17	Return on mid-year RAV	AEDm	834.75	802.29	768.53	732.51	2,883.98
18	Annual revenue requirement	AEDm	2,112.01	2,087.28	2,060.63	2,031.60	7,607.39
19	Discounted annual revenue requirement	AEDm	2,066.04	1,953.92	1,845.91	1,741.53	7,607.39
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					0.00
21	PV of revenue requirement (after foregone financing costs)	AEDm					**7,607.39**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**	
22	**Revenue driver 1**		1.00	1.00	1.00	1.00		
23		AEDm	**1,763.20**	1,763.20	1,763.20	1,763.20		
24		AEDm	1,763.20	1,763.20	1,763.20	1,763.20	6,466.28	
25		%	86%	85%	85%	84%	**85%**	
26	**Revenue driver 2**	TIG	299,598,284	309,813,603	320,028,923	330,244,242	**Constraints for Solver Run**	
27		AED/TIG	**0.9898**	0.9898	0.9898	0.9898		
28		AEDm	296.54	306.65	316.76	326.88	1,141.11	
29		%	14%	15%	15%	16%	**15%**	
30	**Revenue driver 3**	TIGD	0	0	0	0		
31		AED / TIGD	**0.50**	0.50	0.50	0.50		
32		AEDm	-	-	-	-	-	
33		%	0%	0%	0%	0%	**0%**	
		Variables for Solver Run						
34A	Annual revenue (non-profiled - *X=0*)		2,059.74	2,069.85	2,079.96	2,090.08	7,607.39	
34	Annual revenue	AEDm	2,059.74	2,069.85	2,079.96	2,090.08	**TOTAL**	Difference
35	**Discounted annual revenue at 1 January 2018**	AEDm	2,014.91	1,937.60	1,863.22	1,791.66	**7,607.39**	**0.00**

1 - Run solver with *X=0*
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**1,763.20**
38	**Co-efficient of variable revenue term (b)**	**AED / TIG**	**0.9898**
39	**Co-efficient of variable revenue term (c)**	**AED / TIGD**	**0.50**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	782.48	784.86	787.86	790.99	786.55
41	Implied return on mid-point RAV	%	4.22%	4.40%	4.61%	4.86%	4.52%
41A	Accounting actual annual depreciation, RC1	AEDm	790.36	805.67	824.16	843.98	816.04
41B	Estimated NBV for RC1	AEDm	13,673.77	13,074.50	12,456.74	11,819.15	12756.04
41C	Estimated actual annual profit	AEDm	895.78	887.47	875.98	862.12	880.34
41D	Estimated actual return on year-end NBV	%	6.55%	6.79%	7.03%	7.29%	6.92%

Annex B.7: ADSSC – RC1 calculations (option 2)

Appendix B.7: ADSSC - Price Control Calculations

Line No. **(All figures are in 2018 prices)**

				RC1			
	Inputs			**2018**	**2019**	**2020**	**2021**
1	Operating expenditure allowance	AEDm		723.64	659.51	649.65	640.62
2	Opening RAV	AEDm		19,737.21	20,194.41	20,946.28	21,480.74
3	Closing RAV	AEDm		20,194.41	20,946.28	21,480.74	21,930.74
4	Mid-Year RAV	AEDm		19,965.81	20,570.35	21,213.51	21,705.74
5	Total depreciation for RC1	AEDm		986.79	536.75	481.88	498.25
6	Forecast for revenue driver 1	Fixed term		1.00	1.00	1.00	1.00
7	Forecast for revenue driver 2	m3		422,083,318	450,845,765	481,635,659	511,011,886
8	Forecast for revenue driver 3	Customer Accounts		0	0	0	0
9	PV of financing costs foregone on PC4 and PC5 capex	AEDm	0.00				
10	Cost of capital (real)		4.50%				
11	Weight in revenue for Revenue driver 1		85.00%				
12	Weight in revenue for Revenue driver 2		15.00%				
13	Weight in revenue for Revenue driver 3		0.00%				
14	X Factor		0.00				

			RC1				
	RC1 Required Revenue Calculations		**2018**	**2019**	**2020**	**2021**	**PV over RC1 Period at 1 January 2018**
15	Operating expenditure allowance	AEDm	723.64	659.51	649.65	640.62	2,456.37
16	Total depreciation for RC1	AEDm	986.79	536.75	481.88	498.25	2,326.55
17	Return on mid-year RAV	AEDm	898.46	925.67	954.61	976.76	3,437.86
18	Annual revenue requirement	AEDm	2,608.90	2,121.93	2,086.14	2,115.63	8,220.78
19	Discounted annual revenue requirement	AEDm	2,552.11	1,986.35	1,868.75	1,813.56	8,220.78
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					0.00
21	PV of revenue requirement (after foregone financing costs)	AEDm					**8,220.78**

	RC1 Revenue Forecast and Profiling		**2018**	**2019**	**2020**	**2021**	**PV Share in TOTAL**
22	**Revenue driver 1**		1.00	1.00	1.00	1.00	
23		AEDm	**1,905.37**	1,905.37	1,905.37	1,905.37	
24		AEDm	1,905.37	1,905.37	1,905.37	1,905.37	6,987.66
25		%	86%	85%	85%	84%	**85%**
26	**Revenue driver 2**	m3	422,083,318	450,845,765	481,635,659	511,011,886	**Constraints for Solver Run**
27		AED/m3	**0.7235**	0.7235	0.7235	0.7235	
28		AEDm	305.37	326.18	348.45	369.70	1,233.12
29		%	14%	15%	15%	16%	**15%**
30	**Revenue driver 3**	Customer Accounts	0	0	0	0	
31		AED / Customer	**1.00**	1.00	1.00	1.00	
32		AEDm	-	-	-	-	-
33		%	0%	0%	0%	0%	**0%**
		Variables for Solver Run					
34A	Annual revenue (non-profiled - $X=0$)		2,210.73	2,231.54	2,253.82	2,275.07	8,220.78
34	Annual revenue	AEDm	2,210.73	2,231.54	2,253.82	2,275.07	**TOTAL** Difference
35	**Discounted annual revenue at 1 January 2014**	AEDm	2,162.61	2,088.96	2,018.96	1,950.24	**8,220.78** **0.00**

1 - Run solver with $X=0$
2 - Copy line 34 as values in line 34A

Target for Solver Run

	Results		**2018**
36	**X Factor**		**0.0**
37	**Fixed revenue term (a)**	**AED million**	**1,905.37**
38	**Co-efficient of variable revenue term (b)**	**AED / m3**	**0.7235**
39	**Co-efficient of variable revenue term (c)**	**AED / Customer Account**	**1.00**

	Implied Financial Indicators		**2018**	**2019**	**2020**	**2021**	**Average**
40	Implied annual profit	AEDm	500.30	1035.28	1122.29	1136.20	948.52
41	Implied return on mid-point RAV	%	2.51%	5.03%	5.29%	5.23%	4.52%
41A	Accounting actual annual depreciation, RC1	AEDm	992.47	972.03	953.54	939.94	964.50
41B	Estimated NBV for RC1	AEDm	21318.20	21486.15	21672.58	21872.61	21587.39
41C	Estimated actual annual profit	AEDm	494.62	600.00	650.63	694.51	609.94
41D	Estimated actual return on year-end NBV	%	2.32%	2.79%	3.00%	3.18%	2.82%