HOUSTONKEMP Economists

Memo

To	Verity Watson - ENA
From	Ann Whitfield and Brendan Quach
Subject	AEMO's proposed use of a social discount rate below the regulated WACC for NPV assessment in the ISP
Date	7 March 2019

AEMO's 2019 Planning and Forecasting Consultation Paper proposes to:

- use the same weighted average cost of capital (WACC) (6.25 per cent) to derive annualised capital costs for market-driven generation and regulated transmission investments; and
- use a lower social discount rate (4.0 per cent) for the purposes of the NPV assessment.

The earlier 2018 ISP used a WACC value of 6.0 per cent to derive the annualised capital costs for generation and transmission investments, and a social discount rate of 7.0 in the NPV assessment.[1]

Use of the same WACC for market-driven generation and regulated transmission investments

AEMO proposes to use a WACC of 6.25 per cent (real pre-tax) for all development options, including regulated transmission and various generation and storage technologies. This WACC is used to derive an annual capital cost for generation and transmission investments.

AEMO states that it adopts this long-term WACC because:[2]

> … each generation technology can be considered as part of the overall generation portfolio funded through available capital investing in the energy market in a technology-neutral manner.

AEMO adopted the same approach in the 2018 ISP. This approach has also been adopted by some (if not all) TNSPs in their market modelling for RIT-T applications.

The use of a common WACC across both market-driven and regulated investments is consistent with the principle of competitive neutrality. The AER has previously recognised that using a lower discount rate for only one type of investment in the market - network or non-network investments by TNSPs – would create a bias in favour of TNSPs ahead of other competing purposes.[3]

AEMO's arguments mirror those made by the ACCC and AER for adopting the same discount rate across regulated and non-regulated investments under the RIT-T:

> The critical aspect of defining the discount rate for the purposes of the regulatory test is to ensure that the relevant discount rate recognises regulated and unregulated investments in a competitively neutral manner.[4]

[1] See AEMO 2018 ISP, p.94 reference to WACC used to annualise capital costs, and footnote 25 on reference to 'social discount rate'.

[2] Consultation Paper, page 37.

[3] AER, *Final Decision | Regulatory Test version 3 & Application Guidelines*, November 2007, page 29.

[4] ACCC, *Decision | Review of the Regulatory Test for Network Augmentations*, 11 August 2004, page 47. See also AER, *Final Decision | Regulatory Test version 3 & Application Guidelines*, November 2007, page 29.

Use of a different discount rate for the NPV assessment to the WACC used to determine the annual cost of network and generation developments.

AEMO is proposing to use a discount rate for the NPV analysis that differs to the WACC used in determining the annual cost of different development options, and which is *below* the regulated WACC (which forms the 'lower bound' of the discount rate used in the NPV analysis in the RIT-T assessment).

This approach risks leading to non-intuitive outcomes, as it results in the NPV of the annual cost stream being *above* the initial cost of the investment.

This issue is illustrated by the following simplified example:

- a single investment of $1,000 at the start of the period, with an economic life of 10 years;
- no operating or maintenance costs;
- zero inflation; and
- straight line depreciation.

Table 1 presents the annual costs of this investment (derived on the basis of AEMO's proposed 6.25 per cent WACC), and then calculates the NPV of these annual costs using the same WACC (6.25 per cent) and also a lower social discount rate (4 per cent).

Table 1: Annual costs and NPV under different discount rate

	NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Opening RAB		1,000.0	900.0	800.0	700.0	600.0	500.0	400.0	300.0	200.0	100.0
Depreciation		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Return on investment		62.5	56.3	50.0	43.8	37.5	31.3	25.0	18.8	12.5	6.3
Annual cost		**162.5**	**156.3**	**150.0**	**143.8**	**137.5**	**131.3**	**125.0**	**118.8**	**112.5**	**106.3**
NPV of annual costs (4%)	1,106.3										
NPV of annual costs (6.25%)	1,000.0										

The table shows that adopting the same WACC as the discount rate for the NPV analysis results in the NPV of the $1,000 investment being equal to $1,000.

However, applying what we understand to be AEMO's proposed approach of using the WACC to calculate the annual costs of an investment and then applying a lower social discount in the NPV assessment, results in the NPV of the initial $1,000 investment being calculated as $1,106.30. That is, AEMO's proposed methodology overstates the cost of the investment option in present value terms (ie, the $1,000 investment at the start of the period has a NPV of more than $1,000, which is counter intuitive).

Implications of using a different discount rate for the NPV assessment in the ISP compared to that used in the RIT-T

The RIT-T requires a commercial discount rate to be used in the NPV calculation, together with sensitivity analysis that uses the regulated WACC as the lower bound. The regulated WACC is above the social discount rate that AEMO is proposing to use.

This higher discount rate required under the RIT-T has the potential to result in investments found to form part of the optimal ISP network development path, not being found to pass a subsequent RIT-T.

- AEMO's ISP assessment may find some investments to have a positive market benefit, but TNSPs assessing the same project under the RIT-T may find a negative market benefit;
- AEMO's ISP assessment may find a particular investment option to have the highest positive net market benefit, but the TNSP's assessment under the RIT-T could find another option has a higher net market benefit.

Annex A presents an example to illustrate the potential for different outcomes to emerge from the ISP and subsequent RIT-T assessments.

Use of a Social Discount Rate vs the WACC for the NPV assessment

AEMO argues for the adoption of a social discount rate for the NPV assessment because:[5]

- it reflects the value society places on the present versus the future– the opportunity cost associated with consumption versus investment; and
- it has a lower risk premium than commercial investments.

In our opinion, these arguments are misplaced.

Investments in generation and transmission are predominately funded by private investors. These investments involve a degree of risk (evidenced by regulators setting rates of return above the risk-free rate and the observation of a debt risk premium on debt issued by the electricity sector).

Adopting a social discount rate will result in a misallocation of capital as it ignores the risk adjusted opportunity costs of these investments.

Consistent with this view, we note that the AER has previously explicitly considered whether the discount rate used to calculate NPVs for the purposes of the RIT-T should be below the regulatory WACC. It concluded that:[6]

> [..] neither private investors nor consumers have access to a social discount rate when making their own borrowing and spending decisions. Using a social discount rate for only one type of investment in the market - investment in the network or non-network options – would create a bias in favour of investment by TNSPs ahead of all other competing purposes. Specifically, it could mean that NSPs systematically pre-empt investment by actual and prospective participants.

We therefore consider that the discount used in the ISP assessment and in the RIT-T assessment should be the same, and in both cases should be a commercial discount rate.

[5] Consultation Paper, page 38.

[6] AER, *Final Decision | Regulatory Test version 3 & Application Guidelines*, November 2007, page 29.

A1. Example of the use of different discount rates leading to inconsistency between the ISP and RIT-T outcomes

Two different options each generate market benefits of $88.5 per annum:[7]

- Option A – involves a single investment of $1,000 at the start of the period that has an economic life of 20 years and requires no opex; and
- Option B – involves two investments each of $640, one at the start of the period and one at the start of year 11, each with an economic life of 10 years and requiring no opex.

Table 2 presents the NPV assessment of these two projects using AEMO's proposed approach for the ISP (ie, adopting a WACC of 6.25 per cent to calculate the costs of investments while using a social discount rate of 4 per cent for the NPV assessment). Under this, both options result in a positive net market benefit, in present value terms. Further, the net present value of Option A is greater than Option B.

Table 2: AEMO ISP NPV assessment (with a discount rate of 4%)

	Present value benefits	Present value of costs	Net present value	Selected option
Option A	1,202.8	-1,180.3	22.5	√
Option B	1,202.8	-1,186.3	16.4	

When the TSNP assesses these options under the RIT-T it is required to use a commercial discount rate, which will be higher than the social discount rate used by AEMO. Table 3 presents the results of the NPV assessment for both options using a 6.25 per cent discount rate.

Table 3: RIT-T assessment (with a discount rate of 6.25%)

	Present value benefits	Present value of costs	Net present value	Selected option
Option A	994.8	-1,000.0	-5.2	
Option B	994.8	-989.1	5.8	√

Table 3 highlights that:

- Option A which has a positive net benefit under AEMO's proposed approach, now has a negative net market benefit under the RIT-T; and
- Option B continues to have a positive net present value and would now be the preferred solution.

[7] For simplicity assuming that these benefits do not change through time, assets are depreciated using a straight line methodology and that inflation is zero. Further, the assessment period for all analysis is 20 years.