



مكتب التنظيم و الرقابة
Regulation & Supervision Bureau

Regulatory review of price controls for 2018 onwards

RC1 draft proposals

20 April 2017

EC/E02/108

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water, wastewater and electricity sector of the Emirate of Abu Dhabi

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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), through a consultation process. The Bureau published its first consultation paper in February 2016, followed by the second consultation paper in September 2016 to set the Regulatory Controls 1 (to be termed as RC1) for the four network companies for 2018 onwards.
2. The Bureau received detailed responses to the second consultation paper from ADWEA, its group companies and ADSSC. This document sets out our draft proposals on the RC1 taking into account these responses. These draft proposals retain a number of important features of the current PC5 controls, particularly the overall concept of maximum allowed revenue (MAR). However, we have proposed changes and improvements to the regulatory regime mainly in relation to the structure and profiling of MAR, inflation indexation of certain MAR components, asset life assumptions for new investments, and efficiency review of capital expenditures. These draft proposals also allow flexible arrangements to set new controls, cost allowances and incentives during the RC1 period as and when agreed to facilitate implementation of new activities, investments, initiatives and Government directives.
3. While the delayed response from ADWEA group to the second consultation paper has delayed the publication of these draft proposals, the Bureau still aims to publish its final proposals for RC1, in October / November 2017, with the intention that the RC1 controls take effect from 1 January 2018 and apply for four years (2018-2021).
4. Written responses to the issues raised in this paper should be provided by no later than **10 June 2016** to:

Aftab Raza
Director of Economic Regulation
Regulation and Supervision Bureau
PO Box 32800
Abu Dhabi
Fax: 02-6424217
Email: araza@rsb.gov.ae
5. Finally, please note that we propose making responses to the consultation exercise publicly available.


SAIF SAEED AL QUBAIS
Director General



Highlights of RC1 draft proposals

Main features of regulatory regime

- CPI-X controls in terms of maximum allowed revenue (MAR) for four years (2018-2021)
- Existing separation of controls retained with TRANSCO's water controls enhanced to include Liwa storage
- Flexibility to introduce new separate controls for distribution and supply of recycled water for AADC and ADDC
- Flexible arrangements to allow annual opex adjustments for specified items
- Ex-ante approach to capex review used first time, with interim ex-ante review planned in 2018-2019 for 2020-2021 capex
- Regular ex-post capex review (next planned in 2018 for 2016-2017 capex)
- Reputational incentives introduced for the first time

Sector suggestions accepted and challenges

Sector suggestions accepted

- deferral of Government investment return arrangement to Government
- continuing with 4-year control duration
- variable revenue driver term in MAR formula
- use of consultant and hybrid approach for opex allowances
- more frequent and timely ex-post capex revisions
- introduction of ex-ante capex review
- flexible regulatory arrangements (e.g. providing specific allowances)
- providing reputational incentives

Sector challenges

- lower MAR mainly due to capex underspending
- lower ex-ante capex allowances
- removal of inflation from depreciation and RAV
- provision of information to justify additional cost allowances

Delivering customer benefits

- lower and profiled MAR, consequently lower unit cost and tariff in future
- efficiency incentives for companies via multi-year CPI-X form of regulation
- incentives for companies' improved security and service reliability
- direct incentives for customer service
- transparency

Meeting Government objectives

- lower MAR and consequently lower subsidy in future
- incentives for efficient use of Government funding
- ex-ante capex review
- incentives to deliver Government objectives (eg, DSM, biosolids reuse, SAIDI and SAIFI)

Executive Summary

Introduction

1. This document describes the Bureau's draft proposals for RC1 controls for four network companies (AADC, ADDC, TRANSCO and ADSSC) for 2018 onwards, taking into account the responses to our second consultation paper issued in September 2016.

Strategic issues and objectives (Section 2)

2. We maintain our proposal to focus the RC1 review 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.
3. On the treatment of government funding, our proposals are:
 - (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 the capital investment, and consequently exclude inflation indexation from depreciation and regulatory asset value (RAV).
4. With respect to efficient use of capital, the Bureau maintains its proposals:
 - (a) to 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) to promote and support better alignment between different stakeholders in the capital approval and budgeting process in the sector; and

- (c) to strengthen the processes and methods to record and report the network companies' costs and outputs, including through implementation of Activity-Based Costing (ABC) system by the network companies.
- 5. In relation to the cost controlling and revenue profiling, we propose smoothing the MAR profile by using:
 - (a) X-factors; and
 - (b) extended asset life assumptions for new investments, for price control purposes.
- 6. To enhance transparency and sustainability of the sector, the Bureau maintains the view about 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 demand side management (DSM).
- 7. For monitoring customer services activities and outputs in the sector, we propose specific incentives with targets and key performance indicators (KPIs). During RC1, we will continue to review and consider how the economic regulatory framework can facilitate and improve the way in which companies provide their services to end-users.

Form of controls (Section 3)

- 8. Our draft proposals on the form, structure, separation and duration of RC1 controls include:
 - (a) Continue with the CPI-X revenue cap form of controls.
 - (b) Retain the current separation of price controls for all companies with the following specific provisions:
 - (i) Consider further separation in the next price controls, if sufficient and robust information - specifically cost allocation - is provided;
 - (ii) A separate control for distribution and supply of recycled water by AADC and ADDC;
 - (iii) Enhance the scope of the existing price controls for RC1 by allowing appropriate opex allowances for: AADC, ADDC and ADSSC - management of tankering services for water, wastewater and non-drinking water; ADSSC - informative billing; and TRANSCO - Liwa aquifer as a strategic storage.
 - (c) 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.
 - (d) Set RC1 control duration for four years (2018-2021), with regular capex reviews and annual adjustments for specific opex items.
 - (e) 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:

Table 1: Revenue-drivers – draft 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)	15%
ADSSC	Fixed term	85%
	Annual flow at treatment plants	15%

- (f) Set the general structure of the MAR for each business for any year “t” of the RC1 period as follows:

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

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 draft proposals. For subsequent years, values of “a_t” (total value less proportion representing depreciation allowance) and “b_t” are indexed against the UAE Consumer Price Index (CPI) less X factor and the proportion of “a_t” representing depreciation allowance against minus X factor only.
- (ii) “Q_t” and “K_t” are the performance incentive amount and the correction factor for the year “t”, respectively.

Operating costs (Section 4)

9. The Bureau’s opex consultants have used a hybrid approach combining top-down and bottom-up methods to estimating reasonable allowances for operating expenditure (opex) for the network companies over the RC1 period, based on consultation with the companies during 2016, the companies’ historical costs, benchmarks and particularly 2015 audited opex as the base level.
10. Our RC1 opex projections in 2018 prices adopted in these draft proposals and listed in **Table 2** are based on the opex consultant’s draft report issued in January 2017. These opex allowances amount to around AED 3 billion per year (in 2018 prices) for RC1 and are:
 - (a) lower than 2015 actuals by about 4%-8% for AADC and ADDC and higher than 2015 actuals by approximately 1%-4% for ADSSC and TRANSCO;
 - (b) in general, significantly lower than companies’ 2016 AIS forecasts; and
 - (c) lower than PC5 allowances for 2017 for all companies but higher for ADSSC.

Table 2: RC1 opex projections – draft proposals

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	419	406	393	380
	Water	195	191	186	183
	Total	613	597	579	563
ADDC	Electricity	532	520	509	501
	Water	319	315	311	309
	Total	852	835	820	810
TRANSCO	Electricity	369	372	366	362
	Water	354	359	362	364
	Total	723	731	728	726
ADSSC	Total	817	803	791	778
Total		3,005	2,966	2,919	2,877

11. The above RC1 opex projections:

- (a) include provisional allowances for Emiratisation, training and apprenticeship costs, subject to annual adjustments for actual Emiratisation rate and actual numbers of staff, training courses and students achieved during the year;
- (a) exclude the Bureau's licence fees (proposed to be passed-through);
- (b) presently do not include additional allowances for mega developments (for AADC, ADDC and ADSSC), costs for energy consumption of water pumping stations and Liwa aquifer (for TRANSCO) and management of tankering services (for AADC, ADDC and ADSSC). We intend to include provisional allowances for these in our final proposals once the opex consultant receive required information and justification from companies and issue final reports in June 2017;
- (c) include opex savings from various initiatives such as transfer of operation and maintenance of street lighting from distribution companies to Municipalities, billing services by distribution companies to ADSSC and commissioning of ADSSC's STEP project.

12. In their final report due in June 2017, the opex consultant will update their RC1 opex projections by taking into account the companies' 2016 actual audited costs.

Capital expenditure (Section 5)

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

13. The Bureau presented its final efficiency assessment reports to the companies for PC4 and PC5 capex in June 2016 and December 2016, respectively, setting out the capital efficiencies as shown in table below. The ex-post review of 2016-2017 (the last two years of PC5) is planned to be conducted by the Bureau in 2018.

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%

14. These efficiency scores have been applied to companies' actual audited capex to determine the actual efficient capex for the respective years. **Table 4** below presents the difference between efficient capex and provisional capex allowed in price controls. In aggregate and nominal prices:

- For PC4 (2012-2013), the network companies had efficient capex of AED 17.2 billion, which was AED 11.6 billion lower than the provisional allowance of AED 28.7 billion.
- For PC5 (2014-2015), the network companies had efficient capex of AED 10 billion, which is half of the provisional AED 20 billion allowance.
- These amounts representing mainly under-spending and some inefficiencies are being "clawed-back" via appropriate adjustments to the companies' RAVs at this price control review. The resulting financing costs unduly earned or foregone (amounting to AED 8 billion in NPV terms) have been applied to revenue requirement over the RC1 period. The capex under-spending during 2012-2015 are the main reason for significant reduction in MAR for RC1 compared to PC5.

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

		PC4 Capex			PC5 capex		
		2012	2013	Total	2014	2015	Total
AED million, nominal prices							
AADC	Electricity	-602	214	-388	-477	-554	-1,030
	Water	34	263	297	-106	-212	-317
ADDC	Electricity	-731	-403	-1,134	-1,942	-2,188	-4,130
	Water	-269	79	-190	35	-284	-248
TRANSCO	Electricity	-4,391	-2,686	-7,077	-51	-1,152	-1,203
	Water	-161	-1,911	-2,072	-1,704	-1,593	-3,297
ADSSC	Total	80	-1,085	-1,005	392	-332	59
Total		-6,039	-5,529	-11,568	-3,853	-6,315	-10,167

Future capex - RC1 capex (2018-2021)

15. Based on the ex-ante review concluded in February 2017, we have used the following capex allowances for RC1 period in these draft proposals. Given the quality and justification of capex schemes submitted by the companies, the RC1 capex allowances (AED 12.5 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). These allowances are another main reason for lower MAR estimates for RC1.

Table 5: RC1 capex allowances – draft proposals

AED million, nominal prices		2018	2019	2020	2021	Total
AADC	Electricity	771	556	204	138	1,669
	Water	294	160	69	46	569
ADDC	Electricity	541	214	40	9	804
	Water	605	440	262	208	1,515
TRANSCO	Electricity	1,006	758	337	367	2,468
	Water	201	172	158	80	611
ADSSC	Total	1,444	1,316	1,060	1,010	4,830
Total		4,862	3,616	2,130	1,858	12,466

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.

Financial issues (Section 6)

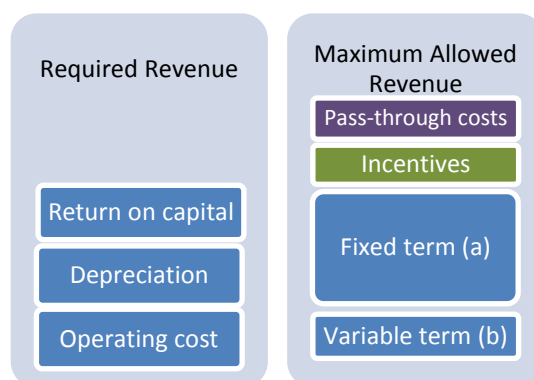
18. Based on our consultant's recommendations, we have retained (i) the use of straight-line depreciation and weighted average life concept for all assets, (ii) the asset life assumptions of 30 years and 50 years for pre-2018 capital investments for water and electricity businesses and wastewater business, respectively, and have extended the asset life assumptions for new investments for RC1 onwards as follows:
 - (a) 40 years for electricity businesses of AADC and ADDC;
 - (b) 55 years for water businesses of AADC and ADDC and both water and electricity businesses of TRANSCO; and
 - (c) 65 years for collection, treatment and disposal businesses of ADSSC.
19. We have updated RAVs for the following:
 - (a) the removal of inflation indexation from RAV and depreciation allowance decreasing the 2018 opening RAVs for the network companies by about AED 11 billion;
 - (b) the difference of actual efficient capex compared to provisional capex for PC4 (2012-2013) and PC5 (2014-2015) rolled into the RAVs, decreasing the 2018 opening RAVs by about AED 19 billion
 - (c) the above adjustments and inclusion of the ex-ante RC1 capex allowances leading to RAV decrease to AED 90 billion (nominal prices) by the end of 2021.

20. 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 8.6 billion (in 2018 prices) in present value terms.
21. Based on the overseas regulatory proposals and evidence from the local and regional capital markets, we have proposed a real cost of capital of 4.2% for RC1.

Price control calculations (Section 7)

22. Consistent with the previous work, 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 1: Price control calculations framework



23. The notified values (‘a’ and ‘b’) determined in these draft proposals for 2018 (expressed in 2018 prices) are given below. For subsequent years, the notified value ‘b’ and a specified proportion of the notified value ‘a’ will be adjusted annually by CPI-X indexation and the remaining proportion of the notified value ‘a’ representing the depreciation will be subject annual indexation against –X factor (i.e no CPI indexation). In contrast to previous price controls, we have used non-zero X-factors to suitably profile the MAR for each business over RC1 period to minimise the step change from year to another. We are currently assessing various factors including network MAR, generation and production costs, forecast demands, and planned ex-post and ex-ante capex reviews, which may impact total sector costs, customer tariffs and Government subsidy in future. Accordingly, we may revise X factors in the RC1 final proposals in order to ensure a robust balance between various impacts while ensuring neutral impact on network MARs in NPV terms over RC1 period.

Table 6: Notified values for RC1 – draft proposals

2018 prices			X			a		b	
						Part representing depreciation			
AADC	Electricity	25%	1,151.86	AEDm	53.13%	1,326.33	AED / customer account		
	Water	5%	414.61	AEDm	52.94%	761.79	AED / customer account		
ADDC	Electricity	25%	1,922.87	AEDm	55.71%	855.65	AED / customer account		
	Water	15%	815.44	AEDm	51.19%	449.52	AED / customer account		
TRANSCO	Electricity	25%	2,154.59	AEDm	55.39%	0.4245	Fills / kWh metered		
	Water	25%	1,385.25	AEDm	53.90%	0.8258	AED / TIG metered		
ADSSC		10%	1,976.67	AEDm	39.48%	0.7567	AED / m ³ wastewater treated		

Notes: These notified values for 2018 are based on an assumed UAE CPI of 107.22 (base year 2014 = 100) for 2017. Full 'b' value and part of 'a' value not representing depreciation will be subject to an adjustment for actual UAE CPI for 2017.

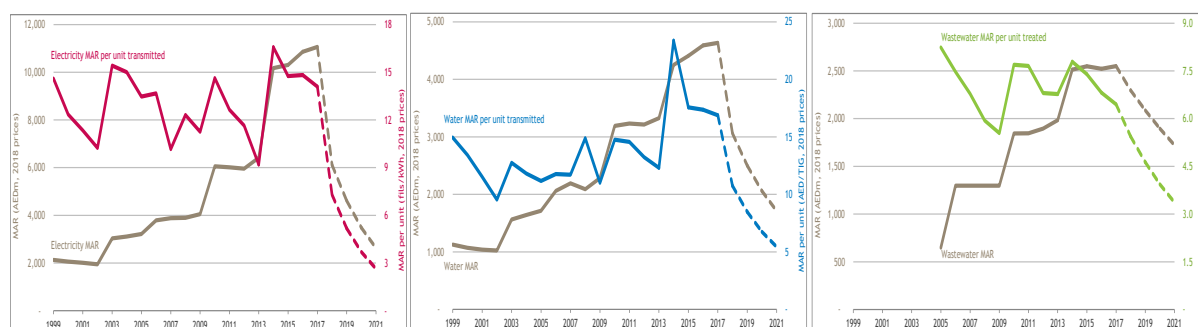
24. The annual MARs projected for each business over the RC1 period in respect of its “own” costs (i.e. excluding pass-through costs) are summarised in **Table 7**.

Table 7: Projected MAR over RC1 period – draft proposals

AED million, 2018 prices			2018	2019	2020	2021
AADC	Electricity		1,351	1,016	764	574
	Water		485	462	441	421
ADDC	Electricity		2,250	1,696	1,278	963
	Water		954	814	695	594
TRANSCO	Electricity		2,510	1,899	1,437	1,087
	Water		1,620	1,222	921	694
ADSSC		Total	2,296	2,086	1,896	1,723
Total			11,467	9,196	7,433	6,057

25. The charts below show the expected effect of these draft proposals on the total price-controlled costs and unit costs for electricity, water and wastewater, respectively. The declining annual total MARs and increasing demand means that the draft proposals are expected to result in reductions in the unit costs (in real terms) by 54% to 82% from the 2015 levels.

Figure 2: Projected trends of price-controlled MARs

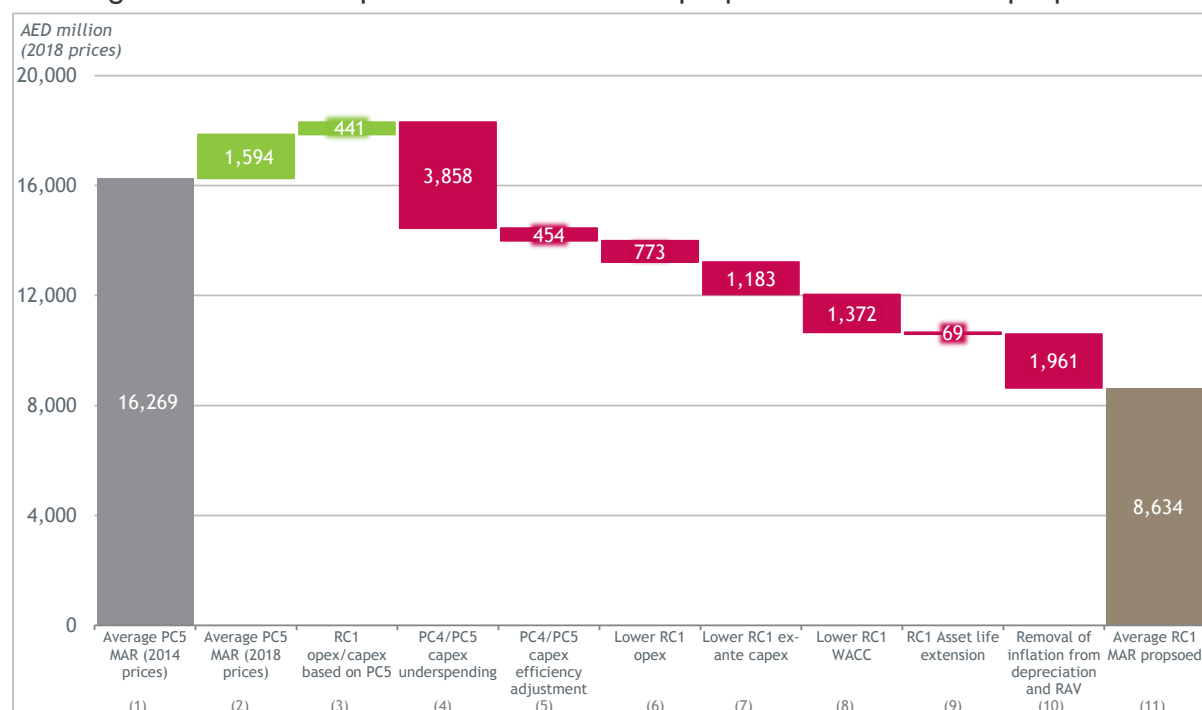


26. The majority of the projected MAR is accounted for by regulatory depreciation, followed by opex and the return on capital. In aggregate, the average return on capital or profit is expected to be around AED 1.4 billion (2018 prices) a year over the RC1 period.

27. The chart in **Figure 3** summarises the impacts of the RC1 draft proposals when compared with the PC5 final proposals (based on average annual MAR), indicating an overall impact of approximately AED 9.2 billion per year. This chart shows the following breakdown of impacts (from the largest to the smallest impact):

- (a) Under-spending of PC4 and PC5 capex in relation to the provisional allowances included in PC4 and PC5 controls – reduction in average MARs for RC1 by AED 3.4 billion (combined effects of steps 3 and 4 in the chart). The impact of the PC4/PC5 ex-post capex efficiency adjustment amounting to AED 0.45 billion is relatively low when compared with this underspending;
- (b) Removal of inflation indexation from depreciation (step 10), and one-off adjustment to the RAV (which has no retrospective financial impact) – reduction in average MAR of approximately AED 2 billion;
- (c) Lower WACC for RC1 than PC5 (step 8) – reduction in average MAR of AED 1.4 billion;
- (d) Lower RC1 ex-ante capex allowances (step 7) than PC5 provisional capex allowances – reduction in average MAR of AED 1.2 billion;
- (e) Lower opex projections and longer new asset life assumptions for RC1 than PC5 (steps 6 and 9) – reduction in the RC1 average MAR by AED 0.8 billion and AED 0.069 billion, respectively.

Figure 3: Overall impact – From PC5 final proposals to RC1 draft proposals



Performance incentives (Section 8)

28. Current PC5 price controls for all the four network companies include a Performance Incentive Scheme (PIS) designed to encourage appropriate quality of service, outputs

and performance. Under this scheme, companies are rewarded for improved service and output performance, and are penalised for deteriorating performance on an annual basis against a set of 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).

29. In these draft proposals, we have proposed continuing with the same incentive arrangements for the RC1 period, but also with the introduction of reputational incentives (ie, without any financial reward or penalty). The main differences in relation to the incentives proposed under the PC5 final proposals are the following:
- (a) We have not proposed to discontinue any existing incentive. The effective period of the current DSM strategy and action plan incentive ends with PC5 (31 December 2017), and has been replaced by a new DSM incentive (using an outputs approach based on the consumption savings achieved).
 - (b) The key modifications to the existing incentives (under PC5) RC1 are:
 - (i) retain the incentives for the SBAs (including PCRs) and AIS submissions, but with penalty-only scheme (adjusted upwards by the TA ratio) for delayed and/or incomplete/non-compliant submissions;
 - (ii) rename the 'water distribution losses' incentive as 'water meter penetration' (all other elements remain unchanged);
 - (iii) introduce targets for SAIFI and SAIDI, consistent with the Government;
 - (iv) rename the current 'energy lost' incentive to 'unsupplied energy' and apply a bonus only for zero energy unsupplied, and apply a penalty for any unsupplied energy based on value of lost load (VOLL); and
 - (v) introduce new targets for the biosolids reuse incentive.
 - (c) We have proposed to introduce a number of new financial incentives:
 - (i) On availability, security and quality of supply: Non-revenue water and direct supply (for water distribution); System despatch costs (transmission); and recycled water quality compliance (wastewater);
 - (ii) On sustainability: DSM and HSE reporting;
 - (iii) On customer services: Customer complaints.
 - (d) We have also proposed to introduce reputational incentives and/or monitored KPIs in the following areas:
 - (i) Transmission system availability (which remains unchanged other than removing the financial bonus/penalty);
 - (ii) Financial performance ratios;
 - (iii) Business continuity management; and
 - (iv) System minutes loss (proposed by TRANSCO).
30. The table below provides a brief overview about the individual incentives that we have proposed for RC1, highlighting the main changes to the current list of incentives –

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including the new incentives which are being proposed. Individual performance incentives are discussed in detail in **Annexes C-G** (these annexes are being issued to the network companies with these draft proposals). If accepted, these incentives will be incorporated into the companies' licences at this price control review for implementation in RC1.

31. Compared to the second consultation paper, the number of new proposed incentives for all businesses has now been reduced. Each incentive will be subject to a cap equal to 0.50% of business' core MAR (ie, excluding pass-through costs). We are also developing incentives for demand forecasting to be included in the RC1 final proposals to implement our recent consultant (Poyry) final report recommendations on electricity demand forecasting.

Table 8: Incentives for RC1 – Summary of Bureau’s current thinking

S.No.	Individual incentive	Relevant businesses	Existing or new incentive	Main change from existing incentive
Annex C – Provision of high quality information				
C.1	SBAs / PCRs	All	Existing	Penalty-only scheme
C.2	AIS	All	Existing	Penalty-only scheme
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	None
D.3	Interface metering	Water	Existing	None
D.4	Water meter penetration	AADC and ADDC Water	Revised	Incentive renamed
D.5	Security of supply	TRANSCO Water	Existing	Target being reviewed/reconsidered
D.6	Non-revenue water	AADC and ADDC Water	New	New incentive
D.7	Direct supply / Removal 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
E.3	HSE reporting	All	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
G.4	Business continuity management	All	New	New incentive
G.5	System minutes loss	TRANSCO Electricity	New	New incentive

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
AIS	Annual Information Submission
BST	Bulk Supply Tariff
CAPM	Capital Asset Pricing Model
CPI	Consumer Price Index
DoF	Department of Finance
DSM	Demand Side Management
IM	Interface Metering
KPI	Key Performance Indicator
MAR	Maximum Allowed Revenue
MTI	MAR and Tariff Information
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
TA	Technical Assessor
TRANSCO	Abu Dhabi Transmission and Despatch Company
TSO	Transmission System Operator
WACC	Weighted Average Cost of Capital

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1. Introduction and background

- 1.1 The network companies in the electricity, water and wastewater sector in the Emirate of Abu Dhabi (namely, AADC, ADDC, TRANSCO and ADSSC) are natural monopolies. Therefore, it is appropriate for them to be subject to price controls set by the Bureau. Specifically, the Bureau has established multi-year CPI-X price controls, in order to both constrain market power and incentivise the performance of the network companies. Key events in the evolution of these price controls were as follows:
- (a) For **AADC**, **ADDC** and **TRANSCO**, we set:
 - (i) the first price controls (PC1) in 1999, to run for three years, and then extended these for a further year to cover the four-year period from 1999 to 2002;
 - (ii) the second price controls (PC2) 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).
- 1.2 Our previous consultation and proposal papers describe these price controls in detail, and are available at www.rsb.gov.ae.

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 onwards

- 1.3 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, and have so far published:
- (a) the initial letter on 23 November 2015 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 first consultation paper, in February 2016, setting out the Bureau's initial views on the main issues that should be considered in setting the RC1 controls; and
 - (c) 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.

- 1.4 Following publication of the RC1 second consultation paper, ADWEA and its companies formed a joint committee and made a joint-submission on 14 December 2016 (against the deadline of 17 November 2017). ADSSC submitted its response to the second consultation paper in time on 17 November 2017.
- 1.5 The Bureau met with ADSSC on 1 March 2017 and with ADWEA group on 22 March 2017 to discuss the main points of their responses to RC1 second consultation paper and our initial feedback on those points.
- 1.6 This document describes the Bureau's draft proposals for the RC1 controls for, having taken into account the licensees' responses to second consultation paper.
- 1.7 Given the joint submission, we refer to AADC, ADDC and TRANSCO combined as the ADWEA group companies and we used ADWEA group to cover AADC, ADDC, TRANSCO and ADWEA, where relevant in this document. However, we do refer to individual companies where they have made their own specific response. **Table 1.1** below sets out the timetable for this review – both the steps completed and the remaining milestones.

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
30 April 2016	Companies submitted 2015 audited Separate Business Accounts (SBAs)
7 April 2016	Companies responded to RC1 First Consultation Paper
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
April 2017	Bureau publishes RC1 Draft Proposals
30 April 2017	Companies to submit 2016 audited SBAs
June 2017	Bureau's RC1 opex and asset life consultant to publish final reports
10 June 2017	Companies to respond to RC1 Draft Proposals
October / 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

- 1.8 The RC1 first and second consultation paper 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. The Bureau regulates the conduct of sector companies through the conditions of licences issued by the Bureau to these companies. In regulating its licensees, the Bureau must have regard to its statutory duties and functions relating to:

- (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.

1.9 Further, the Bureau has an obligation to:

- (a) act consistently;
- (b) minimise the regulatory burden on licensees;
- (c) take account of the financial position of licensees; and
- (d) give reasons for our decisions.

1.10 This price control review is governed by the aforementioned duties, functions and obligations, as well as the statutory requirement that the network companies should accept our proposed licence modifications before they are applied. Additionally, licensees can challenge our decisions on licence modifications through an arbitration process.

Main feature of current price controls

1.11 The RC1 second consultation paper also described the main elements of the current price control. In summary, these elements are:

- (a) The price controls for the network companies have been in the form of CPI-X revenue caps, defining the MAR for each company or business, for each year of the price control period, according to the formula:

$$MAR = \text{Pass through costs} + a + (b \times \text{Revenue driver 1}) + (c \times \text{Revenue driver 2}) + Q - K$$

- (b) The MARs include a fixed term and one or two revenue drivers that link the MAR with the company's outputs in terms of:
 - (i) peak demand;
 - (ii) units transmitted, distributed or treated; and
 - (iii) customer numbers.
- (c) There are separate price controls for the water and electricity businesses of the companies. For AADC and ADDC, the price controls cover both distribution and supply businesses. For ADSSC, a single price control covers all three of its separate businesses (sewerage, wastewater treatment and disposal).
- (d) Those costs that are subject to competition or regulation in other parts of the supply chain (e.g. bulk supply and transmission charges) are treated on a pass-through basis.
- (e) The price controls have been set to allow the companies to recover the estimated efficient level of opex, regulatory depreciation and a return on RAV.
- (f) The price controls incentivise companies to reduce costs. This is because at least until the next price control review, the companies retain the benefit, in the form of

additional profits, from any efficiency-gains against the price control assumptions or efficiency targets.

- (g) The calculation of regulatory depreciation and returns requires the determination of allowed capex. The treatment of capex has been based on ex-post assessments. This has seen the companies initially receive only provisional capex allowances at the start of the control period, without a review or approval of capex projects. After the end of the price control, our efficiency reviews have determined the firm capex allowance. Notably, during the PC5 consultation process, we suggested moving towards an ex-ante approach for capex regulation in the next price controls.
- (h) The opex allowances for the PC5 period were estimated using a hybrid of top-down and bottom-up approaches. This was in contrast to the previous price controls where only a top-down approach was used. The opex projections have included various specific allowances for additional roles and responsibilities, as well as capability building in important areas.
- (i) Regulatory depreciation allowances have reflected an assumed asset-life of 30 years for all new investments by AADC, ADDC and TRANSCO and 50 years for ADSSC. At the same time, the Weighted Average Cost of Capital (WACC) has been based on overseas regulatory decisions, crosschecked against the analyst estimates from local and regional capital markets.
- (j) Some companies also undertake certain unlicensed activities with the Bureau's consent, which are not subject to price controls. However, there is a notable exception in the case of TRANSCO's unlicensed transmission activities in other Emirates. Specifically, allocating TRANSCO's assets between its licensed and unlicensed activities is sufficiently difficult – therefore, its price controls now include both activities.
- (k) The price controls also include incentives to encourage appropriate quality of service, outputs and performance. This sees the companies assessed on an annual basis and measured against pre-defined performance indicators and targets. In turn, the companies are either rewarded for improved service and output-performance, or penalised for deteriorating performance. An independent Technical Assessor (TA) verifies the accuracy of information required to assess companies' performance, in accordance with Bureau's relevant Regulatory Instructions and Guidance (RIG).

Related work streams

- 1.12 A number of related work streams are supporting this price control review, as shown in **Figure 1.2**

Figure 1.2: Work streams relating to RC1 review



- 1.13 A summary of these is provided below, with further in-depth coverage provided in the relevant sections of this paper.

PC4 ex-post capex review (2012-2013)

- 1.14 In June 2016, the Bureau completed a backward-looking, ex-post, efficiency review of the companies' capex during the last two years of the PC4 period (2012 and 2013) by delivering the final reports for individual companies. In this review, we assessed a sample of capex projects for each business, using a scoring method to determine the capex efficiency over the two years

PC5 ex-post capex review (2014-2015)

- 1.15 In July 2016, we began an ex-post capex efficiency review of the first two years of PC5 period (2014-2015). This review incorporated lessons-learned and improvements-made to our assessment methodology following the PC4 capex review. Having issued the draft reports to the companies in November 2016, we completed the review and issued the final reports to the sector in January 2017.

RC1 ex-ante capex review

- 1.16 Following a series of workshops and meetings with the network companies between February and July 2016 to develop the framework of the RC1 ex-ante capex review, the review concluded in February 2017, when we issued our final decision to the companies on the ex-ante capex allowances for RC1 period (2018 onwards).

RC1 opex assessment

- 1.17 We have engaged the support of Deloitte & Touche as the consultant to review and determine the reasonable and efficient opex for the RC1 period that we will allow in the new price controls. The consultants commenced work in June 2016 and issued its inception and interim in 2016 and draft reports in January 2017 for review and comments by the sector companies, with the final report due in June 2017.

RC1 asset-life assessment

- 1.18 Our opex consultant is also advising us on the potential extension of the asset-life assumptions used in calculating regulatory depreciation for both new and existing assets.
- 1.19 The consultant has already issued its inception and interim reports in 2016 and draft report in February 2017, which were shared with the sector companies for their comments. The consultant's final report is expected in June 2017.

Alignment of regulatory and funding arrangements for ADSSC

- 1.20 Since 2015, we have been engaging with the Abu Dhabi Department of Finance (DoF) in relation to ADSSC's funding arrangements. While ADSSC, DoF and the Bureau have agreed on the principles to align the regulatory and funding arrangements, ADSSC is yet to submit a proposal for the Government approval.

Activity Based Costing (ABC) system

- 1.21 During 2016, we worked with the network companies to establish the detailed requirements of an Activity Based Costing system (ABC). ADDC and TRANSCO shared their plans to seek an external consultant's assistance in developing and implementing the ABC system. Potentially, this could extend across all the ADWEA group companies.

Ring-fencing

- 1.22 In July 2016, the Bureau published its consultation paper on regulatory ring-fencing requirements in network companies' licences, in order to improve transparency, efficiency and accountability. Currently, we are considering stakeholders' responses to the consultation paper. We also note that the outcome of this work stream could affect the regulatory regime for 2018 onwards.

Return of and return on Government funding

- 1.23 During 2016, we received Government direction to develop proposals with DoF and ADWEA for a mechanism to make sure the Government receives repayment of and/or return on its investments in the electricity and water network. Accordingly, the Bureau has developed various proposals in consultation with the stakeholders and submitted final proposals in February 2017 for Government review and approval.

2. Strategic objectives and issues

Introduction

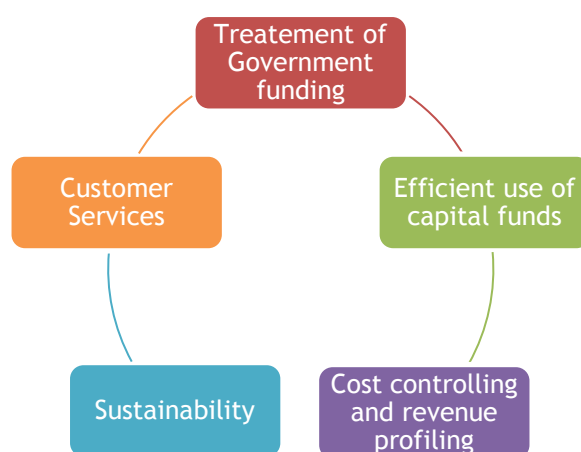
- 2.1 The RC1 first and second consultation papers set out our initial thinking on the key challenges and objectives for this price control review. We highlighted a number of strategic issues in relation to the funding and regulatory arrangements for the four network companies and the way they have been implemented in the past. Namely, these were areas relating to treatment of Government funding, subsidy, capital efficiency, increases and profiling of costs and tariffs, customer services, and sustainability.
- 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 draft proposals on such matters. Detailed design and implementation issues in relation to certain aspects of price controls resulting from the discussion in this section are discussed in subsequent sections of this document.

Strategic challenges and objectives for this review

Second consultation paper

- 2.3 The previous consultation papers identified five strategic challenges and objectives for this price control review. They then discussed some of the ways to address these challenges, particularly in terms of setting strategic objectives and modifying the regulatory regime.
- 2.4 Given the general agreement and support of the stakeholders, we maintained focus on the five strategic areas in the second consultation paper, listed in **Figure 2.1**.

Figure 2.1: Five strategic challenges and issues for this review



- 2.5 The second consultation paper also highlighted our willingness to work with licensees to ensure the proper business separation of distribution and supply. In line with this, we invited ADDC, which raised the issue, and AADC to include a robust plan and timetable to achieve that objective and identify any likely benefits and costs.

Responses

- 2.6 In response to the RC1 second consultation paper, ADWEA and the four network licensees generally maintained their view shared in response to the first consultation paper. Namely, they agreed with the strategic challenges and objectives discussed in the paper, while pointing out specific issues and opportunities for the price control review:
- (a) ADWEA group (ADWEA, AADC, ADDC and TRANSCO) recognised that the price control review identifies a number of critical issues for the sector. They suggested a form of regulation based on working collaboratively and seeking to achieve efficiencies through co-operation and promotion of best practices. This vision included the Bureau's recognition of the sector's constraints and the sharing of resources across the sector to deliver the Government requirements. ADWEA group suggested that the Bureau should regulate only and ADWEA group would manage both the sector and the areas of improvement, which could be achieved by setting agreed and achievable key performance indicators (KPIs) and targets. ADWEA further indicated that it has formed a regulatory advisory committee (RAC) to achieve this vision.
 - (b) ADWEA group also considered that the current regulatory arrangements are complex, and may not be well understood by other stakeholders. It argued that future uncertainties, as well as the number of initiatives which the sector is being requested to progress by the Government (e.g. municipalities taxes and recycled water), need a regulatory system that responds flexibly to the requirements by enabling annual adjustments (which also align with the Government funding).
 - (c) ADSSC reiterated its agreement that the five areas highlighted in the RC1 consultation papers reflect the strategic challenges and objectives faced by the sector. ADSSC highlighted in particular that the alignment of the regulatory and funding regimes is critical to the company.

Assessment

- 2.7 Based on the generic positive response – while recognising the challenges and opportunities identified – we will maintain the five strategic areas to focus on in this price control review. A more detailed discussion of matters relating to each of these areas is included in the remainder of this section, and further detailed as required in other sections of this document.
- 2.8 Our views on the specific issues and opportunities identified in the responses to the second consultation paper are as follows:
- (a) We share the principles of ADWEA group's vision, namely on the benefits of cooperating to achieve the sector future challenges and the Government objectives for the sector. We note that this requires efforts from all stakeholders and that all of them work diligently within their own responsibilities to deliver what is required from them – an area where we believe there is still scope for improvement in the sector. We will undertake work only where the sector is not able to deliver independently, and we welcome ADWEA's recently formed RAC. We hope that ADWEA group's vision for the sector will be successfully

implemented, and the sector will work cooperatively within the established economic regulatory framework to improve and deliver the sector KPIs and their respective targets.

- (b) On this note, we also support ADWEA group's view about achieving improvements through the regulation and management of clear KPIs and targets, based on the promotion of best practice. We seek to support this, from a regulatory perspective, by identifying priority areas and working with the sector to design appropriate incentives and align them, where possible, with the objectives and improvements sought by the Government and desired by customers. In particular, we have reviewed some of the incentives following the receipt of the responses to the second consultation paper. Now, we seek the sector's collaboration and constructive engagement to further refine the draft incentives proposed in this paper, if and where necessary that aim to drive the improvements required in the sector.
- (c) We disagree with the view that the regulatory model is complex. More importantly, we disagree with the focus of some respondents on the complexity of the model. In our view, this is incorrect and detracts from what should be the focus of the discussion. While ADEWA group did not identify the complex areas of regulation and how they can be simplified without compromising their objectives and effectiveness, the focus should be making sure that the regulatory economic framework is the most suitable for meeting the needs of the sector and its customers, as well as the Government's objectives. In relation to these aspects:
 - (i) We note that the core elements of the regulatory framework have been in place for over 17 years, based on which we cannot agree that it is not understood by the key stakeholders in the sector. In fact, we would be concerned if the sector companies have not understood the regulatory framework, which according to them have been in place for long time without any change.
 - (ii) We fully support the drive to share and promote best practice in the sector. The existing regulatory framework follows – not by copying every element, but adapting the model to the sector's environment and reality – best practice, in relation to the implementation of price controls in mature regulatory environments such as the UK and Australia.
 - (iii) It is factually incorrect that the model has not changed over the years – as it has been suggested by some respondents. Importantly, each of the six price control reviews (the present included) discussed, proposed and implemented changes to the price control design and overall economic regulatory model. Moreover, we emphasise ADWEA group's support to our view on the need for both flexibility and ways to appropriately manage uncertainty.
 - (iv) Over the years, the price control model has been adapted to reflect the changing realities of the sector, and currently includes a number of

flexible arrangements such as annual opex adjustments, Emiratization allowances, or specific cost pass-through items. The current review is also looking at introducing a forward-looking ex-ante review of capital expenditure, and complementing it with an ex-post review followed by more frequent two-year adjustments to the sector's revenue requirements. We expect that these mechanisms, while going in the direction that the sector requested in its responses, will appropriately balance the risks undertaken by the companies with those for end-customers, without compromising the drive for efficiency, which is a core element of the regulatory framework.

- (v) Notwithstanding, we are open and welcome the sector's suggestions and its work to improve the regulatory framework where possible. It is fundamental that stakeholders work to deliver and/or improve the targets and KPIs established within the established regulatory framework.
- (vi) On the specific aspect of the initiatives that the Government has requested the sector to progress, we note that the municipality tax is an unregulated/consented activity (and thus not subject to the price control review). In addition, recycled water will be subject to the price control review under RC1 or otherwise, and we look forward to receiving the necessary information from the sector to enable such a review.
- (d) Regarding ADSSC's suggestion on aligning regulatory and funding arrangements, as discussed in the second consultation paper, we acknowledge the recent agreement in principle between DoF, the Bureau and ADSSC for netting-off Government funding repayments from the MAR. However, ADSSC has not submitted a final draft of its proposal for the Bureau and DoF's review before submission to the Government. We expect that ADSSC will work diligently with the government to formally implement this agreement, and will reflect in the RC1 proposals accordingly.

Draft proposals

2.9 We maintain our proposal to focus the RC1 review 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

Second consultation paper

- 2.10 The previous consultation paper highlighted the challenges arising from the 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.
- 2.11 We identified specific issues in relation to the design and implementation of the regulatory regime and funding arrangements for the sector, namely:
- (a) the regulatory and funding model was not being implemented as originally envisaged, thereby reducing the effectiveness of regulation and the pressure for companies to perform efficiently;
 - (b) Government funds provided to network companies for capital projects without the sector paying any interest or repaying any part of the principal amount;
 - (c) lack of transparency for the Bureau on the fund flows between the DoF, ADWEA and the network companies, thus preventing any compliance assessment;
 - (d) lack of clear terms and conditions for the repayment of Government loans by the sector companies, building liabilities and risks;
 - (e) the Government directly paying IWPP and fuel costs, thereby reducing the effectiveness of the price controls, efficiency incentives and efficient subsidy; and
 - (f) no reconciliation between estimated and actual subsidies.
- 2.12 Accordingly, the second consultation paper set out our likely proposals as follows:
- (a) either netting-off the repayment of Government funds from the MAR, or any other arrangement agreed with DoF and ADWEA, to ensure repayment of Government funds and/or return on such funds to the Government;
 - (b) the rate of return should reflect the actual cost of funding and Government ownership, subject to the outcome of our engagement with DoF on the appropriate rate of return for the sector; and
 - (c) explicitly define the depreciation allowance in price controls to repay only the principal of any debt, and consequently exclude inflation indexation from depreciation.

Responses

- 2.13 Having stated that this is a matter for ADWEA, the Bureau and Government to discuss and decide on, the ADWEA group neither supported netting-off the repayment of Government funds from the MAR, nor supported removing inflation indexation from the depreciation and RAV. ADSSC also expressed concerns about the impact of removal of inflation indexation from the depreciation. Stakeholders' comments on the three areas discussed in the second consultation paper are summarised as follows:

Repayment of Government funding

- 2.14 ADWEA considered that the treatment of Government funding was addressed in a recent meeting between the Bureau, DoF and ADWEA. According to ADWEA, netting-off the repayment of government funds from MAR is no longer necessary, because the aforementioned entities in principle agreed that:
- (a) the net balance of past government funding will be treated as equity;
 - (b) all the annual funds retained by ADWEA will be used to fund capital projects for the sector; and
 - (c) there will be an annual reconciliation between the funds actually used by ADWEA for capital projects and the return-on-investment due from ADWEA to DoF.
- 2.15 ADWEA group companies had a similar response. They indicated that repayment of Government funds, rate of return and depreciation are matters for ADWEA to discuss with the Bureau and Government. Accordingly, they suggested that any future regulatory model is aligned with the Government's strategic direction. Furthermore, they did not support netting-off the repayment of Government debt from the MAR, because they considered the current funding arrangement to be successfully workable.
- 2.16 ADSSC indicated that its capital finances are treated as loans, though there is no formal agreement with the Government on the mode of repayment. It further welcomed the clarification of the Bureau's proposal on the treatment of Government funds in the RC1 draft proposals.

Removal of inflation indexation from depreciation

- 2.17 ADWEA also disagreed with the statement that the purpose of the regulatory depreciation allowance is to repay the principal of any debt. Therefore, it should not be used to justify removing inflation indexation from the depreciation allowance. ADWEA defended the current arrangement stating that it removes the need for the Bureau to increase future funding to accommodate the impact of inflation on the capital replacement programmes.
- 2.18 While indicating that a separate treasury function is a decision for ADWEA that will require significant investigation, ADWEA recognised the value of a decentralised treasury function, and stated that it would advise us about its analysis. In addition, ADWEA considered that the weighted average cost of capital (WACC) must be sufficient to both ensure the long-term viability of the sector and reflect the needs and expectations of ADWEA as the Government representative for the sector.
- 2.19 Further, ADWEA group companies did not support removing inflation indexation from the depreciation, because it creates intergenerational issues and risks the long-term sustainability of the sector.
- 2.20 ADSSC also highlighted that removing inflation from depreciation could impact adversely on capital replacement investment.

Allowed rate of return

- 2.21 In relation to the WACC, ADWEA group companies agreed that the cost of equity should reflect the Government's aspirations, while a cost of debt reflecting the long-term debt premium should also be consistent with those expectations.
- 2.22 ADWEA group companies also indicated their agreement to introducing financial ratios, stating that this addresses the Bureau's concerns and renders more stringent ring-fencing measures unnecessary. In any case, they claimed these measures are inappropriate given the current ownership structure in the sector.

Assessment

Repayment of Government funding

- 2.23 We note the sector's lack of support for the proposal to nett-off Government funding repayments from the MAR. As observed in the second consultation paper, netting-off arrangements have been in place for a long time in the sector, albeit currently being applied outside the regulatory framework and with no transparency for the Bureau.
- 2.24 As stated in the second consultation paper, the existing arrangements do not appear to be sufficiently robust. This is because the absence of or limited repayment of Government funds provided previously has led to the network companies accumulating significant liabilities and the Government keep funding capital, with customer tariff/subsidy used to fund such capital as well.
- 2.25 Notwithstanding, we have worked with ADWEA and the DoF and developed/agreed during 2016-2017 a proposal in principle to treat all Government funding as equity, and to allow ADWEA to use all funds generated within the sector for funding future capital projects or paying return to the Government. However, if for some reason this agreement is not formalised and progressed/implemented, the Bureau reserves the right to make appropriate adjustments to the network companies' MAR in accordance with our netting-off proposals. This will make sure that the Government receives its return on the investment made in the sector.
- 2.26 In relation to the separate treasury function, we note ADWEA's support and look forward to receiving its additional analysis. As indicated in the second consultation paper, under the subsidy payment reforms consulted upon by us in 2014, each of ADWEA group companies is expected to establish a separate treasury function. As discussed then, the treasury function is being considered as part of the review of the ring-fencing work stream. 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.

Removal of inflation indexation from depreciation

- 2.27 We note the views of ADWEA group and ADSSC on the proposal for removing inflation indexation from depreciation, particularly in relation to the potential impact on capital replacement funding. However, as explained in the second consultation paper:

- (a) In the price control calculations, we do not assume that the depreciation of capex in one year is used to fund any replacement assets in future. If we had done this, we would not have fully funded the efficient capex for each year through a separate allowance, and we would have reduced the required revenue or MAR. Importantly, the price control calculations envisaged using the depreciation allowance to repay the capital funding, and not to fund the replacement assets.
- (b) This is the normal arrangement under any regular bank loan. It is also used in the sector with the IWPP and ISTP model, where the capital recovery charge under the PWPAs is not indexed against inflation – for the same reason we identified for removing inflation indexation from the RAV or depreciation. This is also the arrangement used, in terms of the depreciation definition, in previous price controls. As an example, the network companies' disclosures on capex funding in the 2014 and 2015 SBAs clearly show that no capex, including replacement assets, has been funded by depreciation.
- (c) If not all, a significant part of the assets replaced in the past has been based on provision of funds external to the network companies. We acknowledge that under our proposal – to explicitly define depreciation as serving the purpose of repaying the principal of any debt and consequently exclude inflation indexation from depreciation – this arrangement would apply for all future asset replacements.
- (d) In other words, this proposed arrangement enables the network companies to receive the corresponding allowances for depreciation and return on capital from the moment that any new capital replacement is undertaken (subject to the capital efficiency review process) – but not before. This ensures that the network companies are properly financed in the short, medium and long-term, and have the necessary funds to meet their responsibilities. It also ensures an appropriate intergenerational balance, as existing consumers will avoid paying today for asset replacements that will be used by and benefit future consumers.

Allowed rate of return

2.28 We welcome the comments about the rate of return to be used for calculating return on capital allowance for RC1. Our views are as follows:

- (a) We consider that customers should only pay for an efficient or optimal capital structure. For the previous price control reviews, we estimated the return on capital based on benchmarking the gearing and WACC observed in the international, regional and local capital markets as well as those used by overseas and local/regional utility regulators. For this review, we had proposed that the return on capital reflects the Government ownership of the companies including the interest-free loans if any. However, as indicated below, we have consulted and agreed with DoF to continue our marked-based gearing and return approach.
- (b) As per the Government directive, we have engaged with DoF on the return on Government funding. Further to this, DoF has clarified that the expected returns from the sector should continue to reflect the market conditions. Therefore, we

will continue to use the same approach as used for previous price controls. This will see us 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.

- 2.29 The financial issues surrounding the determination of the WACC, depreciation and the updated RAV are dealt with in more detail in Section 6. However, at the outset, we clarify that we are not proposing any retrospective adjustments to MAR. Rather, the removal of inflation from depreciation and RAV since 1999 will only adjust the RAV and MAR for future periods. Finally, we welcome the support for introducing monitoring of financial ratios, which we discuss in more detail in Section 8.

Draft proposals

- 2.30 Our draft proposals, in light of the above discussion, are:

- (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.

Efficient use of capital funds

Second consultation paper

- 2.31 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. In turn, this has led to continuous investment requirements for the sector, increasing outputs and rising sector costs.
- 2.32 We highlighted that the challenges with the backward-looking, ex-post approach to capex regulation over previous reviews. Accordingly, we considered options to enhance the approach to capex reviews and the efficient use of capital funds, and given the wider support from the sector, maintained the initial proposals to:
- (a) move from the existing ex-post capex reviews to use forward-looking, ex-ante capex reviews to set out firm capex allowances for the price controls. At the same

time, there would be limited ex-post capex in the future reviews – which would likely result in regular capex adjustments to the MAR during the control period;

- (b) promote and implement better alignment between different stakeholders in the capital approval and budgeting processes in the sector; and
- (c) strengthen the processes and methods to record and report the network companies' costs and outputs – including ABC implementation by the companies.

Responses

2.33 Overall, the network companies and ADWEA agreed that Government funds should be used efficiently, and that capital efficiency can be improved in the sector. In addition, the companies provided qualified support for the ex-ante capex reviews proposal:

- (a) ADWEA agreed that, in future, the Bureau may have a role in approving the value of capital projects. It noted that, currently there is a Government approval process, so any change would need to add value, without increasing bureaucracy or complexity.
- (b) ADWEA group supported ex-ante capital efficiency for the front-end strategic planning activities, and partially supported ex-ante capital efficiency for other tasks within the asset-creation business process. They considered that whole life-cycle costs should be efficient, using the best mix of capital and maintenance costs. ADWEA group companies considered that the regulatory model is overly complex, and suggested working together cooperatively to improve capital efficiency, including the assessment process.
- (c) ADWEA group also stated that if RSB wants to fully embrace ex-ante, then further details are required. It requested the Bureau to only proceed with the agreement of the sector, suggesting that the transition from ex-post to ex-ante is not being applied appropriately and lacks clarity. ADWEA group considered that any process adopted should adequately cater for variations in plans, executions and expenditure due to market fluctuations or changes in Government requirements. ADWEA group companies also supported the ABC concept, although they requested the Bureau to conduct a regulatory impact assessment to justify the business case for ABC system.
- (d) ADSSC noted its commitment to introduce an initial ABC, highlighting potential difficulties in obtaining funding. It also stated that the level of detail and granularity of costs and reports needs balancing with the expected benefits that these can bring. ADSSC also identified the need for DoF/Government involvement, in order to make the ex-ante capital review process efficient.

Assessment

2.34 The Bureau welcomes the support for the proposal to implement forward-looking, ex-ante capex reviews, with limited ex-post capex in the future arrangements. We welcome and support equally the companies' willingness to work together and collaboratively in the ex-ante capex process. We have responded earlier in this section to the questions about the

complexity of the regulatory model. Our views on responses in relation to the efficient use of capital funds are as follows:

- (a) The Bureau has conducted two separate work streams on transition from (i) the existing regime, exclusively based on ex-post assessment of the capital expenditure, to (ii) a mix of firm capex allowances set out ex-ante in the RC1 period, complemented with limited ex-post capex assessment every two years. The separate work stream for the first ex-ante review was initiated in 2016 to determine firm capex allowances for the RC1 period (2018 onwards) by assessing front-end elements of capex projects such as project justification, optioneering, design and budgeting. We note that the details of this review, including the scope, have been consulted, discussed and progressed together with the sector during 2016-2017, namely through workshops, meetings, as well as individual assessment meetings and the RC1 consultation papers. The RC1 ex-ante capex review has now been concluded and the Bureau issued its decision on ex-ante capex allowances for RC1 in February 2017. Sections 5 and 6 explain how the outcome of this ex-ante work stream has been used in setting the RC1 controls and provide detail on further ex-ante capex reviews during the RC1 period.
- (b) Nonetheless, in the long run, we consider that the ex-ante capex review ideally should cover all elements of the capital expenditure process, including the whole life-cycle costs of assets. Therefore, we recognise that the current ex-ante assessment process is at its initial stage of development, and will gradually evolve to become a full ex-ante review process in future regulatory reviews with limited or no ex-post capex assessment. However, this is not envisaged to happen in RC1, given the current status of the sector, maturity of capex processes within the companies and their responses to the RC1 ex-ante capex review.
- (c) The additional details and methodological questions about the future ex-ante approach to capex assessment will be developed through the existing separate work stream, and we welcome and support the need to work collaboratively in developing these details. In the meantime, we note that using ex-ante capex reviews only for front-end elements, complemented with limited ex-post capex reviews every two years, will provide the required flexibility for the sector to manage its investments during the transition into full ex-ante capex reviews. Further, we have also proposed an interim ex-ante capex review in 2019 to review and if necessary reset the ex-ante capex allowances for the last two years of the RC1 period (i.e. 2020-2021). These endeavours aim at addressing the sector concerns regarding catering for variation in capex plans, execution and expenditure due to market fluctuations, changes in Government requirements and even customer demands, and better ways to deliver and manage the system.
- (d) In relation to the ABC system, while the companies have highlighted some concerns, we welcome both their acknowledgment of the importance of ABC and their commitment to fully support for this initiative. The sector companies have met and exchanged correspondence with the Bureau where they widely recognised the benefits of the ABC system. In addition, we understand that the

companies are now in the process of hiring a consultant to assist with developing and implementing ABC system. Section 4 deals with further details and specific issues about the implementation of ABC system.

Draft proposals

2.35 The Bureau welcomes the general support received and would like to maintain its proposals:

- (a) to 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) to promote and support better alignment between different stakeholders in the capital approval and budgeting process in the sector; and
- (c) to strengthen the processes and methods to record and report the network companies' costs and outputs – including through implementation of the ABC system by the network companies.

Controlling and smoothing costs and revenues

Second consultation paper

2.36 In the first and second consultation papers, we observed that increasing costs and increasing MAR have put more focus on the sector's need and ability to achieve cost savings and efficiency. This trend continued over the previous years – for example, motivated by the delivery of planned mega developments, introduction of nuclear power plants, inefficiencies, or delays in full adjustment of allowed capex. This has led to a step increase in MAR at each price control review, followed by a relatively flat MAR over the price control period. This in turn leads to challenges such as subsidy payment requirements and the 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).

2.37 We highlighted work streams which could effectively smooth costs and revenues, such as more frequent capex reviews and adjustments, improved approach for opex projections and specific allowances, or robust processes to record, monitor and report costs and outputs. The Bureau considered the following more direct options for controlling costs and profiling the MAR, smoothing increases in the companies' revenue streams over future years:

- (a) use profiling factors to smooth the revenue allowances at the price control review through and across price controls periods to avoid step increases or decrease in MAR from one control period to another; and

- (b) consider longer asset life assumptions for the price controls (for which the Bureau has engaged a consultant to review it along with opex projections for RC1).

Responses

2.38 The network companies and ADWEA generally supported the proposals to profile the MAR over the price control period and for the review of asset lives, but offered additional comments:

- (a) ADWEA group supported MAR profiling as long as the companies are not financially disadvantaged. ADWEA group also supported the review of asset lives provided that:
- (i) it is based on sound technical assessment and judgement;
 - (ii) it is based in the review of physical assets specific to the electricity and water businesses; and
 - (iii) it quantifies the revenue requirements impacts of any results.
- (b) ADWEA group companies showed preference for conducting logged-up or logged-down adjustments to the MAR on a more regular, annual basis, with the verification provided by an external financial auditor. It recognised the difficulty of accurately forecasting future demand, while at the same time there is a parallel requirement to provide the infrastructure necessary to support Government plans. The consequent variations in capex should therefore, according to the companies, more efficiently be reflected in a frequent adjustment process to the revenue requirements.
- (c) ADWEA group companies highlighted that customers have expressed concerns about rising tariffs, and requested the Bureau to be transparent about the future customer tariffs, to limit price shocks in the tariff setting process, and to provide transparency about when the full cost-reflective tariff will be implemented. The companies supported cost-reflective tariffs and also requested the Bureau to consider, when setting RC1, the customer expectations and Government plans for subsidy and Emiratisation. ADWEA group companies noted that the Government recently confirmed that mega developments will be gifted to the sector at zero cost, and raised questions about the impact of this measure on RC1.
- (d) ADSSC suggested that historic costs and outputs trends should be used, where appropriate, to inform future projections and used for comparison with suitable like for like benchmarks. It acknowledged the review of asset lives, although it highlighted that due consideration needs to be given to environmental factors, raised significant concerns about the lack of technical/engineering input into the study, and stated that existing asset lives are appropriate.

Assessment

2.39 We welcome the general support from the network companies and ADWEA for our proposals to review asset lives for price control purposes and profile the MAR appropriately. We address the specific issues raised in the responses in more detail as follows:

- (a) Noting the qualified support on the review of asset lives, we look forward to discussing the results of our consultant's work, and for the companies' further engagement in this work. Our consultants have already visited specific sites/assets for each business of all the network companies, and the consultant's draft report issued in February 2017 now includes significant technical inputs as envisaged in the scope of work and requested by the companies to support the consultant's recommendations for use of longer asset lives for new investments (see details in section 5).
- (b) Further to the support for profiling the MAR, we will ensure that the MAR will have the same net present value before and after being profiled, so there is no financial advantage or disadvantage to any party. Section 7 includes additional details on our proposals and the profiled MAR results.
- (c) In relation to the need for frequent adjustments, the current price controls already have a mechanism to provide flexibility and deal with uncertainty through the annual opex adjustments, where costs for specific identified factors are allowed to be passed on to the customers. All other costs are not allowed on a pass-through basis. It is the responsibility of each network company to appropriately manage both its businesses and risks from operational uncertainties, given they are remunerated through the market-based cost of capital for such risks. We also note that the ex-post and ex-ante capital assessment arrangements aim to increase flexibility including with more frequent, two-year ex-post reviews and interim ex-ante review, with related adjustments to the MAR if necessary.
- (d) We agree that the price control review should reflect the operating environment of the sector to the extent outside the companies' control. The previous paragraph provides examples of how the existing arrangements and the RC1 review propose to achieve this – for example, with annual opex adjustments and regular capex assessments and related adjustments. We are open to discuss ways to improve these arrangements and welcome suggestions from the sector.
- (e) We note that until customer tariffs become fully cost-reflective, the Government, not the Bureau, is responsible for setting out the tariff levels. The Bureau provides support, analysis and advice to the Government on such customer tariffs, but ultimately the tariff policy and determination is Government's decision. Accordingly, we have no mandate and cannot provide any transparency about this matter.
- (f) The Bureau is not aware of the Government's decision for the adoption of mega developments at zero cost to the sector. Should this be formalised and/or confirmed, we agree that no additional revenue requirements will be necessary

except for covering the operational expenditure related with the operation and maintenance of the assets.

Draft proposals

- 2.40 We propose smoothing the network companies' revenue streams at this price control review by using:
- (a) X-factors; and
 - (b) extended asset life assumptions for new investments, for price control purposes.

Sustainability

Second consultation paper

- 2.41 Greater transparency is required from the sector on costs and level of efficiency. This is motivated by the rapid development of the Emirate, the increasing demand, investment and overall sector costs, and reform of cost-reflective tariffs. In the first and second consultation papers, we highlighted five areas where additional work could lead to a more sustainable sector:
- (a) address ADWEA recharge to make them more transparent and efficient;
 - (b) incentivise desired licensee behaviour and specific outcomes;
 - (c) enhance the framework for developing and implementing demand side management (DSM);
 - (d) ensure the funding, quality and efficiency of tankering services; and
 - (e) ensure the companies have the financial strength to repay Government loans, withstand financial risks and seek commercial funding in future.

Responses

- 2.42 The network companies generally endorsed the focus on working towards a more transparent and sustainable electricity, water and wastewater sector in the Emirate:
- (a) ADWEA argued that duplicating studies in the sector, for example on smart grids, increases expenditure and confusion, and suggested that it would be preferable that these programs are coordinated by ADWEA and implemented by licensees with the Bureau's support.
 - (b) ADWEA group companies supported transparency across all participants in the sector. This includes fair value analysis of costs incurred from ADWEA, as well as cost justification from RSB in relation to any regulatory initiative.
 - (c) ADWEA group companies also considered that the current sustainability concept is too narrow. Accordingly, they suggested that RSB commits to a work stream in order to fully understand the impacts and challenges of Emiratisation – including training and development – and how to capture and report all the related costs.

They suggested that this work stream may be delivered by the ADWEA group companies, with the Bureau participation.

- (d) ADWEA group companies considered that the current transmission use of system (TUoS) and distribution use of system (DUoS) statements makes it difficult to segregate the costs of supplying different customers. They noted that retail tariffs do not align with these costs, and they are unclear and would like additional transparency about the Bureau's approach in setting the red and green tariff bands.
- (e) ADWEA group companies indicated they have recently accelerated the implementation of DSM, and have appointed, or are in the process of appointing, external advisers. They considered that better progress can be achieved by working collaboratively with RSB and share resources and capabilities, and noted that cost-reflective tariffs would positively contribute to DSM.
- (f) ADWEA group companies also suggested dealing separately with tankering water services, to take account of environmental sustainability. They also stated that financial sustainability is a matter to be discussed with ADWEA.
- (g) ADSSC supported greater transparency and sustainability, and suggested that more emphasis should be placed on sustainability factors.

Assessment

2.43 We welcome these responses that show that respondents embraced sustainability as an important element of their businesses, and in some cases believed that the scope of sustainability should be enlarged. In relation to specific areas of sustainability:

- (a) We continue to express our willingness to work with ADWEA and companies to achieve a more consistent approach to studies and implementation programmes, and remove duplication of efforts wherever possible. In this regard, we look forward to sector initiatives and transparency. In some instances, we may have taken the initiative on specific work streams where the sector did not deliver, or there was no transparency provided for us about ADWEA group companies' work. Nevertheless, we are willing to support any initiative which we assess will increase value in the sector.
- (b) We fully support transparency and specific work streams to address areas where transparency in the regulatory process appears insufficient. In relation to our transparency, we note that we publish our annual report on our website. We also regularly benchmark our costs with other entities and submit these reports to the Government. In relation to the network companies, we reiterate that the companies are required by their licences and Regulatory Accounting Guidelines (RAGs) to ensure fair valuation of services provided by ADWEA or its affiliates. Furthermore, we will enforce this requirement strictly for the 2016 Separate Business Accounts (SBAs). We have recent developments and progress from the companies to meet this requirement, which we appreciate.
- (c) We are willing to work with the sector to assess and develop the scope of sustainability. As mentioned in the second consultation paper, we are willing to

consider the companies' suggestion to develop further performance-based regulation and their suggestion for the design and later implementation of an improvement program (which can be extended to cover training and development of Emiratis in addition to other areas such as asset management, carbon accounting, smart grids or risk). In this respect, we note that:

- (i) we maintain our view that performance-based regulation generally, and performance incentives in particular, are appropriate tools for driving network companies' delivery of quality outcomes. We are using the responses to the second consultation for developing the scope and design of performance incentives included in our proposals, which we expect will strengthen this area during the RC1 period. Section 8 provides further details about our proposals for RC1 performance incentives.
 - (ii) PC5 provides allowances specifically on Emiratisation, covering both acquisition and training of Emiratis. The work from our RC1 opex consultants provides an additional opportunity to analyse and report the impacts of Emiratisation. We are open and look forward to working with the companies on these matters, which should not replace the companies' responsibilities to manage adequately these challenges.
 - (iii) in the second consultation paper, we asked for details on plans to develop and design the suggested improvement programmes. We expect that the companies or RAC suggested by ADWEA will facilitate developing these initiatives for and during the RC1 period.
- (d) We are unclear how the DUoS and TUoS may prevent the accurate allocation of costs. We are open to discuss with the network companies how the methodologies and processes can be improved, and expect that the companies would have all the detailed costs to enable accurately allocating and estimating the costs to serve any group of customers. We encourage the distribution companies to develop and propose an appropriate MTI statement, which should provide another opportunity to address these matters. Regarding the approach to setting the green and red tariff bands, we provide support, analysis and advice to the Government, but ultimately the tariff policy and determination is Government's decision as long as customer tariffs remain below the full cost-reflective levels. Accordingly, we have no mandate and cannot provide any transparency about this matter. However, we are willing to provide any explanation on setting the cost-reflective tariffs which are directly based on information provided by the sector companies, including the Bulk Supply Tariff (BST), TUoS and MTI submissions.
- (e) We are working with the distribution companies to facilitate implementation of their DSM strategies and action plans, and we welcome the approach for working collaboratively. We have not seen this approach implemented over the last two years either by the two distribution companies or by ADWEA – they have not completed specific actions, have not shared information, have been slow or created obstacles to progress DSM. While we agree that working collaboratively can lead to better results, we urge the two companies to implement it without further delay and definitively progress the implementation of DSM.

- (f) Based on this, the Bureau has expressed concerns about the commitment of the ADWEA group to deliver DSM to date. We adopted an output-based approach to monitor and assess AADC and ADDC's performance, and have proposed changes to their licences to ensure an appropriate and transparent regulatory framework for the implementation up to the end of 2017 – although this is yet to be accepted by the companies. We also propose to use performance incentives, using a similar outputs-based approach, in developing the regulatory framework for DSM from 2018 onwards (Section 8 discusses further DSM incentives).
- (g) We continue our engagement with the sector to develop regulatory and logistics arrangements for providing potable water services and providing wastewater services through tankers. Sections 3 and 4 contain further details on the price control proposals for the provision of tankering services, specifically in terms of funding arrangements and reporting requirements.

Draft proposals

- 2.44 To enhance transparency and sustainability of the sector, the Bureau maintains the view about 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.

Customer services

Second consultation paper

- 2.45 The first and second consultation papers identified the measurement, quality and standard of customer services provided by network companies is an area that needs strengthening, to ensure that licensees have robust processes to deal with customer expectations and apply best international practices. The protection of water, wastewater and electricity users is one of the key duties of the Bureau, which emphasised that:
- (a) the pressure from the fast development of the country and the rapid demand growth must not have unintended consequence on the provision of customer service quality and standards; and
 - (b) that the sector should be able to respond to end-users' potential higher expectations arising from the recent customer tariff reforms.
- 2.46 As customer services is expected to be an area of high significance and impact over the next price control period, we proposed developing the economic regulatory framework to:
- (a) monitor and ensure that the current licence requirements are adhered to by the network companies;
 - (b) strengthen the framework for developing and implementing international best practices in customer services; and
 - (c) incentivise desired licensee behaviour and specific outcomes.

Responses

- 2.47 Overall, ADWEA group and ADSSC supported the focus to improve and strengthen customer services:
- (a) ADWEA group companies welcomed the Bureau's collaborative work and feedback in the customer services working groups. They indicated that managing an infrastructure business is different from a customer-focussed business, and suggested that a separate supply business structure would enable them to better manage and implement the required changes. ADWEA group companies noted that other regulators require the separation of the retail business, and showed concerns that the requirement to have and report on separate business accounts is not matched by separate revenue streams in the price controls. The companies would like a more committed and agreed view from the RSB before undertaking further plans on separation of the distribution and supply businesses.
 - (b) ADWEA group companies supported introducing incentives with targets and KPIs for customer services, and requested the Bureau to be more proactive in setting up the regulatory framework for activities such as recycled water and municipality billing; and
 - (c) ADSSC stated it has taken proactive steps to align with existing practices for water and electricity.

Assessment

- 2.48 We note and welcome the sector's efforts to become more customer-focussed organisations, including the support for introducing targets and KPIs for monitoring this area. Further to the recent work with the network companies – which assessed compliance with existing licence requirements and checked the companies' current practices on customer services – we have developed specific KPIs on customer services and proposed specific incentives within this report – see Section 8 for the details of these proposals.
- 2.49 In relation to the separation of the supply and distribution business, as mentioned in the second consultation paper, we welcome firmer plans and proposals from the distribution companies. One of our concerns, mentioned previously, is the absence of accurate cost allocation between the two businesses. In our view, this has prevented further advances in separating the price controls for the two businesses. We consider that the first step on this project would be a roadmap on how separation of the two business could benefit and could be effectively achieved, starting by addressing the issue of cost allocation accuracy. We anticipate that the full implementation of ABC system may be useful in this respect. Section 3 further discusses the separation of the supply and distribution businesses.
- 2.50 The Bureau has worked diligently with the relevant sector committees to deliver the required outcomes on both recycled water – where ADWEA is coordinating a sector-wide working group – and on municipal billing, where we have led the development of the framework and facilitated the implementation even though this is not a regulated activity.

Draft proposals

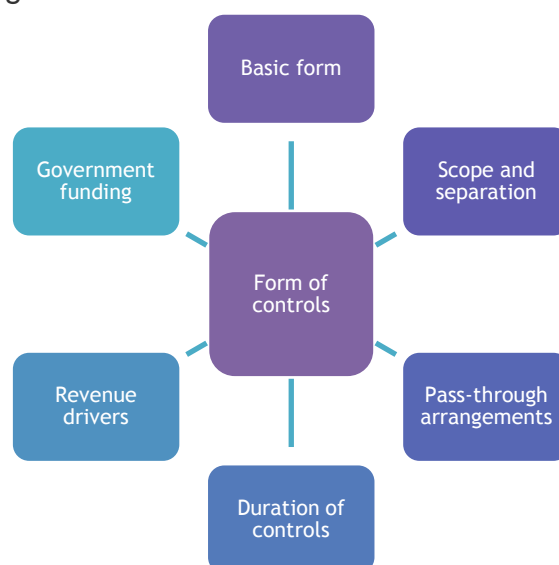
- 2.51 For monitoring customer services activities and outputs in the sector, we propose specific incentives with targets and KPIs. During RC1, we will continue reviewing and considering how the economic regulatory framework can facilitate and improve the way in which companies provide their services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

3. Form of controls

Introduction

- 3.1 The second consultation document described the key issues that should be considered in designing the RC1 controls. Specifically, these issues relate to the form, duration, separation and structure of the controls, and pass-through arrangements for certain costs.

Figure 3.1 – Form of new controls



- 3.2 The 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, but providing the opportunity for a medium-term review to take account of unexpected developments and changes in costs; 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 second consultation document 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, particularly the repayment of Government funding to the sector. The paper also examined the need for fixed and variable elements involving revenues drivers.

- 3.4 This Section 3 summarises and assesses the views from stakeholders on these and other specific issues and sets out the Bureau's proposals on the form of controls for RC1.

Basic form of price control

Second consultation paper

- 3.5 The second consultation paper highlighted that the price caps and incentives regime are widely used in both protecting customers and encouraging efficient operation of utility monopolies. Accordingly, we sought stakeholders' views on our initial conclusion to broadly retain CPI - X revenue caps from the existing regulatory arrangements and make appropriate enhancements to address strategic issues.

Responses

- 3.6 ADWEA group companies and ADSSC broadly supported the current CPI - X form of controls. They however highlighted that a parallel process exists where the Government reviews and approves the annual opex and capex funding, reflecting a lack of stakeholders' understanding and appreciation of the entire process of setting cost allowances in the price controls.

- 3.7 Key comments from the respondents were as follows:

- (a) While ADWEA group companies are committed to work with the Bureau on developing the initiatives and work programmes, they believed that the consultation process and written exchanges are not appropriate. Instead, it sought to establish working groups for more open consultation process. Moreover, the ADWEA group companies identified the following areas where more discussions are required:

- (i) asset management – international practices;
- (ii) training and developing the Emirati workforce;
- (iii) capital efficiency; and
- (iv) intelligent network of the future.

ADWEA group companies specifically sought the Bureau's views as to how asset management issues should be dealt within the RC1 framework.

- (b) ADWEA group companies supported the current form of price control arrangements in that they set efficient future revenue streams based on a building block approach which are adjusted for variations in forecasts, strategy, size and types of activities. The group noted that other stakeholders do not appear to be fully aware of this process, thereby seeking annual approvals for capex and opex from the Government.
- (c) ADWEA group companies did not support the fixed lump sum amount of the revenues for AADC and ADDC, and recommended separating price controls for supply businesses, with a single revenue driver (number of customer accounts) to alleviate these concerns.

- (d) ADWEA group companies supported the continuation of inflation indexation of depreciation and RAV. They also stated that this matter should be discussed in detail between ADWEA and the Bureau, and expected that such discussions should outline the long and short-term financial impact.
- (e) ADWEA group companies observed that reassessing opex and asset lives, through the Bureau's consultant, is an appropriate step for achieving more rational opex and return on asset estimates. With respect to MAR calculations, the ADWEA group highlighted that the consultant's opex estimate will create undue risks if the consultant has not taken into account Abu Dhabi's exogenous factors.
- (f) While recognising that licence conditions provide a clear calculation methodology for each KPI and incentive, ADWEA group argued that the Q-factor incentive is judgmental. Accordingly, they suggested removing Q-factors, arguing that the bonus/penalty amount is minimal compared with the total MAR. Instead, they suggested that incentives should be reputational only.

Assessment

3.8 The Bureau welcomes the sector companies' general support for the current form of controls, highlighting the varying degrees to which the model has driven sector improvement. Our assessment of the specific issues raised by the companies is as follows:

- (a) The Bureau welcomes ADWEA group companies' commitment to work closely with RSB on developing the sector's initiatives and work programmes. We also welcome ADWEA group companies' suggestions for a consultation process through workgroups discussions.
 - (i) It is important to note that, at each stage of the consultation, we held a number of meetings and presentations for the individual companies. At the second consultation paper stage, our efforts included meeting with ADSSC on 1 March 2017 and with ADWEA on 22 March 2017 (though it took long time for ADWEA group to confirm its availability for the meeting).
 - (ii) We would highlight that significant engagements have been conducted at management and working levels for various inputs to the price controls such as capex reviews, opex and asset life assessment, new activities (including tankering, recycled water, municipality fees), subsidy payment reforms, ring fencing and treatment of Government return, often as the Bureau's initiatives.
 - (iii) Notwithstanding the foregoing, we will be pleased to establish working groups as proposed by the companies to enable another platform for consultation with the sector. However, such a working group arrangement should supplement and not substitute the existing consultation process. While additional engagement may be justified and be useful to discuss and progress certain topics, we consider that the existing consultation process, based on the written record of all the views from stakeholders, is

the most robust and transparent way to undertake the price control review. It is also consistent with the best practice in many other jurisdictions. Finally, formal consultation and communication are necessary to meet the requirement of Law No (2) of 1998 to evidence the companies' acceptance or rejection of any proposed license modification before it is issued by the Bureau.

- (iv) Our second consultation paper, in response to the views from the sector, expressed our willingness to consider the development of performance-based programs, including areas such as asset management, and welcomed further details on the sector plans in this respect. We reiterate our position and are willing to consider reasonable suggestions from stakeholders.
 - (v) With respect to both training and developing Emiratis and capital efficiency, we are aware that the network companies are expected to meet specific Government requirements to help meet the wider policy objectives of the Emirate. In relation to Emiratisation, we have introduced flexible arrangements in PC5 to account for the impact of the Government policies and objectives in the overall level of opex in the companies. This accounts for the cost involved in hiring, training and developing Emiratis. We propose to continue with this approach in RC1. Accordingly, we are reviewing the costs of both Emiratisation and their training and development, with the assistance of our opex consultant, and we will incorporate necessary allowances where appropriate. We welcome the sector engagement with our consultant to ensure that the required information is available to determine these opex allowances. For further details on Emiratisation, see Section 4.
 - (vi) With respect to capital efficiency, in January 2017 we shared the final efficiency assessment report for 2014-2015. We will continue to work closely with all the network companies on future capex reviews. Section 5 outlines more details on the underlying methodology and calculations.
 - (vii) With respect to ADWEA's reference to the identified area concerning intelligent network of the future, the Bureau is willing to support such plans and regulatory framework development to enable necessary transition provided there is a clarity on vision, objectives and targets being shared on this and its benefits to the sector. The Bureau would seek more clarification from ADWEA on the relation of such plans with ADWEA's smart grid roadmap, different elements of the intelligent network of the future, the scale of investment foreseen over the short, medium and long terms, the key drivers and performance indicators, and the expected benefits in terms of reliability, stability and efficiency.
- (b) We note ADWEA group's support for continuation of the current form of controls and the building block approach to setting controls. With regard to other stakeholders' awareness, ADWEA should lead on wider funding matters, ensuring robust and transparent processes, which in turn would increase other stakeholders' awareness of this issue. We have worked with ADWEA to explain

these arrangements to DoF and other Government entities and will continue to support ADWEA on these arrangements. However, it is usual in all jurisdictions that utilities work to deliver and satisfy various regulatory, Government, shareholders and investors requirements.

- (c) Considering ADWEA group companies concerns on the MAR with the fixed term only, we have updated our proposals to include both fixed and variable revenue-drivers. Further details are provided later in this section.
- (d) We note ADWEA group's support for continuation of inflation indexation for depreciation and RAV. However, we have explained in Section 2 the reasons for our proposal to remove inflation indexation from the RAV and depreciation, and Section 6 provides more details on this.
- (e) With regard to the ADWEA group's concern that opex may not account for Abu Dhabi-specific factors, our opex allowances in current price controls have provided specifically for such factors. In addition, all the companies are aware that our opex consultant is specifically considering local exogenous factors. We encourage the network companies to provide all necessary information to our consultants. In the meantime, we are sharing all the consultant's reports with the network companies for their feedback. Furthermore, we are open to the sector's suggestions and we will incorporate justified refinements into the opex allowances through the opex consultant's work.
- (f) The Bureau welcomes ADWEA group companies support for the principle of using performance incentives in the price control framework. We also note that this is not a fully consistent view among ADWEA group companies, as responses also include a suggestion for removing the Q-factors, and allow only for reputational incentives. In our view:
 - (i) While reputational incentives may add value, financial incentives are essential as they help reflect the risks to consumers, such as quality of service. Therefore, we do not agree that financial incentives are of little importance – otherwise, ADWEA group companies would not have consistently identified them for discussion both during price control review and during annual implementation and assessment of incentives.
 - (ii) In fact, we have seen significant improvements in the various areas which have been subject to financial incentives. By way of example, improvements in the quality and timely submission of SBAs and PCRs would not have been possible without those incentives. In addition, incentives have driven marked improvements in areas such as transmission system availability and water quality. On other hand, in areas where performance has improved to an extent where we believe that further financial incentives would have little effect, we are prepared to remove the financial incentive – as we are proposing for the system availability incentive. Overall, as the evidence clearly demonstrates, these types of incentives are effective and yield good results.
- (g) We have made extensive efforts to make incentives as objective as possible by issuing detailed RIGs (for example water quality, timely delivery of information,

SAIDI, SAIFI). However, some incentives necessarily require a level of judgement (for example, the robustness of the DSM strategy, or the quality of information delivered/degree of completeness of improvements). We are open to discuss and welcome any suggestions on improving, where and if possible, the objectivity and effectiveness of the price control performance incentives. Further details on the incentive proposals for the RC1 period are included in Section 8.

Draft Proposals

- 3.9 Given the companies' general support for the existing regime and the discussion above, our view is that 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.
- 3.10 Accordingly, we retain our proposal to continue with the CPI-X revenue cap form of price controls for RC1.

Scope and separation of controls

Second consultation paper

- 3.11 The second consultation paper highlighted that there are separate price controls for the water and electricity businesses of AADC, ADDC, and TRANSCO. It also observed that no such separation exists for either of ADSSC's sewerage, wastewater treatment and disposal businesses, or the distribution companies' distribution and supply businesses.
- 3.12 The paper noted that separation of price controls for individual businesses enhance cost transparency, enables the setting of cost reflective tariffs, facilitates competition and creates potential to restructure the sector in future. The paper discussed the funding arrangements for possible new responsibilities to AADC, ADDC and ADSSC, namely informative billing for wastewater services, managing tankering services for both wastewater and drinking water, and the distribution and supply of recycled water. However, funding these activities via price controls do not always necessarily warrant a change in the price-control separation arrangements - rather funding can be provided through an additional allowance in the relevant business MAR to keep the complexity to minimum.
- 3.13 The paper sought views on whether these arrangements remain appropriate for the future or whether these should be revised and what would be the appropriate revisions including introducing:
- (a) new separate price controls for supply businesses if competition is planned to be introduced or if robust information on cost is available through ABC system, or for distribution and supply of recycled water;
 - (b) unlicensed activities for ADSSC's informative billing by AADC and ADDC without any price controls; or
 - (c) cost allowances in the existing price controls for ADSSC's informative billing or for tankering management for water, wastewater and non-drinking water.

Responses

- 3.14 The ADWEA group companies and ADSSC are broadly satisfied with the existing arrangements on the scope and separation of price controls. However, ADWEA group companies made the following specific suggestions:
- (a) ADWEA group companies welcomed the flexibility provided by the regulatory regime in terms of allocating new allowances where licensees are required to carry out new businesses. They also sought further information on the timing / frequency of reviews, and on how the costs for any new business will be assessed. The companies expressed their preference for annual reviews of costs, and for the cost assessment exercises to be undertaken by external independent assessors.
 - (b) ADWEA group companies highlighted that the second consultation paper was silent with respect to TRANSCO's proposal for stronger regulatory separation between its transmission system operator and transmission asset owner roles. Consequently, they requested clarity on how this matter will progress, noting its preference for progress to be made through working groups.
 - (c) AADC and ADDC reasoned that the references to water in Article 71 in Law No 2 make it reasonable to assume that the regulated activity is desalinated water, and not the distribution and supply of recycled water. Furthermore, they contended that the law is silent about the distribution and supply of recycled water to customers, whereas the law clearly identifies the disposal of wastewater as a regulated activity. Based on this, AADC and ADDC argued that it is reasonable to assume that the Bureau should not regulate the distribution and supply of recycled water.
 - (d) ADWEA group companies highlighted that the matter of incorporating ADSSC's wastewater business within the existing businesses of the distribution companies is under consideration. Consequently, the group requested, as part of the consultation process, our views on the viability of this approach.
 - (e) AADC and ADDC contended that the law does not specify billing of either sewage services or municipality fees as regulated activities. Although an alternative for AADC and ADDC would be to seek the Bureau's consent for undertaking these activities, ADDC stated that this is inappropriate from the regulatory structure perspective. Instead, it suggested addressing this with stakeholders to deliver the Government's requirements. Overall, ADWEA group companies are seeking greater clarity on these issues.
 - (f) ADWEA group companies claimed that the current regulatory arrangements are inconsistent regarding the separation of supply and distribution costs. Consequently, they suggested that the Bureau looks closely at its requirement under Article 96 of Law No 2, which requires the Bureau to act consistently and impose minimum restrictions on the licensees. Further, the group suggested that the Bureau either eliminates the requirement for separate business accounts for supply and distribution or determines a separate revenue stream (i.e. separate price controls) for both supply and distribution. It noted achieving this might be

challenging, but, by combining the group's expertise with the Bureau, it reckoned this is achievable. However, the distribution companies noted that the Bureau intends to apply the same form of separate controls.

- (g) For additional activities, such as sewerage services and municipality fees, the ADWEA group companies suggested either excluding them as non-licensed activities or including additional allowances in the MAR. If the latter option is perused, then the group requested that the matter is reassessed both within the context of the law and in discussion with stakeholders. As was the case in PC5, the group supported annual adjustments for additional money for system enhancement, efficiency improvement and additional capabilities allowance. They also highlighted that these allowances should be applied without restricting their use to specific areas. Instead, the group requested the creation of a pool of funds, from which they would collect the required allowances as deemed appropriate.
- (h) ADWEA commented that the current price control does not address a major challenge in the sector related to mega developments.

Assessment

3.15 Based on our assessment and the licensees' views, the existing scope and separation of price controls appear to remain broadly appropriate for the existing businesses. Our assessment on specific issues raised by the companies is summarised below:

- (a) The Bureau welcomes ADWEA group companies' support for the flexibility that the regulatory regime provides to accommodate additional activities. In this regard, the Bureau clarifies the two points raised by ADWEA group:
 - (i) The plans and timetable that we shared with the sector in November 2015 allowed sufficient time for the companies to provide information and justification required to set necessary cost allowances and new price controls for additional activities as part of RC1 controls. Where such information is not made available as per the timetable for RC1 consultation, we will seek to work with the companies to set such allowances and price controls during the RC1 period.
 - (ii) The price control review is the Bureau's role, thus it should be not outsourced to any external body. However, we can use external consultants to assist, but not determine, the price controls. As for the duration and frequency of reviews – for any new activity, the annual adjustment should follow the mechanism set as part of the price control review. As the companies are aware, the formula for calculating such costs should have been agreed and set in the price control review, as it was previously for mega developments, Emiratization and capability building in specific areas. In these instances, the financial auditor and technical assessor were used to validate the inputs used to adjust annual opex according to the mechanism that was established and agreed in the price control review.

- (b) In order for us to consider the regulatory separation of TRANSCO's transmission system-operator and transmission asset-owner activities, we require robust proposals that include the associated organisational structuring and cost allocation. Currently, we do not have separate business accounts and cost allocations that reflect the proposed separation. We are also aware that this issue relates to the ongoing work of the sector under ADWEA for the Government. However, we have not seen proposal for such separation.
- (c) We found ADWEA group companies' concerns about recycled water inconsistent with the recommendations of the sector-wide working groups under ADWEA's lead. We are actively working on our assigned roles within the Government resolution on recycled water, and we note that AADC has already applied for licence modification for this new activity, with ADDC expected to follow soon. With these established working groups and Government decision in March 2017 to establish and regulate the distribution and supply of recycled water, we believe that the group's concerns are addressed. Under this work, recycled water is a regulated activity, and we welcome the distribution companies to fully engage with our consultants assessing opex and asset lives in order to provide all the required information, which will enable us to set appropriate revenue allowances for this business. Our proposal is to introduce a separate price control for the distribution and supply of recycled water. This is because it is a distinguishable product with its own identifiable assets, costs and customers – away from those relating to electricity and drinking water.
- (d) With respect to incorporating ADSSC's wastewater business within the existing businesses of the distribution companies, this is a separate work stream and we are aware of different high-level options proposed by different parties under ADWEA's lead and we will discuss this further as ADWEA clarifies the proposal. Therefore, until there is clarity on what changes will occur, if any, this consultation is based on the current businesses and structures.
- (e) In relation to the clarification required by ADWEA group companies on issues surrounding billing for sewage services and municipality fees, we note that these are not regulated activities for the distribution companies but require the Bureau's consent and separate business accounts to avoid cross-subsidy with the regulated businesses and protect interest of the customers of the regulated businesses. We have nonetheless worked very closely with the companies and will keep supporting the sector on this project as necessary. **Table 3.1** sets out how each company's activities for the new businesses (as discussed above) are treated under the regulatory framework:

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	✓		✗	✓

- (f) ADWEA group companies views on separating the distribution and supply price controls were discussed extensively during the PC5 review. We reiterate that the cost allocation between supply and distribution is not sufficiently robust to allow such separation. However, if the companies improve the robustness - likely to be achieved on implementation of ABC system - then we will consider such separation in the next price controls. In the meantime, we look forward to, as a starting point, the distribution companies' proposals on developing the regulatory approach to set the revenue requirements for the supply businesses as highlighted in their response. Once the stakeholders put forward a robust proposal on such an approach, we are willing to engage through working groups to discuss the proposals.
- (g) In relation to the additional activities identified by the ADWEA group companies, such as sewerage services and municipality fees:
- This price control review will only determine opex allowances for regulated activities (however, costs now allocated to new unlicensed activities should be removed from RC1 base opex allowances for regulated business – see Section 4).
 - At the same time, we note ADWEA group's support for annual opex adjustments, however we stress that we can only allow funding for justified costs. Specifically, the companies will have to justify to the opex consultant any cost allowances or improvement areas that should qualify for annual adjustments. We are aware of the need for the regulatory arrangement to allow reasonable funding and we are willing to work with the licensees to find the optimal arrangement to address any new relevant issues. The Bureau does not agree to the ADWEA group companies' suggestion for additional MAR allowances and the use of a funding pool for unspecified purposes without restrictions. Our view is that such a relaxed arrangement would be insufficient for driving economic and efficient outcomes from the companies. In fact, this would contradict our statutory duties both on ensuring the development and operation of an economic and efficient sector and on the protection of customer

interests. Therefore, neither customers, nor Government via the subsidy, should have to pay for costs unrelated to efficient delivery of performance, outputs or service. Consequently, the companies will need to provide us, and our opex consultant, with all required information about new businesses.

- (iii) Notwithstanding the foregoing, we are willing to consider flexibility in the regulatory regime to adjust cost allowances for unforeseen developments occurring during the price control period. Of particular note is the planned introduction of value added tax (VAT) in the country from 1 January 2018. We believe that the current definition of the “regulated revenue” in the companies’ licences already allow a pass-through treatment of any such tax. We are however open to any suggestions to provide further clarity on this and welcome companies’ proposals.
- (h) ADWEA’s claim that the current price control does not address the issue of mega developments overlooks important aspects of the current price controls. Specifically, the price controls already provide opex allowance for the adoption of mega-development network assets through annual opex adjustment carried out by the Bureau. This arrangement includes criteria and a calculation method that were agreed as part of the current price controls. Currently, the Urban Planning Council (UPC) is leading another work stream, which ADWEA is part of, and we have already shared our position papers as part of this work stream – a paper that sets out the principles and scenarios for mega development adoption and another paper that sets out the asset ownership boundaries and the interim O&M responsibilities at mega developments. Going forward, we will continue to work and participate actively on these issues. As and when a mega development infrastructure is adopted by a licensee with a fair value determined and payment made, the Bureau will make an adjustment to the price controls for the licensee from time to time based on the justified amounts.

Draft Proposals

- 3.16 In light of above discussion, we propose retaining the current separation of price controls for all companies with the following specific provisions:
- (a) We 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 distribution and supply of recycled water by AADC and ADDC.
 - (c) The scope of existing price controls for companies 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 businesses)
 - (ii) ADSSC: informative billing (as part of the price controls for ADSSC wastewater businesses); and

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

Cost pass-through arrangements

Second consultation paper

- 3.17 The second consultation paper listed the costs currently allowed as pass-through items in the price controls as (all of which are subject to competition or regulation via an economic purchasing obligation or price controls):
- (a) for the distribution companies – the bulk power and water purchases and transmission charges;
 - (b) for ADSSC – payments under the long-term Sewage Treatment Agreements (STAs);
 - (c) for TRANSCO – the purchase of ancillary services related to electricity business; and
 - (d) for all companies – a component of the Bureau's annual licence fee.
- 3.18 The paper also explained that the current practice of including some licence fees in opex allowances while setting price controls and allowing pass-through treatment of other fees through derogation effectively allows all Bureau's fees on a pass-through basis. Adding a new term, say "L", in the MAR formula for each licensee will formalise and simplify this treatment, in line with utility regulation in other jurisdictions.
- 3.19 The paper asked:
- (a) whether the current arrangements relating to cost pass-through remain appropriate for the future, or whether they should be revised and if so what would be appropriate changes; and
 - (b) whether there is a case for extending pass-through treatment to full amount of the Bureau's licence fees, which would avoid us having to issue annual derogations to allow pass-through of any additional licence fee?

Responses

- 3.20 Licensees broadly supported the existing pass-through costs arrangements and made suggestions as follows:
- (a) ADDC suggested revising the cost pass-through arrangements so that TUoS charges to distribution companies would, in turn, pass through into the DUoS charges with both the TUoS and DUoS charges then passing onto the supply business. It noted that this would match arrangements in other jurisdictions and would better identify the associated costs for each customer group. Further, ADDC contended that the current pass-through arrangements do not enable costs to be fully-reflected in the end-user tariffs developed by the Bureau. It

claimed that costs are misallocated, such that undue cross-subsidy may exist and customers are receiving mixed price-signals.

- (b) AADC supported that the full amount of the Bureau's licence fees to be allowed as pass-through and suggest that this arrangement should be accommodated in the licences and eliminate the need for derogations. AADC suggested the Bureau to discuss the pros and cons of its proposed new term "L". It sought clarification on the statement made about the higher marginal costs of supplies to other emirates as they do not believe that there should a cross subsidy to other emirates.
- (c) AADC and ADDC raised a concern that there are wider policy developments (ie, subsidy payment reforms) that the Bureau is supporting, which could mean that the MAR is not paid in full each year. Their concern focussed on risks for the sector's financial viability if the subsidy is to be calculated net of revenue that should be collected, as opposed to what is actually collected. AADC and ADDC agreed that the revenue collection process is an area of improvement and highlight that they have set the relevant business KPIs.
- (d) ADWEA group companies claimed there is a need for an external third-party to verify the Bureau's costs and suggested that the Bureau's licence fee should be assessed by external auditors for its pass-through treatment. ADWEA stated that, if the Bureau justifies its efficient cost as being approved by its board, then a reciprocal treatment should be applied to ADWEA.
- (e) ADDC argued that the Bureau's costs are not transparent, certainly with regards to special projects. It suggested the Bureau should provide 5-year budgets for its costs and adopt fair-value tests for the regulation of the sector. ADDC contended that greater transparency would improve the efficiency and did not agree to the pass-through of licence fees until there is transparency.
- (f) TRANSCO noted the Bureau's commitment to engage further on ancillary services area and stated that we should present our work plan, scope and objectives for this work stream.
- (g) ADSSC argued that cost from outsourcing O&M services 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

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

- (a) With regards to ADDC's suggestion to pass on TUoS charges onto DUoS charges before passing onto the supply business, we note that having the supply business pay TUoS and DUoS is an established principle, not only in Abu Dhabi, but also in other jurisdictions. Importantly, this arrangement enables supply businesses to sell to customers that are directly connected to transmission

system and set tariffs that reflect the costs incurred in supply to that customer. Having said this, we are willing to understand and address if ADDC elaborates its concerns about the actual or perceived misallocation or cross-subsidy it indicated in its response.

- (b) In reference to TRANSCO's request for our work-plan for ancillary services, previously we offered on TRANSCO's request to engage with TRANSCO and ADWEC to reassess TRANSCO's role in procurement and management of ancillary services and sought TRANSCO's proposals. We are yet to receive these proposals; as soon as we do, we will provide further support.
- (c) With regards to the concerns of AADC and ADDC about the subsidy payment reforms, we would first like to clarify that subsidy payment reforms envisage calculation of subsidy based on MAR and revenue that should be billed, as opposed to collected; that is, as long as the distribution companies timely bill the customer, they are entitled to related subsidy. Further, the companies are already aware that the Government initiative states that subsidy should not be collected on units classed as avoidable losses – units that in any case do not earn any revenue from customers. The subsidy payment reforms disallow the distribution companies to get compensation for these losses through subsidy. Importantly, this seeks to replicate the arrangement for utility companies that can only recover their required revenue from customers – such companies receive no revenue for avoidable losses and no revenue if they fail to bill customers. This highlights the fact that a company needs to be fully efficient in operating its business, including in the area of revenue billing (and collection). In developing the proposals, ADWEA, the distribution companies and the Bureau have, independently and collectively, all provided support and advice to the Government, along with the Department of Finance. Looking ahead, the subsidy payment reforms will maximise the incentive for the distribution companies to minimise avoidable losses and improve their revenue billing to customer. Overall, we believe this will deliver a more holistic approach to efficiency.
- (d) Regarding the suggestion from ADWEA group (and ADSSC) that an external third party should assess our licence fees, along with their request for transparency on these fees, we would highlight that we regularly benchmark our costs and seek the Government's views on these. In addition, we engage independent auditors who verify and report on our costs, and then make relevant information, including our independently audited accounts, publicly available on our website. Moreover, the introduction of the new L-term in the MAR formula will consolidate and increase transparency of our licence fees. This approach is consistent with regulatory arrangements in many other jurisdictions. We also have a five-year forward plan against which we work and report to our board and the Government.
- (e) The Bureau welcomes AADC's explicit support for the Bureau's full recovery of our licence fees through the pass-through arrangement. As discussed previously, the newly proposed "L" term will promote consolidation and further transparency on the Bureau's licence fees – in contrast to the present arrangement, where certain fees are embedded within companies' opex allowances under price

controls and other fees are allowed a pass-through treatment via derogation. As a way of clarifying the higher marginal costs of supplies to other emirates, the supply of water and electricity to Northern Emirates by water and electricity is costlier than it is for Abu Dhabi, so a higher tariff is set to cover this additional cost. ADWEC is addressing this point with Northern Emirates as per the Government and regulatory instruction - we agree that there should no cross subsidy to other emirates.

- (f) Whilst we agree with ADSSC's view that outsourced services should be competitively procured, such an arrangement does not necessarily justify pass-through of the costs. Looking ahead, we will welcome evidence that demonstrates to our opex consultant that ADSSC's procurement of O&M services is competitive. In turn, this will help justify whether the RC1 opex projections will allow their full cost estimate.

Draft Proposals

3.22 Given the views expressed by the respondents and our assessment above, the Bureau proposes 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

Second consultation paper

3.23 To date, we have typically set the price controls for three to four years. The maximum was four-and-a-half years in case of ADSSC's PC3 control. The current PC5 controls have a duration of four years.

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

3.24 The second consultation paper discussed several aspects relating to the optimal duration of price controls. This included incentives for efficiency and potential to reduce exposure to unanticipated outcomes. In some jurisdictions, duration of the price controls is typically four or five years, while in more mature jurisdictions, such as UK, the duration is as much as eight years. Our consultation paper recommended a relatively shorter period of price control than that experienced elsewhere, largely because of:

- (a) uncertainties;
- (b) ongoing discussions on companies restructuring and potential new responsibilities;

- (c) demand growth in Abu Dhabi; and
- (d) the quality of available data.

3.25 The paper stated the Bureau 's thinking for a four-year duration for the RC1 controls.

Responses

- 3.26 ADWEA group companies supported a quadrennial (four-year) period for the next price control, with flexibility to address specific identified cost-uncertainties. They highlighted that, previously, each company's acceptance of the licence amendments for PC4 was delayed by about 15 months, until the allowance for Emiratisation was incorporated. In turn, they claimed that this delay slowed progress on Government initiatives.
- 3.27 In the context of PC5, ADWEA group companies contended that the Bureau's opex consultant at that time, in recognising Abu Dhabi's specific challenges, had allowed 90% of ADDC's proposed opex. However, the group also noted that it had been unable to adjust its resources to deliver the plans agreed for PC5.
- 3.28 ADWEA group companies believed that the regulatory model needs modification to reflect the Government's objectives. They claimed that the adopted regulatory model works well in the jurisdictions where privatisation has taken place, because private entities are highly responsive to changes in the regulatory allowance. By way of example, ADDC contended that the regulatory determination for PC4 opex was not updated during the control period and, therefore, the regulatory model requires adjustment.
- 3.29 ADSSC supported a duration of four years for the RC1 period and recommended that this duration applies to all companies.

Assessment

- 3.30 The Bureau noted the support of the ADWEA group companies and ADSSC for a duration of four years for RC1. We welcome the distribution companies' appreciation and support both for the use of an opex consultant and for the more robust treatment of opex in PC5 and RC1. As for the need for flexibility to address uncertainties, our planned changes to capex regulation will provide some support to the sector request for increased flexibility needed to address uncertainties and challenges. As discussed in Sections 2 and 5, the plan is for more regular ex-post and ex-ante reviews that will then be followed by relevant MAR adjustments. The specific cost allowances provided for additional responsibilities such as Emiratisation, additional capabilities and mega developments along with necessary adjustments during the control period have addressed uncertainties and the challenges faced by the companies. However, tankering is another area for which the Bureau is seeking information from the companies in order to provide the necessary funding.
- 3.31 For ADDC's specific claim about the lack of annual update during the PC4 period, we would highlight that annual opex allowance adjustments are undertaken on annual basis, subject to the required inputs and evidence from the companies and only if a mechanism is established and agreed – which was not the case for PC4.

- 3.32 In terms of the ADWEA group's suggestion to modify the regulatory model to reflect the Government objectives, we would reiterate our support for Government objectives. Accordingly, we look forward to receiving proposals from the ADWEA group and, more specifically, ADDC on how to deliver these objectives effectively and efficiently. At the same time, we would look forward to working with ADWEA and Government to ensure the companies manage the costs efficiently. However, we will be concerned if the companies advise us that cost efficiency is not their objective.

Draft Proposals

- 3.33 In light of the overall agreement, the Bureau's proposal is to set RC1 price controls for four years (2018-2021), with regular capex reviews and annual adjustments for specific opex items.

Revenue drivers

Second consultation paper

- 3.34 The second consultation paper highlighted that the current MAR formula involves a fixed term and one or two variable terms for revenue drivers. While ADSSC has one revenue driver, the other network companies have two revenue drivers. These revenue drivers associate with each companies' outputs, namely, the number of customers supplied and the volume of units transmitted, treated or distributed. In addition, weights apply to the fixed and variable elements using an 80:20 ratio.
- 3.35 The paper outlined a number of concerns associated with using outputs-based revenue drivers:
- (a) output-based revenue drivers for units may disincentivise sustainability and DSM;
 - (b) the potential for significant MAR fluctuations, which, in turn, would feed through to TUoS charges, customer tariffs and subsidy requirements; and
 - (c) complexity in applying regular cost adjustments, particularly capex adjustments affecting the MAR via updates to the RAV.
- 3.36 In the second consultation paper, we sought the stakeholders' views on whether each company's core MAR should be fully expressed in fixed absolute terms (subject to some inflation indexation), without any variable elements linked to output-based revenue-drivers.

Responses

- 3.37 Respondents broadly favoured retaining the existing revenue drivers based approach and made the following suggestions:
- (a) ADWEA group companies argued that the revenue drivers' mechanism is supported by a wide range of international practices. TRANSCO contended that revenue drivers should be based on the cost drivers as already established by the Bureau and its opex consultant. TRANSCO also stated that separating

demand and volume variables is artificial and adds little value. However, it noted that fixing all the variables would create uncertainty and risk for the sector. It also highlighted that if flexibility is introduced through annual adjustments, this will reduce the revenue drivers' importance. Moreover, TRANSCO expressed its desire for a fair assessment to be reflected in the price control.

- (b) AADC and ADDC discussed the separation of price control between supply and distribution, for which they sought our support and cooperation. The two companies observed that the current revenue stream is for both supply and distribution businesses, whereas the revenues drivers are built-up for both supply and distribution elements. They suggested eliminating the "metered units" revenue driver, in support of the DSM initiative, and retaining the customer accounts driver at 15% weight. They also proposed that the municipality fee and non-potable water accounts be included in the driver.
- (c) ADSSC noted that the wastewater flow at treatment works is the only revenue driver in its MAR and it should be retained.

Assessment

3.38 While the companies generally supported our approach to limit variable revenue drivers, yet most preferred to retain at least one revenue driver instead of MAR fully expressed in fixed absolute terms. Our assessment of the companies' other comments is as follows:

- (a) In response to TRANSCO's concern about fixing all the revenue drivers, our proposal is now to include one revenue driver in the MAR determination, which should address TRANSCO's concerns on revenue drivers. We also propose a 85%/15% weighting between the fixed revenue element and the variable revenue driver. Therefore, we will propose volume of units transmitted as TRANSCO's sole driver, which will be consistent with TUoS being charged on a volume basis. In practice, weights and MARs will vary according to how actuals affect the revenue driver, as happens now. However, we will not remunerate MAR shortfalls arising from forecasting errors, otherwise this will make the MAR a fixed term in practice that will not vary with the volume. Overall, the MAR will largely be fixed, which should address TRANSCO's other concerns about undue MAR fluctuations. Moreover, this approach will also align with the ADWEA group companies' preference for simplifying the framework further.
- (b) Distribution companies' comments regarding separate controls for supply businesses are discussed earlier in this section. However, we accept their suggestion for retaining the number of customer accounts as the variable revenue driver for their water and electricity price controls with a 15% weight in MAR. The fixed element will then have a weight of 85%.
- (c) In line with the above, we propose retaining the current "annual wastewater flow at treatment works" as the variable driver for ADSSC with a 15% weight in MAR, along with the fixed element (having a 85% weight in MAR).

Draft Proposals

- 3.39 Given the overall views expressed, we propose to 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, as summarised in table below.

Table 3.2: Revenue-drivers – draft 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)	15%
ADSSC	Fixed term	85%
	Annual flow at treatment plants	15%

- 3.40 For these draft proposals, we have retained the definitions of these revenue drivers as set out in the current licences for respective companies. However, in case of TRANSCO, we are willing to consider a suggestion if made by TRANSCO to define units transmitted to include reasonably estimated units (in addition to metered units) provided TRANSCO proposes a robust method to estimate units transmitted when not metered. Further, given the importance and use of metered units distributed and peak demands leaving transmission system, we are minded to retain the provision of these quantities in the audited PCRs as verified by the TA for other uses.

Structure of RC1 controls

- 3.41 In the light of the above discussions, the general structure of the MAR for each business for any year “t” of the RC1 period as follows:

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

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 draft proposals. For subsequent years, values of “a_t” (less the proportion representing depreciation allowance) and “b_t” are indexed against the UAE Consumer Price Index (CPI) less X factor and the value of “a_t” representing depreciation allowance against minus X factor only.
- (b) “Q_t” and “K_t” are the performance incentive amount and the correction factor for the year “t”, respectively.
- 3.42 The notified values “a” and “b” will be indexed using the following formulas from year t-1 to year t:

$$(a) \quad a_t = \left[\text{depreciation proportion} \times a_{t-1} \times \left(1 + \frac{-X}{100} \right) \right] + \left[\text{remaining proportion} \times a_{t-1} \times \left(1 + \frac{\text{CPI} - X}{100} \right) \right]$$

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

- 3.43 In these draft proposals, we have used the following UAE CPIs figures where 2016 and 2017 CPIs figures are estimates and will be adjusted to actual figures in our RC1 final proposals and through annual indexation formula in the audited PCRs during RC1 period, respectively, as these actual figures become available.

Table 3.3: 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	105.63	107.22
UAE Inflation	1.51%	0.88%	0.88%	0.66%	1.10%	2.35%	4.07%	1.50%	1.50%

Source: Federal Competitiveness and Statistics Authority (Base year 2014 = 100). 2016 and 2017 CPIs are based on assumed CPIs of 1.5%.

Price control calculations

Second consultation paper

- 3.44 The second consultation paper described that calculating price control revenues entails using three building-blocks – opex, regulatory depreciation and return on capital – in combination with present value calculations. It is through these steps that we derive the licensees' core price-control revenues (excluding pass-through costs). In turn, these core price-control revenues help determine the notified values of 'a', 'b' and 'c' in the MAR formulae for the current price controls.
- 3.45 To date, we have used a net present value (NPV) approach to sculpting the licensees' required revenues over the regulatory period. NPVs are calculated at discount rate that reflects the estimated cost of capital.

Responses

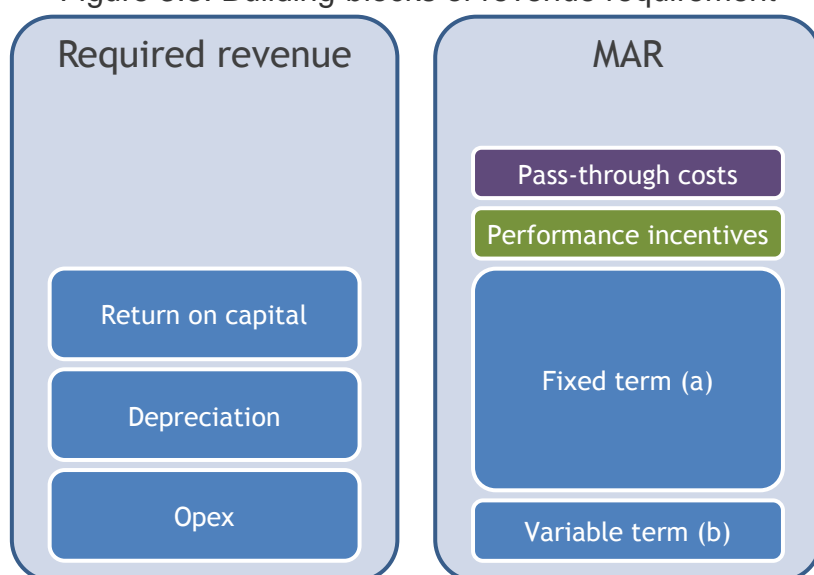
- 3.46 ADSSC was content with the approach to price control calculations and suggested that a further assessment be undertaken at the next review. The respondents aforementioned comments on revenue drivers also related to the price control calculations in that they highlighted the suggestion for a fixed term 'a' and at least one variable term with a coefficient 'b'.

Assessment and draft proposals

- 3.47 Given respondents' general support, we have adopted an NPV-based building-block approach to price control calculations in these draft proposals for RC1. This is similar to the approach used for the previous price control reviews, but it has three main differences for RC1:
- (a) Calculation of the notified value of "a" and "b" terms only (as discussed in the preceding paragraphs).
 - (b) Removal of the inflation from both the RAV and depreciation (as discussed in Sections 2, 6 and 7).

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

Figure 3.3: Building-blocks of revenue requirement



Revenue driver projections

- 3.48 To carry out price control calculations and calibrate the notified values of 'a' and 'b', we require reasonable forecasts of the proposed variable revenue drivers for the RC1 period. The four network companies have provided revenue driver projections in their latest 2016 Annual Information Submissions (AIS) which have been reviewed by the independent Technical Assessor (TA). These projections are set out in **Table 3.4** below.
- 3.49 While we can review these projections further for the RC1 final proposals against other sources as well as the actual past trends, these are the latest projections submitted by the companies and reviewed by the TA and hence provide a good starting point.

Table 3.4: Revenue driver projections for RC1 – draft proposals

			2018	2019	2020	2021	CAGR 2017-2021
AADC	Electricity customer accounts	Customers	150,353	153,089	155,653	158,048	1.4%
	Water customer accounts	Customers	91,917	94,775	97,823	101,072	2.5%
ADDC	Electricity customer accounts	Customers	382,583	395,056	407,934	421,233	2.6%
	Water customer accounts	Customers	308,535	317,279	326,982	337,330	2.3%
TRANSCO	Electricity metered units transmitted	MWh	83,780	89,033	94,286	99,540	4.9%
	Water metered units transmitted	MIG	284,772	294,988	305,203	315,418	2.8%
ADSSC	Annual wastewater flow treated	1000 m3	422,083	450,846	481,636	511,012	5.3%

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

- 3.50 **Table 3.5** below presents the actual or estimated data for the PC5 period on the same revenue drivers for comparison purposes. While the overall growth rates for RC1 projections in the table above are generally comparable to those observed in the recent past as the table below for many revenue drivers, the exceptions are the metered units

Regulatory review of price controls for 2018 onwards – RC1 draft proposals

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transmitted which show significantly lower growth for RC1 period (4.9% and 2.8%) than recent past (12.3% and 14.0%).

Table 3.5: Actual or estimated revenue driver data for earlier years

			2014	2015	2016	2017	CAGR 2013-2017
AADC	Electricity customer accounts	Customers	136,661	146,573	144,244	147,439	2.2%
	Water customer accounts	Customers	80,225	83,968	86,737	89,240	2.8%
ADDC	Electricity customer accounts	Customers	336,331	348,002	358,809	370,506	2.7%
	Water customer accounts	Customers	286,385	291,828	297,249	301,403	3.1%
TRANSCO	Electricity metered units transmitted	MWh	61,386	69,850	73,273	78,527	12.3%
	Water metered units transmitted	MIG	181,987	251,040	264,342	274,557	14.0%
ADSSC	Annual wastewater flow treated	1000 m3	322,680	344,389	370,110	395,213	6.0%

Source: Actual data for 2014-2015 from network companies' PCR's, all other data are from companies' 2016 AIS submissions.
Source: CAGR stands for compounded average growth rate.

- 3.51 When compared against ADWEC's total (metered and non-metered) units transmitted as per its AIS, TRANSCO's revenue driver (metered units transmitted) projections for RC1 period in **Table 3.4** above are significantly higher for both electricity and water metered units transmitted and hence may need further review and adjustment before use for price control calculations in the RC1 final proposals.
- 3.52 As mentioned earlier, we have retained the definitions of all revenue drivers in these draft proposals as in the current licences. However, in the case of TRANSCO, we are willing to consider TRANSCO's arguments for changing metered units based revenue drivers (which include both MDEC and non-MDEC compliant metered quantities) to total units based revenue drivers to include both metered (whether MDEC or non-MDEC compliant) as well estimated quantities. TRANSCO should explain how TRANSCO, TA and the Bureau will be convinced that the estimated quantities are reasonable and indeed transmitted through the transmission system. In this regard, TRANSCO will need to propose a method for estimation for the Bureau and TA review and agreement. Once agreed, such a method can become part of a RIG issued by the Bureau if necessary. If TRANSCO makes such a case, we will also require robust projections of such revenue drivers for the RC1 final proposals.

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. To this end, the Bureau in its first and second consultation papers proposed the following methodology to determine opex allowances for RC1:
- (a) a hybrid of both a high-level top-down approach and a more detailed bottom-up approach using an external consultant - Deloitte & Touche M.E. ('Deloitte'), similar to PC5 to set the main opex projections for RC1;
 - (b) an approach similar to PC5 to set specific allowances for cost items, where the companies neither have control over the underlying cost drivers nor can estimate these costs with reasonable accuracy; and
 - (c) seek further clarity from the companies and inputs from the opex consultant regarding the capitalisation policies and replacement of opex with capex solutions.
- 4.2 The Bureau's RC1 opex consultant (Deloitte) has issued three reports – namely, the inception, interim and draft reports on RC1 opex projections – with the final report due in June 2017. The most recent draft report issued in January 2017 sets out the final methodology, initial analysis and initial opex projections for RC1 period (2018-2021).
- 4.3 This Section 4 summarises the companies' opex performance over 2010-2015 (as provided in our second consultation paper) and the work already completed by the consultant and reported in the consultant's draft report. In addition, we have assessed the licensees' responses to the RC1 second consultation paper before presenting our proposals on RC1 opex allowances based on the consultant's draft report.

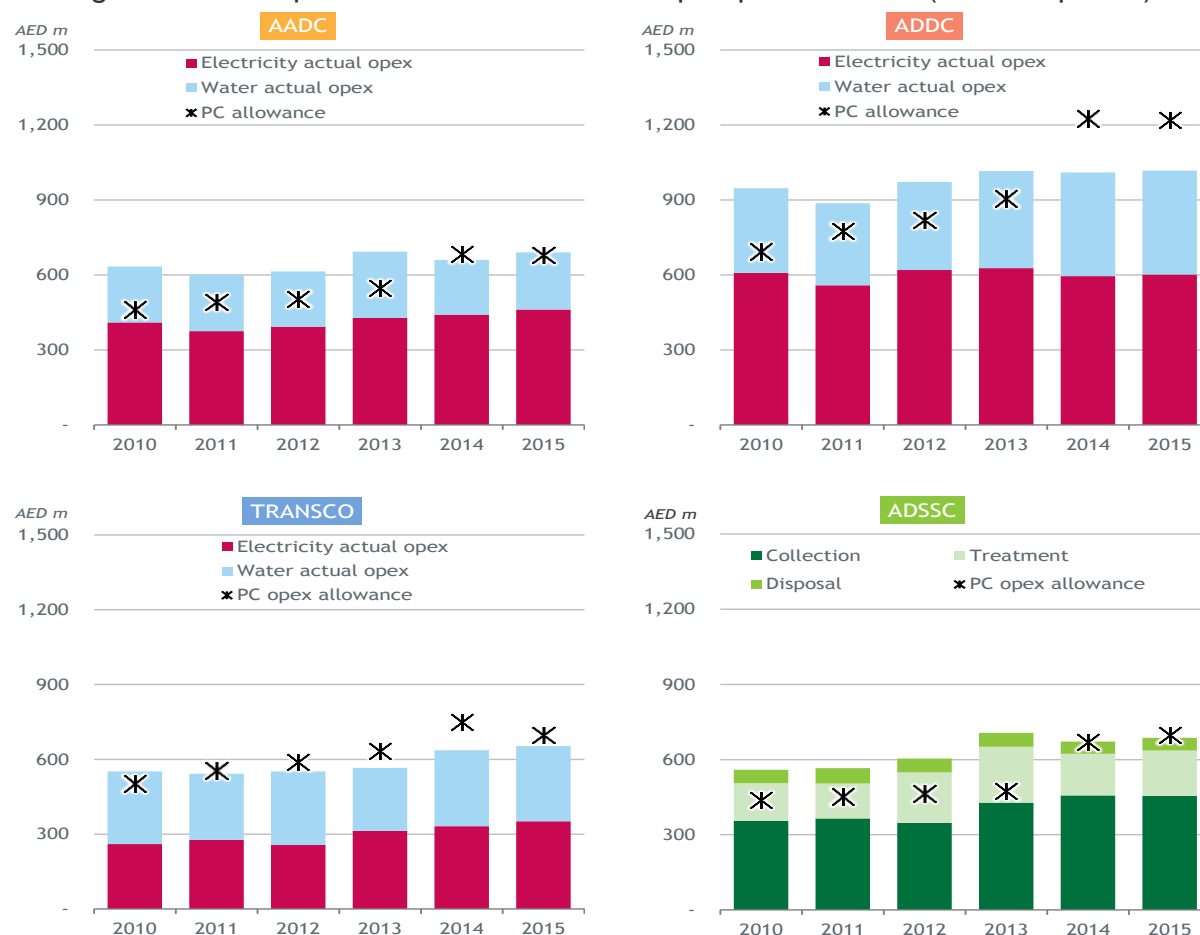
Companies' opex performance

- 4.4 In the RC1 second consultation paper, 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 (**Figure 4.1**). In this time period, the four companies' aggregate opex increased on average by 3% a year from around AED 2.7 billion per year to AED 3.0 billion per year in nominal terms. The companies, in general, missed the price control opex targets during the period 2010-2013. However, they then either met or exceeded the targets set for the first two years of PC5 (2014-2015), except for ADSSC and AADC which marginally missed the 2014 and 2015 targets, respectively. This performance analysis will be updated in the RC1 final proposals in light of the 2016 actual costs that will be reported in the companies' 2016 SBAs due for submission to the Bureau on 30 April 2017.

4.5 In the second consultation paper, we expressed our concerns over:

- the distribution companies' high supply business costs compared with the distribution business costs; and
- 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' 2010-2015 actual opex performance (nominal prices)



Source: Companies' 2010-2015 SBAs
Notes: "PC allowance" standards for opex allowance provided under price controls for the company on an aggregate basis

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

- over the period of 2010-2015, 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 once in 2014;
- ADDC's actual opex increased on average by almost 1% a year over the period of 2010-2015. ADDC did not meet the annual price control opex target during 2010-2013; however, it outperformed the targets during 2014-2015;
- TRANSCO's actual opex increased on average by 3% a year over 2010-2015. Broadly, it met the annual price control opex targets over the period of 2011-2015, but marginally missed the 2010 target;

- (d) ADSSC's actual opex increased on average by almost 4% a year over 2010-2015. ADSSC did not meet the annual price control opex target during 2010-2014 but met the target during 2015;
- (e) staff costs continued to constitute the largest or major part (57% to 61%) 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 43% in 2015.

Approach to opex projections and allowances

Second consultation paper

- 4.7 Earlier RC1 consultation papers summarised the high-level approach that the Bureau used to set the opex allowances at the previous price control reviews, particularly the hybrid approach used for setting the PC5 controls. This included specific allowances for cost items where the companies either do not have control over underlying cost drivers or cannot estimate these costs with reasonable certainty. In addition to providing an opportunity for reassessing the PC5 approach, the second consultation paper also invited the companies comments on:
- (a) how the trade-off between opex and capex should be addressed; and
 - (b) whether implementation of activity based costing (ABC) system will improve the allocation of costs to the business.
- 4.8 While the paper assessed a number of the companies' comments on opex, many of these were referred to the Bureau's RC1 opex consultants to consider in their work on operating cost projections.

Responses

- 4.9 The network licensees generally supported continuation of the PC5 approach for setting the price control opex allowances and responded positively to the above issues and made a number of suggestions:
- (a) Highlighting the operating and regulatory environment:
 - (i) ADWEA group companies considered the current regulatory arrangements are complex and not suitable for the companies' being Government entities and operating in a specific environment where a parallel budget approval process within the Government funding exists.
 - (ii) The companies argued that this misalignment is the reason for the companies' over/under spending against the price control opex allowances in the past discussed in the preceding paragraphs.
 - (iii) The companies suggested greater cooperation and collaboration between the Bureau and the companies to improve skills, capabilities and professionalism in the sector and alignment of regulatory and

Government requirements. TRANSCO indicated that its actual opex to-date was less than opex allowance due to issues around recruitment.

- (b) ADWEA group companies accepted that staffing in certain areas in the companies may be in excess of benchmarks, however, indicated the pressure on the sector to reduce staff to achieve desired efficiency.
- (c) To address the opex and capex trade-off issue, the companies highlighted the possibility of adopting a total expenditure (totex) approach to set the allowances as used in other jurisdictions. However, recognising the complexities of a totex approach, the companies proposed a flexible approach to setting the regulatory allowances coupled with:
 - (i) transparency on the assumptions used and mechanism of reconciliation; and
 - (ii) adjustment of any change in the companies' capitalisation policies during implementation of the price controls.
- (d) AADC and ADDC noted that until ABC system is implemented, allocating costs to the supply business is a theoretical exercise which may not reflect the true costs. They noted that they are not organisationally structured according to regulatory requirements and the price control is not separated between distribution and supply businesses. The companies suggested implementing ABC system and aligning organisational structure accordingly to regulatory requirements to enable distribution companies explain deviations in costs and allocation to separate businesses. AADC asserted that reasons for an apparent increase in share of supply business costs include both a higher proportion of National staff in the workforce and a misallocation of costs due to incorrect understanding and implementation of cost allocation methodology as set out in the Bureau's regulatory accounting guidelines (RAGs). AADC indicated that it expects the conclusions of consultant's opex review to create a motivation to revisit the cost allocation procedures, which might bring better solutions or corrective/reformative measures in opex estimation, fixing-targets and reporting procedures and calculation. The companies reiterated that the Bureau is yet to provide regulatory impact assessment for implementation of ABC system that will undoubtedly create additional costs for the sector.
- (e) As indicated above, ADWEA group companies in general fully supported the implementation of ABC system. However, the companies considered that expecting the 2017 SBAs to be based on full ABC implementation (by 30 April 2018) is optimistic and lacks a robust understanding of the challenges the companies are likely to face, such as significant changes in human resource practices - moving to a performance based culture - and injection of capabilities and skills that may not currently be available within the businesses.
- (f) The distribution companies argued that RAGs are overly complicated, are administratively burdensome and are not matched by separate price controls for the distribution and supply businesses. ADWEA group companies supported the need for cost transparency, including the ADWEA recharge, and emphasised that similar transparency should be in place for the Bureau's licence fee.

- (g) ADSSC stated that it is working closely with the Bureau's opex consultant and providing the required information. ADSSC suggested the Bureau and its opex consultant should consider ADSSC's operating environment, factor-in the company's historic trends (actual costs), select realistic benchmarks and apply adjustments to controllable costs only. ADSSC committed to introduce an initial ABC system to both support the development of cost reflective tariffs and bring greater granularity and transparency to its costs. However, it noted that such initiative can be implemented only if funds are made available. Finally, ADSSC asserted that it has appropriate capitalisation policies developed in light of the International Financial Reporting Standards (IFRS), which ensures consistency in the capitalisation of costs.

Assessment

4.10 The Bureau welcomes the licensees' support for the proposed approach to opex allowances. Our comments on their specific concerns and suggestions are as follows:

- (a) With regards to operating and regulatory environment:
- (i) The companies' comments on regulatory arrangements are discussed in detail in section 2. Although the companies suggested greater cooperation and collaboration between the Bureau and the companies to improve skills and capabilities and alignment of regulatory and Government requirements, the companies did not provide any specific requirements or make any specific proposal to address them. Nevertheless, we have always acknowledged the need for collaboration, aligning regulatory and Government requirements, and considering the companies' operating environment and capability building requirements.
 - (ii) Accordingly, the opex allowances are set in close consultation with the companies providing them opportunities to challenge our projections and provide their inputs with convincing explanation. For PC5 and RC1, we engaged consultants on the companies' suggestion to develop the opex forecasts by using a number of approaches, cost drivers and cost justifications from the companies. To take account of uncertainties, we also introduced flexible arrangements for specific allowances such as Emiratisation, Nationals' training and mega developments. Nevertheless, we welcome the companies' specific proposals to ensure full alignment with, and consideration of, the operating environment and their suggestion for greater cooperation and collaboration with the Bureau.
 - (iii) On the historic opex performance, we consider that such performance has been affected by many factors including shareholder pressure (or lack of it), management and operating efficiencies and resource procurement and management.
- (b) We welcome the companies' recognition that staffing-level inefficiencies may exist in certain areas and are willing to support them to improve on these.
- (c) It may not be pragmatic to consider or implement a totex approach at this stage given the current maturity and recent performance of the companies on providing

robust forecasts and justifications for future capex. Also, we welcome the companies' suggestion for greater transparency over the assumptions used and mechanism of adjustment of any change in the capitalisation policies. Furthermore, we look forward to the companies detailed proposals on both the SBA disclosures for providing the required transparency and the mechanism for adjustment.

- (d) The companies' comments on separate price controls for the distribution and supply business are discussed in section 2. We note the companies' acceptance of a lack of robust cost allocation between distribution and supply businesses. We look forward to distribution companies' further review and refinements in cost allocation methodology, particularly implementation of ABC system to ensure the accurate allocation of costs to separate businesses, including distribution and supply.
- (e) We welcome ADWEA group companies' recognition of the benefits the sector can achieve through implementation of a robust ABC system and the companies' support for implementing such a system. The Bureau together with the sector has already assessed the need and costs and benefits of ABC system (such assessment inevitably being qualitative more than quantitative) with all parties convinced and on board. Accordingly, the Bureau has worked closely with the companies to finalise the scope of work for engaging external consultants to develop and implement ABC system. We now look forward to working with the companies and their consultant over the course of this project in coming months with the target for the companies' 2018 SBAs (1st year of RC1, due on 30 April 2019) prepared on a fully implemented ABC system.
- (f) RAGs were developed in consultation with the companies and followed a systematic phased approach, whereby the companies:
 - (i) first conducted a pilot run of the RAGs on then existing, 2012 SBAs;
 - (ii) implemented certain RAGs in the 2013 SBAs; and
 - (iii) then implemented the remaining requirements of RAGs in the 2014 SBAs.

Except for fair-valuation of related party charges and a few other essential requirements introduced after the RAGs, the companies' recent SBAs broadly align with the RAGs. We welcome the companies support for greater transparency of costs including the ADWEA recharge. Importantly, transparency over the Bureau's license fees is already in place, including publication of both the Bureau's annual audited financial statements and its scale of charges and services. These are available on our website, where the former details the Bureau's costs and the latter sets out a high-level methodology for allocating costs to the license holders.

- (g) We appreciate ADSSC's cooperation on the opex projection work stream and support its suggestion for using realistic benchmarks with adjustments made only to controllable costs. Furthermore, ADSSC is welcomed to engage with the opex consultant and provide its comments on the consultant's reports. We also appreciate ADSSC's support on implementing ABC and look forward to working

closely with ADSSC on this. Finally, while ADSSC's capitalisation policies should be prepared in light of RAGs/IFRS, we look forward to its support both in implementing a reconciliation mechanism and in making the necessary adjustments for any change in its capitalisation policies during implementation of the price control.

Proposed approach to opex projections

4.11 In the interim report issued in October 2016, the Bureau's RC1 opex consultant proposed the following seven-step methodology, similar to PC5, for developing the RC1 opex projections. The consultant has now firmed up their methodology in their draft report issued in January 2017. 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 2015 (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 2015, as derived in step 1, to the start of RC1 period (i.e., 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 2010-2015, 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. 2015) 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 allowing a transition-path for the company from its expected opex-level at the start of RC1 – based on the TCP from step 3 – towards the efficient cost-level based on BECP from step 5. This is the **proposed cost path (PCP)**.

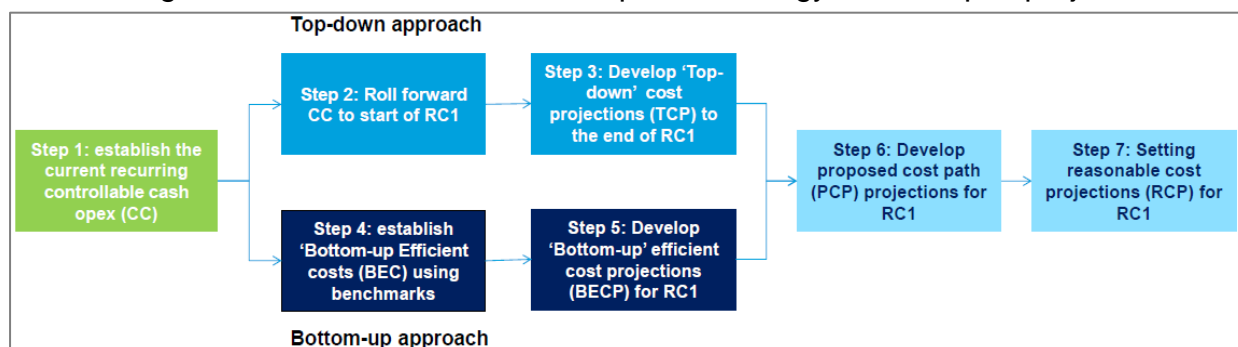
For all companies, the PCP projections have been based on a linear catch-up rate of 15% per annum starting from the second year of RC1. In turn, this will close 45% of the gap between TCP and BECP by the end of RC1 period (2021). This may require further consideration to reflect the extent possible to which the 3%-4% per annum real productivity gain may be surpassed;

- (g) **Step 7** – set the projections of reasonable total opex for RC1 by adding a reasonable estimate of non-controllable opex and adjusting cost savings – either:
- (i) 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) from consented unlicensed activities that will share some of the distribution companies' existing costs such as billing services for ADSSC, Municipalities and ADNOC –

to the opex projections from step 6 - termed **reasonable cost projection (RCP)**.

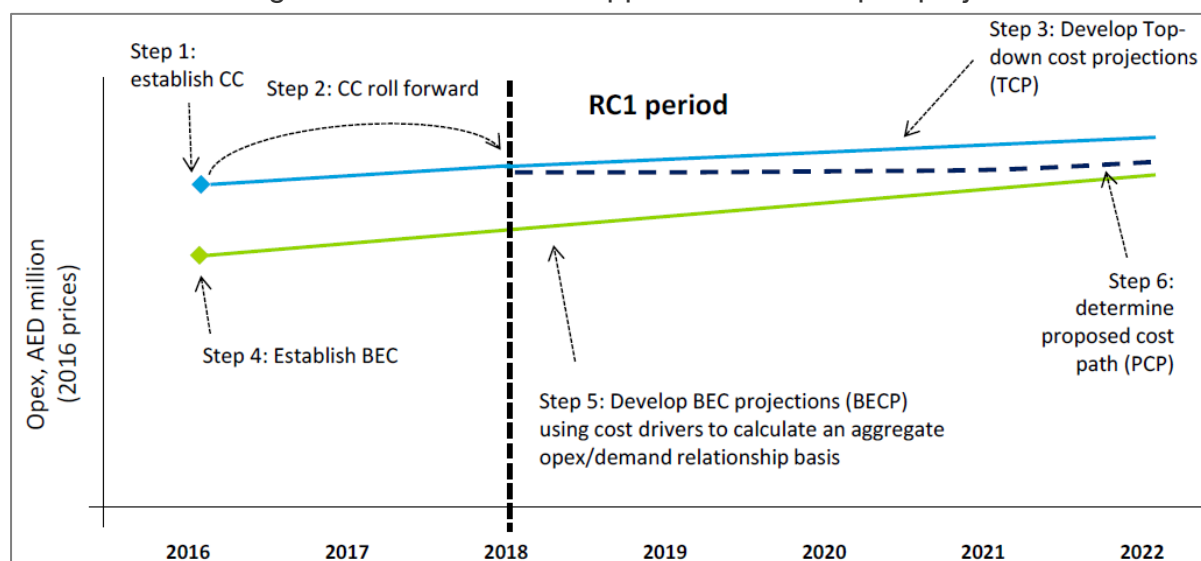
4.12 The consultant's methodology is further illustrated in **Figures 4.2** and **4.3**. At present, consultant's opex projections use the audited 2015 actual costs as the base-level and are expressed in 2016 prices to facilitate comparison with projections in the consultant's final report based on audited 2016 actual costs.

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 Draft Report, January 2017
Notes: For illustration purposes only and not drawn to scale.

Proposed approach to treatment of specific costs

4.13 The Bureau's opex consultant also proposed, in its draft 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 new UAE National staff, the RC1 opex projections include separate allowances for direct training of such staff. For TRANSCO, the opex projections also include an allowance for the apprenticeship scheme for the UAE Nationals, which is based on the most recent actual annual cost-per-student in its 2015 SBAs and the estimate for the total number of apprentices, both provided by TRANSCO.
- (b) **Allowance for additional capabilities** – for AADC and ADDC, the consultant included a specific opex allowance for the additional organisational activities (such as demand side management) 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 intends to include, in its final report, a specific opex allowance for additional costs arising from the transfer of mega-development infrastructure to the companies. This is to be based on additional discussions with, and data from, the companies.
- (e) **Allowance for private tankering services for AADC, ADDC and ADSSC** – the consultant plans to include a specific opex allowance for costs of managing private tankering services in order to improve the quality of service for customers not connected to the water or sewerage network.

- (f) **Allowance for TRANSCO for Liwa Aquifer Recharge Scheme (LARS)** – the consultant's intention is to include additional opex allowances for TRANSCO's water business for LARS, which is currently under construction.
- (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 costs** – the consultant aims to include additional allowances for the pumping energy costs for TRANSCO water business in its final report, subject to finalisation of the metering and billing arrangements that are currently being discussed among TRANSCO, the distribution companies, ADWEC and the Bureau.
- (i) **Cost of billing services** – For ADSSC, the consultant included a specific opex allowance for costs that the distribution companies will charge to ADSSC for billing services. Notably, the billing services provided to ADSSC, Municipalities or any other entity will be classed as unlicensed activities of the distribution companies, such that no costs allowances will be provided in the price controls of distribution companies. However, the efficiencies that will arise for the distribution companies from sharing existing costs with the new activities will be reflected in their price control allowance.
- (j) **GCC grid cost** – For TRANSCO, the consultant did not include any allowance in the opex projections for GCC grid costs, in view of the issues being discussed between TRANSCO and the Bureau.

4.14 Taking into consideration the companies' general support, we propose to continue during RC1 with the PC5 approach of annual adjustment in the additional allowances (except items (c) and (g) above) for any deviation between the estimates and the relevant company's actual results for parameter such as Emiratisation rate and numbers of staff, training courses and students.

Allowance for Emiratisation and training costs

4.15 The assumptions used by the consultant for calculating the additional allowance for Emiratisation, are listed in the consultant's draft report, in terms of:

- (a) total number of full-time employees (FTEs) – either calculated by the 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.

4.16 Consistent with PC5, the RC1 opex projections include separate allowances for direct training of the companies' new UAE National staff, as listed in **Table 4.2**. These allowances are based on estimates of both average training course cost and the number of new UAE National staff. By contrast, training costs for the existing employees are already reflected in the RC1 opex projections base allowance.

Table 4.1: Emiratization allowances included in RC1 cost allowance

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	1.30	1.60	1.30	1.40
	Water	0.60	0.70	0.60	0.60
	Total	1.90	2.30	1.90	2.00
ADDC	Electricity	0.50	0.60	0.70	0.90
	Water	0.40	0.50	0.50	0.70
	Total	0.90	1.10	1.20	1.60
TRANSCO	Electricity	3.60	4.30	4.40	4.60
	Water	2.50	2.60	2.60	2.60
	Total	6.10	6.90	7.00	7.20
ADSSC	Total	5.30	6.00	6.80	7.40
Total		14.20	16.30	16.90	18.20

Table 4.2: Direct training allowances included in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	-	-	-	-
	Water	-	-	-	-
	Total	-	-	-	-
ADDC	Electricity	0.30	0.30	0.20	0.20
	Water	-	-	-	-
	Total	0.30	0.30	0.20	0.20
TRANSCO	Electricity	1.60	1.70	1.60	1.50
	Water	-	-	-	-
	Total	1.60	1.70	1.60	1.50
ADSSC	Total	1.00	0.90	0.80	0.50
Total		2.90	2.90	2.60	2.20

- 4.17 As in PC5, the RC1 opex projections for TRANSCO include an allowance for an apprenticeship scheme for the UAE Nationals (see **Table 4.3**) based on the most recent annual cost per student and the estimated total number of apprentices. This allowance will be adjusted both for the actual number of apprentices and for any material difference between the assumed and actual annual per-student cost of this scheme (subject to the efficiency assessment of any higher costs).

Table 4.3: Apprenticeship scheme allowances in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
TRANSCO	Electricity	3.30	3.60	1.80	-
	Water	2.90	3.20	1.60	-
Total		6.20	6.80	3.40	-

Note: TRANSCO needs to provide required information for 2021 to Deloitte to estimate the allowance.

- 4.18 Since the cost of TRANSCO's apprenticeship programme is reimbursed separately, TRANSCO and its financial auditors need to ensure that the apprentices are excluded from its FTE figures. This will make sure that reimbursement is not duplicated through the Emiratization and apprenticeship allowances.

Allowance for additional capabilities

- 4.19 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 the new organisation structure not receiving external approvals. Consequently, these additional allowances were clawed-back from AADC and ADDC through annual opex adjustments. For RC1, the consultant has reinstated these allowances for AADC and ADDC, with no allowance for ADSSC. The resulting allowances are listed in **Table 4.4**.

Table 4.4: Additional capabilities allowances in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	1.60	1.60	1.60	1.60
	Water	1.00	1.00	1.00	1.00
	Total	2.60	2.60	2.60	2.60
ADDC	Electricity	1.50	1.50	1.50	1.50
	Water	1.20	1.20	1.20	1.20
	Total	2.70	2.70	2.70	2.70
Total		5.30	5.30	5.30	5.30

Real price effects on staff costs

- 4.20 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 basic salaries. The resulting allowances are listed below in **Table 4.5**.

Table 4.5: Real price effects on staff costs included in RC1 opex projections

AED million, 2016 prices		2018	2019	2020	2021
AADC	Electricity	4.20	5.60	7.10	8.60
	Water	2.10	2.80	3.60	4.30
	Total	6.30	8.40	10.70	12.90
ADDC	Electricity	4.30	5.70	7.10	8.50
	Water	2.90	3.90	4.90	5.90
	Total	7.20	9.60	12.00	14.40
TRANSCO	Electricity	6.70	9.10	11.30	13.60
	Water	4.30	5.70	7.10	8.50
	Total	11.00	14.80	18.40	22.10
ADSSC	Total	3.40	4.60	5.70	6.80
Total		27.90	37.40	46.80	56.20

Allowance for mega development assets

- 4.21 As discussed above, AADC, ADDC and ADSSC need to provide reasonable estimates of network length and the timing of the transfer of such assets to the companies, so that the opex consultants estimate specific allowances in their final report in June 2017, which will then be considered in the RC1 final proposals.
- 4.22 Once such opex estimates are incorporated into RC1, we can adjust this allowance annually for any deviation between the actual size and timing of assets transferred and the assumption used for the allowance. Such an adjustment would be made using the opex-per-kilometre benchmark established at this price control review. In case the companies take over only the operational control of such assets without transfer of ownership, only 50% of the set allowance will be provided until the time the companies

take ownership of the assets. This is consistent with our approach for PC5, incentivises the companies to take asset ownership as soon as possible and assumes no remuneration of O&M services from developers or third parties.

Allowance for tankering services for AADC, ADDC and ADSSC

4.23 Currently, we intend for our final proposals to include additional opex allowances for AADC, ADDC and ADSSC for the management of tankering services, in order to improve quality of these services for customers not connected to the water or sewerage network. 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 sector on the regulatory framework. Tankering management framework is led by ADWEA and one aspect is assessing the cost-impact of this activity and discussing with the opex consultant suitable allowances that can be provided at this price control review. Our preliminary assessment shows the following two costs are involved:

- (a) payments to third-party contractors either for transporting water from the distribution companies' water stations to the customers, or for the haulage of wastewater from customers to ADSSC's treatment reception points; and
- (b) distribution companies' and ADSSC's costs of managing this activity, based on the companies' requirement for new staff and systems or outsource of such management activity to a third party.

The companies need to provide their cost estimates and justification to the opex consultant to include the allowances in the consultant's final report (due in June 2017), in turn in the RC1 final proposals.

Allowance for TRANSCO for Liwa Aquifer Recharge Scheme

4.24 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, we intend to include an additional opex allowance in our final proposals for TRANSCO. The Bureau and the TRANSCO are discussing with the opex consultant suitable water business allowances that can be provided at this price control review. Our preliminary assessment shows the following two costs are involved:

- (a) TRANSCO's payments for services provided by an outsourced service provider; and
- (b) TRANSCO's own costs for operating and maintaining its storage facility.

4.25 TRANSCO must submit and justify actual and forecast internal operating expenditure for LARS assets to the opex consultant by April 2017 to enable the inclusion of a reasonable allowance for efficient operating expenditure for TRANSCO's price controls for 2018 onwards. Where TRANSCO is intending to incur operating cost that relates to services provided by an out-sourced service provider, then TRANSCO needs to provide evidence of such operating cost being a competitive or economically efficient cost so that such cost may be allowed by the Bureau to be recovered by TRANSCO through the price controls.

Water pumping costs

- 4.26 During 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 PC5 period. Accordingly, the allowances are clawed back through annual opex adjustments. TRANSCO is currently in discussion with the distribution companies and ADWEC to develop arrangements for metering and billing to TRANSCO for all pumping stations in Abu Dhabi and outside. The consultant's intention is to include additional allowances for the pumping costs, subject to finalisation of these arrangements and availability of information from TRANSCO.

Cost of billing services by distribution companies to ADSSC

- 4.27 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 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.
- 4.28 The distribution companies' charges and the subsequent opex allowance for ADSSC comprise the distribution companies' existing costs, allocated to ADSSC, and incremental costs.

Table 4.6: Billing services allowance in RC1 opex projections

<i>AED million, 2016 prices</i>		2018	2019	2020	2021
ADSSC	Total	146.20	146.20	146.20	146.20

GCC grid cost

- 4.29 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 the opex consultant for the allowance.

ADWEA recharges

- 4.30 ADWEA recharges have been treated in the same manner as the 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, in line with companies' other costs.

Pumping energy cost increases due to electricity tariff

- 4.31 The consultant has included additional allowance for TRANSCO and ADSSC pumping station costs for the increase in energy costs resulting from the electricity tariff increase in the Emirate for 2017. Any further increase in electricity tariff during RC1 period will be taken into consideration through inflation indexation of opex allowance.

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

<i>AED million, 2016 prices</i>		2018	2019	2020	2021
ADSSC	Total	11.80	12.00	12.20	12.40
TRANSCO	Water/Total	17.80	18.40	19.00	19.60
Total		29.60	30.40	31.20	32.00

Total allowances for specific costs

- 4.32 **Table 4.8** presents the total allowances for the specific costs, discussed above, for each business included in the consultant's draft report. These total allowances will range between AED 232 million and AED 260 million a year over the RC1 period. These allowances are dominated by ADSSC (average AED 171 million a year) and TRANSCO (average AED 48 million a year), followed by ADDC (AED 15 million a year) and AADC (AED 14 million a year).

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

<i>AED million, 2016 prices</i>		2018	2019	2020	2021
AADC	Electricity	7.10	8.80	10.00	11.60
	Water	3.70	4.50	5.20	5.90
	Total	10.80	13.30	15.20	17.50
ADDC	Electricity	6.60	8.10	9.50	11.10
	Water	4.50	5.60	6.60	7.80
	Total	11.10	13.70	16.10	18.90
TRANSCO	Electricity	15.20	18.70	19.10	19.70
	Water	27.50	29.90	30.30	30.70
	Total	42.70	48.60	49.40	50.40
ADSSC	Total	167.70	169.70	171.70	173.30
Total		232.30	245.30	252.40	260.10

Cost savings

- 4.33 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 ADSSC and the Municipalities;
 - c) ADSSC's Strategic Tunnel Enhancement Program (STEP); and
 - d) Distribution companies' customer service transformation or digitisation.

4.34 **Table 4.9** presents the cost savings from above initiatives for each business included in the consultant's draft report. These total savings will be approximately AED 294 million a year over the RC1 period. These savings are dominated by ADDC (AED 153 million a year) and AADC (AED 91 million a year), followed by ADSSC (AED 50 million a year).

Table 4.9: Cost savings adjusted in RC1 opex projections

<i>AED million, 2016 prices</i>			2018	2019	2020	2021
Operation and maintenance of street lighting	AADC	Electricity	13.90	13.90	13.90	13.90
	ADDC	Electricity	32.40	32.40	32.40	32.40
	Total		46.30	46.30	46.30	46.30
Billing services to ADSSC	AADC	Electricity	33.40	33.40	33.40	33.40
		Water	31.90	31.90	31.90	31.90
		Total	65.30	65.30	65.30	65.30
	ADDC	Electricity	13.80	13.80	13.80	13.80
		Water	78.40	78.40	78.40	78.40
		Total	92.20	92.20	92.20	92.20
	Total		157.50	157.50	157.50	157.50
Billing services to the Municipalities	AADC	Electricity	5.40	5.40	5.40	5.40
		Water	3.20	3.20	3.20	3.20
		Total	8.60	8.60	8.60	8.60
	ADDC	Electricity	9.60	9.60	9.60	9.60
		Water	8.20	8.20	8.20	8.20
		Total	17.80	17.80	17.80	17.80
	Total		26.40	26.40	26.40	26.40
Customer service transformation	AADC	Electricity	2.20	2.20	2.20	2.20
		Water	1.30	1.40	1.40	1.40
		Total	3.50	3.60	3.60	3.60
	ADDC	Electricity	5.60	5.60	5.60	5.60
		Water	4.50	4.50	4.50	4.50
		Total	10.10	10.10	10.10	10.10
	Total		13.60	13.70	13.70	13.70
STEP	ADSSC	Total	50.10	50.10	50.10	50.10
	Total		50.10	50.10	50.10	50.10
Total	AADC	Electricity	54.90	54.90	54.90	54.90
		Water	36.40	36.50	36.50	36.50
		Total	91.30	91.40	91.40	91.40
	ADDC	Electricity	61.40	61.40	61.40	61.40
		Water	91.10	91.10	91.10	91.10
		Total	152.50	152.50	152.50	152.50
	ADSSC	Total	50.10	50.10	50.10	50.10
	Total		293.90	294.00	294.00	294.00

Supply of recycled water

4.35 At present, these services are managed by ADSSC and the Municipalities. The plan is for the supply of recycled water to be transferred to the distribution companies as a separate licensed activity with its own separate price control. Accordingly, the Bureau and the distribution companies are discussing with the opex consultant suitable, estimated allowances to provide in the new, separate price controls for recycled water businesses. 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. It appears that this may not happen in the timetable for this price control review. In such a case, 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

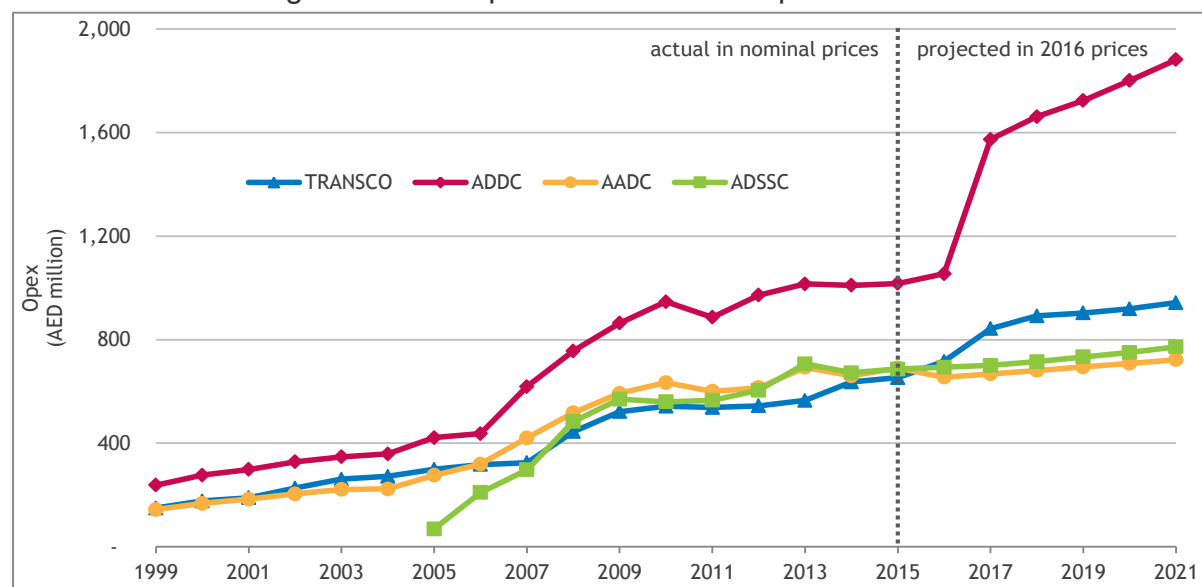
4.36 **Table 4.10** and **Figure 4.4** present the companies' actual opex to date and opex projections for future years including RC1 period (2018-2021) from their 2016 AIS submissions in 2016 prices (unless stated otherwise).

Table 4.10: Companies' RC1 opex forecasts

AED million, 2016 prices		2015	2016	2017	2018	2019	2020	2021
AADC	Electricity	481	445	454	463	472	481	491
	Water	238	210	214	219	223	227	232
	Total	719	655	668	681	695	709	723
ADDC	Electricity	626	618	925	978	1,014	1,061	1,109
	Water	432	437	649	684	710	741	773
	Total	1,058	1,055	1,574	1,662	1,724	1,801	1,882
TRANSCO	Electricity	366	392	453	437	446	456	474
	Water	313	324	390	455	457	463	469
	Total	680	716	843	892	903	919	943
ADSSC	Total	714	693	701	715	733	750	772
Total		3,171	3,119	3,785	3,950	4,055	4,180	4,320

Source: 2015 actuals from the companies 2015 SBAs. 2016-2021 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.

4.37 The main trends in these 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 billion to 4.3 billion in 2016 prices from 2015 to 2021 at an average annual rate of 6% a year (cumulative increase by 42%). The company-specific trends up to 2021 are:
- (i) AADC – increased by 0.8% a year on average or cumulative 4.7% to AED 723 million;
 - (ii) ADDC – increased by 10.8% a year on average or cumulative 85% to AED 1,882 million;
 - (iii) TRANSCO – increased by 6.3% a year or cumulative 44% to AED 943 million; and
 - (iv) ADSSC – increased by 2% a year or cumulative 12.5% to AED 772 million.
- (b) **annual staff costs** increase from AED 1.9 billion to 2.6 billion over 2015-2021 in 2016 prices at an average rate of 5.8% per annum (cumulative increase by 40%) and remain the largest or major part of opex, accounting for overall 60% of total opex.

Consultant's initial opex projections

- 4.38 In its draft report, the opex consultant projected the network companies' opex using the top-down and bottom-up approaches for the period 2018-2021, in 2016 prices.
- 4.39 The consultant's initial recommendation for the RC1 opex allowances is summarised in **Table 4.11**. This represents a proposed cost path assuming a 45% catch-up of the gap from top-down projections to bottom-up projections by the end of 2021 and gives sufficient time for the companies to make improvements and achieve reasonable efficiency. These projections include cost allowances for TRANSCO's transmitting water and electricity outside Abu Dhabi and include specific allowances for all companies in relation to items discussed above such as Emiratisation, training, additional capabilities, pumping energy costs and billing services. The projections indicate 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

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

Assessment of consultant's opex projections

Comparison against companies' opex forecasts

4.40 As the comparison between **Tables 4.10** and **4.11** indicates, the consultant's initial 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) consultant's estimated aggregate opex for the four companies (AED 2.8-2.9 billion) are lower than the companies' forecasts (AED 4.0-4.3 billion) by AED 1.2-1.4 billion or, on average by AED 1.3 billion or 31%; and
- (b) the consultant's initial opex projections imply a reduction of AED 131 million or 19%, AED 962 million or 54% and AED 209 million or 23% for AADC, ADDC and TRANSCO, respectively and an increase of AED 31 million or 4% for ADSSC against the individual companies' forecasts, due to the following cost reductions or increases reflected in the 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;
 - (ii) reduction for AADC and ADDC in particular relating to the savings from billing services to ADSSC and Municipalities, O&M cost of street lighting and customer service transformation;
 - (iii) no additional pumping energy costs for TRANSCO;
 - (iv) cost of billing service from distribution companies to ADSSC.

Comparison against companies' 2015 actual opex

4.41 **Table 4.12** compares the consultant's initial opex projections for RC1 against the companies' 2015 actual opex and highlights important expected trends:

- (a) for AADC, the RC1 projections assume an opex decrease from 2015 to 2018 at an average annual rate of 6% and from 2015 to 2021 at 4% a year, mainly by including cost savings from street lighting responsibilities transferring to Municipalities and billing services to ADSSC and Municipalities;
- (b) for ADDC, the RC1 projections assume an opex decrease from 2015 to 2018 at an average annual rate of 8% and from 2015 to 2021 at 5% a year (for reasons similar to those stated above for AADC);
- (c) for TRANSCO, the projections assume 1% annual increase in opex from 2015 to 2018 as well as from 2015 to 2021;
- (d) for ADSSC, the projections assume an annual increase of 4% in opex from 2015 to 2018 and 1% from 2015 to 2021 (mainly because of allowance for billing services costs included in the projections); and
- (e) on an aggregate basis, the projections indicate a reduction in costs from 2015 by AED 254 million by 2018 (at an average rate of 3% a year) and by AED 379 million by 2021 (at an average rate of 2% a year).

Table 4.12: Consultant's initial opex projections – comparison against 2015 actuals

AED million, 2016 prices	2015 actual opex	2018 projection against 2015 actual			2021 projection against 2015 actual		
		2018 opex	Difference	CAGR (%)	2021 opex	Difference	CAGR (%)
AADC	719	595	-123	-6%	547	-172	-4%
ADDC	1,058	827	-232	-8%	787	-272	-5%
TRANSCO	680	702	22	1%	704	25	1%
ADSSC	714	793	79	4%	755	40	1%
Total	3,171	2,917	-254	-3%	2,792	-379	-2%

Comparison against 2017 price control allowances

4.42 **Table 4.13** compares the consultant's initial opex projections for RC1 against the PC5 allowance for 2017 opex (the last year of PC5). This comparison highlights the following:

- the RC1 opex projections assume a decrease in opex allowance for all the four network companies (except ADSSC) by 14% to 44% mainly due to savings or cost re-allocations included in distribution companies' projections and pumping costs excluded from TRANSCO projections. For ADSSC, the projections indicate an increase of 12% during the same period mainly on account of billing services costs. On aggregate, this gives a decrease of AED 814 million or 22%; and
- the RC1 projections indicate a relatively smaller decrease in opex allowance from 2017 to 2021, at an average annual rate of 5%-15% for the individual companies (except ADSSC) or a decrease of about AED 939 million or at an annual rate of 7% for all companies in aggregate. For ADSSC, the projections indicate an annual increase of 2% over this period.

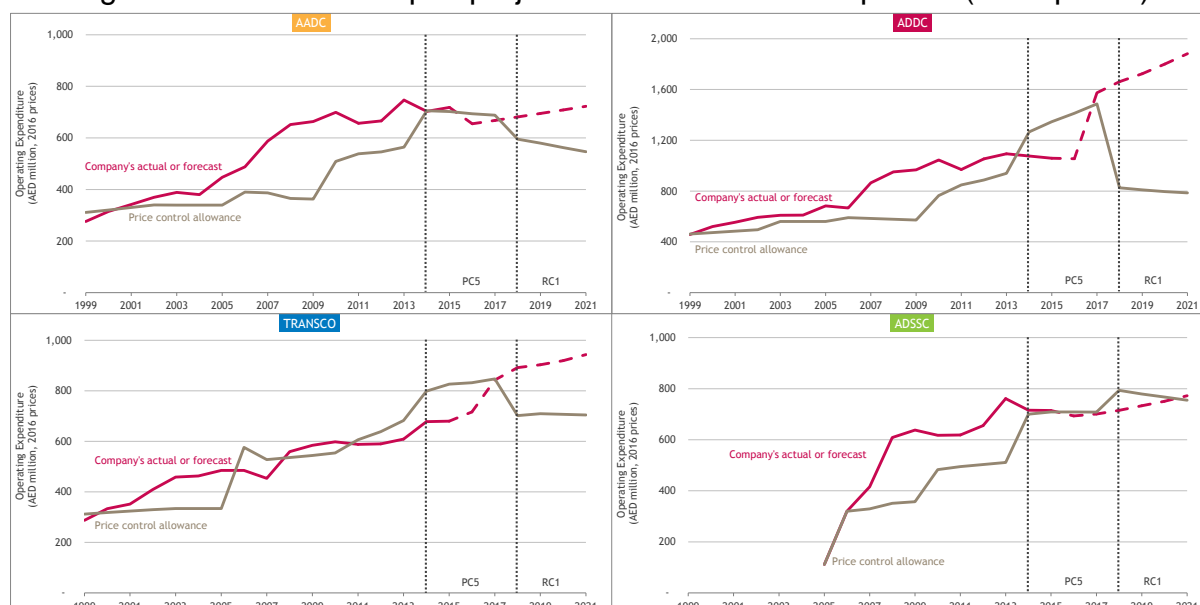
Table 4.13: Consultant's initial projections – comparison against 2017 price control allowance

AED million, 2016 prices	2017 allowance	2018 against 2017 allowance			2021 against 2017 allowance		
		2018 opex	Difference	CAGR (%)	2021 opex	Difference	CAGR (%)
AADC	688	595	-93	-14%	547	-142	-6%
ADDC	1,487	827	-660	-44%	787	-700	-15%
TRANSCO	847	702	-145	-17%	704	-143	-5%
ADSSC	709	793	85	12%	755	46	2%
Total	3,731	2,917	-814	-22%	2,792	-939	-7%

Summary of comparisons

4.43 The following charts present the consultant's initial RC1 opex projections, the above comparative analysis, the overall trends for the price control opex allowances and the companies' actual opex.

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



- 4.44 As the above charts show, the proposed opex allowances for RC1 are generally lower (except for TRANSCO and ADSSC) than the companies' 2015 actual opex by around 6%-8% for the reasons stated above. This is significantly lower than their 2016 AIS forecasts in real terms because of both the exclusion or re-allocation of certain costs and the expected cost savings or efficiency gains and pending inclusion of certain specific cost allowances in the opex consultant's final report or in future upon submission of required information from companies.

Draft proposals

- 4.45 Pending further work by the opex consultant over the next few months, the Bureau has adopted in these draft proposals the consultant's initial opex projections for RC1 from its draft report of January 2017 as set out in **Table 4.11** above in 2016 prices and in **Table 4.14** below in 2018 prices.

Table 4.14: RC1 opex projections – draft proposals

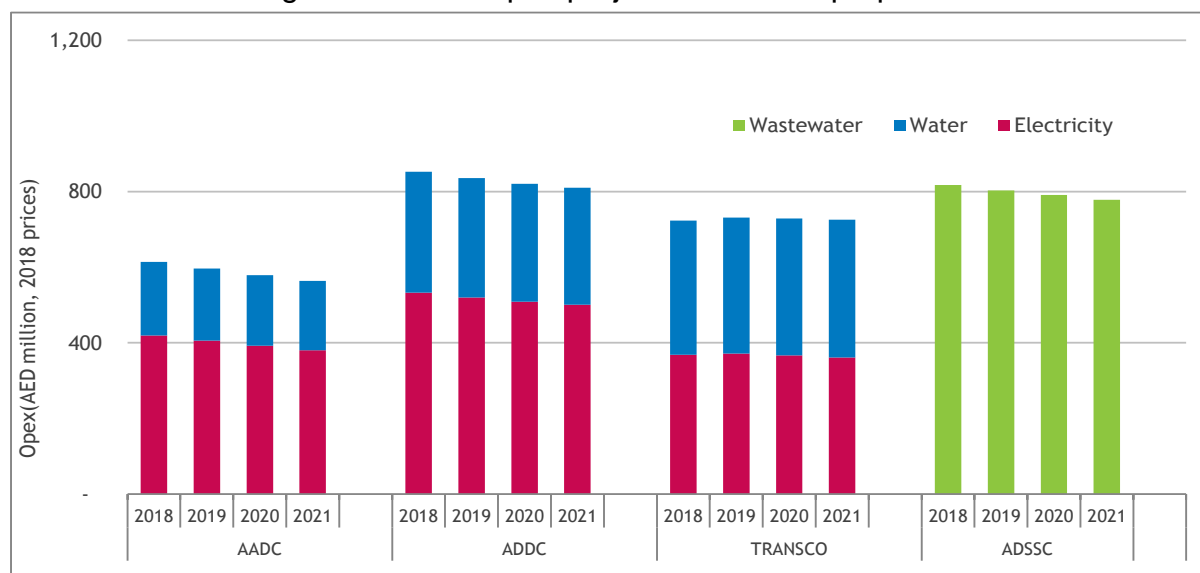
AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	419	406	393	380
	Water	195	191	186	183
	Total	613	597	579	563
ADDC	Electricity	532	520	509	501
	Water	319	315	311	309
	Total	852	835	820	810
TRANSCO	Electricity	369	372	366	362
	Water	354	359	362	364
	Total	723	731	728	726
ADSSC	Total	817	803	791	778
Total		3,005	2,966	2,919	2,877

- 4.46 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 830 million p.a.), followed by ADSSC (average AED 800 million p.a.), TRANSCO (average AED 730 million p.a.) and AADC (average AED 590 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 – draft proposals



4.47 The RC1 opex projections presented in these draft proposals:

- (a) include provisional cost allowances for Emiratisation, direct staff training, and TRANSCO apprenticeship program subject to annual adjustments during the relevant year of the RC1 period;
- (b) exclude the Bureau's licence fees given the pass-through treatment proposed for RC1;
- (c) presently do not include additional opex allowances for mega developments (for AADC, ADDC and ADSSC), water pumping energy costs and LARS (for TRANSCO) and private tankering services (AADC, ADDC and ADSSC). Our final proposals will include these allowances upon opex consultant receiving and assessing the required information and justification from companies; and
- (d) 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 ADSSC and commissioning of ADSSC's STEP project.

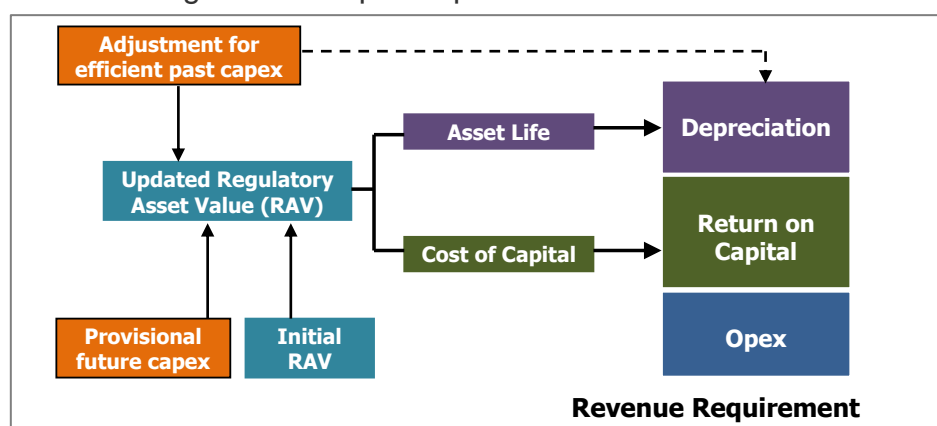
4.48 Looking ahead, the opex consultants are due to issue their final report in June 2017. The consultant will update their RC1 opex projections by taking into account the companies' 2016 actual audited costs, further information and comments from the companies, and any further research they undertake. It is therefore essential that the companies provide all required information with reasonable explanation and justification in time for the consultant's final report on RC1 opex.

5. Capital expenditure

Introduction

- 5.1 Capital expenditure (capex) is the most significant input to the price control calculations and directly affects two of the three building block of the required revenue. That is, in the price controls, capex is funded through depreciation and return on capital allowances, with the Bureau's estimates of efficient capex being added to the RAVs over time. The way that capex is planned and subsequent works are procured therefore provides significant opportunities to improve sector efficiency. Capex is also important for the timely meeting of demand for both new connections and load growth, and as well as the replacement or improvement of existing network infrastructure.

Figure 5.1: Capex in price control calculations

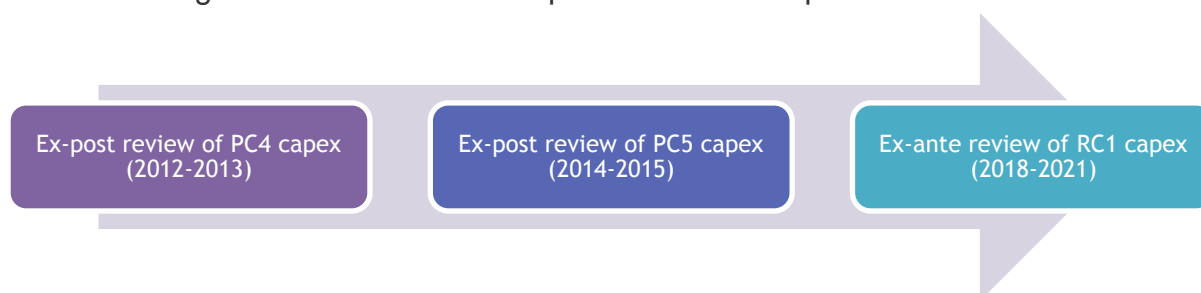


- 5.2 The treatment of capex in the previous price control reviews has essentially been based on an ex-post assessment of efficient capex. Under ex-post regime, provisional allowances for future capex are incorporated into the price controls to facilitate the financing of capex and the smoothing of the price control revenue from one period to another (without indicating the Bureau's views of the efficient level of capex). Necessary financial adjustments are then made at the subsequent price control review to compensate a company for the difference between the provisional capex allowance and the actual efficient capex (taking account of financing costs). The high-level efficiency criteria (established by the Bureau in 1999) are that capex will be considered efficient:

- (a) if it was required to meet growth in customer demand or relevant security and performance standards; and
- (b) if it was efficiently procured (in relation to both the tendering process and project management).

- 5.3 Capex undertaken from PC1 through to PC4 (2010-2011) was dealt with at the previous price control reviews. This section 5 deals with both (a) the ex-post capex efficiency reviews for PC4 (2012-2013) and PC5 (2014-2015), and (b) the ex-ante review to provide capex allowance for RC1.

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



5.4 The following considerations are relevant to these work streams.

- (a) In the earlier RC1 consultation papers, the Bureau made a number of commitments to the treatment of PC4 (2012-2013) and PC5 (2014-2015) capex. This included assessing capex efficiency and using a process-scoring methodology with adjustments to price control to be made at this review. In June 2016 and January 2017, respectively, we issued the final efficiency assessment reports for both PC4 (2012-2013) and PC5 (2014-2015) capex using a process-scoring methodology similar to the previous capex reviews, albeit with refinements for lessons-learned from previous reviews including the 2012-2013 capex review.
- (b) The Bureau and network companies have always acknowledged the limitations of the ex-post approach to capex assessment. Therefore, the Bureau, in liaison with the companies, has planned to move towards a forward-looking ex-ante approach to the treatment of future capex in the price controls. In February 2016, we conducted a workshop with the companies to discuss the framework for ex-ante capex review. At a subsequent workshop in May 2016, we proposed the high-level framework and timetable for this review. With the ex-ante review conducted for all companies during 2016, we have now concluded the review with the issue of our decision in February 2017 to the companies setting out the ex-ante capex allowances for RC1 period. The plan is to incorporate firm allowances for future capex in RC1 based on this ex-ante review, to be followed by:
 - (i) an interim review in the middle of RC1 period (ie, 2019) to reset if necessary the ex-ante capex allowances for the last two years of RC1 period (ie, 2020-2021); with
 - (ii) regular but limited ex-post reviews to close annual capex in the price controls as soon as possible – with the next ex-post capex review planned for the last two years of PC5 (2016-2017) in 2018.

5.5 The application of the above approach to capex over each price control period to date is summarised in the following table.

Regulatory review of price controls for 2018 onwards – RC1 draft proposals				
Author	Document	Version	Publication date	Approved by
CC/SI/SS/AR	EC/E02/108	Issue 1	20 April 2017	SSQ

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 us in 2015-2016	2014-2015 capex review carried out by us 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
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.	Adjustment for 2014-2015 being made in RC1. Interim adjustment for 2016-2017 to be considered during RC1 or at next price control review	Interim adjustment to be considered during RC1 or at next price control review

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 capex

Second consultation paper

5.6 The efficiency of capex for the first two years of PC4 period (2010 – 2011) was assessed and reflected when the PC5 controls were set. The RC1 first and second consultation papers summarised the arrangements agreed for the last two years of PC4 (2012-2013) and the first two years of PC5 (2014-2015).

Table 5.2: PC4 (2012-2013) provisional and actual capex

AED million, nominal prices		Provisional capex			Actual capex		
		2012	2013	Total	2012	2013	Total
AADC	Electricity	923	930	1,853	348	1,238	1,586
	Water	133	134	268	183	434	617
	Total	1,057	1,064	2,121	531	1,672	2,203
ADDC	Electricity	1,611	1,622	3,232	988	1,368	2,356
	Water	605	609	1,215	378	773	1,151
	Total	2,216	2,231	4,447	1,366	2,141	3,507
TRANSCO	Electricity	5,366	5,402	10,768	1,041	2,899	3,940
	Water	2,596	2,613	5,209	2,619	755	3,374
	Total	7,962	8,015	15,976	3,660	3,654	7,314
ADSSC	Total	3,078	3,098	6,176	3,360	2,142	5,502
Total		14,313	14,408	28,720	8,917	9,609	18,526

Notes: Conversion from provisional capex 2010 prices to nominal prices is based on estimate UAE CPI 93.57 for 2009, actual 94.34 for 2009, 95.17 for 2010, 96 for 2011, 96.64 for 2012 and 97.71 for 2013. Actual figures were sourced from the companies' audited SBAs.

5.7 At the 2009 PC4 control review, provisional capex allowances of approximately AED 28.7 billion (in nominal prices) for 2012-2013 were incorporated into the PC4 controls for the four network companies. In comparison, these companies actually spent AED 18.5 billion

(in nominal prices), or AED 10.2 billion lower than their provisional allowances as shown in the table above.

- 5.8 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.
- 5.9 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 5.3**).

Table 5.3: PC4 (2012-2013) capex efficiency scores

Adjusted efficiency	Electricity	Water / Wastewater
AADC	92.38%	91.58%
ADDC	89.08%	89.01%
TRANSCO	93.67%	92.97%
ADSSC		94.00%

- 5.10 **Table 5.4**, reproduced from the second consultation paper, indicates the companies' efficient capex spent in nominal prices during 2012-2013, derived by applying the efficiency scores from **Table 5.3** to respective actual capex in **Table 5.2**.

Table 5.4: PC4 (2012-2013) actual efficient capex in nominal prices

AED million, nominal prices		2012	2013	Total
AADC	Electricity	321	1,144	1,465
	Water	168	397	565
	Total	489	1,541	2,030
ADDC	Electricity	880	1,219	2,099
	Water	336	688	1,025
	Total	1,217	1,907	3,123
TRANSCO	Electricity	975	2,715	3,691
	Water	2,435	702	3,137
	Total	3,410	3,417	6,827
ADSSC	Total	3,158	2,013	5,172
Total		8,274	8,879	17,153

- 5.11 The RC1 second consultation paper sought views from the network companies on the work to date on the ex-post capex reviews for 2012-2013 (and 2014-2015).

Responses

- 5.12 While respondents had comments on the ex-post capex assessments for 2012-2013 and 2014-2015, yet all unanimously supported timely assessments and adjustments in the price controls, preferably on annual basis. The respondents in general favoured moving towards more forward-looking ex-ante reviews with further clarity from the Bureau on certain areas and stressed the need for alignment of regulatory allowances with Government requirements. The individual responses of ADWEA, ADWEA group companies and ADSSC are summarised below:

- (a) ADWEA group companies recognised that the sector could improve capital delivery. However, the group expressed concerns on both the ex-post approach and process scoring methodology (PSM) employed by the Bureau for recent reviews. ADWEA group companies considered that the ex-post approach is backward looking and risky to the sector and the underlying PSM is subjective and non-transparent. The group argued that the methodology unfairly penalises the companies since a direct link between process-based assessments and efficient capex spending does not exist. Further, the companies' performance under this approach is measured against practices that are considered efficient now but were not considered so at the time when the companies actually spent this capex. Accordingly, ADWEA group companies did not support this approach unless the Bureau demonstrates the effect of non-achievement of processes on capex efficiency. They argued that consultations on 2014-2015 ex-post capex assessment were unduly narrow, and employed a methodology that did not represent the sector's consensus. The companies suggested for the Bureau to further develop the approach, offering necessary support.
- (b) ADWEA group companies preferred the Bureau to employ independent external consultants for capital efficiency assessments as opposed to carrying out such reviews with the Bureau's internal resources.
- (c) ADSSC believed that the 2012-2013 assessment was a step forward compared to those done previously. However, it noted that the Bureau should thoroughly study the proposed capex adjustments given effects on the future of its business. It also claimed that the assessment has subjective inconsistencies that undermine the process' validity. ADSSC stated that it has responded to 2015 underspending separately, seeking clarification on how unused capex is removed from both the RAV and MAR. To better understand the assessment process, ADSSC sought a detailed breakdown of the elements involved in the assessments.

Assessment

5.13 We welcome ADWEA group companies' recognition that further efficiencies in capital delivery are achievable and their offer for support to the Bureau. We also welcome the companies' suggestions to ensure that regulatory allowances are fully aligned with Government requirements. Our assessment of the companies detailed comments is as follows:

- (a) On the companies' comments regarding the methodology, timing and results, we highlight that:
 - (i) There is a wide range of capex review methodologies and in Abu Dhabi we have used two main methodologies (with variations and refinements over time) in the past namely - Monetary Quantification Methodology (MQM) and Process Scoring Methodology (PSM). Like others, both these methods have advantages and limitations. The companies have expressed concerns about both methods but clearly and consistently preferred PSM.

- (ii) To address the companies concerns, particularly transparency on efficiency scoring and application of scores on capex to derive efficient capex, the Bureau further developed the PCM in consultation with companies. The methodologies for both PC4 and PC5 capex reviews were developed through extensive consultations with the sector through workshops, meetings and opportunities to provide comments on the draft and final capex review reports. The companies have already accepted the final reports.
 - (iii) We have considered the issues surrounding timely capex reviews and the desire to reduce the time-lag between actual spend and adjustment in the price control. Accordingly, we have already significantly reduced the time lag by undertaking ex-post capex reviews every two years in recent past. We believe this strikes an appropriate balance and any departure from this would impose unjustified burdens on both the regulator and licensees.
 - (iv) Nevertheless, the Bureau notes and recognises inherent limitations of the ex-post capex review approach in general and the companies' preference for ex-ante reviews for future capex, thus we are moving towards ex-ante approach (see further details later in this section). However, the first experience of ex-ante reviews shows that the sector does not have the required information even for the front-end elements of the capital planning. Hence, very few new projects have been approved, which is a great concern. The companies need to significantly improve their capex planning process for smooth transition towards their preferred, ex-ante approach.
- (b) We also note ADWEA group companies' suggestion for external consultants to carry out the capex efficiency reviews. However, we note the companies have had concerns over such consultants, particularly in relation to the region's specific conditions. In the past, the sector suggested using Bureau's in-house expertise given their knowledge, understanding of the sector, companies' operating environment and planning statements. The Bureau accepts that different approaches have their own merits, and reserves the right to assess in consultation with the stakeholders at each stage which approach better serves the sector. Currently, we consider that the approach we followed, using our own resources, better meets the requirements of the sector for this review, and as previously provided by the companies, the feedback was overall positive.
- (c) We welcome ADSSC's recognition that the methodology has improved from previous assessments. We reiterate that all companies had and fully availed the opportunity to provide feedback on the assessments via draft and final efficiency assessment reports. Therefore, the Bureau believes that this process was transparent. The detail criteria and process of assessment are provided in these reports. The impact and treatment of capex under/over spending and efficiency reviews on MAR and RAV are explained in this section and section 6, respectively.

Draft proposals

- 5.14 **Table 5.5** presents the difference between efficient capex in **Table 5.4** and provisional capex allowed in price controls from **Table 5.2**. In aggregate, the network companies had efficient capex of AED 17.2 billion, which was AED 11.6 billion lower than the provisional allowance of AED 28.7 billion – all in nominal prices. This amount has been clawed-back via an appropriate adjustment to the companies' RAVs at this price control review, inclusive for the time value of money and financing costs unduly earned or foregone. Section 6 provides further details on this.

Table 5.5: PC4 (2012-2013) additional (shortfall) efficient – draft proposals

AED million, nominal prices		2012	2013	Total
AADC	Electricity	(602)	214	(388)
	Water	34	263	297
	Total	(568)	477	(90)
ADDC	Electricity	(731)	(403)	(1,134)
	Water	(269)	79	(190)
	Total	(1,000)	(324)	(1,324)
TRANSCO	Electricity	(4,391)	(2,686)	(7,077)
	Water	(161)	(1,911)	(2,072)
	Total	(4,552)	(4,597)	(9,149)
ADSSC	Total	80	(1,085)	(1,005)
Total		(6,039)	(5,529)	(11,568)

Treatment of PC5 capex

Second consultation paper

- 5.15 At the 2013 price control review (PC4), provisional capex allowances of AED 20 billion (in nominal prices) for the PC5 period were incorporated into the PC5 controls for the four companies. As shown in **Table 5.6** below, the total provisional capex for 2014-2015 was AED 20 billion (in nominal prices).
- 5.16 In response to the companies' suggestion for a more timely review, the PC5 capex review has been brought forward, such that 2014-2015 capex was reviewed in 2016 with the RAV efficiency adjustments to be made at this review.
- 5.17 Both the RC1 first and second consultation papers stated that a similar scoring methodology to PC4 capex review would apply when assessing the capex efficiency of PC5 (2014-2015). In September 2016, in consultation with the sector, we finalised the newly adopted methodology for this capex review and onwards. The methodology took into consideration the lessons-learned and challenges faced during the PC4 capex review, as well as the companies' comments on PC4 capex review methodology. We also strengthened the methodology's focus on cost, time and quality deliverables/outputs of the capex projects.

Table 5.6: PC5 (2014-2015) provisional and actual capex

AED million, nominal prices		Provisional capex			Actual capex		
		2014	2015	Total	2014	2015	Total
AADC	Electricity	700	717	1,417	246	179	425
	Water	300	307	607	210	103	313
	Total	1,001	1,024	2,025	456	282	738
ADDC	Electricity	2,702	2,765	5,467	859	653	1,512
	Water	600	614	1,215	701	365	1,066
	Total	3,302	3,379	6,681	1,560	1,018	2,578
TRANSCO	Electricity	2,301	2,355	4,657	2,369	1,267	3,636
	Water	1,801	1,843	3,644	107	275	382
	Total	4,102	4,199	8,301	2,476	1,542	4,018
ADSSC	Total	1,601	1,639	3,239	2,184	1,432	3,616
Total		10,006	10,241	20,247	6,676	4,274	10,950

Notes: Conversion from provisional capex 2014 prices to nominal prices is based on estimate UAE CPI 97.65 for 2013, actual 97.71 for 2013 and 100 for 2014. Actual figures were sourced from the companies' audited SBAs.

5.18 The RC1 second consultation paper sought views from the network companies on the work planned for ex-post capex reviews for 2014-2015.

Responses

5.19 The companies provided their views on the ex-post review for 2014-2015 capex similar to the comments on 2012-2013 capex review summarised in the earlier paragraphs of this section.

Assessment

5.20 The Bureau's assessment of the responses is provided in the preceding section on the treatment of PC4 capex.

Draft proposals

5.21 In December 2016, the Bureau completed the ex-post capex efficiency assessment for the period 2014-2015 and presented its draft efficiency assessment reports to the companies in November 2016. Based on additional evidence from the companies, we concluded our assessment, with the final efficiency assessment reports issued in January 2017. Overall, the companies' efficiency scores ranged from 88.38% to 94.98% (see **Table 5.7**)

Table 5.7: PC5 (2014-2015) capex efficiency scores

Adjusted efficiency	Electricity	Water / Wastewater
AADC	91.02%	92.69%
ADDC	88.38%	90.65%
TRANSCO	94.98%	90.90%
ADSSC		91.23%

- 5.22 **Table 5.8** presents the companies' efficient capex spend in nominal prices during 2014-2015, derived by applying the efficiency scores from **Table 5.7** to respective actual capex in **Table 5.6**.

Table 5.8: PC5 (2014 - 2015) efficient capex

AED million, nominal prices		2014	2015	Total
AADC	Electricity	224	163	387
	Water	195	95	290
	Total	419	258	677
ADDC	Electricity	759	577	1,336
	Water	635	331	966
	Total	1,395	908	2,303
TRANSCO	Electricity	2,250	1,203	3,453
	Water	97	250	347
	Total	2,347	1,453	3,801
ADSSC	Total	1,992	1,306	3,299
Total		6,153	3,926	10,079

- 5.23 **Table 5.9** below presents the difference between efficient capex in **Table 5.8** and provisional capex allowed in price controls from **Table 5.6**. Overall, the network companies had efficient capex of AED 10 billion, which is half of the provisional AED 20 billion allowance – all in nominal prices. This amount needs to be clawed-back through an appropriate adjustment to the companies' RAVs at this price control review, inclusive of the time value of money and financing costs unduly earned or foregone. Section 6 provides further details on this.

Table 5.9: PC5 (2014-2015) additional (shortfall) efficient – draft proposals

AED million, nominal prices		2014	2015	Total
AADC	Electricity	(477)	(554)	(1,030)
	Water	(106)	(212)	(317)
	Total	(582)	(766)	(1,348)
ADDC	Electricity	(1,942)	(2,188)	(4,130)
	Water	35	(284)	(248)
	Total	(1,907)	(2,471)	(4,379)
TRANSCO	Electricity	(51)	(1,152)	(1,203)
	Water	(1,704)	(1,593)	(3,297)
	Total	(1,755)	(2,745)	(4,500)
ADSSC	Total	392	(332)	59
Total		(3,853)	(6,315)	(10,167)

Treatment of future capex

Second consultation paper

- 5.24 Acknowledging the deficiencies of the ex-post approach used for capex reviews so far, the second consultation paper stated that we intend moving towards an ex-ante capex review approach for assessing future capex. This approach will require more reliable

future-capex forecasts. Importantly, this aligns both with the Government's request for more robust information before approving funding for capex projects, and with the interests of end-customers, particularly those paying cost-reflective tariffs.

5.25 We shared an initial action plan for implementing the revised regulatory regime for capex, containing the following:

- (a) by end of 2016 – complete an ex-ante review and approval of future capex to set firm capex allowances for 2018 onwards;
- (b) by end of 2017 – incorporate firm capex allowance for 2018 onwards in RC1 final proposals;
- (c) regularly – continue ex-ante and ex-post capex reviews (as part of the planning statement process or otherwise); and
- (d) regularly – make MAR adjustments for firm future capex allowances and ex-post actual efficient capex.

5.26 We also presented our initial thoughts on a revised regulatory regime for the treatment of capex summarised 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);
- (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;
- (c) make regular MAR adjustments to incorporate approved capex in the price controls, thereby making sure the controls always reflect the approved (and not provisional) capex; and
- (d) explore alignment with other existing capital approval and budgeting processes.

5.27 Views were sought on the proposed approach and plan for ex-ante capex review.

Responses

5.28 ADWEA group companies and ADSSC have broadly favoured moving towards more forward-looking ex-ante reviews. The responses of ADWEA, the ADWEA group companies and ADSSC are summarised below.

5.29 While ADWEA group companies supported approval of capex plans in advance of expenditure, they believed that the ex-ante approach proposed by the Bureau is overly complicated and unsuitable for the current planning environment of the Emirate. The companies sought further clarity on a number of areas in ex-ante regime:

- (a) triggers for the ex-post assessment, treatment of over/under allowance spend and claw back of the expenditure saving arising from efficient practice;
- (b) scope of ex-ante allowance in the early years of RC1;

- (c) the scope, time duration and scheme assessment thresholds for the Bureau review and approval;
 - (d) firm timeline for phasing-out the ex-post assessment;
 - (e) an assessment methodology fixed prior to RC1 commencement;
 - (f) transparency as to the treatment of ex-ante assessment; and
 - (g) time allowance for licensee internal processes, systems and approval changes.
- 5.30 ADWEA group companies sought clarification on adjustment to reporting timescale across the sector to support budgetary submissions and alignment with the budget capex submission to GSEC. Specifically
- (a) ADWEA group companies stated that an absence of clarity in our pre-approval of projects poses concern as to the layers this process may entail which could create delays. They sought clarity as to subsequent steps for project-approvals, in conjunction with the government processes. They added the transition towards an ex-ante process should be in a manner that is agreed by all parties and does not create additional risk for any party.
 - (b) ADWEA stated that the Bureau might have a role in capital approvals. However, it stated that the existing capital approval is being undertaken by the Government. It highlighted that any departure from this should add value without increasing complexity and bureaucracy. As such, ADWEA sought greater detail on this matter in order to avoid uncertainty across the sector.
- 5.31 ADWEA group companies expressed concerns that the proposed approach for ex-ante allowance for RC1 does not capture the market conditions, such as the contract award, following tendering, having a value that exceeds the budgeted amount and suggested to incorporate flexibility in the approach to accommodate such variances.
- 5.32 ADSSC believed that the transition to ex-ante process is too early, given its complexity. As such, ADSSC believed that the proposal requires further analysis and assessment, particularly in early stages of the project. As such, ADSSC requested a clearer process with respect to agreement levels between all the stakeholders (ie ADSSC, DoF and other Government entities) to avoid any unnecessary duplication. It also sought for a clear mechanism for measuring outputs.

Assessment

- 5.33 The Bureau welcomes ADWEA group companies' general support for moving towards the ex-ante process. Our assessment of their detailed comments is as follows:
- 5.34 We do not agree with ADWEA group companies' concerns about complexity of ex-ante proposed approach. We presented and consulted with the sector our approach and findings at various stages of the ex-ante process during 2016-2017 to ensure the requirements are clear for all parties. The details on the methodology for the ex-ante review, including the other areas where the ADWEA group companies sought clarity, are available in our ex-ante review reports and the decision issued to the companies in February 2017 (see process details in later paragraphs in this section). However, we

recognise that this is the first time that this approach is applied. Both the methodology and stakeholders understanding of the methodology will evolve over time to reflect the lessons-learned from the first round. We will continue to work closely with the sector in the coming years to further improve the methodology, the transparency and the stakeholders' understanding.

(a) Our responses to the areas listed in ADWEA's response as per paragraph 5.29 above are summarised as follows:

- (i) For projects or schemes already approved through ex-ante review, the trigger for the ex-post assessment is either cost deviation more than 10% against the Bureau's approved allowance with no change in scope or change in scope of work for the project / scheme. That is, if the variance (over/under) spent on a project (without the change in scope) is within 10% of ex-ante allowance, the project will not be subject to an ex-post review. However, if the variance was identified to be more than 10% then the project will be subject to a detailed ex-post review. Further, the ex-post assessment will be carried out for all the projects executed by the companies (subject to the materiality threshold) that were not approved by the Bureau through ex-ante allowance. The Bureau is willing to consider passing on a proportion of any savings to the sector and we look forward to companies' suggestion in this respect.
- (ii) In relation to the scope of the ex-ante allowance in the early RC1 years, note that the ex-ante capex allowance has been determined for the whole period of RC1. However, considering the challenges for the inaugural adoption of an ex-ante approach, the Bureau has planned for an interim ex-ante review during 2018-2019 and to revise, if necessary, the ex-ante capex allowances for the last two years of RC1 (2020-2021) during 2018-2019.
- (iii) With regards to the scope, time duration and scheme assessment thresholds, the Bureau's first ex-ante review has already concluded in February 2017 and detailed methodology, assessment and results have been presented and shared with the companies. The preceding sub-paragraphs clarify the timing for the interim ex-ante capex review in 2019 and scope and thresholds for the ex-post capex review of projects started during RC1.
- (iv) The timeline during which the legacy ex-post assessment will be phased out will depend mainly on the companies' provision of information and robust capex planning to implement a full form of ex-ante capex review. Given the companies' performance in the first ex-ante capex review during 2016-2017, it would indicate that complete phase out of ex-post assessment will take some time. The Bureau's newly proposed interim ex-ante capex review during 2018-2019 will provide further clarity on the robustness and readiness of the companies' front-end capex processes and hence the timeline for the phase out of ex-post capex assessment. We expect that as the companies' capex processes and information provision improve, the scope and results of ex-ante review will enhance and the need and scope for ex-post review will diminish.

- (v) In preparation of the interim ex-ante capex review in 2019, the Bureau will consult with the network licensees during 2018 on any refinements and changes required to the approach for such review.
- (vi) We presented and discussed in detail with the companies the timeline, methodology, initial findings and final decision on the ex-ante capex allowances for RC1 in 2016-2017. As mentioned above, we will continue to work closely with the companies on the next ex-ante capex review to improve the transparency further. Sections 6 and 7 explain how the RC1 capex allowances derived through the first ex-ante capex review are used in the RC1 price control calculations.
- (vii) With regards to the time allowances for changes in licensees internal process, systems and approval changes, the Bureau's newly proposed interim ex-ante review during 2018-2019 provides some time and opportunity for the companies to further improve their capex processes in order to justify further ex-ante allowances for 2020-2021 capex for the purposes of price controls.

5.35 The Bureau's role is currently limited to the regulatory review of schemes for price control purposes. However, we have held discussions with the Government and there is an agreement in principle that the capital approval process should not duplicate roles and increase bureaucracy. To this end, we are willing to work further with the Government and the sector.

5.36 In relation to the ADWEA group companies' concerns that the contract award amount following tendering may have a value that exceeds the ex-ante allowance. capex regulatory regime already provides flexibility to account for this uncertainty. Specifically, this involves regular ex-post capex reviews to address deviations from the approved capex and allow remuneration of additional capex allowances subject to the thresholds for deviations against the ex-ante allowance and companies' robust justification for deviations above such thresholds.

5.37 We note ADSSC's concerns and welcome its suggestions. As explained above, the ex-ante process will develop gradually by embracing lessons learnt and will improve with the sector's support overtime. With frequent Bureau engagements with the sector, we believe that this approach will develop in a clear and transparent manner. We have already highlighted our discussion with the Government on ex-ante approach and our willingness to support further discussion to avoid any unnecessary duplication.

Ex-ante allowances for RC1

5.38 With two workshops held in February and May 2016, the Bureau and the companies were fully engaged and agreed the timeline on ex-ante capex review to meet the requirements of the RC1 price controls. Based on the network companies' feedback, we developed the ex-ante capex templates for capturing new and ongoing project information, further refined these and then updated the details of the ex-ante capex process. We also sought the companies' feedback on the proposed templates used to capture business-case information. Following the Bureau's review of companies' submission on capex spend profile and business cases during June – October 2016, we

conducted additional individual meetings with the companies in November 2016 to further explain our approach and bridge information gaps.

- 5.39 Companies provided further information and feedback during November 2016 – January 2017. We shared our final assessment during meetings with individual companies in January 2017. The Bureau issued its final assessment and decision in February 2017 setting out the capex allowances for RC1 period.
- 5.40 **Table 5.10** below summarises the four network companies' RC1 capex forecasts, in nominal prices.

Table 5.10: RC1 Capex forecasts as per ex-ante capex review

AED million, nominal prices		2018	2019	2020	2021	Total
AADC	Electricity	771	556	204	138	1,669
	Water	294	160	69	46	569
	Total	1,065	716	273	184	2,238
ADDC	Electricity	541	214	40	9	804
	Water	605	440	262	208	1,515
	Total	1,146	654	302	217	2,319
TRANSCO	Electricity	1,006	758	337	367	2,468
	Water	201	172	158	80	611
	Total	1,207	930	495	447	3,079
ADSSC	Total	1,444	1,316	1,060	1,010	4,830
Total		4,862	3,616	2,130	1,858	12,466

- 5.41 Unfortunately, the companies have not been 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.
- 5.42 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 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.

Draft proposals

- 5.43 **Table 5.10** above sets out the ex-ante capex allowances for RC1 period as per our review during 2016-2017 and decision in February 2017 that we have used in the price control calculations in these draft proposals.
- 5.44 The capex schemes we approved through ex-ante review may see changes in their actual expenditure against ex-ante allowance and these will subject to ex-post review in future subject to 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.

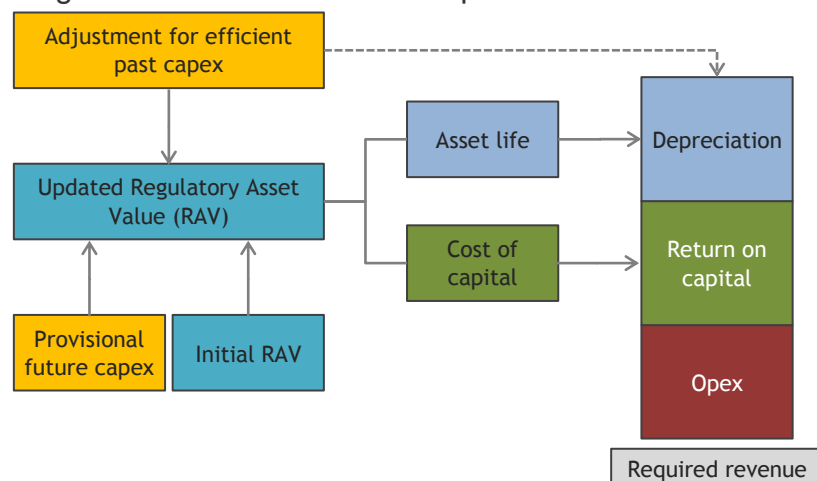
- 5.45 Given the companies' performance during the first ex-ante capex review, the Bureau has agreed with the companies to provide further flexibility by carrying out an interim ex-ante review in 2019 for the last two years of RC1 period (2020-2021) and if necessary revising the ex-ante allowances for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

6. Financial issues

Introduction

- 6.1 The revenue allowed in the price controls enables the network companies to finance their 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 RC1 second consultation paper described the calculation of the RAV and the appropriate allowances for regulatory depreciation and return on capital. The paper raised issues in relation to the removal of inflation from regulatory depreciation and RAV, extending the asset life assumptions for price controls and options for setting the allowed rate of return for RC1:
- As mentioned in Section 1, we have been working closely with the stakeholders through our consultant (Deloitte) on the review of asset life assumptions. The consultant issued its inception and interim reports on asset life review in 2016 and draft report in February 2017. The consultant is due to issue the final report in June 2017.
 - On the cost of capital, we have been engaged in discussions with DoF and ADWEA during 2016-2017 as part of our work on developing a proposal for the Government on the treatment of Government funding (see Section 2 for details).
- 6.3 This Section 5 discusses the companies' responses to these issues and sets out the Bureau's draft proposals on these issues and our calculations of updated RAVs for RC1.

Regulatory depreciation

Second consultation paper

- 6.4 Earlier consultation papers described the current price control arrangements for calculation of depreciation allowance covering depreciation for past and future capex, capitalisation policies, straight-line method of depreciation and asset life assumptions as set out in **Table 6.1** below.
- 6.5 The papers shared our intention to change two important aspects of the price control as follows:
- (a) explicitly define the regulatory depreciation allowance as a capital cost recovery tool to repay the principal or original amount of capital investment, and, accordingly, remove inflation indexation from the RAV and depreciation allowance; and
 - (b) review the assumptions for asset lives in the price controls to apply longer assumptions for the future price controls, which, in the short term, will lower the annual depreciation allowances and hence MAR. The paper also considered whether any extension to asset life assumption should apply to new and existing assets, or only to new investments.

Table 6.1: Asset life assumptions used until PC5

Business		Initial RAV				Life of New Capex
		RAV Year	RAV	Depreciation	Implied Life	
AADC	Electricity	1999	1,516.140	78.780	19.25	30
	Water	1999	129.320	3.850	33.59	30
ADDC	Electricity	1999	2,939.200	130.950	22.45	30
	Water	1999	845.560	57.130	14.80	30
TRANSCO	Electricity	1999	2,907.100	115.100	25.26	30
	Water	1999	2,053.187	113.645	18.07	30
ADSSC		2005	4,430.479	324.923	13.64	50

Responses

- 6.6 The respondents to the second consultation paper generally opposed the removal of inflation indexation from depreciation allowance. In summary:
- (a) ADWEA disagreed with our proposal to remove inflation from depreciation and our views that the purpose of the depreciation allowance to repay principal investment. ADWEA group preferred continuing with inflation indexation of RAV and depreciation to ensure consistency of approach with other regulators, particularly the UK and Australia which have similar CPI-X regulatory regimes and address financial risks to the sector.
 - (b) While ADWEA group acknowledged separate funding of the replacement expenditure through the price controls, it argued that the removal of inflation lowers the current costs by knowingly pushing the funding burden forward.

- (c) ADWEA group stressed the need for the Bureau to provide greater transparency on this matter and quantify the effect on the sector's current and future financing needs. The companies sought further clarity and confirmation whether we also propose removing the inflation on return and also whether the adjustment would apply retrospectively, giving their disagreement in advance, if this was the case.
- (d) ADSSC expressed concern that removing inflation could adversely affect the company's ability in future to have adequate funds for investment in replacement capex. ADSSC argued that inflation protection is integral component of its business and that some of its (outsourced operation and maintenance) contracts have inflation indexation. Therefore, ADSSC considered that we have not provided robust arguments for our proposal.

6.7 With regards to the asset life assumption:

- (a) ADWEA and its group in general supported the review of asset life assumptions, with the proviso that the review is based on physical inspection, robust technical assessment, sound judgement relevant to operation and maintenance of assets in the Middle East context. They also noted the review requires support with a quantitative assessment of the likely short and long-term effects on the MAR. The companies asserted that ADWEA's planned asset life review is not in competition with our work, but compliments it instead.
- (b) AADC and ADDC highlighted absence of their processes and procedures, and lack of asset data granularity in their systems, which prevent them from tracking actual performance on asset life. Accordingly, they suggested that the current study should focus only on identifying the information requirements and gaps, before having a further study to identify any adjustments in asset lives.
- (c) ADWEA group contended that any new asset life assumptions should apply only to new assets. In their view, applying the changes on existing assets would infringe a fundamental principle of regulation by re-opening a previously agreed matter.
- (d) Acknowledging the ongoing review of the asset life assumption, ADSSC expressed its concerns on lack of technical/engineering input into the study and stressed the need to duly consider environmental factors that affect the lifecycle. ADSSC considered that the current useful life assumptions remain appropriate.

6.8 The respondents expressed preference for the continued use of straight-line method for regulatory depreciation.

Assessment

6.9 While we have assessed many of the companies' comments, some of these were referred to our consultant to consider in its review of asset life assumptions. These included:

- (a) physical inspection, robust technical assessment, sound judgement relevant to operation and maintenance of assets with robust technical/engineering input into the study;

- (b) the need to duly consider the environmental factors affecting the lifecycle; and
- (c) AADC and ADDC's lack of processes, procedures and granularity of asset data in their systems.

6.10 Our assessment of the companies' main responses on removing inflation from depreciation and the review of asset life assumptions is summarised as follows:

- (a) We reiterate our view that the depreciation allowance in the MAR is provided for the recovery of companies' original investment. Importantly, this was clearly stated in our previous consultation papers, including the PC4 first and second consultation papers (paragraph 5.1 in each paper). Therefore, depreciation does not require inflation protection.

This arrangement is similar to a bank loan, where the lender does not have inflation protection for the principal amount of the loan. The same concept applies on capital cost recovery (CCR) charge under the power and water purchase agreements (PWPAs) and the sewerage treatment agreements (STAs) in the sector.

We also welcome ADWEA group's recognition that the regulatory regime provides separate funding for replacement capex. Significantly, this means that the companies' reference to certain other regulators in the UK and Australia may not be appropriate.

- (b) In these draft proposals, we have included the calculations and their line-by-line descriptions with reference to Annexes A and B and the financial models issued to the companies with these draft proposals as well as the effects of removing inflation from the RAV, thereby giving full transparency to all the stakeholders. As stated earlier, we have no intention of applying any retrospective adjustments to the MAR for pre-RC1 years in relation to inflation being removed from depreciation and RAV from 1999-onwards. We reiterate that such adjustments will only apply to MAR for future years. The impact of this change on the companies' future MAR is summarised later in this section.
- (c) We confirm that the inflation protection on the return component of the MAR will continue in line with the existing practice through annual inflation indexation of the relevant component of the MAR.
- (d) We welcome both ADWEA group's general support for the asset life assumption review and ADWEA's study to complement our work though we do not have any details of such study. We have summarised below the consultant's recommendation, the basis of its recommendation and the effect on the companies' future MAR from the proposed change in useful life assumptions.

Assessment of asset life assumption

6.11 As detailed in its draft report issued in February 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, being different from other countries in the Middle East and internationally;

- (b) **Company capabilities regarding the asset lifecycle management:** The companies' management of asset can have an impact, either positive or negative, on the asset lives of the different network assets. Accordingly, 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, procurement, installation and construction, commissioning, operation, maintenance and refurbishment.
- (c) **Current asset condition and performance:** Similar to asset lifecycle management, the current condition and performance of assets also impact the asset life. Accordingly, 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. The consultant studied the relationship between condition and age as this indicates how well the assets have and are being managed as they deteriorate over time.

6.12 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) 25 years for both water and electricity businesses of TRANSCO and water businesses of AADC and ADDC, (ii) 10 years for electricity businesses of AADC and ADDC and (iii) 15 years for ADSSC, based on the range of benchmarks (adjusted to be relevant to the companies), expert judgement using the asset lifecycle management assessments, and consideration of the external factors and the companies' asset performance information; and
- (c) apply the proposed increase in asset life assumption only on new assets (i.e assets commissioned from the start of the RC1) from 2018. This is based on consultant's assessment of existing asset's condition, the companies' enhanced capabilities and maturity in recent past.

6.13 The consultant's recommended asset life assumptions for new assets are summarised in the table below for various businesses along with the assumptions used to date for previous price control reviews.

Regulatory review of price controls for 2018 onwards – RC1 draft proposals

Author	Document	Version	Publication date	Approved by
CC/SI/SS/AR	EC/E02/108	Issue 1	20 April 2017	SSQ

Table 6.2: Consultant's recommended asset life assumptions

Business		PC1-PC5 asset life assumption	RC1 asset life assumption	
			Pre-2018 capex	Post-2018 capex
AADC	Electricity	30	30	40
	Water	30	30	55
ADDC	Electricity	30	30	40
	Water	30	30	55
TRANSCO	Electricity	30	30	55
	Water	30	30	55
ADSSC		50	50	65

6.14 **Table 6.3** sets out the net effects for the RC1 period, from extending the useful life assumption for only new assets, on both the depreciation and return on capital allowances using ex-ante capex allowances in Table 5.10 in Section 5 and WACC. In aggregate for the four network companies, the expected decrease in the MAR is at most AED 103 million a year (in nominal prices), with the largest net decrease coming from TRANSCO's electricity MAR. However, the sum of depreciation and return on capital components of MAR over long term will increase with the proposed new asset life extension.

Table 6.3: Net impact of extension in asset useful life assumption on MAR

AED million, nominal prices		2018	2019	2020	2021
AADC	Electricity	3	8	11	12
	Water	2	5	7	7
ADDC	Electricity	2	5	6	6
	Water	4	12	17	19
TRANSCO	Electricity	7	20	27	31
	Water	1	4	6	8
ADSSC	Total	3	9	14	18
Total		24	65	89	103

Removal of inflation from depreciation

6.15 **Table 6.4** sets out the impact of removing inflation from depreciation and RAV over RC1 period. This represents the difference between (a) depreciation and return allowances in 2018 prices, had the Bureau continued with the existing arrangements of inflating depreciation and RAV, and (b) depreciation and return provided in nominal terms in the MAR as set out in **Tables 6.7** of this Section and **Annex A** to these proposals, respectively. For the four network companies, this suggests an aggregate decrease in the average MAR by AED 2.1 billion a year, with the most notable decline coming from TRANSCO's electricity MAR.

Table 6.4: Impact of removal of inflation from depreciation and RAV on MAR

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	195	171	167	163
	Water	82	80	78	76
ADDC	Electricity	452	439	427	344
	Water	122	119	116	113
TRANSCO	Electricity	818	797	775	754
	Water	353	345	336	327
ADSSC	Total	355	160	128	126
Total		2,378	2,111	2,026	1,902

Draft proposals

6.16 In view of the above, these draft proposals:

- continue with our suggestion to remove inflation indexation from the RAV and the 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; and
- use a straight-line method for regulatory depreciation using the extended asset life assumptions for new assets proposed by the consultant for RC1.

Calculation of regulatory depreciation for RC1

6.17 At this price control review, 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:

- the initial RAV set for 1999 for AADC, ADDC and TRANSCO and for 2005 for ADSSC;
- each annual efficient capex determined to date i.e. during PC1, PC2, PC3, PC4 and PC5 periods (excluding 2016 and 2017);
- each annual provisional capex during the PC5 period for which efficiency review has not been completed (i.e. 2016 and 2017); and
- 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.

6.18 RC1 Depreciation Model uses, for the initial RAV and subsequent capex until 2017 (PC5) the average asset life assumptions and the capex efficiency assumptions adopted at the previous reviews. In addition, when any initial RAV or annual capex becomes fully-depreciated, its depreciation for future years is set to zero. Importantly, there are separate worksheets in the model for each business. Overall, the model’s output is the total annual depreciation on the initial RAV and the capex to date (provisional or efficient, as the case may be), expressed in nominal prices.

- 6.19 **Table 6.5** below shows the total capex depreciation to date, for each business. This is calculated using the RC1 Depreciation Model, for each year of the RC1 period, in nominal prices. These calculations are 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).
- 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 6.5: Depreciation on initial RAV and on capex to date (excluding RC1 capex)

AED million, nominal prices		2018	2019	2020	2021
AADC	Electricity	350	331	331	331
	Water	126	126	126	126
ADDC	Electricity	856	856	856	784
	Water	241	241	241	241
TRANSCO	Electricity	1,332	1,332	1,332	1,332
	Water	689	689	689	689
ADSSC	Total	702	422	377	377
Total		4,296	3,996	3,952	3,880

- 6.21 **Table 6.5** 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 6.6** 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 6.6: Depreciation on RC1 ex-ante capex

AED million, nominal prices		2018	2019	2020	2021
AADC	Electricity	10	26	36	40
	Water	3	7	9	10
ADDC	Electricity	7	16	19	20
	Water	6	15	21	26
TRANSCO	Electricity	9	25	35	42
	Water	2	5	8	10
ADSSC	Total	11	32	51	67
Total		47	127	179	214

- 6.22 **Table 6.7** 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 and the RC1 period. Each amount in this table is the sum of corresponding amounts shown in **Table 6.5** and **Table 6.6** above.

Table 6.7: Total depreciation for RC1 calculations – draft proposals

AED million, nominal prices		2018	2019	2020	2021
AADC	Electricity	360	357	367	371
	Water	129	133	135	136
ADDC	Electricity	863	872	876	804
	Water	246	256	262	266
TRANSCO	Electricity	1,341	1,357	1,367	1,374
	Water	691	694	697	699
ADSSC	Total	714	454	428	444
Total		4,343	4,123	4,132	4,094

Updating RAVs

Second consultation paper

6.23 The second consultation paper 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 paper also highlighted that:

- (a) as discussed earlier in this section, the closing RAV for 2017 from the previous price control review will be updated – by removing inflation from depreciation allowances from 1999-onwards – to provide an opening 2018 RAV for RC1. Importantly, there will be no retrospective adjustments to the MAR for previous years; and
- (b) future adjustments in the capex allowances, RAV and regulatory depreciation will follow any capex review, as discussed in Section 5.

Responses

6.25 Apart from their concerns on 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 following suggestions:

- (a) ADWEA group companies supported timely ex-post assessments, suggesting the same should be undertaken on an annual basis. The companies contended that the Bureau should incorporate the ex-post efficiency assessment for 2016 at start of RC1, similar to 2014 and 2015 capex. The companies also sought clarity on our plans for assessing 2017 capex and subsequently adjusting the RAV.

- (b) ADWEA group sought clarity and confirmation on how inflation-protection will be provided on the return, given that uninflated (real) WACC and RAV will be used in calculating the return component in the MAR.

Assessment

6.26 We welcome companies' general support for the current arrangements for updating RAVs. Our assessment of companies' suggestions is as follows:

- (a) Respondents' general preference for annual adjustments to RAV and MAR is discussed in detail in earlier consultation papers and Section 2 again. However, the ex-post assessment for 2016 and its adjustment at start of RC1 cannot be made, because of the time constraints. Specifically, the companies' actual audited capex for 2016 will only be available in their 2016 audited SBAs, due for submission by end-April 2017. In turn, this would leave insufficient time to conduct the efficiency review, provide sufficient time for consultation with the companies, and incorporate the adjustments in the RC1 final proposals that are required by Law No (2) of 1998 to be published at the latest by mid November 2017. Accordingly, the ex-post capex efficiency review for 2016 and 2017 will be carried out together during 2018/2019, upon availability of audited actual capex data for 2017. We will then make adjustment for these two years, along with the reassessed ex-ante capex allowances for the remaining two years of RC1 (2018 and 2019), giving due consideration to the materiality and timing of the next price control review.
- (b) The return component of the MAR will be calculated based on the uninflated (real) WACC and RAV. However, inflation on the return component will be provided via an annual indexation of the relevant proportions of the notified values in each company's annual price control return (PCR). This is similar to the existing arrangements.

Draft proposals

6.27 In light of above discussions, the opening and closing RAVs for each year of RC1 are calculated 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;
 - (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.

6.28 **Annex A** sets out the detailed calculations of the updated RAVs and describes these calculations on a line-by-line basis.

Removal of inflation from RAVs

6.29 **Table 6.8** below shows the impact of removing inflation from the RAV, representing the difference between (a) 2018 opening RAV in 2014 prices as reported in PC5 final proposals, and (b) 2018 opening RAV in nominal prices. For the four network companies, this suggests an aggregate decrease in the RAV by around AED 11 billion, with the most notable decline coming from TRANSCO's electricity RAV.

Table 6.8: Removal of inflation from RAVs – impact assessment

AED million		2018 opening RAVs with inflation	2018 opening RAVs without inflation	Impact of removing inflation
		(2014 prices)	(Nominal prices)	
AADC	Electricity	9,482	8,479	1,003
	Water	3,251	2,721	530
ADDC	Electricity	23,610	21,910	1,700
	Water	6,452	5,804	648
TRANSCO	Electricity	38,818	34,181	4,637
	Water	21,795	19,888	1,907
ADSSC	Total	18,717	18,188	529
Total		122,125	111,172	10,953

Updating RAVs for PC4 and PC5 additional efficient capex

6.30 The actual efficient capex spend for PC4 and PC5 (2014 and 2015 only) that is over/under the respective provisional allowance needs rolling into the RAVs. As discussed earlier, there may be foregone or unduly-earned financing costs (relating to both depreciation and return on capital) for the period between the point when the capex for PC4 (2012 and 2013) and PC5 (2014 and 2015) was undertaken, and the time when it will be financed. The proposal is that this will be remunerated over the RC1 period, rather than added to the RAVs. The results are summarised in **Table 6.9** below.

Table 6.9: Updated RAVs and unduly earned financing costs for PC4 and PC5 (2014 and 2015) capex

AED million		NPV of PC4 and PC5 capex foregone (unduly earned) financing costs	Opening 2018 RAVs after removing inflation (from Table 6.6)	PC4 and PC5 additional efficient capex	Opening 2018 RAVs after removal of inflation and updated for efficient PC4 and PC5 capex
		Added to RC1 revenue		Added to RAV	
		(2018 prices)	(nominal prices)	(nominal prices)	(nominal prices)
AADC	Electricity	(532)	8,479	(1,238)	7,241
	Water	50	2,721	(36)	2,686
ADDC	Electricity	(1,776)	21,910	(4,661)	17,250
	Water	(168)	5,804	(382)	5,423
TRANSCO	Electricity	(3,923)	34,181	(6,970)	27,211
	Water	(1,915)	19,888	(4,721)	15,166
ADSSC	Total	(333)	18,188	(867)	17,321
Total		(8,597)	111,172	(18,875)	92,297

6.31 The total NPV of adjustments, up to 2018, for unduly-earned financing costs from PC4 and PC5 capex, for all businesses, amounts to AED 8.6 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.

- 6.32 The total opening 2018 RAV for all the businesses has decreased from about AED 122.2 billion in 2014 prices from the last price control review to about AED 92.3 billion in nominal prices. This decrease in RAV by about AED 29.9 billion reflects mainly the removal of inflation and the adjustment of a negative figure (AED 18.9 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.
- 6.33 With the above additional efficient capex adjustment, the companies' RAV (in nominal prices) has declined lower than the net book value (NBV) of property plant and equipment reported in the companies' SBAs as shown in **Table 6.10** below.

Table 6.10: RAVs before and after additional capex adjustment and NBV

AED million, nominal prices		2015 closing RAVs before PC4/PC5 additional capex adjustment	2015 closing RAVs after PC4/PC5 additional capex adjustment	2015 closing NBV
AADC	Electricity	7,839	6,506	6,899
	Water	2,309	2,272	2,070
ADDC	Electricity	17,981	12,970	14,676
	Water	4,983	4,572	4,720
TRANSCO	Electricity	32,293	24,771	30,342
	Water	17,750	12,671	14,983
ADSSC	Total	16,125	15,221	19,691
Total		99,281	78,983	93,381

- 6.34 The key differences between RAV and NBV are:

- the NBV of assets carried in the SBAs includes inefficient capex (in the order of AED 5 billion) which is not included in the RAV.
- approximately AED 3 billion relating to mega development assets recorded in the SBAs of ADSSC and ADDC but not rolled into their respective RAVs, pending finalisation of deliberations on the treatment and valuation of these assets;
- assets on financial lease recorded in ADSSC's SBAs with NBV of AED 2.8 billion;
- assets received as grant but recorded at fair value in TRANSCO's SBAs with the NBV of AED 1.3 billion;
- accrual vs cash basis of capex recorded in the SBAs and RAV for all the companies; and
- different useful life assumptions used in the price controls and companies' SBAs.

The difference between RAV and NBV due to items (b) to (f) is temporary, since the companies ultimately will get depreciation and return allowance, with negligible impact in NPV terms. However, the item (a) relating to the difference in RAV and NBV due to capex efficiency adjustment is permanent, and therefore may indicate the need for a detailed impairment review of the companies' assets.

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 6.11** summarises the results of this updating of RAVs.
- 6.36 The total RAV for all the businesses decreases from about AED 92.3 billion from the start of 2018 to AED 90.3 billion by the end of 2021 (after adjustments for RC1 ex-ante capex). The RAVs shown in **Table 6.11** are used as inputs to the RC1 price control calculations in Section 7.

Table 6.11: Opening RAVs updated for RC1 ex-ante capex

AED million, nominal prices		2018	2019	2020	2021
AADC	Electricity	7,241	7,652	7,851	7,688
	Water	2,686	2,851	2,879	2,813
ADDC	Electricity	17,250	16,928	16,269	15,433
	Water	5,423	5,782	5,966	5,966
TRANSCO	Electricity	27,211	26,876	26,277	25,246
	Water	15,166	14,677	14,154	13,615
ADSSC	Total	17,321	18,051	18,913	19,545
Total		92,297	92,816	92,309	90,307

Cost of capital

Second consultation paper

- 6.37 Our first consultation paper had described the existing overall framework and approach used to determine the allowed rate-of-return for price controls on the basis of the real weighted average cost of capital (WACC). Under this approach:
- (a) the cost of equity is derived by applying the Capital Asset Pricing Model (CAPM);
 - (b) the cost of debt is derived by adding a suitable corporate debt-premium to a risk-free rate; and
 - (c) the WACC is derived by applying an optimal capital structure or gearing to the costs of equity and debt.
- 6.38 We also highlighted our challenges in determining the WACC. In particular, there is the limited size and liquidity of debt and equity markets in the Emirate of Abu Dhabi, as well as incomplete information about the actual returns agreed by the companies or ADWEA with their fund providers. Accordingly, our previous estimates of the cost of capital have drawn heavily on the estimates of its components from regulators of similar businesses in the UK and Australia. However, we cross-checked these estimates against the local and regional capital market estimates. Consequently, we used a real cost of capital of 5%, 4.5% and 5.5% for setting the PC3, PC4, and PC5 price controls respectively.
- 6.39 In their response to the first consultation paper, companies in essence expressed preference for continuation of the same approach to WACC estimation as used in the previous price control reviews.

- 6.40 The second consultation paper, in line with both the practice in other jurisdictions and our approach to date, maintained our preference for continuing with:
- (a) estimating and using a real WACC in setting the price controls; and
 - (b) applying annual inflation indexation to the return on capital component of MAR.
- 6.41 In the second consultation, we highlighted that we were consulting with DoF on the following possible three options to set the allowed rate of return for RC1:
- (a) WACC is set at 4% pa (nominal) for all debt and equity funding (similar to the debt funding by DoF to other government entities); or
 - (b) Cost of capital is set at 4% pa (nominal) and the cost of equity is determined based on market data and other regulatory authorities' estimates, in line with the Bureau's approach to date; or
 - (c) The approach used to date to set both costs of debt and equity is applied.
- 6.42 Accordingly, the second consultation paper provided our initial thinking to use the estimate or approach agreed with DoF in order to set the cost of capital for RC1.

Responses

- 6.43 In broad terms, the ADWEA group companies did not comment on our cost of capital calculations and deferred this matter to ADWEA. Instead, they only mentioned that the WACC should reflect the Government's objectives. In addition, the group stated that the cost of equity should reflect the long-term aspirations of the Government, and that the cost of debt should reflect the long-term debt-premium consistent with the needs of the Government. Meanwhile, ADWEA supported setting the WACC to reflect its needs and expectations as the Government's representative for the sector, provided that the WACC is sufficient to ensure the sector's long-term financial viability.

Assessment

- 6.44 As discussed in Section 2, from our consultation with both ADWEA and DoF during 2016-2017, we have agreed in principle to set the allowed rate of return for RC1 based on the approach used for estimation of WACC at the previous price control reviews. Therefore, we have used the same approach to estimating WACC for RC1 in these draft proposals, as set out below.
- 6.45 As discussed in the previous consultation documents, local capital-markets remain subject to various limitations. Consequently, it may not be practicable to base estimates of the cost of capital cost of capital solely, or mainly, on local evidence. We therefore balance our view by analysing information available for both overseas and local capital markets. This is consistent with the approach adopted by the telecommunication regulatory authorities in Bahrain and Oman. Specifically, they have supported their cost of capital cost of capital calculations with the data from overseas developed markets, which has involved them cross-checking the information against available local or regional estimates.

WACC estimates based on overseas capital markets information

- 6.46 Below is our assessment of the recent overseas precedents. Compared with our estimates in the previous price controls, the recent proposals for the UK and Australia observe slight decreases in both the risk-free rate and the debt-premium. On the other hand, the equity risk premium remains almost unchanged compared with the evidence gathered for the PC5 final proposals. Overall, this translates into a slight decrease in the cost of debt, the cost of equity and hence the overall WACC.
- 6.47 This declining trend for the risk-free rate is consistent with the yields-to-maturity on 5 to 10 year US treasury bonds since 2010. Currently, these are in the range of 1.9%-2.5%, which is slightly above the 1.2%-2.4% range from 2013. However, this is still below the range of 2%-3% that existed at the time of the PC4 price control review. Similarly, the Emirates Inter-Bank Offered Rate (EIBOR), which is used by the banks in the UAE as the benchmark rate for lending, has also declined, as follows:
- (a) In nominal prices, the six-month and one-year EIBOR have reduced from 2.2% and 2.4% on average from 2009 (the PC4 review) to 1.2% and 1.4% in 2013 (the PC5 review) and to 1.4% and 1.8% in 2016-2017, respectively; and
 - (b) In real terms, the six-month and one-year EIBOR have reduced from 0.6% and 0.9% on average from 2009 (the PC4 review) to 0.09% and 0.25% in 2013 (the PC5 review) and to -0.06% and 0.27% in 2016-2017, respectively.
- 6.48 The following two tables summarise relevant parameters and estimates from recent regulatory decisions or proposals in the UK, Northern Ireland and Australia.

Table 6.12: Recent UK & Northern Ireland regulatory proposals on cost of capital

(real terms)	Ofgem RIIO-ED1 Feb 2014	Ofwatt Dec 2014	UR-NIW Dec 2014	Ofcom Jun2014	CC-NI Mar 2014
RFR	1.5%	1.25%	1.50%	1.30%	1.0%-1.50%
Debt premium	1.10%	1.34%	-0.09%*	1.25%	1.60%-2.10%
Cost-of-debt	2.60%	2.59%	1.41%*	2.55%	3.10%
ERP	5.00%	5.5%	5.00%	5.00%	4.00%-5.00%
Equity Beta	0.90	0.80	0.83	1.01*	0.60-0.70
Cost-of-equity	6.00%	5.65%	5.65%	6.35%	3.40%-5.00%
Gearing	65.00%	63.00%	50.00%	32.00%*	45.00%
Cost of capital	3.79%	3.74%	3.53%	5.13%	3.27%-4.15%
Reported cost of capital (real)	3.9%	3.74%	3.53%	6.6%	3.3%-4.1%

Source: Various overseas regulatory proposals or decisions as listed below:

- (1) Ofgem: "Decision to fast track Western Power Distribution", 28 February 2014;
- (2) Ofgem: "RIIO-GD1 final proposals- finance and uncertainty supporting document" December 2012;
- (3) Ofgem: "RIIO-T1 (NGET-NGGT): Final proposals for NGET and NGGT- Finance", December 2012;
- (4) Ofwatt: "Updated evidence on the WACC for PR14" December 2014;
- (5) Utility Regulator: "Water & Sewerage Services Price Control 2015-21", December 2014;
- (6) Utility Regulator: "Northern Ireland electricity transmission & distribution price controls", October 2012;
- (7) Competition Commission: "Northern Ireland electricity limited price determination", March 2014; and
- (8) Ofcom: "Fixed access market review (WACC for BT group)", June 2014;

* The Bureau considered these figures as outliers and therefore removed them from any subsequent analysis

Table 6.13: Recent Australian regulatory proposals on cost of capital parameters

(real terms)	AER Oct 2015	IPART Jun 2016	ECOSA Jun 2016	AER Oct 2015	ERA Oct 2015	ERA Oct 2015	ERA Oct 2015	ERA Jun 2016
RFR	0.45% ^{**}	1.07% ^{**}	0.08% ^{**}	0.45% ^{**}	0.47%	0.47%	0.47%	0.36%
Debt premium	2.05%	3.10%	4.81%	2.32%	2.20%	2.53%	3.64%	2.72%
Cost-of-debt	2.50% [‡]	4.17% [‡]	4.89% [‡]	2.77% [‡]	2.67%	3.00%	4.11%	3.08%
ERP	6.50%	7.40%	6.00%	6.50%	7.40%	7.40%	7.40%	7.40%
Equity beta	0.70	0.70	0.70	0.70	0.60	0.90 [*]	1.30 [*]	0.70
Cost-of-equity	4.55%	5.19%	4.20%	4.55%	4.91%	7.13%	10.09%	5.54%
Gearing	60.00%	60.00%	60.00%	60.00%	50.00%	25.00% [*]	20.00% [*]	55.00%
Cost of capital	3.05%	3.94%	4.57%	3.22%	3.79%	6.10%	8.89%	4.18%
Reported cost of capital (real)	6.01%	4.9%	4.53%	6.17%	3.75%	6.20%	8.84%	4.33%

Source: Various overseas regulatory proposals or decisions as listed below:

(1) Australian Energy Regulator: "final decision Eragon energy determination 2015-16 to 2019-20", October 2015;

(2) IPART: "Review of prices for Sydney Water Corporation from 1 July 2016 to 30 June 2020" June 2016;

(3) ECOSA: "SA Water Regulatory Final Determination 2016", June 2016;

(4) Australian Energy Regulator: "Final decision SA Power Networks determination 2015-2016 to 2019-20 Attachment 3 - Rate-of-return" October 2015;

(5) Energy Regulation Australia: "Determination on the 2016 Weighted Average Cost of capital for the Freight and Urban Railway Networks, and for Pilbara railways", October 2015; and

(6) Energy Regulation Australia: "Final decision on proposed revisions to the access arrangement for the Dampier to Bunbury natural gas pipeline", June 2016;

Notes: ^{*} indicates a parameter calculated by the Bureau using the information available in the relevant regulator's publication – for example, the real risk-free rate calculated from nominal risk-free rate and inflation estimate using the relationship: Real rate = [(1+Nominal rate) / (1+ Inflation)] -1.

[‡] The Bureau considered these figures as outliers and therefore removed them from any subsequent analysis

6.49 **Table 6.14** presents our initial cost of capital calculations for the RC1, based on the above parameters, but excluding certain outliers. This indicates a range of 2.3% to 6.2% with a mid-point average of 4.2% for the overall cost of capital.

Table 6.14: Initial cost of capital calculations based on overseas regulatory 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%

NOTE: Does not include outliers as identified in the tables above.

Cross-check against recent regional estimates

6.50 **Table 6.15** summarises recent cost of capital estimates, made by local and regional capital market analysts. This is for the regionally-listed electricity and water sector companies and for the locally-listed companies in the real estate, energy and telecommunication sectors.

Table 6.15: Recent regional capital market cost of capital estimates (nominal terms)

	Analyst	Company	Sector	Date	Risk free rate	Cost-of-equity	Cost-of-debt	WACC
1.	NBK Capital	Mazaya Holding	Real estate	Dec 2016		11.0%	5.0%	8.0%-9.8%
2.	Markaz	GCC		Feb 2016				6.9%-7.17%
3.	Al Jazeera Capital	Air Arabia	Aviation	June 2013	2.5%	14.1%	3.25%	9.87%
4.	HSBC	Air Arabia	Aviation	April 2015	3.5%			10.0%
5.	Shuaa Capital	Shuaa	Real Estate	Jan 2013				10.45%
6.	Global Research	Etisalat	Telecom	Sept 2013				12.3%
7.	Bank of America Merrill Lynch	Arabtec	Real Estate	Sept 2013	5.0%	13.6%	8.0%	12.48%
8.	VTB Capital	Emaar	Real estate	Nov 2013	5.5%	10.5%	6.0%	9.38%
9.	VTB Capital	Aldar	Real estate	Nov 2013	5.5%	10.5%	6.0%	9.38%
10.	Bank of America Merrill Lynch	A-Khodari	Real estate	Sept 2013	5.0%	12.0%	6.0%	9.9%

Source: Various research reports by the analyst firms listed above.

Table 6.16: Bureau's initial cost of capital calculations based on local estimates

	Low	High	Mid-Point Average
Risk-free rate (nominal)	2.50%	5.50%	4.00%
Debt premium	0.50%	3.00%	1.75%
Cost-of-debt (nominal)	3.00%	8.50%	5.75%
Equity Risk Premium	5.00%	7.00%	6.00%
Equity Beta	0.86	1.16	1.01
Cost-of-equity (nominal)	6.80%	13.62%	10.06%
Gearing	20.00%	60.00%	40.00%
Cost of capital (nominal)	6.04%	10.55%	8.34%

NOTE: Does not include outliers as identified in the table above.

- 6.51 We are aware the regional and local estimates have been prepared on a nominal basis, but the underlying inflation assumptions are not clear. Therefore, to compare these with our initial estimate of the cost of capital (which is in real terms), it is necessary to make an assumption about inflation.
- 6.52 Using a 4% inflation estimate (refer to Federal Competitiveness and Forecasts Authority, UAE CPI inflation for 2016 and Business Monitor International's UAE Business Forecast Report Q4 2012, 6 July 2012 forecasting UAE CPI inflation in the range of 4%-5% for 2014-2021), combined with the Bureau's estimated WACC of 4.2% gives a nominal rate of return of 8.4% (calculated as $(1+4\%) \times (1+4.2\%)-1$). This is broadly midway through the 6% to 10.6% range identified in **Table 6.16** above.
- 6.53 However, if we use this 4% inflation assumption to convert nominal local market estimates, for example nominal risk-free rates, we face a potential challenge with some exceptionally low, or even negative, risk-free rates. It may be that these local/regional estimates have used a lower inflation estimate, perhaps in the range of 2% to 3%. If so, this would mean that our WACC estimate is in the bottom-half of the aforementioned range. This would appear reasonable, because the top-end of the range relates mainly to

real estate companies, which would be expected to face relatively high risks and so a relatively high cost of capital.

- 6.54 Bearing all of the above in mind, both overseas and local/regional evidence indicate that for the real cost of capital a range of 2.3% to 6.2% (with a mid-point of 4.2%) is reasonable for RC1.

Draft proposals

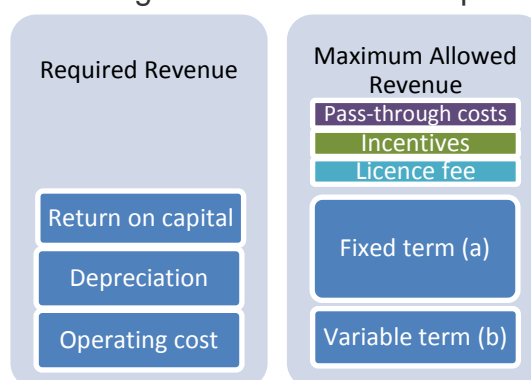
- 6.55 In these draft proposals, we have used a real cost of capital of 4.2%.

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 draft 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 draft 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 draft proposals, the Bureau has used the following framework for its price control calculations, which with few differences, 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 4.2%. The NPV of costs is calculated on a mid-year basis.

Differences from previous price control calculation

- 7.10 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 control resulting in flat MAR profile during the price control period. We are currently assessing various factors including network MAR, generation and production costs, forecast demands, and planned ex-post and ex-ante capex reviews, which may impact total sector costs, customer tariffs and Government subsidy in future. Accordingly, we may revise X factors in the RC1 final proposals in order to ensure a robust balance between various impacts while ensuring neutral impact on network MARs in NPV terms over RC1 period; and
 - (c) As discussed in Sections 2, 3 and 6, the depreciation allowance in the MAR is not subject to annual inflation indexation. Accordingly, a portion of the notified value 'a' representing the depreciation of notified value 'a' will be subject to indexation against –X factor only (i.e no CPI indexation). Remaining part of notified value 'a' and the full value of notified value 'b' is subject to annual indexation against CPI-X.

Price control calculations

- 7.11 **Annex B** to this paper present 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.

Notified values

- 7.12 Based on these price control calculations, the Bureau's draft proposals for the notified values are summarised in **Table 7.1** below. 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.

Regulatory review of price controls for 2018 onwards – RC1 draft proposals				
Author	Document	Version	Publication date	Approved by
CC/SI/SS/AR	EC/E02/108	Issue 1	20 April 2017	SSQ
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Table 7.1: Notified values for RC1 – draft proposals

2018 prices			X	a		b	
				Part representing depreciation			
AADC	Electricity	25%		1,151.86	AEDm	53.13%	1,326.33 AED / customer account
	Water	5%		414.61	AEDm	52.94%	761.79 AED / customer account
ADDC	Electricity	25%		1,922.87	AEDm	55.71%	855.65 AED / customer account
	Water	15%		815.44	AEDm	51.19%	449.52 AED / customer account
TRANSCO	Electricity	25%		2,154.59	AEDm	55.39%	0.4245 Fills / kWh metered
	Water	25%		1,385.25	AEDm	53.90%	0.8258 AED / TIG metered
ADSSC		10%		1,976.67	AEDm	39.48%	0.7567 AED / m ³ wastewater treated

Notes: These notified values for 2018 are based on an assumed UAE CPI of 107.22 (base year 2014 = 100) for 2017. They will be subject to an adjustment for actual UAE CPI for 2017.

- 7.13 These notified values are for 2018 expressed in 2018 prices based on the assumed UAE CPI of 107.22 (base year 2014 = 100), that is inflation rate of 1.50% for 2017. The adjustment for actual inflation for 2017 will be done upon its availability during 2018 i.e., during the RC1 period itself via the Price Control Return (PCR) process. For subsequent years, these notified values will be adjusted by CPI-X indexation in the usual way, except for the part of notified value 'a' representing depreciation which will be subject to an annual indexation against –X factor only (as shown in the proposed structure of MAR for RC1 in Section 3).

Projected MARs

- 7.14 **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:

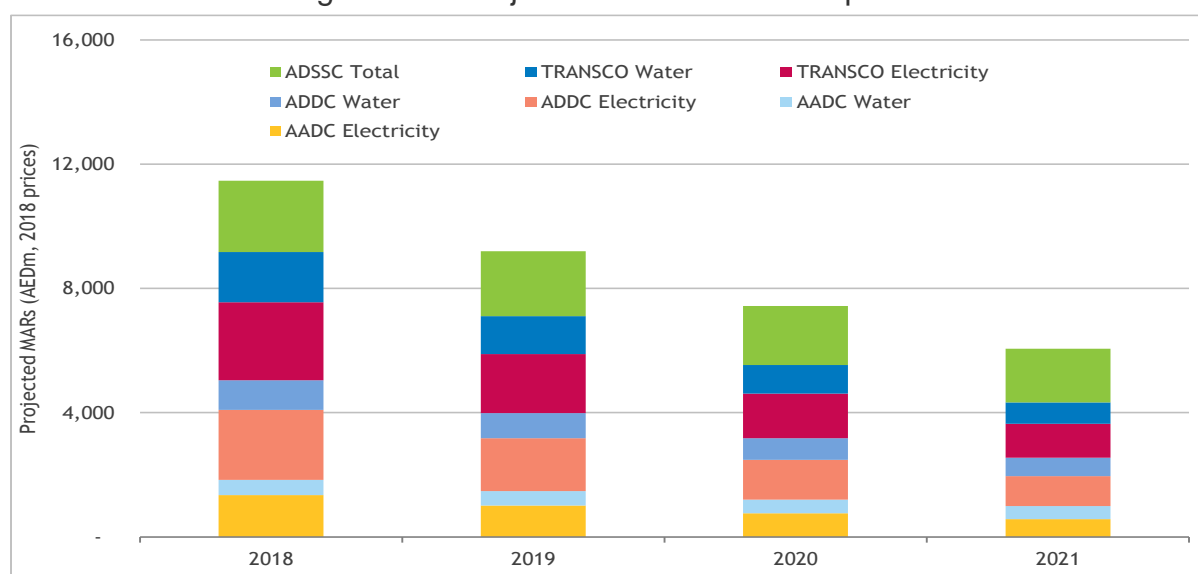
Table 7.2: Projected MAR over RC1 period – draft proposals

AED million, 2018 prices		2018	2019	2020	2021
AADC	Electricity	1,351	1,016	764	574
	Water	485	462	441	421
ADDC	Electricity	2,250	1,696	1,278	963
	Water	954	814	695	594
TRANSCO	Electricity	2,510	1,899	1,437	1,087
	Water	1,620	1,222	921	694
ADSSC	Total	2,296	2,086	1,896	1,723
Total		11,467	9,196	7,433	6,057

- 7.15 In total, the four network companies' MAR (excluding pass-through costs) is expected to be over AED 11.5 billion in 2018 reaching around AED 6.1 billion by 2021. For the three water and electricity network companies, the aggregate MAR is projected to average over AED 6.5 billion over the RC1 period.
- 7.16 For the four companies combined, the projected 2018 MAR is lower by AED 4.6 billion (or 29%) in nominal prices, and by AED 5.8 billion (or 34%) in real prices, as compared to the actual 2015 MAR of AED 16.1 billion in 2015 prices (AED 17.3 billion in 2018 prices). This MAR comparison excludes performance bonuses and penalties, correction factor, pass-through costs, other financial adjustments and licence fee derogation.

7.17 **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



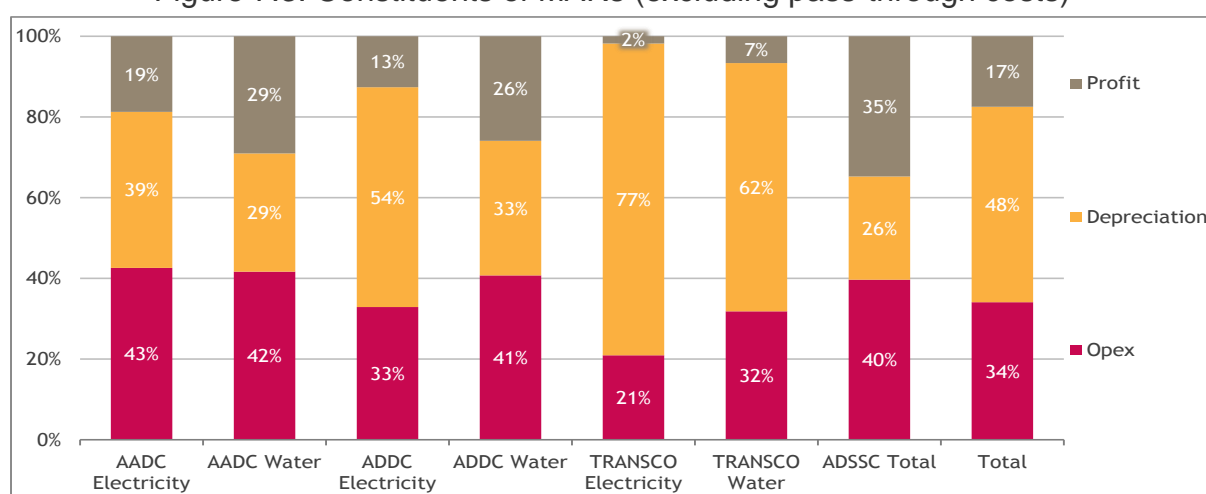
Analysis of draft proposals

Constituents of projected MARs

7.18 **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 financing costs have been treated as part of the profits.

7.19 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 57% to 81%), compared to opex which accounts for only 21% to 43% of revenue.

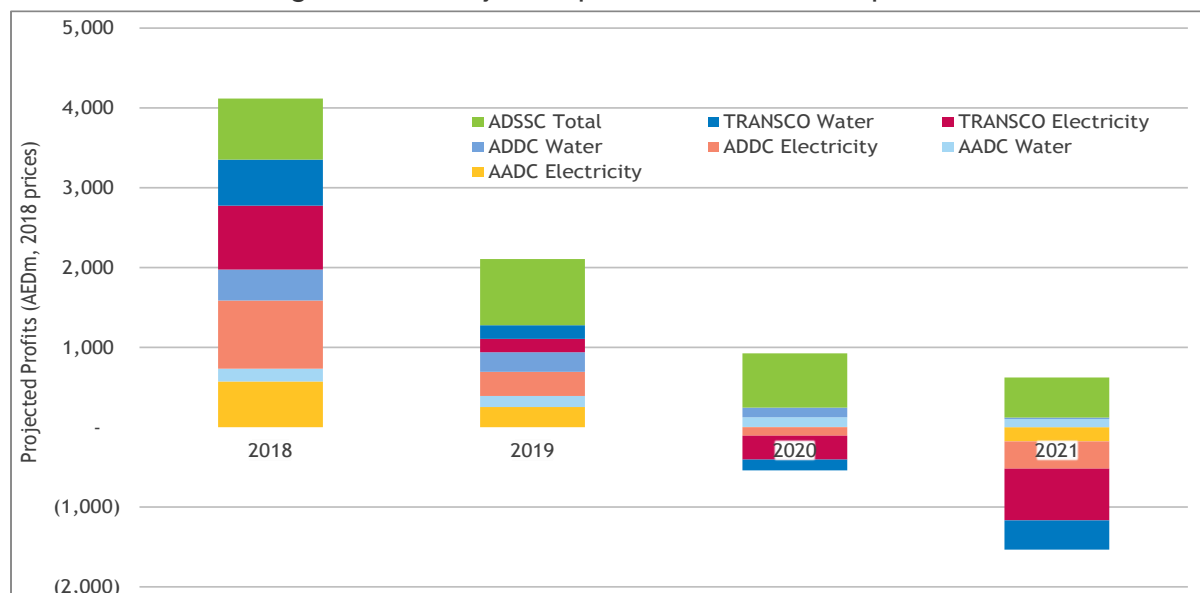
Figure 7.3: Constituents of MARs (excluding pass-through costs)



Projected Profits

7.20 **Figure 7.4** shows the profile of projected profit (or more precisely, the return on capital) for the companies.

Figure 7.4: Projected profits over the RC1 period



7.21 Overall, the total profits for the four companies are expected to be of the order of AED 1.4 billion (2018 prices) a year on average over the RC1 period, as compared to the actual profit of AED 8.6 billion in 2015. The average projected profit (including financial adjustments mentioned earlier) for each company over RC1 period is as follows (2018 prices):

- (a) AADC: about AED 300 million per annum
- (b) ADDC: about AED 400 million per annum
- (c) ADSSC: about AED 700 million per annum
- (d) TRANSCO: about AED 100 million per annum

7.22 The decrease in profits is mainly due to negative adjustment of AED 8.1 billion for PC4 and PC5 capex related foregone financing costs applied to RC1 revenue requirements and hence to the profits, a lower WACC allowed in RC1 (4.2% compared to 5.5% in PC5) and removal of inflation from depreciation and RAV. When comparing such lower profit against profits estimated or observed during PC5 period, we should keep in view significantly high MARs due to higher provisional capex allowances than justified by the actual spending during PC5. This has been highlighted by the Bureau to the network companies during annual performance review meetings and presentations during 2015 and 2016 following the receipt and review of their 2014 and 2015 SBAs. The average profits over PC5 and RC1 combined would give a more balanced view of the companies' profitability.

Effect of Draft Proposals on sector costs

7.23 **Figures 7.5, 7.6 and 7.7** show the expected effect of these draft 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/m3).

Figure 7.5: Projected trend of price-controlled MAR – electricity

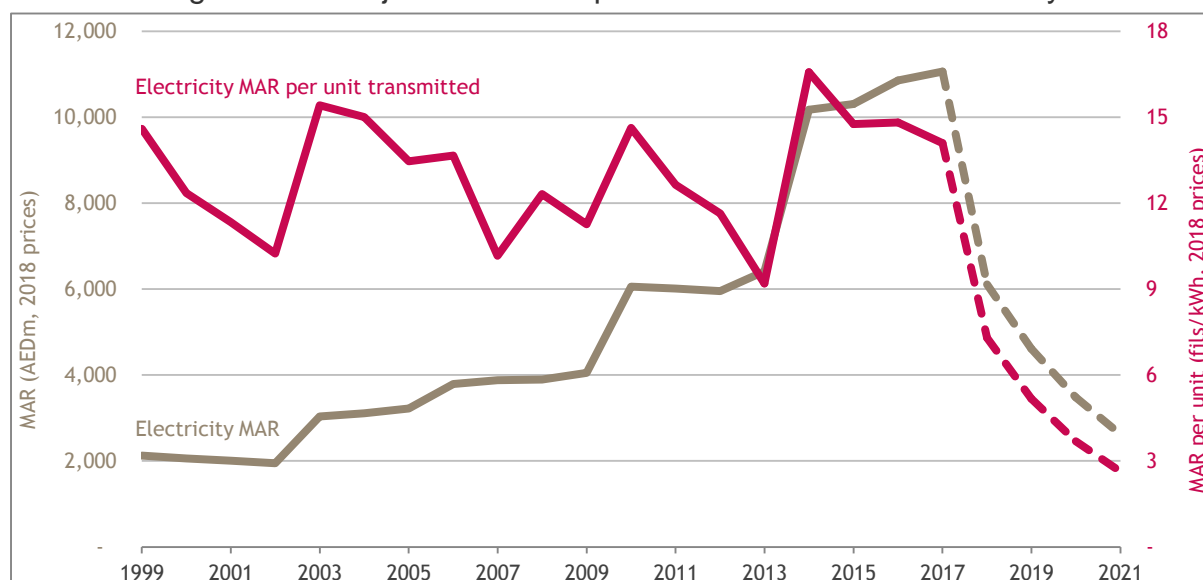


Figure 7.6: Projected trend of price-controlled MAR -water

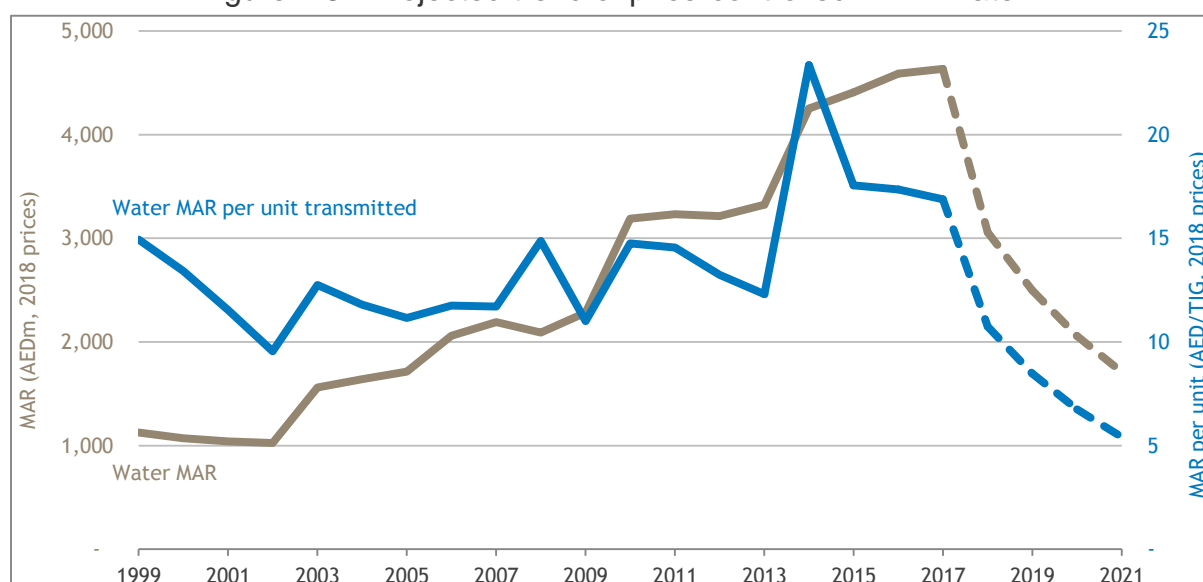
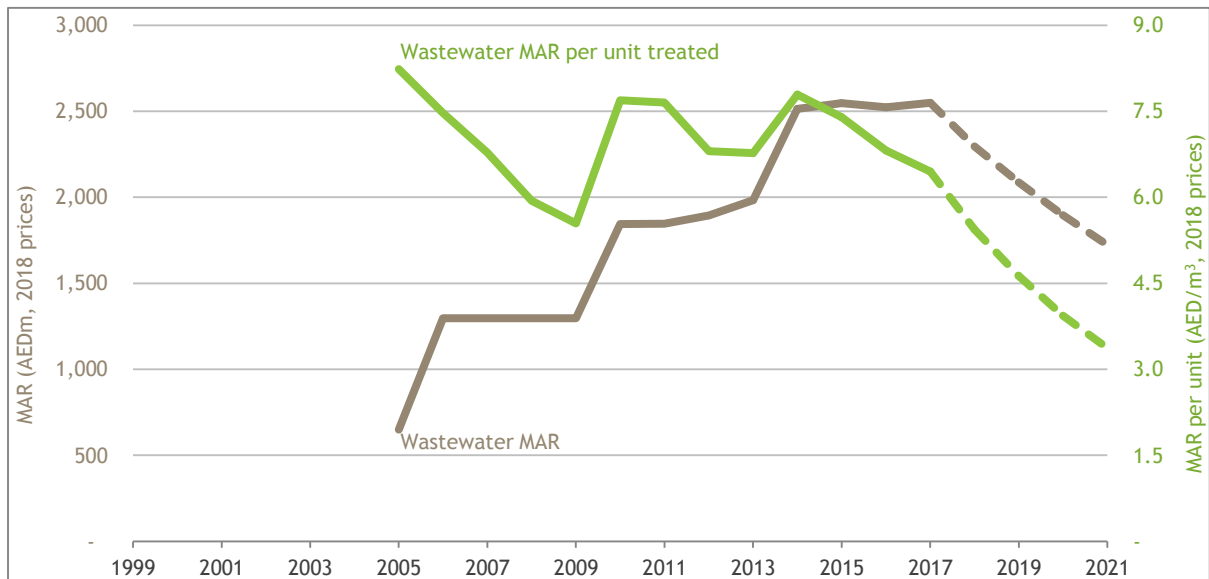


Figure 7.7: Projected trend of price-controlled MAR – wastewater



7.24 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 draft 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 23% from 1999 to 2021 (in real terms), the MAR per unit transmitted is expected to be around 2.6 fils/kWh in 2021, lower by 82% 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 52% from 1999 to 2021 (in real terms), the MAR per unit transmitted is expected to be 5.4 AED/TIG in 2021, lower by 64% 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 33% from 2005 (annualised) to 2021 (in real terms), the MAR per unit transmitted is expected to be 3.4 AED/m³ in 2021, lower by 59% than in 2005 (in 2018 prices).

Comparison against 2015 actual MARs

7.25 **Table 7.3** compares the projected MARs for RC1 against the 2015 actual MARs. This comparison excludes performance bonuses and penalties, correction factor, pass-through costs and other financial adjustments or derogations.

7.26 As previously highlighted, the total 2018 projected MAR is lower than the 2015 actual MAR by AED 5.8 billion (or 34%) in real terms. The projected MARs continue to decrease over the RC1 period. By 2021, the total projected MAR is less than the total 2015 actual MAR by AED 11.2 billion (in 2018 prices) or 65%.

7.27 Similarly, MAR per unit transmitted or treated is projected to decline in 2018 prices from 2015 as follows:

- (a) Electricity: decline by about 12.1 fils/kWh or 82% by 2021;
- (b) Water: decline by about 12.1 AED/TIG or 69% by 2021; and
- (c) Wastewater: decline by approximately 4 AED/m³ or 54% by 2021.

Table 7.3: Comparison of RC1 projected MARs against 2015 actual MARs

AED million		2015 actual MAR		2018 MAR (2018 prices)		2021 MAR (2018 prices)	
		2015 prices	2018 prices	MAR	% increase from 2015	MAR	% increase from 2015
AADC	Electricity	1,662	1,782	1,351	-24%	574	-68%
	Water	506	543	485	-11%	421	-22%
ADDC	Electricity	3,315	3,554	2,250	-37%	963	-73%
	Water	964	1,034	954	-8%	594	-43%
TRANSCO	Electricity	4,638	4,973	2,510	-50%	1,087	-78%
	Water	2,641	2,832	1,620	-43%	694	-75%
ADSSC	Total	2,376	2,548	2,296	-10%	1,723	-32%
Total		16,103	17,265	11,467	-34%	6,057	-65%

Comparison against PC5 average MARs

- 7.28 **Table 7.4** compares the projected average MAR for the four network companies during RC1 period against corresponding average MARs during PC5 period. This comparison excludes performance bonuses and penalties, correction factor, pass-through costs and other financial adjustments or derogations.
- 7.29 The main reasons for significantly lower average MARs in RC1 than PC5 are as follows:
- (a) Capex efficiency adjustment and under spending of PC4 and PC5 capex than provisional allowances;
 - (b) Financing costs foregone;
 - (c) Lower opex allowances;
 - (d) A lower WACC (4.2% compared to 5.5% allowed in PC5);
 - (e) Removal of inflation from depreciation and RAV; and
 - (f) Lower ex-ante allowances for RC1 than the provisional allowances in PC5. We expect the companies will spend more during RC1 period than the current ex-ante allowances for RC1. Subject to ex-post efficiency review and interim ex-ante interim reviews, we may be making adjustments to MARs for additional capex thereby increasing the MARs.
- 7.30 The next sub-section provides a quantification of the main impacts of the RC1 proposals on the network companies MARs.

Table 7.4: Comparison of projected RC1 and PC5 average MARs

AED million		PC5 average MARs		RC1 average MARs – profiled	Difference	
		2014 prices	2018 prices	(2018 prices)	(2018 prices)	%
AADC	Electricity	1,661	1,823	926	-897	-49%
	Water	496	545	453	-92	-17%
ADDC	Electricity	3,426	3,761	1,547	-2,214	-59%
	Water	973	1,069	764	-304	-28%
TRANSCO	Electricity	4,731	5,195	1,734	-3,461	-67%
	Water	2,697	2,961	1,114	-1,846	-62%
ADSSC	Total	2,285	2,509	2,000	-509	-20%
Total		16,269	17,863	8,538	-9,324	-52%

Overall impact assessment – from PC5 final proposals to RC1 draft proposals

- 7.31 To assess the overall impact of the RC1 draft proposals, we have undertaken an analysis to compare the PC5 average MAR, as defined in the PC5 final proposals, with the RC1 draft proposals average MAR as currently included in this document.
- 7.32 The starting position for this analysis is the PC5 financial model and corresponding PC5 depreciation model. We then replace on a step-by-step basis (eleven steps, in total) the main inputs to the PC5 financial model until we arrive at the final position as included in the RC1 financial model used for these RC1 draft proposals. Note that in this analysis:
- The impacts are assessed on the average MAR;
 - With the exception of the first step, which provides the PC5 average MAR in 2014 prices, and the last step, where the impact of the proposal to remove inflation indexation from depreciation is assessed, all the analysis is carried in 2018 prices;
 - The analysis is based on the non-profiled MAR. Profiling is conducted on a NPV basis, ensuring that the financial impact of profiling on the network companies is neutral in NPV terms. However, there will be a small difference in the average RC1 MAR between the profiled and non-profiled MAR.
- 7.33 The steps in this analysis for assessing the overall impact of the RC1 draft proposals are the following:
- Start with the PC5 average MAR in 2014 prices, as defined in the PC5 financial model. This average MAR is with reference to the period 2014-2017 PC5 period;
 - Change the PC5 average MAR to 2018 prices (effect of inflation);
 - Move the period of reference of the average MAR, from the PC5 period to the RC1 period (2018-2021). In order to conduct this step, we need to transpose all the key assumptions/key inputs to the PC5 financial model into the RC1 financial model (e.g. PC5 opex projections, PC5 provisional capex, PC5 WACC, PC5 asset lives). Note that this provides a counterfactual – and thus an hypothetical average MAR – which is a necessary step to assess the individual impact of the key changes in input assumptions for the RC1 draft proposals. However, any

difference in the average MAR in relation to this step does not represent any financial impact on the network companies. It rather only provides the necessary base to perform the analysis;

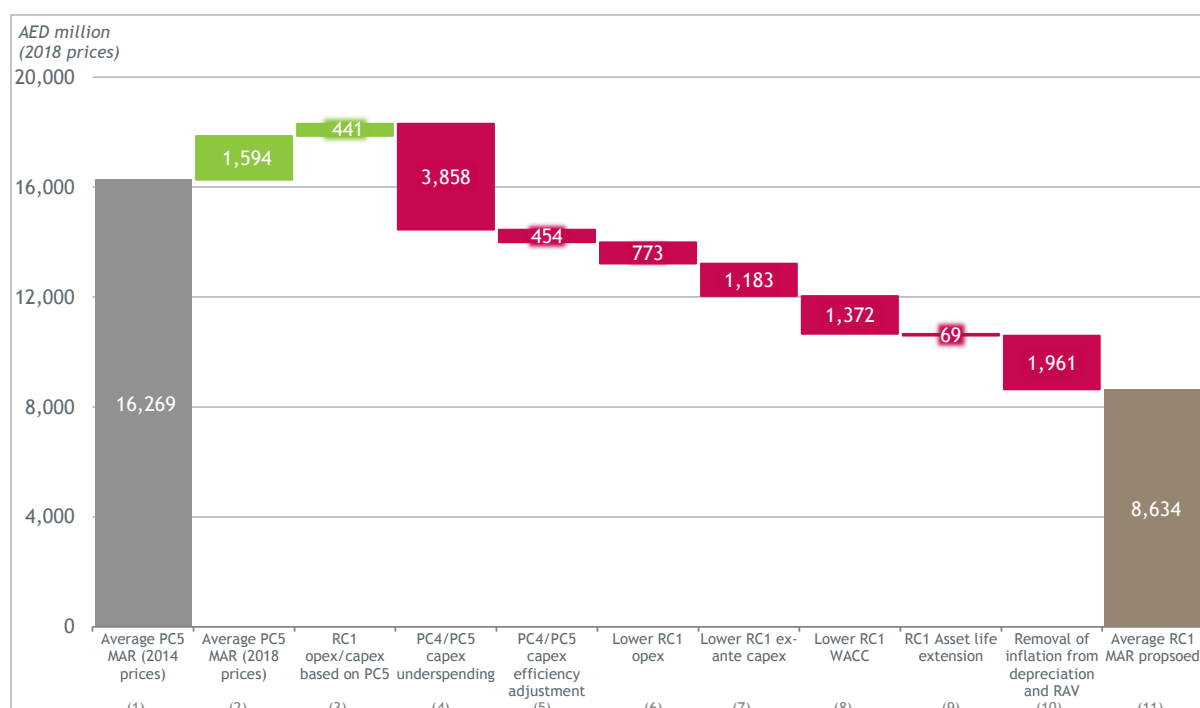
- (4) From this base, replace in the financial model the provisional capex (used in the PC5 financial model) with the actual capex for the period 2012-2015;
- (5) Apply the efficiency scores for each network company, as assessed through the ex-post capex efficiency reviews for the periods 2012-2013 and 2014-2015;
- (6) Replace the PC5 opex projections, included in the financial model for the 2018-2021 period, by the RC1 opex projections, as included in our consultant's draft report on the RC1 opex projections for the network companies;
- (7) Step 7 replaces the PC5 provisional capex, included in the financial model as inputs for 2018-2021 period, with the RC1 ex-ante capex, which resulted from the RC1 ex-ante capex reviews conducted by the Bureau in collaboration with the sector;
- (8) This step replaces the PC5 assumed WACC of 5.5% (real) with the WACC of 4.2% (real) as proposed in these RC1 draft proposals;
- (9) This step replaces the PC5 asset life assumptions (which affect both the financial and depreciation models) with those provided by our consultants in their draft report on RC1 asset life assumptions;
- (10) The step 10 then modifies the financial and depreciation models so that inflation indexation is removed from depreciation. This step also includes the one-off adjustment to the RAV, which although does not have any retrospective impact, yet it reduces the RAV and therefore the depreciation and return allowances in future years;
- (11) The final step provides the average MAR for the RC1 period (based on non-profiled MARs), as included in the RC1 financial model.

7.34 **Figure 7.8** summarises the results of this step by step analysis showing that the RC1 draft proposals have an overall declining impact of approximately AED 9.2 billion per year on the average MAR from PC5 (converted into 2018 prices) to RC1. The major impacts arise from:

- (a) Under-spending of PC4 and PC5 capex in relation to the provisional allowances included in PC4 and PC5 – resulted in reduction in average MARs for RC1 by AED 3.4 billion (combined effects of steps 3 and 4 in the Figure 7.8). The PC4/PC5 ex-post capex efficiency adjustment for the periods 2012-13 and 2014-2015, of approximately AED 0.5 billion, had a relatively lower impact when compared with the companies' capex underspending;
- (b) The next major impact was the removal of inflation indexation from depreciation (step 10), and one-off adjustment to the RAV. The one-off adjustment to the RAV, while not producing any retrospective financial impacts, reduced the allowed revenues for depreciation and return during the RC1 period. The total impact of this proposal is approximately AED 2 billion;

- (c) A lower WACC (4.2% for RC1 compared to 5.5% allowed in PC5 – step 8), reduced the average MARs for RC1 period by AED 1.4 billion.
- (d) Lower RC1 ex-ante capex allowances when compared to the PC5 provisional capex allowances (step 7) had the next largest impact, reducing average MARs for the RC1 period by AED 1.2 billion.
- (e) Lower opex projections for the RC1 period (compared to the PC5 projections) and the new asset life assumptions (steps 6 and 9), had the lowest impacts, reducing the RC1 average MAR by AED 0.8 billion and AED 0.01 billion, respectively.

Figure 7.8: Overall impact – From PC5 final proposals to RC1 draft proposals



8. Incentives

Introduction

- 8.1 Price controls for all the four network companies include a Performance Incentive Scheme (PIS) designed to encourage appropriate quality of service, outputs and performance. Under this scheme, companies are rewarded for improved service and output performance, and are penalised for deteriorating performance on an annual basis against a set of 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).
- 8.2 In earlier consultation papers, we proposed maintaining this approach to performance incentives in broad terms within RC1, based on which we proposed certain specific incentives.
- 8.3 This section summarises the licensees' responses and our revised proposals on incentives. The section begins with a discussion of our overall approach to formulating incentives at this price control review and then sets out in turn our proposals on each of the key areas of incentives originally identified. This is followed by a discussion on specific aspects in the design of incentives, and details of the proposed calibration of incentive schemes and the proposed magnitude of respective incentives. **Annexes C to G**, containing details on the proposed incentives, will be issued to the four network companies separately.

Key areas for incentives development and implementation

Second consultation paper

- 8.4 In the second consultation paper we proposed to:
- (a) maintain the existing three priority areas for incentives; namely, provision of high quality information; quality, security and availability of supply; and end user efficiency;
 - (b) work with the sector to expand the incentives framework to two new areas: (i) customer services through the supply side workgroup or otherwise, and (ii) sustainability, particularly to introduce a new incentive for timely HSE reporting, and develop the DSM incentive to meet the current implementation phase of DSM;
 - (c) explore whether and how programme-based incentives can be developed and implemented for areas such as asset management, carbon accounting, risk management, business continuity and smart grids.

Responses

- 8.5 ADWEA group companies generally supported the priority areas for incentives, provided that these incentives add sector value and are implemented in a manner that ensures full

consultation and documentation. ADSSC put greater focus on improvements and comparative performance.

- (a) ADWEA considered that any incentive should reflect fully the challenges faced by the companies in delivering it, pointing as examples of current limitations such as staff recruitment and organisation chart approval. ADWEA added that the Bureau should ensure that the incentives drive performance and reflect local experience. ADWEA group companies supported regulatory incentives that align with improvements required by the Government, suggesting more role delineation between the Bureau and ADWEA, including in agreeing which areas to incentivise.
- (b) ADWEA group companies recommended reflecting in any incentives the commitments made and agreed with the Government, and indicated that compliance and incentives are contradictory, maintaining that reputation and compliance within government entities is a preferable approach.
- (c) While supporting the identification and measurement of KPIs and the alignment required, ADWEA group companies also noted that incentives implementation is dependent on the resources and funds being made available to them.
- (d) Notwithstanding, ADWEA group companies agreed that the three generic areas of incentives are appropriate, highlighting however no support for incentives related to timely submission. They agreed with the Bureau proposals for incentives in two additional areas, customer services and sustainability (though TRANSCO opposed the HSE incentive). They also supported developing the DSM Incentive, as well as flexible, programme based incentives where these add value and align strategic objectives across the sector – particularly in asset management.
- (e) ADWEA group companies suggested greater engagement from the Bureau through working groups to reflect international metrics and to minimise undue capex. They noted also that incentives should be framed to reflect the longer-term performance beyond the RC1 period.
- (f) ADWEA group companies indicated that the incentives in the second consultation paper were overly general in nature, and provided little detail for them to comment on.
- (g) ADSSC mentioned that the financial incentives are unlikely to drive better performance, and that a better option may be to encourage sharing of best practice by publishing comparative performance measures to encourage the companies to learn from each other.

Assessment

8.6 The Bureau welcomes the general support for incentives, and for the priority areas for incentives in RC1, and agrees that the regulatory framework and incentives require alignment with the Government objectives and improvements.

- (a) In our view the regulatory incentives reflect the Government objectives and reflect local factors. However, we are open to discuss any views and specific incentives

where the sector believes that this alignment does not exist, or a better alignment could be obtained. We note that, in the second consultation paper, we have specifically asked the sector for details about any misalignment of incentives, and detailed information on the priority areas and/or KPIs that the companies may have been requested to provide to the Government. We received no such information in response to our consultation.

- (b) We do not agree that compliance and incentives are contradictory, and that using only reputational incentives are a preferable approach. While compliance with the regulatory framework is a requirement, we understand that the companies have to undertake a journey in order to be fully compliant with every aspect of the framework. Incentives help the companies to achieve compliance, to drive performance, and to maintain the level of compliance over time. HSE and information requirements are two examples in this area. Similarly, we consider that a balanced mix between financial incentives which over time have been instrumental in driving performance and improvements in several areas, as the timely and quality information, and transmission system availability) and reputational incentives is an efficient way to drive the improvements in the sector.
- (c) We agree that incentives cannot be set in isolation of resource requirements, and have not taken such approach to date. One important reason why the RC1 is the most appropriate platform to conduct the review of the incentives framework is the relation with the determination of revenue requirements. However, it is critical that the network companies use a holistic approach in their response to and in preparation of the price control review. On incentives, this means identifying and acknowledging the priority areas, assessing the costs (capex and opex) involved in delivering the required improvements and targets. Finally, this should be used by the companies to ensure that responses and information provided to the Bureau (e.g. on ex-ante capex reviews and opex assessment by our consultants) is complete and includes the costs in meeting the incentive targets.
- (d) We welcome ADWEA group companies' request for flexibility, and in particular TRANSCO's request for greater attention and support for improvement programme incentives and agree that, despite implementation issues, the programme development work conducted on economic despatch provides a good reference for work in this area. The Bureau reiterates its request for TRANSCO and the sector to identify in more detail the areas of work and the initial scope, in order to be able to progress this further. We note that incentives also adopt the same flexible approach that we use in the overall price control review, and we are open to discuss and implement incentives over the period of the price control if these were not fully developed during the price control review.
- (e) The Bureau welcomes and supports ADWEA group companies' request for further engagement in the development of incentives. We note however that the Bureau has been seeking this engagement with the sector, with very limited success, particularly through working groups during PC5 to develop specific areas. We trust that we can build from the suggested approach by ADWEA group for a collaborative and cooperative approach to improve and further develop a robust incentives framework.

- (f) In relation to the comments regarding overly general description or limited details on incentives, we highlight that four annexes with detailed proposals for each specific incentive scheme were shared with the network companies together with the Bureau's second consultation paper. These annexes, besides presenting the details for each incentive scheme, also sought specific views on particular aspects of the schemes. We received very limited comments to these proposals, (though TRANSCO and ADSSC did provide more comprehensive views).
- (g) We agree with ADSSC that sharing best practice and comparative performance is important. Accordingly, we are including in our draft proposals a number of monitoring and reputational incentives. We also agree that incentivised improvement programs may be a useful tool to drive performance, and will work with the sector to develop this suggestion.
- 8.7 The Bureau notes the general support from ADWEA group for the identified five incentive areas, and considers that the current incentives framework has been useful in driving improvements in the performance of the sector in specific areas over time.
- 8.8 Our draft proposal is therefore to maintain the five priority areas and explore programme-based improvements for incentives. Each of these areas is discussed in detail later in this section.

Figure 8.1: Main aspects of the performance incentives



Customer services

- 8.9 Customer services are one of the key strategic areas of focus for RC1. In late 2015, we created a supply side workgroup which has a work programme for identifying and implementing improvements to the regulatory framework and sector practices on customer services. Further to the completion of this programme – covering areas such as customer billing, connections, complaint and data handling, quality and standard of services – we have a draft proposal to introduce an incentive in the area of complaints handling. Further details on this incentive can be found in **Annex F**. We will keep working over the RC1 period and building on the outputs of the supply side group to develop additional customer services related incentives, for example in areas such as customer connections, implementation of service standards, or improvements in customer satisfaction.

- 8.10 Once performance indicators in these areas are fully developed, with precise definitions and targets, the Bureau will consider the best approach to introduce it into the price control regulatory framework, either during the RC1 period or as part of the next price control review.

Sustainability

- 8.11 On sustainability, our draft proposal is to introduce one performance incentive to enhance the HSE performance of the sector. This aims to ensure that the required information on an incident is provided on time, allowing the Bureau to analyse the data and take any necessary preventive or corrective actions. Further details on this incentive can be found in **Annex E**. We are also proposing a new incentive on DSM to reflect the distribution companies' progress in implementing the DSM strategy and action plan and achieving consumption savings. This is further discussed below and in **Annex E**.

Improvement work programme

- 8.12 We will also engage with the companies to explore opportunities to further enhance programme-based incentives, as suggested by ADWEA group companies (TRANSCO in particular). 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 defines KPIs, reporting mechanisms and design of potential incentives and finally draws the roadmap for improvements to achieve specific targets and implementation. Such an approach could apply in asset management, risk management, carbon accounting, business continuity and smart grids. Our draft proposal is to use the time from now up to the final proposals to:
- (a) Clearly identify target areas for the improvements work program; and
 - (b) Set out an initial scope of work for these areas, including how the sector may develop the improvement work program prior to implementation, and what could be the rewarding mechanisms.
- 8.13 We would then use the outcome of this work to be more specific in the RC1 final proposals on how the improvement program may be incentivised from the price control perspective. Further to the RC1 final proposals:
- (a) Detail of the programmes and incentives would then be developed over time, 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.
 - (c) Where appropriate, the recovery of costs and incentive payments could be allowed through licence modifications, derogations, incentive schemes or wider opex and capex funding arrangements.
- 8.14 **Table 8.1** below summarises all the specific incentives proposed in these draft proposals for each of the five key areas, indicating for each business the existing ("✓" symbol) and new ("☑" symbol) incentives.

Table 8.1: Incentives in the current price controls

	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		☑		☑			
Direct supply / 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⁾	☑	☑	☑	☑			
HSE reporting	☑	☑	☑	☑	☑	☑	☑
Customer service							
Customer complaints	☑	☑	☑	☑			☑
Reputational and monitored KPIs							
Transmission system availability					✓	✓	
Financial performance ratios	☑	☑	☑	☑	☑	☑	☑
Business continuity management	☑	☑	☑	☑	☑	☑	☑
System minutes loss					☑		
Number of existing incentives for RC1	6	6	6	6	5	6	3
Number of new financial incentives for RC1	3	5	3	5	2	1	3
Number of new reputational incentives for RC1	2	2	2	2	3 ⁽³⁾	2 ⁽³⁾	2
Total number of incentives for RC1	11	13	11	13	10	9	8
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.

Draft proposals

8.15 Our draft proposal is to:

- (a) maintain the existing three priority areas for incentives; namely, provision of high quality information (with a revised implementation approach – further details below); quality, security and availability of supply; and end user efficiency;

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- (b) expand the incentives framework to two new areas: (i) customer services, through an incentive on customer complaints handling, and (ii) sustainability, particularly to introduce a new incentive for timely HSE reporting, and develop the DSM incentive to meet the current implementation phase of DSM;
- (c) explore whether and how programme-based incentives can be developed and implemented for areas such as asset management, carbon accounting, risk management, business continuity and smart grids – namely by inviting the sector to identify the target areas and develop an initial scope of work.

Technical Assessor arrangements

Second consultation paper

8.16 In the second consultation paper, we suggested maintaining overall the existing TA arrangements, with possible improvements such as:

- (a) ensuring that Regulatory Instructions and Guidance (RIGs) for the TA are in place and updated as necessary;
- (b) ensuring that the TA information and guidance package for the price control returns (PCRs) and RIGs for the AIS produced by the Bureau are developed where they are deemed necessary; and
- (c) considering whether the company's board of directors should have the ultimate responsibility for quality assurance.

Responses

8.17 The network companies supported maintaining the current arrangements for the TA:

- (a) ADWEA group companies welcomed enhanced quality assurance assessment by the TA, which in their view should be treated in the same manner as a financial auditor. They indicated that the need for the TA to produce fully comprehensive reports, describing in detail many licensee practices, adds limited sector value.
- (b) ADWEA group companies emphasised the need for independence of the TA from both licensee and regulator, and suggest that such independence should not be questioned, and the TA should not be overruled by either the Bureau or the companies. They accepted that the TA should be open to challenge, but its decision should stand if accompanied by robust justification.
- (c) ADWEA group companies also indicated an inconsistency with the words used in the licence when compared with the current requirements of the Bureau as regards to improvement/recommendation and made/completed. They suggested that the changed licence words should be part of the RC1 consultation.

Assessment

8.18 We note the companies' support for continuing with existing TA arrangements, and provide below our assessment of their specific responses:

- (a) We note that the requirements on the robustness of the TA reports and the level of explanation/justification of information are not an additional requirement. The existing licences for the network companies set out how the companies should have robust and documented processes to satisfy the TA requirements, and to comply with the licence requirements. This is a critical component to provide confidence in the accuracy of the information provided in the PCRs and AIS. We also note that the financial auditor is governed by IFRS and IAS, while the TA is governed by licence requirements, RIGs and the TA information package. The Bureau and the companies must ensure that the TA complies with these requirements.
- (b) In relation to the independence of the TA and the suggestion for changing the licence, we fully support the independence of the TA, though we agree that independence does not mean not questioning or challenging the TA where we see significant gaps in the approach or results reported. We consider that this accountability is required, as it will benefit the sector and ultimately reinforce the independence of the TA.
- (c) While we do not suggest changing the licence at this stage, we would like to highlight that the RIG and TA information package are the appropriate tools to govern the TA's work and clarify any area of confusion. This is what the Bureau has done recently in the following areas, in consultation with the companies:
 - (i) The TA should explain significant changes in the revenue drivers and/or technical performance indicators. The licences already set out that the TA will be required to obtain any information from the companies, as may be required by the Bureau from time to time. We believe that many companies consider this feature a valuable addition by the TA;
 - (ii) There have been cases where the TA identifies/recommends areas for improvement, and in the following year, instead of assessing the degree of completion, the TA changes the recommendation. The TA should justify any removal or amendment of recommendations from the previous year;
 - (iii) There have been instances where the TA indicates that an area of improvement has been achieved, where the Bureau has evidence of the contrary. In such cases where the Bureau challenged the TA, the TA changed its recommendation/assessment. While we agree that an appropriate balance is required, this highlights the need for the TA providing robust supporting evidence for its assessment, and for having appropriate accountability exerted both by the Bureau and the companies;
 - (iv) There are some instances where the companies have a methodology for determining certain outputs (e.g. SAIDI and SAIFI). If this methodology is changed at some point in time, the Bureau needs to approve it, to ensure that the revised methodology is still meeting the licence requirements. If the TA can provide assurance that any change in a methodology or related assumptions are in accordance with the licence requirements, we are open to revise and remove this requirement for approving

methodology changes, which we recognise places burden on all parties. We welcome the sector proposals in this respect.

- 8.19 Based on the above and considering the views from stakeholders, the Bureau is currently thinking on broadly maintaining the core of the existing TA arrangements, reinforcing it with robust RIGs to support the TA role, and involvement of the board of directors in the quality assurance of regulatory reporting.

Draft proposals

- 8.20 We propose maintaining the core of the existing TA arrangements, strengthening them by:
- (a) ensuring that RIGs for the TA are in place and updated as necessary;
 - (b) ensuring that the TA information and guidance package for the price control returns (PCRs) and RIGs for the AIS produced by the Bureau are developed where they are deemed necessary; and
 - (c) ensuring that the company's board of directors have the ultimate responsibility for quality assurance, by requesting their sign-off of regulatory reports (PCRs and AIS).

Incentives for high quality information

Second consultation paper

- 8.21 The previous RC1 consultation papers noted that the network companies appear to have sustained a good performance on the incentives for the timely provision of information submissions (SBAs/PCRs and AIS), though highlighting some concerns about the quality of AIS. Nonetheless, we emphasised the contribution of incentives to deliver important improvements, over previous price control periods, on the quality and timely submission of information by the companies.
- 8.22 Based on this, the second consultation paper suggested retaining the incentives for the SBAs (including PCRs) and AIS submissions, with a penalty-only scheme (adjusted upwards by the TA ratio) for delayed and/or incomplete/non-compliant submissions.

Responses

- 8.23 ADWEA group companies did not support incentives related with timely submission and argued that SBA, PCR and AIS no longer require incentivisation, though noting their support for the role of the TA in assessing and assuring the quality of such information.
- 8.24 ADWEA group companies considered that the current approach is unduly invasive and heavy handed, and welcomed the Bureau's involvement in a cooperative and collaborative approach to provide the necessary high quality data suitable for the Bureau and other stakeholders.

- 8.25 TRANSCO recalled its suggestion on PC5 to withdraw incentive to timely submit accounts, indicating that any failure in this respect can be addressed at senior management level.

Assessment

- 8.26 The Bureau believes that there is scope for improvements in the quality of the submitted information and some incentives remain appropriate to make such improvements. This is supported by the Bureau's recent experience with the 2015 SBAs and PCRs submitted by the companies in 2016, where some companies did not meet certain requirements clearly set out in the licences, RAGs, TA information and guidance package and RIGs.:
- 8.27 We welcome the suggestion to work collaboratively and cooperatively through working level interactions or otherwise, to ensure that the quality of information meets the high standards required. Indeed, we have been working closely with the companies and providing management and working level feedback and reminders, including review of draft submissions, to highlight requirements both before and after formal submissions.
- 8.28 Given that the timely provision of high quality information is an intrinsic and essential part of a licensee's statutory duties (to facilitate effective regulation), we consider that our proposal for an asymmetrical financial incentive for the provision of high quality information of SBAs/PCRs and AIS for RC1 is appropriate.
- 8.29 We propose to apply the information incentives to all network companies in the sector. The TA assessment and assurance of the quality of information and improvements recommendations will be retained. Further details on the incentive schemes for both the SBAs/PCRs and AIS are included in **Annex C**.

Draft proposals

- 8.30 The Bureau draft proposal is to retain the incentives for the SBAs (including PCRs) and AIS submissions, with a penalty-only scheme (adjusted upwards by the TA ratio) for delayed and/or incomplete/non-compliant submissions

Incentives for availability, security and quality of supply

Second consultation paper

- 8.31 In the second consultation paper, we set out our thinking on the electricity and water transmission network to:
- (a) Remove the financial incentive in both the water and electricity transmission system availability incentives, but maintain the related KPIs for monitoring purposes only;
 - (b) Rename the existing energy lost incentive to unsupplied energy. We considered two options for the incentive, either maintaining the existing approach, or calculating the penalty based on the estimated VOLL, and apply bonus only where there is no unsupplied energy;

- (c) Introduce the TSO incentive for cost deviation indicator, with effect from the start of the RC1; and
- (d) Keep the remaining incentives unchanged (water quality, water security of supply, and electricity interface metering).

8.32 The thinking on electricity and water distribution was to:

- (a) On electricity distribution, include an absolute target for SAIFI and SAIDI, implemented through a glide path over the RC1 period. All other electricity incentives were proposed to remain unchanged (distribution loss reduction and interface metering);
- (b) For water distribution, change the name of the existing water distribution loss reduction incentive to metering penetration;
- (c) Introduce two new incentives for non-revenue water and removal of ground storage tanks;
- (d) Maintain all the other water distribution incentives unchanged at this stage (water quality, removal of timed supply and interface metering).

8.33 In relation to the wastewater sector, our views were to:

- (a) Maintain the incentive to improve biosolids reuse performance, seeking ADSSC's views on how this incentive could be enhanced;
- (b) Introduce two new incentives, one on improving recycled water quality (where we seek views on two alternatives for the PIS, a financial incentive and a reputational incentive), and the other on drainage area planning.

Responses

8.34 TRANSCO and ADSSC responded comprehensively to the incentives proposed in the area of availability, quality and security of supply, while AADC and ADDC provided specific comments to only some selected areas.

8.35 In relation to incentives to the water and electricity distribution businesses, AADC and ADDC:

- (a) Indicated that several incentives, at first instance, would not be acceptable to them, and required further information and discussion.
- (b) Supported the alignment of the Government and the Bureau's targets for SAIDI and SAIFI, as well as the Bureau's proposals to introduce absolute targets for SAIDI and SAIFI on a glide path. ADDC and AADC indicated that they have provided initial plans to upgrade/rehabilitate the electricity networks in order to achieve these targets, which they may need to update over time. The two companies highlighted that if they obtain the necessary resources/funds, either as part of the Bureau's consultant work on opex, or the ex-ante capex review, these targets would be achievable.
- (c) Supported the non-revenue water incentive and associated targets, considering that the incentive should not be duplicated in the reduction of payment of MAR.

- (d) Believed that the incentive for direct supply needs further discussion and agreement, to ensure that all points in the distribution system have enough pressure in network to reach the water to overhead tank. They expressed concerns about security of supply, and need for alignment with the Municipality and other Government entities. AADC and ADDC indicated that unless these factors are resolved, they are unlikely to agree to this incentive.

8.36 In relation to the incentives for the wastewater sector, ADSSC noted that:

- (a) The biosolids reuse incentive should be removed. ADSSC indicated that the constraint has been to find outlets for the biosolids that are acceptable to relevant stakeholders, as other Government entities have been reluctant to accept reuse as a beneficial outcome.
- (b) The approach with the recycled water quality incentive was acceptable. However, in ADSSC's view, the targets were unrealistic. ADSSC suggested using international standards, and proposed 98-100, 95-98, and 90-95 as the performance percentages respectively for the gold, silver and bronze targets. ADSSC also indicated that certain parameters should be exempted from the assessment such as residual chlorine, which is sometimes above the required range to ensure high quality at the point of transfers.
- (c) The proposal to introduce a drainage area planning focused incentive was unacceptable for RC1, as ADSSC's strategy was still aspirational and was not fully developed.

8.37 On the incentives for the transmission businesses, TRANSCO indicated that:

- (a) Including the bromate and residual chlorine into the water quality KPI was inconsistent, since lessening bromate levels involves reducing compliance with the chlorination parameter. TRANSCO therefore suggested considering to remove the bromate from the index, or adjust the dead-band.
- (b) The Bureau was aware of the difficulties faced by TRANSCO in producing a daily back-cast, necessary for the system despatch incentive. TRANSCO mentioned that back-casting may be available from Q1 2017, if both the support tools (e.g. new unit commitment) and appropriate skilled resources are in place. TRANSCO noted that the KPI is dependent on the support of another licensed operator, and it should not be penalised by the action or inaction of that operator.
- (c) In what concerns the incentive for unsupplied energy, TRANSCO rejected retaining the energy lost target of 0.00025158% of the total annual energy, as it does not reconcile with any international standards and allow benchmarking. Alternatively, TRANSCO suggested introducing a different KPI, the System Minutes Loss (SML) index, which is approved and well defined by different international utilities and enables benchmarking. TRANSCO also suggested introducing the SAIDI and SAIFI KPIs to the electricity transmission network.
- (d) It accepted the value of continuing to monitor and report network availability, which is a metric in general consistent with international practice.

- (e) On the water security of supply incentive, TRANSCO expressed concerns about the year-on-year consistency of the KPI and respective target as well as lack of an appropriate long-term performance signal. TRANSCO proposed considering the yearly unsupplied quantity as percentage of the total yearly supplied quantities and applying incentives from 2019 after the TA verify the performance for 2018 to set target for 2019. It argued that elements of the KPI performance are not in TRANSCO's direct control, and thus the KPI should have a dead-band in the early part of RC1 to avoid undue penalty or reward.

Assessment

8.38 The Bureau has considered stakeholders' views in order to further develop the incentives proposals. The Bureau's views in relation to the comments above, and changes to the existing incentives, are set out below.

8.39 On the incentives to the water and electricity distribution businesses:

- (a) The incentives framework approach is flexible, and we are open to discuss and develop incentives (either already proposed or to be proposed in the future) and implementing them, once finalised, during the RC1 period if necessary. We highlight however that we proposed detailed changes to the existing incentives, and detailed new incentives in the RC1 second consultation papers. AADC and ADDC position to reject in principle many incentives, while offering very limited comments to only a few proposed incentives is therefore unattainable. In any case, we look forward for AADC and ADDC suggested cooperative approach and for their fully engagement in this important area.
- (b) We welcome AADC and ADDC support for the SAIDI and SAIFI incentives and alignment of the targets with the Government required targets. Our draft proposals include revised targets, which promote a glide path consistent and aligned with the Government targets set for 2020, and rewards the companies for improvements achieved in this area. However, it is noted that the companies have not provided any relevant capex and opex requirements for the ex-ante capex review and opex consultant's review.
- (c) We note AADC and ADDC's support for the non-revenue water incentive.
- (d) In relation to the incentive for direct supply / bypass of ground storage tanks, we believe that the level of security of supply is at a satisfactory level that enables by-passing ground storage tanks (where the pressure is adequate). The security of supply is ensured by the availability of roof storage tanks, which according to the Water Safety Regulations should hold 12 to 24 hours of water supply. The gradual progress in improving network pressure to match the minimum level of service will impact positively in the number of ground tanks by-passed.

8.40 In relation to the existing wastewater incentives and ADSSC's comments:

- (a) Having considered ADSSC's lack of progress on the biosolids incentive in PC5, we believe there is a need to continue incentivising improvement in this area, and to align the targets with more attainable expectations.

- (b) Based on ADSSC feedback, we propose to introduce financial incentive for improving recycled water quality (dropping the reputational incentive, which ADSSC believes is not effective).
- (c) We accept ADSSC view that the drainage area planning incentive would not be feasible during the RC1 period. Whereas the biosolids and recycled water incentives rely on comprehensive data sets and processes that allow for the development of an effective RIG, the drainage area incentive is not sufficiently mature to carry forward at this time.

8.41 In relation to the comments received from TRANSCO:

- (a) On water quality performance, [relevant parameters under Disinfection & Disinfection By-Products Control Index (DCI) will remain, so Bromate & RCI_2 will remain as key relevant parameters under DCI, which would be subject to TA final assessment. In fact, the Water Quality Regulations under part 6 (clause 6.9) treats the chlorine dioxide similarly to chlorine, and shall be monitored according to the sampling frequency of CL2. The Bureau may consider revisiting DCI parameters where needed once the Chlorine Dioxide chlorination is introduced to the transmission network permanently.
- (b) We maintain our proposal to introduce the system despatch incentive. As TRANSCO expects that back-casting can be implemented in Q1 2017, we maintain that this incentive should be effective from 2018.
- (c) In relation to the alternatives to the unsupplied energy incentive proposed by TRANSCO, our view is that SAIDI, SAIFI and SML are not effective replacements for the existing KPI. Further work is necessary to adapt SAIDI and SAIFI definitions and benchmarks to the transmission system. We are open to work with TRANSCO to further develop these KPIs and introduce them in the future. We see merit in the SML KPI to complement and support, but not to replace, the existing unsupplied energy KPI. We therefore propose to introduce this KPI as a monitored/reputational KPI at this stage. Given the above, our draft proposal includes a number of changes to the existing energy lost incentive:
 - (i) Rename the indicator to unsupplied energy;
 - (ii) Continue with the KPI existing definition, but changing the incentive scheme to apply a penalty for any unsupplied energy, and a bonus only where there is no unsupplied energy in the period.
 - (iii) Use an estimate of the value of lost load (VOLL) as the penalty to encourage compliance with the security standards and to provide a value which can be used to justify network investment in locations which do not meet the minimum security standard.
- (d) We note TRANSCO support for continuing monitoring water and electricity transmission system availability incentives.
- (e) In relation to water security of supply, the Bureau has no objection to amend the target and use unsupplied quantity of water expressed as a percentage of the annual supplied quantities. We will engage with TRANSCO in Q2 and Q3 to

agree on the new incentive scheme and set the targets, which will become part of the Final Proposals.

8.42 **Annex D** include full details about the proposed incentives.

Incentives for demand forecasting

- 8.43 In the RC1 second consultation paper, we indicated that we would consider proposing incentives for demand forecasting, following the ongoing work in the sector in this area. The Bureau has now concluded the project to review and recommend improvements on the demand forecasting arrangements in the sector.
- 8.44 As part of this project, the Bureau's consultant final report 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.
- 8.45 While the details for these KPIs are defined in the demand forecasting final report, and could be easily transposed into the RC1 incentives framework, we understand that the sector needs to conduct some work in this area before these KPIs, and related financial incentives, can be fully implemented.
- 8.46 We are therefore not proposing demand forecasting incentives in these RC1 draft proposals. We expect that the work the sector needs to undertake in this area will be completed in near future. Further to this work, we will assess over the next months whether it may be feasible to introduce any demand forecasting incentives from the beginning of 2018 – in which case we may introduce the respective details as part of the RC1 final proposals, due later in 2017. If this is not feasible, we plan to introduce demand forecast incentives during the course of the RC1 period. 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.

Draft proposals

- 8.47 The incentives draft proposals on electricity and water distribution are the following:
- (a) promote a year-on-year improvement and a glide path performance improvement for SAIFI and SAIDI over the RC1 period, aligned with the Government required targets, and also strengthen the incentive for the companies to implement and use a connectivity model.
 - (b) rename the existing water distribution loss reduction incentive to metering penetration;
 - (c) change the methodology to calculate the electricity distribution losses;
 - (d) introduce two new incentives for non-revenue water and removal of ground storage tanks;
 - (e) maintain all the other electricity and water distribution incentives unchanged at this stage (interface metering, water quality, removal of timed supply).
- 8.48 In relation to the electricity and water transmission network, our draft proposals are to:

- (a) remove the financial incentives for transmission system availability, but use the related KPIs for monitoring only;
- (b) rename the existing energy lost incentive to unsupplied energy, with the penalty linked to the estimated VOLL, and apply bonus only for zero unsupplied energy;
- (c) introduce a reputational incentive for the SML index;
- (d) introduce the incentive for despatch cost deviation indicator; and
- (e) keep the remaining incentives unchanged (water quality, water security of supply, and interface metering).

8.49 In relation to the wastewater sector, we propose to:

- (a) Maintain the incentive to improve biosolids reuse performance; and
- (b) Introduce one new incentive for improving recycled water quality.

Sustainability incentives – Efficient use of water and electricity and HSE

Second consultation paper

8.50 The RC1 second consultation paper discussed proposals for the introduction of a revised DSM incentive, and a new HSE incentive. On DSM, we included a proposed incentive to encourage AADC and ADDC to deliver consumption savings, measuring such savings by the end of the RC1 period:

- (a) for residential, government and commercial customers, either:
 - (i) on a per unit of gross floor area basis (in terms of water and electricity consumption intensity); or
 - (ii) on a per capita basis;
- (b) for either industrial or agricultural customers – on a per account basis.

8.51 On HSE, we proposed introducing a new incentive for timely HSE reporting.

Responses

8.52 ADWEA group companies supported reporting and developing the DSM Incentive. ADDC and AADC indicated that they have agreed in principle with the Bureau to set the specific DSM consumption saving targets, as they implement their DSM strategies and action plans. The two companies highlighted existing constraints and ask for Bureau's cooperation and recognition of progress. They also noted that DSM is a long-term strategy and plan, and that there are apparent contradictory messages in the current tariff setting process. In this respect, AADC and ADDC also welcomed closer co-operation and transparency in the future.

8.53 In addition, AADC stated being in the process of the appointing a DSM consultant, which will review and change as necessary its DSM strategies and action plans, in advance of beginning the implementation process.

- 8.54 In relation to the HSE incentive, TRANSCO did not believe that mandatory requirements should need to be incentivised or penalised (only a distinct lack of submitting on time, in the wrong format or to an adequate quality should be penalised). TRANSCO noted that the Bureau must be mindful as to the value-added from each incentive, as HSE reportable numbers are very low, but that a single failure may cause a penalty. In addition, TRANSCO mentioned that the sector companies have two regulators in relation to HSE, and requested the Bureau to withdraw from this matter or to ensure effective single regulation exists.

Assessment

Incentives for specific end-use efficiency initiatives

- 8.55 The Bureau welcomes the companies support to develop the DSM incentive, including the reporting aspects related with DSM. In relation to the specific points raised by the companies in this area:
- (a) The Bureau welcomes the suggested approach to work collaboratively. To this date however, there have been continuously objections and delays by the two distribution companies in progressing DSM and responding to the Bureau's decisions, proposals and requests for PC5. The licence modification is a good example, which the companies accepted in principle, but rejected once the modification was actually proposed, without providing any specific objection aspects other than the consultation period. We expect that the suggested cooperative approach will positively progress DSM, but acknowledge that the approach to date by the sector has contributed to significant lack of progress in implementing DSM.
 - (b) The matters relating to customer tariffs are discussed in detail in Section 2.
 - (c) We urge AADC to implement its DSM strategy and action plan without further delays. We look forward to work with AADC and its appointed consultant in this important initiative.
- 8.56 The Bureau notes that the options included in the second consultation paper for the DSM KPI, and in particular the usage intensity KPIs, would provide a granular and robust representation of consumption and how the impact of any related savings would apply across consumers and consumer groups. However, we acknowledge that currently the implementation of any of those options is not without specific obstacles, in particular in terms of data available. We will keep working on the usage intensity KPI with the view to implement it in the future.
- 8.57 Our draft proposal for the RC1 period is to use a KPI – in line with the recent consultation on the proposed DSM licence modification – based on the actual savings directly attributed to/measured from DSM activities in consumption per capita. In addition, we plan developing incentives or funding arrangements for delivering individual initiatives included within the distribution companies' DSM strategy and action plans for 2017 onwards, to the extent justified.
- 8.58 The Bureau has already made available the high-level process and cost analysis, justification and recovery principles (through letters dated 24 October 2016 to ADDC,

dated 10 November 2016 to AADC, and dated 17 February 2017 to both companies), which must be followed to enable the two distribution companies recovering their costs in relation to specific end-use efficiency or DSM initiatives (including pilot projects). These arrangements build on the implementation of the distribution companies DSM strategies and action plans in the PC5 period, and must be adhered to so that consumption savings can be accounted for, and cost can be recovered in the RC1 period. In summary, these arrangements include:

- (a) Requirement of submission of business cases – including costs, key milestones, deliverables, measurement and validation approach, and profile of consumption savings targets – for Bureau's assessment and consideration of any DSM initiative, in advance of approving estimated efficient implementation costs. This process would also allow the Bureau to set an incentive payment for each project.
- (b) Recovery of costs via price control process (e.g. capex reviews, or opex annual adjustments), unless otherwise agreed with the distribution companies, and against actual efficient implementation costs, but subject to independent measurement/TA auditing showing actual costs incurred and results achieved.
- (c) Incentive payments to be made by price control adjustments, but following evidence that the DSM initiative has been a success/achieved target results.

HSE reporting incentive

8.59 In relation to the HSE incentive, the Bureau notes that:

- (a) The objective of introducing the HSE reporting incentive is twofold: highlighting the importance of HSE in the sector, and drive the sector's performance in HSE – namely performance in implementing best HSE practices, appropriate reporting, which will have effects in the Bureau's ability to analyse the data and take future corrective and/or preventive measures. Based on the above objectives, the Bureau considers that the financial penalty-based scheme is the most appropriate at this stage. The initial notification (IN) report in particular is a critical requirement, due to the nature and impact of the HSE related events which may trigger it. We acknowledge TRANSCO view about the low number of reports, and therefore propose to bring down the target for compliance with the incident initial notification (INI) report deadlines from 100% to 90%, in line with the target for the final investigation report (FIR).
- (b) On the dual governance issue, the Bureau notes that it is not unusual for utilities to report to multiple regulators on the same matter with the same or different objectives. However, we would like to ensure that our requirements or incentives do not contradict other regulators' requirements. We also note that the sector regulatory HSE requirements in the Bureau are different than OSHAD reporting requirements. Under Law No. 2 (1998), the Bureau has an obligation to ensure the provision of special health and safety regulations related to supply of water, wastewater services and electricity to the general public.

8.60 **Annex E** includes the details of our proposals for sustainability incentives.

Draft proposals

8.61 The Bureau's draft proposal is as follows:

- (a) In relation to DSM:
 - (i) introduce an outputs-based approach incentive to monitor, assess and incentivise the two distribution companies to achieve specific consumption savings targets; and
 - (ii) develop incentive and/or funding arrangements for individual initiatives included within the distribution companies' DSM strategy and action plans, to the extent justified.
- (b) In relation to HSE:
 - (i) Introduce an incentive for the timely provision of the different types of HSE reporting requirements.

Reputational incentives

Second consultation paper

8.62 In the second consultation paper, we considered the introduction of reputational incentives (i.e., without financial bonus and/or penalties) in the following areas:

- (a) water and electricity transmission system availability;
- (b) improving recycled water quality (as an alternative to proposed financial incentive);
- (c) financial ratios relating to the companies' debt service capabilities, gearing, liquidity and bill collection, which are widely used by the credit rating agencies themselves as well as the regulators and regulated companies; and
- (d) the RPMs relevant to network companies through a separate report or through the existing arrangements and reporting to GSEC.

Responses

8.63 While AADC and ADDC appeared to support them, ADSSC showed lack of confidence that reputational incentives would be able to drive significant positive results:

- (a) ADWEA group companies offered specific comments on the financial ratios reputational incentive:
 - (i) They did not support any KPI that is not intended to provide visibility on financial robustness. On this basis, the companies suggested removing the metric assessing time to reimburse suppliers. ADWEA group companies also expressed concerns about the absence of quantitative modelling for the financial ratios, requesting the Bureau to provide thresholds.

- (ii) Nonetheless, ADWEA group companies broadly supported the use of suite of financial ratios in absence of an externally set credit rating, though questioned the need for such ratios for the Government-owned sector companies. ADWEA group companies presented as examples a number of financial ratios used by credit rating agencies and other regulators. They highlighted the importance of having ranges and definitions for the proposed financial ratios which are consistent and aligned with the ones used by the credit agencies and other regulators.
- (b) AADC and ADDC suggested that reputational comparisons and compliance are more effective tools than a financial bonus and/or penalties (including for the existing information related incentives), and suggested the Bureau to reconsider the application of financial incentives.
- (c) ADSSC did not believe that introduction of a reputational incentive would be beneficial in the Emirate of Abu Dhabi, highlighting the need for a different approach to drive improvements in the sector. At the same time, however, ADSSC suggested that this approach should be based on stronger comparative performance approach.

Assessment

8.64 The Bureau welcomes the general support for the introduction of reputational incentives and a stronger comparative performance approach. In relation to the specific comments raised by the network companies:

- (a) We welcome the broader support to the use of financial ratios. The objective of introducing these arrangements is to monitor and compare the sector companies' financial and operating performance, which ultimately will contribute to improve it. We consider that this remains important regardless of the entities ownership structure. Accordingly, we expect that these arrangements should be appreciated by both ADWEA and the Government. Our thinking is to record and monitor the financial ratios information in first instance in the companies' SBAs. The next step would be to set the target thresholds, which we do not envisage to implement immediately. Nevertheless, we can consider working on the setting the targets in parallel to development of the ratios and welcome the companies' suggestions in this regard. We clarify that the proposed ratios are standard ratios which are likely to allow full comparison with similar companies elsewhere. We note the companies' comparison with credit rating agencies and other regulators. However, we propose to start with the simpler ratios which achieve broadly same objectives, and can move to more robust and complex ratios over time, if required. We consider that the proposed ratios are comparable with the ratios used by credit agencies/other regulators, but welcome the companies' specific views if they see any misalignment.
- (b) We welcome AADC and ADDC support for the introduction of reputational incentives. We consider that financial incentives have played and continue playing an important role in driving performance in the sector for the areas to which they apply. As set out in the second consultation paper, we do not consider that removing all financial incentives and moving into a framework based only on

reputational incentives can drive the levels of quality and performance required. Financial incentives are widely used in regulatory and non-regulatory contexts.

- (c) We note that ADSSC's suggestion for more comparative performance has similar, if not the same characteristics of the reputational incentives that we are proposing.

8.65 In the second consultation paper, we also highlighted that we could introduce a business continuity management incentive, once we had developed further our thinking and the details of this possible incentive. We have now developed some details for this incentive, and consider that, given the nature of the issue that this is a relatively new area for the sector, a reputational incentive in this area is the appropriate forward.

8.66 We received no comments about separately reporting RPMs, and therefore are not pursuing further this matter at this stage. **Annex G** includes the details for our proposed reputational incentives and monitored KPIs.

Draft proposals

8.67 We propose to introduce reputational incentives for the following indicators to be monitored and reported to the stakeholders without financial incentives:

- (a) water and electricity transmission system availability;
- (b) financial ratios relating to the companies' debt service capabilities, gearing, liquidity and bill collection, which are widely used by the credit rating agencies themselves as well as the regulators and regulated companies;
- (c) business continuity management; and
- (d) system minutes loss;

Regulatory Instructions and Guidance

Second consultation paper

8.68 The Bureau highlighted in the previous RC1 consultation papers that RIG documents are an important element of the implementation of an incentive, where it has been identified that the additional instructions and guidance are required for the companies to perform adequately and effectively discharge their obligations under the licence.

8.69 In this sense, we proposed in the second consultation paper to continue issuing RIGs where appropriate, and sought feedback from the sector on which existing or new incentives may require RIGs.

Responses

8.70 While ADSSC did not comment on this topic, other network companies agreed to the importance of the development of RIGs and consultation on the RIGs before issue.

- (a) ADWEA group companies considered the use of RIGs as a prerequisite of good quality regulatory reporting. These companies supported the provision of RIGs,

provided that these are consistent with the licence definition, namely that they are consulted on, agreed to and consider the time and efforts required to comply with them. They added that the Bureau should demonstrate that its intent to develop RIGs is to ensure all parties benefit, and indicated their aim to work together, cooperatively and collaboratively.

- (b) ADWEA group companies noted that the Bureau has not always sought to provide adequate consultation in respect to certain RIGs, or balance the RIG added value with the time and effort required to comply with it. They also noted that current RIGs and RAGs have been amended through the issuance of separate letters, which was not in line with the licence and makes the original document outdated.
- (c) ADWEA group companies suggested that RIGs should provide detailed and clearly described guidelines, should be flexible to accommodate the needs based amendments and to accommodate circumstantial compulsions (in the cases where licensees indicate clear limitations and reasons for non-compliance).

Assessment

8.71 The Bureau recognises the importance of RIG documents to provide detailed guidance on the individual performance indicators, so as to address emerging issues and incorporate lessons learnt.

- (a) We reiterate that all RIGs (and RAGs) issued by the Bureau have been consulted with the sector. In doing so, we have always tried to ensure that the relevant RIG provides useful guidance to all parties, and take into account the time and effort required to implement it. In any case, we are open to discuss with the sector how this particular process can be improved in future. We also emphasise that the companies have a significant role in the development of RIGs, by identifying any emerging issues requiring clarification, and participating actively and constructively in the development of the respective RIGs. The Bureau, as indicated in the preview price controls reviews and included in the licence, will consult on any RIG before implementation. While we will always aim to also agree on the contents of the final RIG, we note that such agreement is not a licence requirement (but consultation is), and not mandatory given the primary aim of the RIG to provide guidance and clarifications to help companies comply with the licences.
- (b) We agree with the view that in principle an appropriate process should be followed to modify a RIG. Where in previous instances we have amended the RIG by issuing a letter, this was done based on the nature and urgency of the issue, and with due consideration of the time and efforts required by all parties for developing and implementing the amendment, and thus considering the most pragmatic solution. While this has been the case, we also note that in all these instances the amendment letter was not issued without consultation with the relevant stakeholders (even if through meetings), and in many instances the letters were issued at the sector's request.

- (c) In issuing or amending any RIGs, the key objective is to clarify and provide guidance about any methodological or processual aspect of the regulatory framework. In line with the approach adopted for the price control review, we aim to make RIGs flexible where necessary, though it may not be possible to consider all circumstances highlighted by stakeholders. We note that primarily the RIG aims to facilitate compliance.

Draft proposals

- 8.72 We will continue issuing RIGs for incentives where deemed appropriate, following consultation with the relevant licensees.

Design and calibration of incentives

Second consultation paper

- 8.73 In the RC1 second consultation paper, we discussed and set out initial views on important aspects of the design of incentives, namely to:
- (a) maintain the cap on individual incentives;
 - (b) maintain using dead-bands of performance where suitable;
 - (c) apply penalty-only incentives to areas where companies have statutory duties such as timely provision of compliant SBAs/PCRs, AIS and HSE reports and apply both bonus and penalty in all other cases; and
 - (d) keep relative targets for the majority of incentives which have this approach.

Responses

- 8.74 ADWEA group companies in general supported the use of incentive caps. However, they opposed incentives that only account for a financial penalty. They agreed with the use of dead-bands where uncertainty – and unfair reward or penalty – may exist for the Bureau or Licensee. They also agreed with the concept of absolute targets for incentives, as long as they were aligned with those of the Government, and were set based on robust assessment, technically achievable and international definition.

Assessment

- 8.75 The Bureau welcomes the support for capping financial incentives and using dead-bands. We consider that removing the cap on financial incentives may likely impose high risks for both end users and network companies in situations where the companies significantly under or over-perform on any given indicator. Further, end-users may not necessarily be ready to pay for or demand the improvement in services where certain thresholds have been achieved. This cap also enables better price signalling to the network companies' investments. We consider that in certain circumstances it is appropriate to have incentives designed to have exclusively a financial penalty. The principles that should be applied in relation to incentives asymmetry are:

- (a) Performance of statutory obligations by the licensee (such as the timely provision of quality information and HSE reporting) should not be rewarded.
- (b) Areas where good performance may bring benefits to end-users, for example through better service quality for the same price, or same service quality at a reduce cost, should receive symmetric bonus and penalty. Most of the financial incentives are in this situation.

8.76 We agree that absolute targets are, in principle, a better driver for performance from the network companies, though there may be exceptions - for example, where the level or quality of historical data available is insufficient to establish absolute targets.

Draft proposals

8.77 Our draft proposals in relation to the design aspects across the incentives are to:

- (a) maintain the cap on individual;
- (b) maintain using dead-bands of performance where suitable;
- (c) apply penalty-only incentives to areas where companies have statutory duties such as timely provision of compliant SBAs/PCRs, AIS and HSE reports and apply both bonus and penalty in all other cases; and
- (d) use absolute targets where appropriate and pragmatic.

Incentive mechanisms and caps on financial impact

Second consultation paper

8.78 The RC1 second consultation paper explained 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 PIS proposed) - Formulas, targets and incentives would be incorporated into the licence and more detailed definitions and reporting arrangements to be set out in Regulatory Instructions and Guidance. TA arrangements would continue and the incentive rates would be defined in this draft proposals paper;
- (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);
- (c) incentives that are identified at a high level – for example for customer services, 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 this or the next price control period.

- 8.79 We also suggested maintaining the cap on the financial impact of each incentive to 0.5% of MAR, to ensure a balanced set of incentives and to help protect the licensee from any undue business risk.

Responses

- 8.80 ADEWA group companies supported a range of incentive mechanisms, depending upon the performance to be measured and rewarded. They indicated however that specific detail from the Bureau in respect to each incentivised area of performance had not yet been provided. They indicated that the detail and process that upholds the Bureau's proposed calibration of each incentive needs to be communicated in a transparent and timely manner, to enable them to verify the detail and where needed take timely action to amend internal processes and/or commit investment to secure the expected performance level.
- 8.81 ADWEA group companies in general supported the use of reward or penalty caps, and maintaining the current level of 0.5% MAR.

Assessment

- 8.82 We welcome the licensees' general support for the proposed incentive mechanisms. As mentioned above, we have already provided details for each incentive in the annexes issued to the network companies together with the RC1 second consultation paper. These draft proposals present (below and in the annexes) additional details about the calibration of the actual incentive rates for financial incentives. This is also consistent with the approach followed in the previous reviews.
- 8.83 We also welcome the sector's support for maintaining the current cap on financial incentives. Accordingly, the maximum bonus or penalty for each incentive will be capped at 0.50% of the company's "own" or core MAR (i.e. MAR excluding pass-through costs). The proposed cap of 0.50% of core MAR will apply to all financial incentives (individually). Given the individual caps on all indicators, the total bonus or penalty through the overall Q term will be automatically capped without any explicit mechanism.

Draft proposals

- 8.84 Our draft proposals are to use a number of incentive mechanisms, namely:
- (a) formula based incentives for performance against metrics specified as part of this price control review (the majority of PIS proposed);
 - (b) incentives for specific end-use efficiency initiatives;
 - (c) incentives for areas which are identified at a high level in this review, and where detailed development will occur during the RC1 period for future implementation;
 - (d) reputational incentives, which do not include any financial bonus and/or penalties;
 - (e) capping financial incentives at 0.5% of the company's annual MAR (excluding pass-through costs).

Operation of incentive mechanism

- 8.85 The incentive schemes for RC1 will operate in the same manner as have 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:

$$Q_t = Q1_t + Q2_t + Q3_t + \dots + QN_t$$

where $Q1_t \dots QN_t$ are the revenue adjustments in respect of the incentive indicators 1, 2, ..., N, respectively.

- 8.86 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.
- 8.87 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.
- 8.88 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 8.2: 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

- 8.89 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

8.90 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:

$$Q = - \text{Incentive rate} \times \text{Number of months of delay from target date} \times (1 + \text{TA ratio})$$

- (b) The maximum penalty for any submission will be capped by a delay of 6 months. That is, the maximum penalty will be:

$$Q = - 6 \times \text{Incentive rate} \times (1 + \text{TA ratio})$$

- (c) 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. The introduction of this ratio into the formula for Q term will formalise the existing practice.

- (d) We have proposed making these information incentive schemes exclusively based on a financial penalty.

Q terms for other performance incentives

8.91 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):

$$Q = \text{Incentive Rate} \times [(\text{Target performance} - \text{Actual performance}) / \text{Target Performance}] \times 100$$

8.92 However, for performance indicators where a higher value than the targets is considered better performance (eg, system availability), the signs in the above formula for Q will be reversed. That is:

$$Q = \text{Incentive Rate} \times [(\text{Actual performance} - \text{Target performance}) / \text{Target Performance}] \times 100$$

8.93 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.

8.94 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.

8.95 For unsupplied energy, the incentive rate is the VOLL.

Performance targets and incentive rates

Performance targets for incentives

8.96 The following table lists the proposed targets for all incentives which will be incorporated into the network companies' licences at this price control review.

Table 8.3: Performance targets for RC1 incentives – draft proposals

	Target / dead-band	First year of performance against incentive
Information (Annex C)		
SBA's (including PCRs as per new RAGs)	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	Previous year performance	2018
Interface metering	90% for water, 95% for electricity	2018
Distribution losses (E)	Previous year performance	2018
Water meter penetration	Previous year performance	2018
Security of supply	% of Supplied Water	2018
Non-revenue water	10%-15% (dead-band) to 10%-12% glide path	2018
Direct supply / Removal of ground storage tanks	Previous year performance +/-10%	2018
SAIDI	Previous year performance / glide path target	2018
SAIFI	Previous year performance / glide path target	2018
Unsupplied energy	0 (bonus); above (penalty)	2018
System despatch costs	Previous year performance	2019
Biosolids reuse	85% of previous year performance	2018
Recycled water quality compliance	95%	2018
Sustainability (Annex E)		
Demand side management	31 December 2021	2018
HSE reporting	100% IN, 90% INI and FIR	2019
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
Business continuity management	NA	2018
System minutes loss	NA	2018

8.97 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 or a reduction in the financial bonus, which will be calculated on a monthly basis. There will be no financial bonus for this incentive.

- (b) For all 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 as follows:
 - (i) For the existing incentives, the company's actual performance in 2017 would be verified under the PC5 arrangement and can be used to set the target for 2018.
 - (ii) However, in cases where we have proposed a new incentive (or significantly modified an existing incentive where the actual performance in the preceding year was not measured according to the new or modified definitions), then 2019 will be the first year when the performance will be subject to incentives and the performance in 2018 will only be verified by TA to set the target for 2019.
- (c) There are however incentives where performance targets are proposed in absolute terms rather than based on the previous year performance. Such incentives can be introduced from the first year of RC1 period (ie, 2018).
- (d) We have proposed for a number of incentives a dead-band for performance where a company will not be subject to any bonus or penalty.

Overall approach on calculating incentive rates

- 8.98 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.

8.99 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

8.100 **Table 8.4** 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.

8.101 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.

8.102 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 8.4** above 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 8.3** above and their incentive rates will apply to adjust MAR in 2020 or later as per the timeline shown in **Table 8.2**.

Table 8.4: Incentive rates – draft proposals

		Calibration assumption	AADC (E)	AADC (W)	ADDC (E)	ADDC (W)	TRANSCO (E)	TRANSCO (W)	ADSSC
Average RC1 MAR	AED million		926	453	1,547	764	1,734	1,114	2,000
Amount at stake	AED million	0.5% of MAR	4.63	2.26	7.73	3.82	8.67	5.57	10.00
Provision of high quality information									
SBA's (PCRs), AIS	AED / month	6 months	772,000	377,000	1,289,000	637,000	1,445,000	929,000	1,667,000
Availability, quality and security of supply									
Water quality (WQPA)	AED / 1%	4 % deviation		566,000		956,000		1,393,000	
Removal timed water supply	AED / 1%	20 % deviation		113,000		191,000			
Interface metering (W)	AED / 1ppt	10 ppt deviation		226,000		382,000		557,000	
Interface metering (E)	AED / 1ppt	4 ppt deviation	1,158,000		1,933,000		2,167,000		
Water meter penetration	AED / 1%	20 % deviation		113,000		191,000			
Security of supply	AED / 1%	20 % deviation						279,000	
Non-revenue water	AED / 1ppt	5 ppt deviation		453,000		764,000			
Removal of ground storage tanks	AED / 1%	10 % deviation		226,000		382,000			
SAIDI / SAIFI	AED	0.5% of MAR	4,632,000		7,734,000				
Distribution loss reduction	AED / 1%	20 % deviation	232,000		387,000				
Unsupplied energy	AED / kWh	VOLL 28 AED/kWh					28 AED/kWh		
System despatch costs	AED / 1%	20 % deviation					433,000	279,000	
Biosolids reuse	AED / 1ppt	15 ppt deviation							667,000
Recycled water quality compliance	AED / 1ppt	5 ppt deviation							2,000,000
Sustainability									
DSM <i>Bonus</i>	AED / 1ppt	4 ppt deviation	1,158,000	566,000	1,933,000	956,000			
<i>Penalty</i>	AED / 1ppt	2 ppt deviation	2,316,00	1,131,000	3,867,000	1,911,000			
HSE	AED / 1%	10 % deviation	463,000	226,000	773,000	382,000	867,000	557,000	1,000,000
Customer services									
Customer complaints	AED / Day	5 days deviation	926,000	453,000	1,547,000	764,000			

Detailed design of individual incentives

8.103 **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 current-thinking on their detailed design.

8.104 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 an existing one.

Table 8.5: Incentives for RC1 – Summary of Bureau’s draft proposals

S.No.	Individual incentive	Relevant businesses	Existing or new incentive	Main change from existing incentive
Annex C – Provision of high quality information				
C.1	SBA's / PCR's	All	Existing	Penalty-only scheme
C.2	AIS	All	Existing	Penalty-only scheme
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	None
D.3	Interface metering	Water	Existing	None
D.4	Water meter penetration	AADC and ADDC Water	Revised	Incentive renamed
D.5	Security of supply	TRANSCO Water	Existing	Target being reviewed/reconsidered
D.6	Non-revenue water	AADC and ADDC Water	New	New incentive
D.7	Direct supply / Removal 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
E.3	HSE reporting	All	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
G.4	Business continuity management	All	New	New incentive
G.5	System minutes loss	TRANSCO Electricity	New	New incentive

Annex A: Updating RAVs

Introduction

- A.1 This **Annex A** to the draft proposals for RC1 describes and sets out the updating of the opening 2018 RAVs projected at the last price control reviews updated for:
- (a) Removal of inflation from RAV;
 - (b) additional efficient PC4 capex over and above the provisional PC4 capex allowances in PC4 controls for all the four network companies (AADC, ADDC, ADSSC and TRANSCO);
 - (c) additional efficient PC5 (2014 and 2015 only) capex over and above the provisional PC5 capex allowances in PC5 controls for all the four network companies; and
 - (d) 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;
 - (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 (2014 and 2015 only) capex

- A.5 Lines 1 through 31 (including new lines N1 to N8 inserted in RC1) of **Annexes A.1 through A.7** set out the updating of opening 2018 RAVs for removal of inflation, additional efficient PC4 and PC5 (2014 and 2015 only) 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 N1-N8 provide updated opening RAV for 2018 in nominal prices, after removal of inflation as follows:

- (a) Line N1 shows 2012 opening RAV in nominal prices taken from PC5 Depreciation Model, adjusted to remove inflation from RAV
- (b) Line N2 shows the provisional PC4 and PC5 (2014 and 2015) capex allowed in PC4 and PC5 controls in PC4 (i.e 2010) and PC5 (2014) terms, respectively
- (c) Line N3 shows the provisional PC4 and PC5 (2014 and 2015) capex in nominal terms
- (d) Line N4 shows the depreciation on pre-2012 capex in nominal terms from the adjusted PC5 Depreciation Model
- (e) Line N5 calculates the depreciation on provisional PC4 and PC5 (2014 and 2015 capex) in nominal terms
- (f) Line N6-N7 show the capex and depreciation on unlicensed assets of TRANSCO in nominal terms
- (g) Line N8 then calculates the closing RAVs in nominal prices, as the sum of opening RAV (line N1), PC4 and PC5 and unlicensed assets capex (Lines N3 and N6) less the sum of depreciation on pre-2012 capex, PC4 and PC5 provisional capex and unlicensed assets (N4, N5 and N7). The closing RAV for 2017 represents the opening RAV for 2018 in nominal prices which is then updated for additional PC4 and PC5 efficient capex, described below.

A.8 Lines 2-8 contain the calculations of additional efficient PC4 and PC5 (2014 and 2015 only) capex to be allowed in RC1:

- (a) Line 2 shows the actual PC4 and PC5 (2014 and 2015 only) capex in nominal terms as per the audited accounts
- (b) Line 3 shows the relevant efficiency scores for PC4 and PC5 (2014 and 2015) 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 (not used in the calculations)
- (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 nominal terms, and
- (g) Line 8 then calculates the additional efficient PC4 and PC5 capex (in nominal prices) as the difference between efficient PC4 and PC5 capex (from Line 4) and provisional PC4 and PC5 capex (from Line 7). The results are shown in Section 5 of the paper.

A.9 Lines 9-11 show the calculation of depreciation foregone (in nominal 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 nominal terms (line N1).

- A.10 Lines 12-18A 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 nominal terms) 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 calculated in line 18 is then converted into 2018 prices in line 18A. The return on capital foregone so calculated (line 18A) is to be added along with the depreciation foregone in Line 11 (nominal terms), 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.11 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 but converted into 2018 prices) and the return on capital foregone (from Line 18A). 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 PC3 related costs at 1 January 2010 by using the PC3 cost of capital from Line 17 as the discount rate
 - (b) Lines 25-27 calculate the present value of the sum of PC4 (2012-2013) and PC5 (2014-2015) related costs at 1 January 2018 by using the PC5 cost of capital from Line 17 as the discount rate
- A.12 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.13 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 nominal prices) from the PC5 calculations at the last price control review after adjustment to remove inflation (which already includes provisional PC4 and PC5 allowances). At the start of these calculations, Line 28 shows the 2018 opening RAV in nominal prices (from Line N1). Line 29 in the previous price controls used to show opening RAV in the new price control terms, however, this is no longer required since RC1 RAVs are in nominal terms. Line 30 shows the adjustment of the opening 2018 RAV from PC5 calculations in nominal 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.14 **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 nominal prices).

- A.15 Line 32 shows the new average asset life assumption for RC1 capex (see section 6 of the paper).
- A.16 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.17 Line 34 lists the Ex-ante RC1 capex as shown in Section 5 of the paper.
- A.18 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.19 Line 36 calculates the depreciation on Ex-ante RC1 capex as presented in Section 5 of the paper.
- A.20 Line 37 calculates the total depreciation by adding Lines 35 and 36 (results shown in section 6 of the paper).
- A.21 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.22 The updated opening RAVs for all businesses are listed in Section 6 of the paper.

Table A.1: AADC electricity – Updating RAV

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	105.63	107.22
	Assumed in PC4	93.57			Assumed in PC5	97.65				
2018 Opening RAVs with PC4/PC5 provisional capex – after one-off adjustment for inflation removal										
		PC4			PC5			RC1		
2018 Opening RAV, PC4/PC5 provisional capex - Nominal prices		2012	2013	2014	2015	2016	2017	2018		
N1	Opening RAV	AEDm, nominal prices	5,992.34	6,602.56	7,188.03	7,517.22	7,839.22	8,166.01	8,478.95	
N2	PC4/PC5 Provisional Capex	AEDm, PC4/PC5 prices	900.00	900.00	700.00	700.00	700.00	700.00	700.00	
N3	PC4/PC5 Provisional Capex	AEDm, nominal prices	923.40	929.53	700.42	716.85	746.01	757.23	757.23	
N4	Actual depreciation, pre-2012 capex	AEDm, nominal prices	-297.79	-297.79	-297.79	-297.79	-297.79	-297.79	-297.79	
N5	Depreciation on provisional PC4/PC5 capex	AEDm, nominal prices	30	-15.39	-46.27	-73.44	-97.06	-121.44	-146.49	
N6	Unlicensed assets capex/RAV	AEDm, nominal prices								
N7	Depreciation on unlicensed assets	AEDm, nominal prices								
N8	Closing RAV	AEDm, nominal prices	6,602.56	7,188.03	7,517.22	7,839.22	8,166.01	8,478.95	8,478.95	
Additional Efficient PC4 and PC5 Capex to be allowed at this Review										
		2012	2013	2014	2015	2016	2017			
2	Actual PC4 and PC5 capex	AEDm, nominal prices	348.00	1,238.00	246.00	179.00	-			
3	Applied capex efficiency factor	%	92.38%	92.38%	91.02%	91.02%	-			
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	321.48	1,143.66	223.91	162.93	-			
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	359.04	1,268.84	245.70	174.69	-			
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, nominal prices	923.40	929.53	700.42	716.85	-			
8	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, nominal prices	-601.92	214.13	-476.51	-553.92	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, nominal prices	-601.92	214.13	-476.51	-553.92	0.00			
11	Depreciation on additional efficient PC4 and PC5 capex (half-year depreciation for the first year of each annual capex)	AEDm, nominal prices	-10.03	-16.50	-20.87	-38.04	-47.27	-47.27		
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, nominal prices	0.00	-591.89	-361.26	-816.90	-1,332.78	-1,285.50		
13	Additional efficient PC4 and PC5 capex	AEDm, nominal prices	-601.92	214.13	-476.51	-553.92				
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, nominal prices	-10.03	-16.50	-20.87	-38.04	-47.27	-47.27		
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, nominal prices	-591.89	-361.26	-816.90	-1,332.78	-1,285.50	-1,238.23		
16	Average of Opening and Closing values	AEDm, nominal prices	-295.94	-476.57	-589.08	-1,074.84	-1,309.14	-1,261.87		
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%		
18	Return on capital foregone	AEDm, nominal prices	-13.32	-21.45	-32.40	-59.12	-72.00	-69.40		
18A	Return on capital foregone	AEDm, 2018 prices	-14.87	-23.79	-35.55	-63.38	-74.18	-70.44		
Financing Costs foregone on Additional Efficient PC3 and PC4 Capex										
		2012	2013	2014	2015	2016	2017			
19	Depreciation foregone	AEDm, 2018 prices	-11.20	-18.30	-22.90	-40.79	-48.70	-47.98		
20	Return on capital foregone	AEDm, 2018 prices	-14.87	-23.79	-35.55	-63.38	-74.18	-70.44		
21	Total financing costs foregone	AEDm, 2018 prices	-26.08	-42.09	-58.45	-104.17	-122.89	-118.43		
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	-27.86	-43.03						
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-70.89						
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		-87.82	-70.50	-119.09	-133.16	-121.64		
27	Accumulated NPV (@ 1 Jan 2018) of financing costs foregone	AEDm, 2018 prices						-532.21		
Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)										
		2018								
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, nominal prices							8,478.95	
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices							9,309.74	
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, nominal prices							(1,238.23)	
31	Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex	AEDm, nominal prices							7,240.72	
Updating RC1 RAVs for RC1 ex-ante Capex										
Updated RC1 RAVs including RC1 ex-ante Capex										
AEDm, nominal prices		2018	2019	2020	2021					
32	Assumed average asset life for new investment	years	40							
33	Opening RAV	AEDm, nominal prices	7,240.72	7,651.92	7,850.85	7,688.27				
34	RC1 ex-ante capex	AEDm, nominal prices	771.00	556.00	204.00	138.00				
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, nominal prices	350.17	330.85	330.85	330.85				
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, nominal prices	9.64	26.23	35.73	40.00				
37	Total depreciation for RC1	AEDm, nominal prices	359.81	357.07	366.57	370.85				
38	Closing RAV	AEDm, nominal prices	7,651.92	7,850.85	7,688.27	7,455.43				

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Table A.2: AADC water – Updating RAV

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	105.63	107.22
Assumed in PC4		93.57			Assumed in PC5	97.65				
2018 Opening RAVs with PC4/PC5 provisional capex – after one-off adjustment for inflation removal										
		PC4			PC5			RC1		
2018 Opening RAV, PC4/PC5 provisional capex - Nominal prices		2012	2013	2014	2015	2016	2017	2018		
N1	Opening RAV	AEDm, nominal prices	1,784.30	1,839.54	1,891.21	2,101.54	2,308.80	2,518.11	2,721.49	
N2	PC4/PC5 Provisional Capex	AEDm, PC4/PC5 prices	130.00	130.00	300.00	300.00	300.00	300.00	300.00	
N3	PC4/PC5 Provisional Capex	AEDm, nominal prices	133.38	134.27	300.18	307.22	319.72	324.53		
N4	Actual depreciation, pre-2012 capex	AEDm, nominal prices	-75.91	-75.91	-75.91	-75.91	-75.91	-75.91		
N5	Depreciation on provisional PC4/PC5 capex	AEDm, nominal prices	30	-2.22	-6.68	-13.92	-24.05	-34.50	-45.23	
N6	Unlicensed assets capex/RAV	AEDm, nominal prices								
N7	Depreciation on unlicensed assets	AEDm, nominal prices								
N8	Closing RAV	AEDm, nominal prices	1,839.54	1,891.21	2,101.54	2,308.80	2,518.11	2,721.49		
		PC4			PC5					
Additional Efficient PC4 and PC5 Capex to be allowed at this Review		2012	2013	2014	2015	2016	2017	2018		
2	Actual PC4 and PC5 capex	AEDm, nominal prices	183.00	434.00	210.00	103.00	-	-		
3	Applied capex efficiency factor	%	91.58%	91.58%	92.69%	92.69%	-	-		
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	167.59	397.46	194.65	95.47	-	-		
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	187.17	440.96	213.59	102.36	-	-		
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, nominal prices	133.38	134.27	300.18	307.22	-	-		
8	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, nominal prices	34.21	263.19	-105.53	-211.75	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, nominal prices	34.21	263.19	-105.53	-211.75	0.00			
11	Depreciation on additional efficient PC4 and PC5 capex (half-year depreciation for the first year of each annual capex)	AEDm, nominal prices	0.57	5.53	8.15	2.87	-0.66	-0.66		
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, nominal prices	0.00	33.64	291.31	177.62	-36.99	-36.33		
13	Additional efficient PC4 and PC5 capex	AEDm, nominal prices	34.21	263.19	-105.53	-211.75				
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, nominal prices	0.57	5.53	8.15	2.87	-0.66	-0.66		
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, nominal prices	33.64	291.31	177.62	-36.99	-36.33	-35.67		
16	Average of Opening and Closing values	AEDm, nominal prices	16.82	162.47	234.46	70.31	-36.66	-36.00		
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%		
18	Return on capital foregone	AEDm, nominal prices	0.76	7.31	12.90	3.87	-2.02	-1.98		
18A	Return on capital foregone	AEDm, 2018 prices	0.85	8.11	14.15	4.15	-2.08	-2.01		
Financing Costs foregone on Additional Efficient PC3 and PC4 Capex		2012	2013	2014	2015	2016	2017			
19	Depreciation foregone	AEDm, 2018 prices	0.64	6.13	8.95	3.07	-0.68	-0.67		
20	Return on capital foregone	AEDm, 2018 prices	0.85	8.11	14.15	4.15	-2.08	-2.01		
21	Total financing costs foregone	AEDm, 2018 prices	1.48	14.24	23.10	7.22	-2.76	-2.68		
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	1.58	14.56						
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		16.14						
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		20.00	27.86	8.25	-2.99	-2.75		
27	Accumulated NPV (@ 1 Jan 2018) of financing costs foregone	AEDm, 2018 prices						50.37		
Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)										2018
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, nominal prices								2,721.49
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices								2,988.15
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, nominal prices								(35.67)
31	Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex	AEDm, nominal prices								2,685.82
Updating RC1 RAVs for RC1 ex-ante Capex										
Updated RC1 RAVs including RC1 ex-ante Capex										
AEDm, nominal prices		RC1								
		2018	2019	2020	2021					
32	Assumed average asset life for new investment	years	55							
33	Opening RAV	AEDm, nominal prices	2,685.82	2,851.25	2,878.56	2,812.78				
34	RC1 ex-ante capex	AEDm, nominal prices	294.00	160.00	69.00	46.00				
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, nominal prices	125.89	125.89	125.89	125.89				
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, nominal prices	2.67	6.80	8.88	9.93				
37	Total depreciation for RC1	AEDm, nominal prices	128.57	132.69	134.78	135.82				
38	Closing RAV	AEDm, nominal prices	2,851.25	2,878.56	2,812.78	2,722.96				

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Table A.3: ADDC electricity – Updating RAV

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	105.63	107.22
	Assumed in PC4	93.57		Assumed in PC5	97.65					
2018 Opening RAVs with PC4/PC5 provisional capex – after one-off adjustment for inflation removal										
		PC4			PC5			RC1		
	2018 Opening RAV, PC4/PC5 provisional capex - Nominal prices	2012	2013	2014	2015	2016	2017	2018		
N1	Opening RAV	AEDm, nominal prices	11,980.78	13,016.24	14,008.52	16,008.83	17,981.42	19,972.45	21,910.11	
N2	PC4/PC5 Provisional Capex	AEDm, PC4/PC5 prices	1,570.00	1,570.00	2,700.00	2,700.00	2,700.00	2,700.00		
N3	PC4/PC5 Provisional Capex	AEDm, nominal prices	1,610.82	1,621.51	2,701.60	2,764.98	2,877.47	2,920.74		
N4	Actual depreciation, pre-2012 capex	AEDm, nominal prices	-548.52	-548.52	-548.52	-548.52	-548.52	-548.52		
N5	Depreciation on provisional PC4/PC5 capex	AEDm, nominal prices	30	-26.85	-80.72	-152.77	-243.88	-337.92	-434.56	
N6	Unlicensed assets capex/RAV	AEDm, nominal prices								
N7	Depreciation on unlicensed assets	AEDm, nominal prices								
N8	Closing RAV	AEDm, nominal prices	13,016.24	14,008.52	16,008.83	17,981.42	19,972.45	21,910.11		
Additional Efficient PC4 and PC5 Capex to be allowed at this Review										
		2012	2013	2014	2015	2016	2017			
2	Actual PC4 and PC5 capex	AEDm, nominal prices	988.00	1,368.00	859.00	653.00	-			
3	Applied capex efficiency factor	%	89.08%	89.08%	88.38%	88.38%	-			
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	880.11	1,218.61	759.18	577.12	-			
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	982.92	1,351.99	833.08	618.78	-			
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, nominal prices	1,610.82	1,621.51	2,701.60	2,764.98	-			
8	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, nominal prices	-730.71	-402.90	-1,942.42	-2,187.86	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, nominal prices	-730.71	-402.90	-1,942.42	-2,187.86	0.00			
11	Depreciation on additional efficient PC4 and PC5 capex (half-year depreciation for the first year of each annual capex)	AEDm, nominal prices	-12.18	-31.07	-70.16	-139.00	-175.46	-175.46		
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, nominal prices	0.00	-718.53	-1,090.36	-2,962.62	-5,011.48	-4,836.02		
13	Additional efficient PC4 and PC5 capex	AEDm, nominal prices	-730.71	-402.90	-1,942.42	-2,187.86				
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, nominal prices	-12.18	-31.07	-70.16	-139.00	-175.46	-175.46		
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, nominal prices	-718.53	-1,090.36	-2,962.62	-5,011.48	-4,836.02	-4,660.55		
16	Average of Opening and Closing values	AEDm, nominal prices	-359.27	-904.45	-2,026.49	-3,987.05	-4,923.75	-4,748.29		
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%		
18	Return on capital foregone	AEDm, nominal prices	-16.17	-40.70	-111.46	-219.29	-270.81	-261.16		
18A	Return on capital foregone	AEDm, 2018 prices	-18.06	-45.15	-122.31	-235.12	-279.00	-265.07		
Financing Costs foregone on Additional Efficient PC3 and PC4 Capex										
		2012	2013	2014	2015	2016	2017			
19	Depreciation foregone	AEDm, 2018 prices	-13.60	-34.47	-76.99	-149.03	-180.77	-178.09		
20	Return on capital foregone	AEDm, 2018 prices	-18.06	-45.15	-122.31	-235.12	-279.00	-265.07		
21	Total financing costs foregone	AEDm, 2018 prices	-31.66	-79.63	-199.29	-384.15	-459.78	-443.17		
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, 2018 prices	-33.82	-81.40						
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-115.22						
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		-142.73	-240.37	-439.17	-498.22	-455.19		
27	Accumulated NPV (@ 1 Jan 2018) of financing costs foregone	AEDm, 2018 prices						-1,775.68		
Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)										
		2018	2019	2020	2021					
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, nominal prices						21,910.11		
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices						24,056.90		
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, nominal prices						(4,660.55)		
31	Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex	AEDm, nominal prices						17,249.56		
Updating RC1 RAVs for RC1 ex-ante Capex										
Updated RC1 RAVs including RC1 ex-ante Capex										
	AEDm, nominal prices	2018	2019	2020	2021					
32	Assumed average asset life for new investment	years	40							
33	Opening RAV	AEDm, nominal prices	17,249.56	16,927.50	16,269.01	15,433.34				
34	RC1 ex-ante capex	AEDm, nominal prices	541.00	214.00	40.00	9.00				
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, nominal prices	856.29	856.29	856.29	783.64				
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, nominal prices	6.76	16.20	19.38	19.99				
37	Total depreciation for RC1	AEDm, nominal prices	863.05	872.49	875.67	803.63				
38	Closing RAV	AEDm, nominal prices	16,927.50	16,269.01	15,433.34	14,638.71				

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Table A.4: ADDC water – Updating RAV

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	105.63	107.22
	Assumed in PC4	93.57			Assumed in PC5	97.65				
2018 Opening RAVs with PC4/PC5 provisional capex – after one-off adjustment for inflation removal										
		PC4			PC5			RC1		
	2018 Opening RAV, PC4/PC5 provisional capex - Nominal prices	2012	2013	2014	2015	2016	2017	2018		
N1	Opening RAV	AEDm, nominal prices	3,343.52	3,750.32	4,152.28	4,570.82	4,983.19	5,399.67	5,804.28	
N2	PC4/PC5 Provisional Capex	AEDm, PC4/PC5 prices	590.00	590.00	600.00	600.00	600.00	600.00		
N3	PC4/PC5 Provisional Capex	AEDm, nominal prices	605.34	609.36	600.36	614.44	639.44	649.05		
N4	Actual depreciation, pre-2012 capex	AEDm, nominal prices	-188.45	-177.06	-131.32	-131.32	-131.32	-131.32		
N5	Depreciation on provisional PC4/PC5 capex	AEDm, nominal prices	30	-10.09	-30.33	-50.50	-70.74	-91.64	-113.12	
N6	Unlicensed assets capex/RAV	AEDm, nominal prices								
N7	Depreciation on unlicensed assets	AEDm, nominal prices								
N8	Closing RAV	AEDm, nominal prices	3,750.32	4,152.28	4,570.82	4,983.19	5,399.67	5,804.28		
Additional Efficient PC4 and PC5 Capex to be allowed at this Review										
		2012	2013	2014	2015	2016	2017			
2	Actual PC4 and PC5 capex	AEDm, nominal prices	378.00	773.00	701.00	365.00	-			
3	Applied capex efficiency factor	%	89.01%	89.01%	90.65%	90.65%	-			
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	336.46	688.05	635.46	330.87	-			
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	375.76	763.36	697.31	354.75	-			
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, nominal prices	605.34	609.36	600.36	614.44	-			
8	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, nominal prices	-268.88	78.69	35.10	-283.57	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, nominal prices	-268.88	78.69	35.10	-283.57	0.00			
11	Depreciation on additional efficient PC4 and PC5 capex (half-year depreciation for the first year of each annual capex)	AEDm, nominal prices	-4.48	-7.65	-5.75	-9.90	-14.62	-14.62		
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, nominal prices	0.00	-264.40	-178.06	-137.21	-410.88	-396.26		
13	Additional efficient PC4 and PC5 capex	AEDm, nominal prices	-268.88	78.69	35.10	-283.57				
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, nominal prices	-4.48	-7.65	-5.75	-9.90	-14.62	-14.62		
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, nominal prices	-264.40	-178.06	-137.21	-410.88	-396.26	-381.63		
16	Average of Opening and Closing values	AEDm, nominal prices	-132.20	-221.23	-157.63	-274.04	-403.57	-388.95		
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%		
18	Return on capital foregone	AEDm, nominal prices	-5.95	-9.96	-8.67	-15.07	-22.20	-21.39		
18A	Return on capital foregone	AEDm, 2018 prices	-6.64	-11.05	-9.51	-16.16	-22.87	-21.71		
Financing Costs foregone on Additional Efficient PC3 and PC4 Capex										
		2012	2013	2014	2015	2016	2017			
19	Depreciation foregone	AEDm, 2018 prices	-5.00	-8.49	-6.31	-10.61	-15.06	-14.84		
20	Return on capital foregone	AEDm, 2018 prices	-6.64	-11.05	-9.51	-16.16	-22.87	-21.71		
21	Total financing costs foregone	AEDm, 2018 prices	-11.65	-19.53	-15.83	-26.77	-37.93	-36.55		
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	-12.44	-19.97						
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-32.41						
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		-40.15	-19.09	-30.60	-41.10	-37.55		
27	Accumulated NPV (@ 1 Jan 2018) of financing costs foregone	AEDm, 2018 prices						-168.50		
Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)										
		2018	2019	2020	2021					
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, nominal prices						5,804.28		
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices						6,373.00		
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, nominal prices						(381.63)		
31	Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex	AEDm, nominal prices						5,422.65		
Updating RC1 RAVs for RC1 ex-ante Capex										
Updated RC1 RAVs including RC1 ex-ante Capex										
	AEDm, nominal prices	2018	2019	2020	2021					
32	Assumed average asset life for new investment	years	55							
33	Opening RAV	AEDm, nominal prices	5,422.65	5,781.52	5,965.88	5,965.87				
34	RC1 ex-ante capex	AEDm, nominal prices	605.00	440.00	262.00	208.00				
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, nominal prices	240.63	240.63	240.63	240.63				
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, nominal prices	5.50	15.00	21.38	25.65				
37	Total depreciation for RC1	AEDm, nominal prices	246.13	255.63	262.02	266.29				
38	Closing RAV	AEDm, nominal prices	5,781.52	5,965.88	5,965.87	5,907.58				

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Table A.5: TRANSCO electricity – Updating RAV

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	105.63	107.22
	Assumed in PC4	93.57			Assumed in PC5	97.65				
2018 Opening RAVs with PC4/PC5 provisional capex – after one-off adjustment for inflation removal										
		PC4			PC5			RC1		
	2018 Opening RAV, PC4/PC5 provisional capex - Nominal prices	2012	2013	2014	2015	2016	2017	2018		
N1	Opening RAV	AEDm, nominal prices	21,812.33	26,159.68	30,363.19	31,342.07	32,293.20	33,260.05	34,181.45	
N2	PC4/PC5 Provisional Capex	AEDm, PC4/PC5 prices	5,230.00	5,230.00	2,300.00	2,300.00	2,300.00	2,300.00		
N3	PC4/PC5 Provisional Capex	AEDm, nominal prices	5,365.99	5,401.60	2,301.36	2,355.36	2,451.18	2,488.04		
N4	Actual depreciation, pre-2012 capex	AEDm, nominal prices	-929.20	-929.20	-929.20	-929.20	-929.20	-929.20		
N5	Depreciation on provisional PC4/PC5 capex	AEDm, nominal prices	30	-89.43	-268.89	-397.28	-474.89	-555.00	-637.32	
N6	Unlicensed assets capex/RAV	AEDm, nominal prices	-	-	4.12	-	-	-	-	
N7	Depreciation on unlicensed assets	AEDm, nominal prices	-	-	-0.13	-0.13	-0.13	-0.13		
N8	Closing RAV	AEDm, nominal prices	26,159.68	30,363.19	31,342.07	32,293.20	33,260.05	34,181.45		
		PC4			PC5			RC1		
	Additional Efficient PC4 and PC5 Capex to be allowed at this Review	2012	2013	2014	2015	2016	2017			
2	Actual PC4 and PC5 capex	AEDm, nominal prices	1,041.00	2,899.00	2,369.00	1,267.00	-			
3	Applied capex efficiency factor	%	93.67%	93.67%	94.98%	94.98%	-			
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	975.10	2,715.49	2,250.08	1,203.40	-			
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	1,089.01	3,012.71	2,469.08	1,290.25	-			
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, nominal prices	5,365.99	5,401.60	2,301.36	2,355.36	-			
8	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, nominal prices	-4,390.88	-2,686.11	-51.29	-1,151.96	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, nominal prices	-4390.88	-2686.11	-51.29	-1151.96	0.00			
11	Depreciation on additional efficient PC4 and PC5 capex (half-year depreciation for the first year of each annual capex)	AEDm, nominal prices	-73.18	-191.13	-236.75	-256.81	-276.01	-276.01		
	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, nominal prices	0.00	-4,317.70	-6,812.68	-6,627.22	-7,522.37	-7,246.36		
13	Additional efficient PC4 and PC5 capex	AEDm, nominal prices	-4,390.88	-2,686.11	-51.29	-1,151.96				
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, nominal prices	-73.18	-191.13	-236.75	-256.81	-276.01	-276.01		
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, nominal prices	-4,317.70	-6,812.68	-6,627.22	-7,522.37	-7,246.36	-6,970.35		
16	Average of Opening and Closing values	AEDm, nominal prices	-2,158.85	-5,565.19	-6,719.95	-7,074.79	-7,384.36	-7,108.35		
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%		
18	Return on capital foregone	AEDm, nominal prices	-97.15	-250.43	-369.60	-389.11	-406.14	-390.96		
18A	Return on capital foregone	AEDm, 2018 prices	-108.50	-277.84	-405.57	-417.20	-418.43	-396.82		
	Financing Costs foregone on Additional Efficient PC3 and PC4 Capex	2012	2013	2014	2015	2016	2017			
19	Depreciation foregone	AEDm, 2018 prices	-81.73	-212.05	-259.80	-275.34	-284.36	-280.15		
20	Return on capital foregone	AEDm, 2018 prices	-108.50	-277.84	-405.57	-417.20	-418.43	-396.82		
21	Total financing costs foregone	AEDm, 2018 prices	-190.23	-489.90	-665.37	-692.54	-702.79	-676.97		
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	-203.21	-500.80						
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-704.01						
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		-872.14	-802.50	-791.73	-761.56	-695.34		
27	Accumulated NPV (@ 1 Jan 2018) of financing costs foregone	AEDm, 2018 prices						-3,923.28		
	Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)	2018								
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, nominal prices							34,181.45	
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices							37,530.61	
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, nominal prices							(6,970.35)	
31	Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex	AEDm, nominal prices							27,211.10	
Updating RC1 RAVs for RC1 ex-ante Capex										
	Updated RC1 RAVs including RC1 ex-ante Capex	RC1								
	AEDm, nominal prices	2018	2019	2020	2021					
32	Assumed average asset life for new investment	years	55							
33	Opening RAV	AEDm, nominal prices	27,211.10	26,875.85	26,276.56	25,246.32				
34	RC1 ex-ante capex	AEDm, nominal prices	1,006.00	758.00	337.00	367.00				
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, nominal prices	1,332.11	1,332.11	1,332.11	1,332.11				
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, nominal prices	9.15	25.18	35.14	41.54				
37	Total depreciation for RC1	AEDm, nominal prices	1,341.25	1,357.29	1,367.24	1,373.64				
38	Closing RAV	AEDm, nominal prices	26,875.85	26,276.56	25,246.32	24,239.67				

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Table A.6: TRANSCO water – Updating RAV

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	105.63	107.22
	Assumed in PC4	93.57			Assumed in PC5	97.65				
2018 Opening RAVs with PC4/PC5 provisional capex – after one-off adjustment for inflation removal										
		PC4			PC5			RC1		
	2018 Opening RAV, PC4/PC5 provisional capex - Nominal prices	2012	2013	2014	2015	2016	2017	2018		
N1	Opening RAV	AEDm, nominal prices	11,708.40	13,706.65	15,635.31	16,728.73	17,750.06	18,783.68	19,887.79	
N2	PC4/PC5 Provisional Capex	AEDm, PC4/PC5 prices	2,530.00	2,530.00	1,800.00	1,800.00	1,800.00	1,800.00		
N3	PC4/PC5 Provisional Capex	AEDm, nominal prices	2,595.78	2,613.01	1,801.07	1,843.32	1,918.31	1,947.16		
N4	Actual depreciation, pre-2012 capex	AEDm, nominal prices	-554.28	-554.28	-554.28	-554.28	-554.28	-448.21		
N5	Depreciation on provisional PC4/PC5 capex	AEDm, nominal prices	30	-43.26	-130.08	-203.64	-264.38	-327.08	-391.50	
N6	Unlicensed assets capex/RAV	AEDm, nominal prices			53.61	-	-	-		
N7	Depreciation on unlicensed assets	AEDm, nominal prices			-3.34	-3.34	-3.34	-3.34		
N8	Closing RAV	AEDm, nominal prices	13,706.65	15,635.31	16,728.73	17,750.06	18,783.68	19,887.79		
Additional Efficient PC4 and PC5 Capex to be allowed at this Review										
		2012	2013	2014	2015	2016	2017			
2	Actual PC4 and PC5 capex	AEDm, nominal prices	2,619.00	755.00	107.00	275.00	-			
3	Applied capex efficiency factor	%	92.97%	92.97%	90.90%	90.90%	-			
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	2,434.88	701.92	97.26	249.98	-			
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	2,719.32	778.75	106.73	268.02	-			
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, nominal prices	2,595.78	2,613.01	1,801.07	1,843.32	-			
8	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, nominal prices	-160.90	-1,911.09	-1,703.80	-1,593.35	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, nominal prices	-160.90	-1,911.09	-1,703.80	-1,593.35	0.00			
11	Depreciation on additional efficient PC4 and PC5 capex (half-year depreciation for the first year of each annual capex)	AEDm, nominal prices	-2.68	-37.21	-97.46	-152.42	-178.97	-178.97		
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, nominal prices	0.00	-158.22	-2,032.09	-3,638.43	-5,079.37	-4,900.39		
13	Additional efficient PC4 and PC5 capex	AEDm, nominal prices	-160.90	-1,911.09	-1,703.80	-1,593.35				
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, nominal prices	-2.68	-37.21	-97.46	-152.42	-178.97	-178.97		
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, nominal prices	-158.22	-2,032.09	-3,638.43	-5,079.37	-4,900.39	-4,721.42		
16	Average of Opening and Closing values	AEDm, nominal prices	-79.11	-1,095.16	-2,835.26	-4,358.90	-4,989.88	-4,810.91		
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%		
18	Return on capital foregone	AEDm, nominal prices	-3.56	-49.28	-155.94	-239.74	-274.44	-264.60		
18A	Return on capital foregone	AEDm, 2018 prices	-3.98	-54.68	-171.12	-257.04	-282.75	-268.57		
Financing Costs foregone on Additional Efficient PC3 and PC4 Capex										
		2012	2013	2014	2015	2016	2017			
19	Depreciation foregone	AEDm, 2018 prices	-2.99	-41.29	-106.95	-163.42	-184.39	-181.66		
20	Return on capital foregone	AEDm, 2018 prices	-3.98	-54.68	-171.12	-257.04	-282.75	-268.57		
21	Total financing costs foregone	AEDm, 2018 prices	-6.97	-95.96	-278.07	-420.46	-467.14	-450.22		
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	-7.45	-98.10						
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-105.55						
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		-130.75	-335.38	-480.68	-506.20	-462.44		
27	Accumulated NPV (@ 1 Jan 2018) of financing costs foregone	AEDm, 2018 prices						-1,915.45		
Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)										
		2018	2019	2020	2021					
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, nominal prices							19,887.79	
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices							21,836.43	
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, nominal prices							(4,721.42)	
31	Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex	AEDm, nominal prices							15,166.37	
Updating RC1 RAVs for RC1 ex-ante Capex										
Updated RC1 RAVs including RC1 ex-ante Capex										
	AEDm, nominal prices	2018	2019	2020	2021					
32	Assumed average asset life for new investment	years	55							
33	Opening RAV	AEDm, nominal prices	15,166.37	14,676.59	14,154.42	13,615.25				
34	RC1 ex-ante capex	AEDm, nominal prices	201.00	172.00	158.00	80.00				
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, nominal prices	688.95	688.95	688.95	688.95				
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, nominal prices	1.83	5.22	8.22	10.38				
37	Total depreciation for RC1	AEDm, nominal prices	690.78	694.17	697.17	699.33				
38	Closing RAV	AEDm, nominal prices	14,676.59	14,154.42	13,615.25	12,995.92				

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Table A.7: ADSSC – Updating RAV

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	105.63	107.22
	Assumed in PC4	93.57			Assumed in PC5	97.65				
2018 Opening RAVs with PC4/PC5 provisional capex – after one-off adjustment for inflation removal										
		PC4			PC5			RC1		
	2018 Opening RAV, PC4/PC5 provisional capex - Nominal prices	2012	2013	2014	2015	2016	2017	2018		
N1	Opening RAV	AEDm, nominal prices	9,001.46	11,584.41	14,126.02	15,123.16	16,125.46	17,160.98	18,187.79	
N2	PC4/PC5 Provisional Capex	AEDm, PC4/PC5 prices	3,000.00	3,000.00	1,600.00	1,600.00	1,600.00	1,600.00		
N3	PC4/PC5 Provisional Capex	AEDm, nominal prices	3,078.00	3,098.43	1,600.95	1,638.51	1,705.17	1,730.81		
N4	Actual depreciation, pre-2012 capex	AEDm, nominal prices	-464.28	-464.28	-464.28	-464.28	-464.28	-464.28		
N5	Depreciation on provisional PC4/PC5 capex	AEDm, nominal prices	50.00	-30.78	-92.54	-139.54	-171.93	-205.37	-239.73	
N6	Unlicensed assets capex/RAV	AEDm, nominal prices								
N7	Depreciation on unlicensed assets	AEDm, nominal prices								
N8	Closing RAV	AEDm, nominal prices	11,584.41	14,126.02	15,123.16	16,125.46	17,160.98	18,187.79		
Additional Efficient PC4 and PC5 Capex to be allowed at this Review										
		2012	2013	2014	2015	2016	2017			
2	Actual PC4 and PC5 capex	AEDm, nominal prices	3,360.00	2,142.00	2,184.00	1,432.00	-			
3	Applied capex efficiency factor	%	94.00%	94.00%	91.23%	91.23%	-			
4	Efficient PC4 and PC5 capex	AEDm, nominal prices	3,158.40	2,013.48	1,992.46	1,306.41	-			
5	Efficient PC4 and PC5 capex	AEDm, 2018 prices	3,527.35	2,233.86	2,186.39	1,400.71	-			
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, nominal prices	3,078.00	3,098.43	1,600.95	1,638.51	-			
8	Additional efficient PC4 and PC5 capex to be allowed at RC1	AEDm, nominal prices	80.40	-1,084.95	391.51	-332.09	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, nominal prices	80.40	-1,084.95	391.51	-332.09	0.00			
11	Depreciation on additional efficient PC4 and PC5 capex (half-year depreciation for the first year of each annual capex)	AEDm, nominal prices	0.80	-9.24	-16.18	-15.58	-18.90	-18.90		
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, nominal prices	0.00	79.59	-996.12	-588.43	-904.94	-886.04		
13	Additional efficient PC4 and PC5 capex	AEDm, nominal prices	80.40	-1,084.95	391.51	-332.09				
14	Depreciation on additional efficient PC4 and PC5 capex	AEDm, nominal prices	0.80	-9.24	-16.18	-15.58	-18.90	-18.90		
15	Additional efficient PC4 and PC5 capex - Closing value	AEDm, nominal prices	79.59	-996.12	-588.43	-904.94	-886.04	-867.14		
16	Average of Opening and Closing values	AEDm, nominal prices	39.80	-458.27	-792.28	-746.69	-895.49	-876.59		
17	Cost of capital (real)	%	4.50%	4.50%	5.50%	5.50%	5.50%	5.50%		
18	Return on capital foregone	AEDm, nominal prices	1.79	-20.62	-43.58	-41.07	-49.25	-48.21		
18A	Return on capital foregone	AEDm, 2018 prices	2.00	-22.88	-47.82	-44.03	-50.74	-48.94		
Financing Costs foregone on Additional Efficient PC3 and PC4 Capex										
		2012	2013	2014	2015	2016	2017			
19	Depreciation foregone	AEDm, 2018 prices	0.90	-10.25	-17.75	-16.71	-19.47	-19.19		
20	Return on capital foregone	AEDm, 2018 prices	2.00	-22.88	-47.82	-44.03	-50.74	-48.94		
21	Total financing costs foregone	AEDm, 2018 prices	2.90	-33.13	-65.57	-60.74	-70.22	-68.12		
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	3.10	-33.87						
24	Accumulated NPV (@ 1 Jan 2014) of financing costs foregone (PC4 capex)	AEDm, 2018 prices		-30.77						
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		-38.12	-79.08	-69.44	-76.09	-69.97		
27	Accumulated NPV (@ 1 Jan 2018) of financing costs foregone	AEDm, 2018 prices						-332.70		
Updated 2018 Opening RAV (including Additional Efficient PC4 and PC5 Capex)										
		2018	2019	2020	2021					
28	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, nominal prices							18,187.79	
29	Initial Opening 2018 RAV (with provisional PC4 and PC5 capex)	AEDm, 2018 prices							19,969.86	
30	Add: Additional efficient PC4 and PC5 capex - Closing value @ 31 Dec 2017	AEDm, nominal prices							(867.14)	
31	Updated Opening 2018 RAV including Additional Efficient PC4 and PC5 capex	AEDm, nominal prices							17,320.65	
Updating RC1 RAVs for RC1 ex-ante Capex										
Updated RC1 RAVs including RC1 ex-ante Capex										
	AEDm, nominal prices	2018	2019	2020	2021					
32	Assumed average asset life for new investment	years	65							
33	Opening RAV	AEDm, nominal prices	17,320.65	18,051.13	18,913.29	19,545.19				
34	RC1 ex-ante capex	AEDm, nominal prices	1,444.00	1,316.00	1,060.00	1,010.00				
35	Total Depreciation on RAV and capex (excluding RC1 ex-ante capex)	AEDm, nominal prices	702.41	421.50	377.49	377.49				
36	Depreciation on RC1 ex-ante capex (half-year depreciation for first year)	AEDm, nominal prices	11.11	32.34	50.62	66.54				
37	Total depreciation for RC1	AEDm, nominal prices	713.52	453.84	428.10	444.02				
38	Closing RAV	AEDm, nominal prices	18,051.13	18,913.29	19,545.19	20,111.16				

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Annex B: RC1 price control calculations

Introduction

- B.1 This **Annex B** to the Draft Proposals for RC1 comprises **Annexes B.1 through B.7** 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** – 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** are presented in a standard format for all businesses. They are explained below with reference to “Line” numbers used in these Annexes and in the RC1 Financial Model.
- B.3 In this **Annex B**, **RC1 period** refers to the four year period 2018-2021 for AADC, ADDC, TRANSCO, and ADSSC.

Inputs (Lines 1-14)

- B.4 Lines 1-14 show the inputs to the main price control calculations:
- (a) Line 1 shows the opex allowance for each year of the RC1 period in 2018 prices as per Section 4.
 - (b) Lines 2 and 3 list the opening and closing RAVs, respectively, in nominal prices for each year of the RC1 period (see Section 6 and **Annexes A1-A7** for details). Line 4 shows the mid-year RAV for each year calculated as the average of the opening and closing RAVs for that year.
 - (c) Line 5 lists the total annual depreciation over the RC1 period as determined in Section 6 and calculations in **Annex A**.
 - (d) Lines 6-8 list the assumptions for the revenue drivers. The assumptions for the variable revenue drivers are as per Section 3, whereas the fixed revenue driver is set to unity.
 - (e) Line 9 shows the NPV as of 1 January 2018 of the financing costs foregone or unduly earned in respect of the additional efficient PC4 and PC5 (2014 and 2015 only) capex (over and above the provisional PC4 and PC5 capex allowances in the PC4 and PC5 controls) in 2018 prices (discussed in Section 6 and calculated in **Annex A**).
 - (f) Line 10 shows the post-tax, real cost of capital proposed for RC1 in Section 6. This is used in the calculation of NPVs as well as the return on capital component of the annual revenue requirement.

- (g) Lines 11-13 list the weights for the revenue drivers in the price-controlled revenue as per Section 3.
- (h) Line 14 shows the Bureau's assumption for the X factor. The choice of X factor determines the revenue profile over the price control period.

Required revenue calculations (Lines 15-21)

B.5 Lines 15-21 show the calculations of required revenue for RC1 in 2018 prices (except for depreciation allowance which is in nominal prices):

- (a) Lines 15 and 16 reproduce the annual opex allowances and depreciation for the RC1 period from Lines 1 and 5. Line 17 calculates the annual return on capital by multiplying the mid-year RAVs (Line 4) by the cost of capital (Line 10). The final column in each line shows the NPV of the relevant allowances over the RC1 period.
- (b) Line 18 calculates the annual revenue requirement for the RC1 period by adding opex, depreciation and return on capital from Lines 15-17. The final column of Line 18 calculates the NPV of the annual revenue requirements over the RC1 period.
- (c) Line 19 calculates, on an annual basis, the discounted annual revenue requirements. The last column figure is the simple sum of these discounted annual revenue requirements over the period and reconciles to the last column figure of Line 18.
- (d) The last column in Line 20 reproduces the NPV of PC4 and PC5 capex foregone financing costs from Line 9.
- (e) Line 21 shows the NPV of the revenue requirement after PC4 and PC5 capex foregone financing costs added, calculated by adding the last columns of Lines 19 and 20. This is the figure used in setting the price controls.

Revenue forecast and profiling (Lines 22-35)

B.6 Lines 22-35 describe the process for calibrating the controls, which utilises the 'Solver' function (an optimisation tool) of Excel:

- (a) Lines 22-25 relate to the fixed revenue term (referred to as "Revenue Driver 1" in the RC1 Financial Model), Lines 26-29 relate to the first variable revenue term (or "Revenue Driver 2"). Lines 30-33 in previous price controls related the second variable revenue term (or "Revenue Driver 3") which has been discontinued in RC1 (discussed in section 3).
- (b) Lines 22-25 relate to Revenue Driver 1 (the fixed revenue term) and run as follows:
 - (i) Line 22 shows the revenue driver forecast, which in this case is set to unity due to the fixed nature of this driver.

- (ii) Line 23 shows the notified value 'a' for each year of the price control period. Initially, this value is unknown. However, the model incorporates formulae which ensure that the value 'a' changes by the X factor from year to year. Therefore, once the value for 2018 is known, those for the subsequent years of the RC1 period are automatically calculated. Refer to paragraph (f) below for determining the values of 'a', and 'b' for 2018. Value of notified value 'c' is zero with the drop of revenue driver 3 in RC1.
- (iii) In Line 24, forecast of revenue from this revenue driver is calculated by multiplying Line 22 (driver forecast) with Line 23 (value of 'a'). The last figure in Line 24 is the NPV of the revenue forecast related to Revenue Driver 1 over the control period.
- (iv) Line 25 calculates the share of revenue related to Revenue Driver 1 in the total annual revenue by dividing Line 24 (revenue forecast for Revenue Driver 1) by Line 34 (annual revenue). The last column figure in Line 25 is the ratio of the NPV of revenue forecast for Revenue Driver 1 to the NPV of total revenue shown as the second last column of Line 35 (total discounted allowed revenue at 1 January 2018). This NPV share is unknown initially but is one of the constraints used in Excel solver.
- (c) Lines 26-29 follow the same format as Lines 22-25 but are related to Revenue Drivers 2 (i.e. the variable revenue driver). As explained above, Lines 30-33 to calculate the share of revenue driver 3 are not used.
- (d) Line 34 calculates the annual revenue forecast as the sum of revenue forecasts for each of the revenue drivers (i.e., Lines 24, 28 and 32).
- (e) Line 35 simply shows, on an annual basis, the discounted figures for annual revenues shown in Line 34 and, in the penultimate column, the total NPV of the revenues over the control period. The last column in Line 35 ("Difference") is used to equate this to the NPV of the total required revenue after PC4 and PC5 capex foregone financing costs from Line 21.
- (f) After inputting the required data and formulae in Lines 22-33, the Excel solver is run to set the last column figure in Line 35 (the "Difference") as the target to a value of zero. The solver is able to do so by changing the values of 'a' and 'b' for 2018 (in Lines 23, 27 and 31), subject to the constraint that the shares of the NPVs of revenue forecasts for the revenue drivers (shown at the end of Lines 25 and 29) in the NPV of total revenue forecast (Line 35) must be equal to the weights set out in Section 3 (as shown in Lines 11, 12 and 13, respectively). The target cell, variable cells and constraint cells for the solver are shown as shaded cells in the Annexes and also indicated by arrows.
- (g) As the result of the solver run, the values of 'a' and 'b' for 2018 are determined. The values of 'a' and 'b' for subsequent years of the RC1 period are then automatically calculated by the model in 2018 prices by applying the X factor.
- (h) The Line 34A shows results of model run setting X factor equal to zero. This output is only for information and is not used anywhere.

Results (Lines 36-39)

- B.7 These lines summarise the values of the 'a', 'b' and 'c' (not used) and the X factor as set by the above calculations.
- B.8 As discussed in section 6, the depreciation allowance in the MAR is not subject to inflation indexation. Accordingly, the notified value 'a' will be subject to indexation except for the part representing the depreciation component of the MAR. The line 40A shows the part representing depreciation in the notified value 'a' (which is the proportion of the notified value 'a' that is not subject to inflation). This is calculated as the ratio between depreciation (NPV over RC1) and the sum of depreciation and return (NPVs over RC1).

Implied financial indicators (Lines 40-41)

- B.9 These two lines calculate two financial indicators in real terms to assess the financing viability of the business as a result of the price control calculations:
- B.10 Line 40 shows the implied annual profit, calculated by subtracting Line 1 (opex allowance) and Line 5 (total depreciation) from Line 34 (annual allowed revenue).
- B.11 Line 41 calculates the implied return on the mid-year RAVs in percentage terms by dividing Line 40 (implied annual profit) by Line 4 (mid-year RAVs).

Table B.1: AADC electricity – RC1 calculations

Line No.	(Opex and return in 2018 prices and depreciation in nominal prices)					
			RC1			
Inputs			2018	2019	2020	2021
1	Operating expenditure allowance	AEDm	419.32	405.92	392.53	380.17
2	Opening RAV	AEDm	7,240.72	7,651.92	7,850.85	7,688.27
3	Closing RAV	AEDm	7,651.92	7,850.85	7,688.27	7,455.43
4	Mid-Year RAV	AEDm	7,446.32	7,751.38	7,769.56	7,571.85
5	Total depreciation for RC1	AEDm	359.81	357.07	366.57	370.85
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	-532.21			
10	Cost of capital (real)		4.20%			
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	Negative X Factor		25.00			
RC1 Required Revenue Calculations			2018	2019	2020	2021
15	Operating expenditure allowance	AEDm	419.32	405.92	392.53	380.17
16	Total depreciation for RC1	AEDm	359.81	357.07	366.57	370.85
17	Return on mid-year RAV	AEDm	312.75	325.56	326.32	318.02
18	Annual revenue requirement	AEDm	1,091.87	1,088.55	1,085.42	1,069.03
19	Discounted annual revenue requirement	AEDm	1,069.64	1,023.41	979.33	925.67
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm				(532.21)
21	PV of revenue requirement (after foregone financing costs)	AEDm				3,465.84
RC1 Revenue Forecast and Profiling			2018	2019	2020	2021
22	Revenue driver 1		1.00	1.00	1.00	1.00
23		AEDm	1,151.86	863.89	647.92	485.94
24		AEDm	1,151.86	863.89	647.92	485.94
25		%	85%	85%	85%	85%
26	Revenue driver 2	Customer Accounts	150,353	153,089	155,653	158,048
27		AED / Customer	1,326.33	994.75	746.06	559.54
28		AEDm	199.42	152.29	116.13	88.43
29		%	15%	15%	15%	15%
30	Revenue driver 3	kWh	0	0	0	0
31		fls / kWh	-	-	-	-
32		AEDm	-	-	-	-
33		%	0%	0%	0%	0%
Variables for Solver Run						
34A	Annual revenue (non-profiled - $X=0$)		936.30	938.80	941.15	943.34
34	Annual revenue	AEDm	1,351.28	1,016.18	764.05	574.37
35	Discounted annual revenue at 1 January 2018	AEDm	1,323.76	955.36	689.37	497.35
1 - Run solver with $X=0$ 2 - Copy line 34 as values in line 34A						
						3,465.84
						TOTAL
						Difference
						0.00
						Target for Solver Run
Results			2018			
36	X Factor		25.0			
37	Fixed revenue term (a)	AED million	1,151.86			
38	Co-efficient of variable revenue term (b)	AED / Customer Account	1,326.33			
39	Co-efficient of variable revenue term (c)	fls / kWh metered	0.0000			
40A	Part representing depreciation	%	53.13%			
Implied Financial Indicators			2018	2019	2020	2021
40	Implied annual profit	AEDm	572.15	253.18	4.94	-176.64
41	Implied return on mid-point RAV	%	7.68%	3.27%	0.06%	-2.33%
						Average
						163.41
						2.17%

Table B.2: AADC water – RC1 calculations

Line No.	(Opex and return in 2018 prices and depreciation in nominal prices)					
			RC1			
Inputs			2018	2019	2020	2021
1	Operating expenditure allowance	AEDm	194.72	190.60	186.48	183.39
2	Opening RAV	AEDm	2,685.82	2,851.25	2,878.56	2,812.78
3	Closing RAV	AEDm	2,851.25	2,878.56	2,812.78	2,722.96
4	Mid-Year RAV	AEDm	2,768.54	2,864.91	2,845.67	2,767.87
5	Total depreciation for RC1	AEDm	128.57	132.69	134.78	135.82
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	50.37			
10	Cost of capital (real)		4.20%			
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	Negative X Factor		5.00			
RC1 Required Revenue Calculations			2018	2019	2020	2021
15	Operating expenditure allowance	AEDm	194.72	190.60	186.48	183.39
16	Total depreciation for RC1	AEDm	128.57	132.69	134.78	135.82
17	Return on mid-year RAV	AEDm	116.28	120.33	119.52	116.25
18	Annual revenue requirement	AEDm	439.57	443.62	440.77	435.46
19	Discounted annual revenue requirement	AEDm	430.62	417.07	397.69	377.06
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm				50.37
21	PV of revenue requirement (after foregone financing costs)	AEDm				1,672.80
RC1 Revenue Forecast and Profiling			2018	2019	2020	2021
22	Revenue driver 1		1.00	1.00	1.00	1.00
23		AEDm	414.61	393.88	374.18	355.47
24		AEDm	414.61	393.88	374.18	355.47
25		%	86%	85%	85%	84%
26	Revenue driver 2	Customer Accounts	91,917	94,775	97,823	101,072
27		AED / Customer	761.79	723.70	687.51	653.14
28		AEDm	70.02	68.59	67.25	66.01
29		%	14%	15%	15%	16%
30	Revenue driver 3	TIG	0	0	0	0
31		AED/TIG	-	-	-	-
32		AEDm	-	-	-	-
33		%	0%	0%	0%	0%
Variables for Solver Run						
34A	Annual revenue (non-profiled - $X=0$)		450.53	452.55	454.71	457.00
34	Annual revenue	AEDm	484.63	462.47	441.44	421.49
35	Discounted annual revenue at 1 January 2018	AEDm	474.76	434.79	398.29	364.96
1 - Run solver with $X=0$ 2 - Copy line 34 as values in line 34A						
Results			2018			
36	X Factor		5.0			
37	Fixed revenue term (a)	AED million	414.61			
38	Co-efficient of variable revenue term (b)	AED / Customer Account	761.79			
39	Co-efficient of variable revenue term (c)	AED / TIG metered	0.0000			
40A	Part representing depreciation	%	52.94%			
Implied Financial Indicators			2018	2019	2020	2021
40	Implied annual profit	AEDm	161.34	139.17	120.18	102.28
41	Implied return on mid-point RAV	%	5.83%	4.86%	4.22%	3.70%

Table B.3: ADDC electricity – RC1 calculations

Line No.	(Opex and return in 2018 prices and depreciation in nominal prices)						
			RC1				
Inputs			2018	2019	2020	2021	
1	Operating expenditure allowance	AEDm	532.65	520.28	508.95	500.71	
2	Opening RAV	AEDm	17,249.56	16,927.50	16,269.01	15,433.34	
3	Closing RAV	AEDm	16,927.50	16,269.01	15,433.34	14,638.71	
4	Mid-Year RAV	AEDm	17,088.53	16,598.26	15,851.18	15,036.03	
5	Total depreciation for RC1	AEDm	863.05	872.49	875.67	803.63	
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	-1,775.68				
10	Cost of capital (real)		4.20%				
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	Negative X Factor		25.00				
			RC1				
RC1 Required Revenue Calculations			2018	2019	2020	2021	PV over RC1 Period at 1 January 2018
15	Operating expenditure allowance	AEDm	532.65	520.28	508.95	500.71	1,903.71
16	Total depreciation for RC1	AEDm	863.05	872.49	875.67	803.63	3,151.69
17	Return on mid-year RAV	AEDm	717.72	697.13	665.75	631.51	2,506.01
18	Annual revenue requirement	AEDm	2,113.42	2,089.90	2,050.37	1,935.85	7,561.41
19	Discounted annual revenue requirement	AEDm	2,070.39	1,964.83	1,849.96	1,676.23	7,561.41
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-1,775.68
21	PV of revenue requirement (after foregone financing costs)	AEDm					5,785.72
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	1,922.87	1,442.15	1,081.61	811.21	
24		AEDm	1,922.87	1,442.15	1,081.61	811.21	4,917.87
25		%	85%	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	855.65	641.74	481.31	360.98	
28		AEDm	327.36	253.52	196.34	152.06	867.86
29		%	15%	15%	15%	16%	15%
30	Revenue driver 3	kWh	0	0	0	0	
31		fls / kWh		-	-	-	
32		AEDm	-	-	-	-	
33		%	0%	0%	0%	0%	0%
Variables for Solver Run							
34A	Annual revenue (non-profiled - $X=0$)		1,557.99	1,565.31	1,572.87	1,580.67	5,785.72
34	Annual revenue	AEDm	2,250.22	1,695.67	1,277.95	963.27	TOTAL
35	Discounted annual revenue at 1 January 2018	AEDm	2,204.41	1,594.19	1,153.04	834.08	5,785.72
							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		25.0				
37	Fixed revenue term (a)	AED million	1,922.87				
38	Co-efficient of variable revenue term (b)	AED / Customer Account	855.65				
39	Co-efficient of variable revenue term (c)	fls / kWh metered	0.0000				
40A	Part representing depreciation	%	55.71%				
Implied Financial Indicators			2018	2019	2020	2021	Average
40	Implied annual profit	AEDm	854.52	302.90	-106.66	-341.07	177.42
41	Implied return on mid-point RAV	%	5.00%	1.82%	-0.67%	-2.27%	0.97%

Table B.4: ADDC water – RC1 calculations

Line No.	(Opex and return in 2018 prices and depreciation in nominal prices)						
			RC1				
Inputs			2018	2019	2020	2021	
1	Operating expenditure allowance	AEDm	319.38	315.26	311.14	309.08	
2	Opening RAV	AEDm	5,422.65	5,781.52	5,965.88	5,965.87	
3	Closing RAV	AEDm	5,781.52	5,965.88	5,965.87	5,907.58	
4	Mid-Year RAV	AEDm	5,602.08	5,873.70	5,965.87	5,936.72	
5	Total depreciation for RC1	AEDm	246.13	255.63	262.02	266.29	
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	-168.50				
10	Cost of capital (real)		4.20%				
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	Negative X Factor		15.00				
RC1 Required Revenue Calculations			2018	2019	2020	2021	PV over RC1 Period at 1 January 2018
15	Operating expenditure allowance	AEDm	319.38	315.26	311.14	309.08	1,157.63
16	Total depreciation for RC1	AEDm	246.13	255.63	262.02	266.29	948.44
17	Return on mid-year RAV	AEDm	235.29	246.70	250.57	249.34	904.41
18	Annual revenue requirement	AEDm	800.80	817.59	823.72	824.71	3,010.47
19	Discounted annual revenue requirement	AEDm	784.50	768.66	743.21	714.11	3,010.47
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-168.50
21	PV of revenue requirement (after foregone financing costs)	AEDm					2,841.97
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	815.44	693.13	589.16	500.78	
24		AEDm	815.44	693.13	589.16	500.78	2,415.68
25		%	85%	85%	85%	84%	85%
26	Revenue driver 2	Customer Accounts	308,535	317,279	326,982	337,330	
27		AED / Customer	449.52	382.09	324.78	276.06	
28		AEDm	138.69	121.23	106.20	93.12	426.30
29		%	15%	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)		765.77	768.90	772.39	776.10	2,841.97
34	Annual revenue	AEDm	954.14	814.36	695.35	593.91	TOTAL
35	Discounted annual revenue at 1 January 2018	AEDm	934.71	765.62	627.39	514.26	2,841.97
							Difference
							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		15.0				
37	Fixed revenue term (a)	AED million	815.44				
38	Co-efficient of variable revenue term (b)	AED / Customer Account	449.52				
39	Co-efficient of variable revenue term (c)	AED / TIG metered	0.0000				
40A	Part representing depreciation	%	51.19%				
Implied Financial Indicators			2018	2019	2020	2021	Average
40	Implied annual profit	AEDm	388.62	243.46	122.20	18.54	193.21
41	Implied return on mid-point RAV	%	6.94%	4.14%	2.05%	0.31%	3.36%

Table B.5: TRANSCO electricity – RC1 calculations

Line No.		(Opex and return in 2018 prices and depreciation in nominal prices)			
		RC1			
Inputs		2018	2019	2020	2021
1	Operating expenditure allowance AEDm	368.83	371.93	366.77	361.62
2	Opening RAV AEDm	27,211.10	26,875.85	26,276.56	25,246.32
3	Closing RAV AEDm	26,875.85	26,276.56	25,246.32	24,239.67
4	Mid-Year RAV AEDm	27,043.47	26,576.20	25,761.44	24,743.00
5	Total depreciation for RC1 AEDm	1,341.25	1,357.29	1,367.24	1,373.64
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	-3,923.28			
10	Cost of capital (real)	4.20%			
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	Negative X Factor	25.00			
		RC1			
RC1 Required Revenue Calculations		2018	2019	2020	2021
15	Operating expenditure allowance AEDm	368.83	371.93	366.77	361.62
16	Total depreciation for RC1 AEDm	1,341.25	1,357.29	1,367.24	1,373.64
17	Return on mid-year RAV AEDm	1,135.83	1,116.20	1,081.98	1,039.21
18	Annual revenue requirement AEDm	2,845.91	2,845.41	2,816.00	2,774.47
19	Discounted annual revenue requirement AEDm	2,787.97	2,675.12	2,540.75	2,402.39
20	PV of financing costs foregone on PC4 and PC5 capex AEDm				-3,923.28
21	PV of revenue requirement (after foregone financing costs) AEDm				6,482.95
RC1 Revenue Forecast and Profiling		2018	2019	2020	2021
22	Revenue driver 1	1.00	1.00	1.00	1.00
23	AEDm	2,154.59	1,615.94	1,211.96	908.97
24	AEDm	2,154.59	1,615.94	1,211.96	908.97
25	%	86%	85%	84%	84%
26	Revenue driver 2	83,779,844,890	89,033,119,015	94,286,393,140	99,539,667,264
27	files / kWh	0.4245	0.3184	0.2388	0.1791
28	AEDm	355.67	283.48	225.15	178.27
29	%	14%	15%	16%	16%
30	Revenue driver 3	0	0	0	0
31	AED / kW metered	-	-	-	-
32	AEDm	-	-	-	-
33	%	0%	0%	0%	0%
Variables for Solver Run					
34A	Annual revenue (non-profiled - $X=0$)	1,735.92	1,751.08	1,766.24	1,781.39
34	Annual revenue AEDm	2,510.25	1,899.42	1,437.11	1,087.24
35	Discounted annual revenue at 1 January 2018 AEDm	2,459.14	1,785.74	1,296.64	941.43
1 - Run solver with $X=0$ 2 - Copy line 34 as values in line 34A					
Results		2018			
36	X Factor	25.0			
37	Fixed revenue term (a) AED million	2,154.59			
38	Co-efficient of variable revenue term (b) files / kWh metered	0.4245			
39	Co-efficient of variable revenue term (c) AED / kW metered	0.00			
40A	Part representing depreciation %	55.39%			
Implied Financial Indicators		2018	2019	2020	2021
40	Implied annual profit AEDm	800.17	170.20	-296.91	-648.03
41	Implied return on mid-point RAV %	2.96%	0.64%	-1.15%	-2.62%
					Average
					6.36
					-0.04%

Table B.6: TRANSCO water – RC1 calculations

Line No.		(Opex and return in 2018 prices and depreciation in nominal prices)					
		RC1					
Inputs		2018	2019	2020	2021		
1	Operating expenditure allowance	AEDm	354.41	359.56	361.62	363.68	
2	Opening RAV	AEDm	15,166.37	14,676.59	14,154.42	13,615.25	
3	Closing RAV	AEDm	14,676.59	14,154.42	13,615.25	12,995.92	
4	Mid-Year RAV	AEDm	14,921.48	14,415.50	13,884.84	13,305.58	
5	Total depreciation for RC1	AEDm	690.78	694.17	697.17	699.33	
6	Forecast for revenue driver 1	Fixed term	1.00	1.00	1.00	1.00	
7	Forecast for revenue driver 2	MIG	284,772	294,988	305,203	315,418	
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	-1,915.45				
10	Cost of capital (real)		4.20%				
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	Negative X Factor		25.00				
RC1 Required Revenue Calculations		2018	2019	2020	2021	PV over RC1 Period at 1 January 2018	
15	Operating expenditure allowance	AEDm	354.41	359.56	361.62	363.68	1,326.42
16	Total depreciation for RC1	AEDm	690.78	694.17	697.17	699.33	2,563.91
17	Return on mid-year RAV	AEDm	626.70	605.45	583.16	558.83	2,193.21
18	Annual revenue requirement	AEDm	1,671.89	1,659.18	1,641.95	1,621.85	6,083.55
19	Discounted annual revenue requirement	AEDm	1,637.85	1,559.88	1,481.47	1,404.34	6,083.55
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-1,915.45
21	PV of revenue requirement (after foregone financing costs)	AEDm					4,168.10
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	1,385.25	1,038.94	779.20	584.40	
24		AEDm	1,385.25	1,038.94	779.20	584.40	3,542.88
25		%	85%	85%	85%	84%	85%
26	Revenue driver 2	TIG	284,772,284	294,987,603	305,202,923	315,418,242	
27		AED/TIG	0.8258	0.6194	0.4645	0.3484	
28		AEDm	235.17	182.70	141.77	109.89	625.21
29		%	15%	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 - $X=0$)		1,121.82	1,127.60	1,133.38	1,139.16	4,168.10
34	Annual revenue	AEDm	1,620.42	1,221.64	920.98	694.29	TOTAL
35	Discounted annual revenue at 1 January 2018	AEDm	1,587.43	1,148.53	830.96	601.18	4,168.10
1 - Run solver with $X=0$ 2 - Copy line 34 as values in line 34A							0.00
							Target for Solver Run
Results		2018					
36	X Factor	25.0					
37	Fixed revenue term (a)	AED million	1,385.25				
38	Co-efficient of variable revenue term (b)	AED / TIG metered	0.8258				
39	Co-efficient of variable revenue term (c)	AED / TIGD metered	0.00				
40A	Part representing depreciation	%	53.90%				
Implied Financial Indicators		2018	2019	2020	2021	Average	
40	Implied annual profit	AEDm	575.23	167.91	-137.81	-368.72	59.15
41	Implied return on mid-point RAV	%	3.86%	1.16%	-0.99%	-2.77%	0.31%

Table B.7: ADSSC – RC1 calculations

Line No.		(Opex and return in 2018 prices and depreciation in nominal prices)					
		RC1					
Inputs		2018	2019	2020	2021		
1	Operating expenditure allowance	AEDm	817.00	802.58	791.24	777.85	
2	Opening RAV	AEDm	17,320.65	18,051.13	18,913.29	19,545.19	
3	Closing RAV	AEDm	18,051.13	18,913.29	19,545.19	20,111.16	
4	Mid-Year RAV	AEDm	17,685.89	18,482.21	19,229.24	19,828.18	
5	Total depreciation for RC1	AEDm	713.52	453.84	428.10	444.02	
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	-332.70				
10	Cost of capital (real)		4.20%				
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	Negative 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	817.00	802.58	791.24	777.85	2,942.34
16	Total depreciation for RC1	AEDm	713.52	453.84	428.10	444.02	1,896.40
17	Return on mid-year RAV	AEDm	742.81	776.25	807.63	832.78	2,907.27
18	Annual revenue requirement	AEDm	2,273.32	2,032.67	2,026.97	2,054.66	7,746.02
19	Discounted annual revenue requirement	AEDm	2,227.04	1,911.02	1,828.85	1,779.11	7,746.02
20	PV of financing costs foregone on PC4 and PC5 capex	AEDm					-332.70
21	PV of revenue requirement (after foregone financing costs)	AEDm					7,413.31
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	1,976.67	1,779.01	1,601.11	1,440.99	
24		AEDm	1,976.67	1,779.01	1,601.11	1,440.99	
25		%	86%	85%	84%	84%	
26	Revenue driver 2	m3	422,083,318	450,845,765	481,635,659	511,011,886	
27		AED/m3	0.7567	0.6810	0.6129	0.5516	
28		AEDm	319.39	307.04	295.21	281.89	
29		%	14%	15%	16%	16%	
30	Revenue driver 3	Customer Accounts	0	0	0	0	
31		AED / Customer	-	-	-	-	
32		AEDm	-	-	-	-	
33		%	0%	0%	0%	0%	
Variables for Solver Run							
34A	Annual revenue (non-profiled - $X=0$)		1,982.40	2,001.06	2,021.03	2,040.08	
34	Annual revenue	AEDm	2,296.06	2,086.05	1,896.31	1,722.89	
35	Discounted annual revenue at 1 January 2014	AEDm	2,249.32	1,961.20	1,710.96	1,491.83	
1 - Run solver with $X=0$ 2 - Copy line 34 as values in line 34A							
						7,413.31	
						TOTAL	
						Difference	
						0.00	
						Target for Solver Run	
Results		2018					
36	X Factor		10.0				
37	Fixed revenue term (a)	AED million	1,976.67				
38	Co-efficient of variable revenue term (b)	AED / m3	0.7567				
39	Co-efficient of variable revenue term (c)	AED / Customer Account	0.00				
40A	Part representing depreciation	%	39.48%				
Implied Financial Indicators		2018	2019	2020	2021	Average	
40	Implied annual profit	AEDm	765.55	829.63	676.97	501.01	693.29
41	Implied return on mid-point RAV	%	4.33%	4.49%	3.52%	2.53%	3.72%