AN EVALUATION OF THE ROLE OF ACCELERATED DEPRECIATION IN REGULATION OF ELECTRICITY AND GAS NETWORKS

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1. Introduction

A number of organisations, such as the peak body for distribution networks (Energy Networks Australia or ENA), are advocating changing the approach to depreciation for regulated electricity and gas transmission and distribution assets. In particular, they are advocating for accelerating the rate of depreciation in certain circumstances.[1]

Depreciation is one of the major building blocks that go to make up the total allowed revenue for regulated gas and electricity networks. Network charges in turn are a significant element of the overall charges that energy users pay, perhaps 40 to 50 per cent of the final charges for residential customers.[2] A change in the standard method for calculating the rate of depreciation could have a significant effect on user charges. Accelerated depreciation would increase user charges for transportation of electricity and gas in the short to medium term, reducing charges in the long term.

This paper analyses the issues involved in accelerated depreciation and touches on some of the other contemporary issues in deprecation. It sets out the nature of depreciation, the approach under the regulatory rules to depreciation, the arguments for and against accelerated depreciation, and some of the other issues that arise in treatment of depreciation under the regulatory rules.

2. Standard approach to depreciation

Depreciation is an accounting concept which applies to investments in capital assets, that is assets which have a useful life that extends over a number of years.[3] In order to justify making investments in capital assets, investors need to recover the cost of the initial capital investment on the asset over the economic life of that asset[4] (plus a rate of return on the asset as well as the costs associated with operating the asset). This recovery of the cost of the initial capital investment of an asset over its economic life is known as depreciation. Depreciation is effectively the return *of* the capital investment.[5]

Infrastructure assets such as electricity transmission and distribution networks have sizable long-lived asset bases, and therefore depreciation is a major component of their total revenue requirements. For example, a selection of three electricity and gas transport assets in Table 1 below shows regulatory depreciation ranged between 12.4 and 23.9 percent of their total revenue requirement in their most recent regulatory arrangement. The ENA notes that depreciation

[1] See, for example, Energy Networks Australia 2015

[2] The other major elements of user charges are generation or production charges, and retail charges. There are also more minor charges associated with schemes to encourage less carbon-intensive forms of generation or production.

[3] Contrast items that are typically used in the same year in which they are purchased, like stationery or petrol. These items are claimed as an expense in their year of purchase. Also contrast assets that have an unlimited useful life, such as land. Land is not subject to depreciation allowance.

[4] Compare the AER's definition of depreciation as "the allowance provided so capital investors recover their investment over the economic life of the asset (return of capital)" at AusNet, 5-7. The reference to AusNet, 5-7 is a reference to the AER draft decision on AusNet transmission's application in respect of the 2017-2018 to 2021-2022 regulatory period and refers to Attachment 5, page 7 of the AER's draft decision.

[5] The AER sets out a clear explanation of the treatment of regulatory depreciation at AusNet, 5-34.

"typically constitutes between 10 and 20 per cent of final network charges, equivalent to over $3.0 billion per year for Australian electricity and gas networks".[6]

Table 1: Regulatory depreciation as a share of total allowed revenue for selected gas and electricity networks

Asset	Type	Regulatory depreciation	Total revenue requirement	Regulatory depreciation as percentage of total revenue
RBP 2012-17	gas transmission	32.7	262.7	12.4
United Energy 2016-20	electricity distribution	421.9	2106.1	20.0
SAPN 2015-20	electricity distribution	917.2	3837.5	23.9

Source: AER final decisions

Infrastructure assets such as electricity and gas transmission and distribution lines are generally regulated because of their natural monopoly characteristics. Under the legislative framework for regulation of these services, the regulated return on the networks is calculated to provide the network 'with a reasonable opportunity to recover at least the efficient costs of providing network services and complying with regulatory obligations'.[7]

In terms of the depreciation portion of these costs, the Australian Energy Regulator (AER)[8] first determines the total sum of assets used to supply regulated network services, and then calculates depreciation on this regulated asset base (RAB). Depreciation is generally calculated by setting a standard asset life for each class of asset within the RAB,[9] and then calculating the depreciation for asset class as a function of the starting value of the asset class, the economic life, and the method of depreciation. The AER generally determines the average remaining life of all the assets in an asset class to determine the amount of depreciation. This is known as the weighted average remaining life (WARL) approach.

One alternative to WARL is the average depreciation approach. The AER notes that "Average depreciation uses a simple approximation (total asset value divided by annual depreciation in the final year of the previous period) to project future depreciation".[10] Another alternative is year-by-year tracking – which tracks multiple assets within each asset class, disaggregating assets by year of expenditure.[11]

[6] ENA 2015, p. 8
[7] National Electricity Law, Revenue and Pricing Principles, section 7A
[8] In Western Australia, the regulatory authority is the Economic Regulation Authority
[9] Otherwise known as an economic life or useful life
[10] United Energy Overview, p. 25. The average depreciation approach assumes that the assets are already regulated and have been subject to a period of regulation. The final year of the previous period provides the basis for the estimation of forecast depreciation. United Energy initially proposed an average depreciation approach for its 2016-2020 regulatory control period: United Energy Overview, p. 24.
[11] United Energy, Overview, p. 25

Table 2 below shows the economic or standard asset lives for a range of selected electricity distribution network assets. The table shows that some of these assets have been assigned long to very long lives.

Table 2: Selected electricity distribution asset types and standard asset or economic lives

Asset class	Standard asset life
Sub-transmission lines and cables	46.3
Cable tunnel (dx)	70.0
Distribution lines and cables	58.0
Substations	46.8
Transformers	45.9
Low voltage lines and cables	52.1
Customer metering and load control	25.0

Source: Australian Energy Regulator 2016a, 5-10, Table 5-5

Once the standard life of each asset class has been determined, depreciation then has to be calculated. The main methods for calculating depreciation are straight line (or prime cost) depreciation and diminishing value (or declining balance) depreciation.

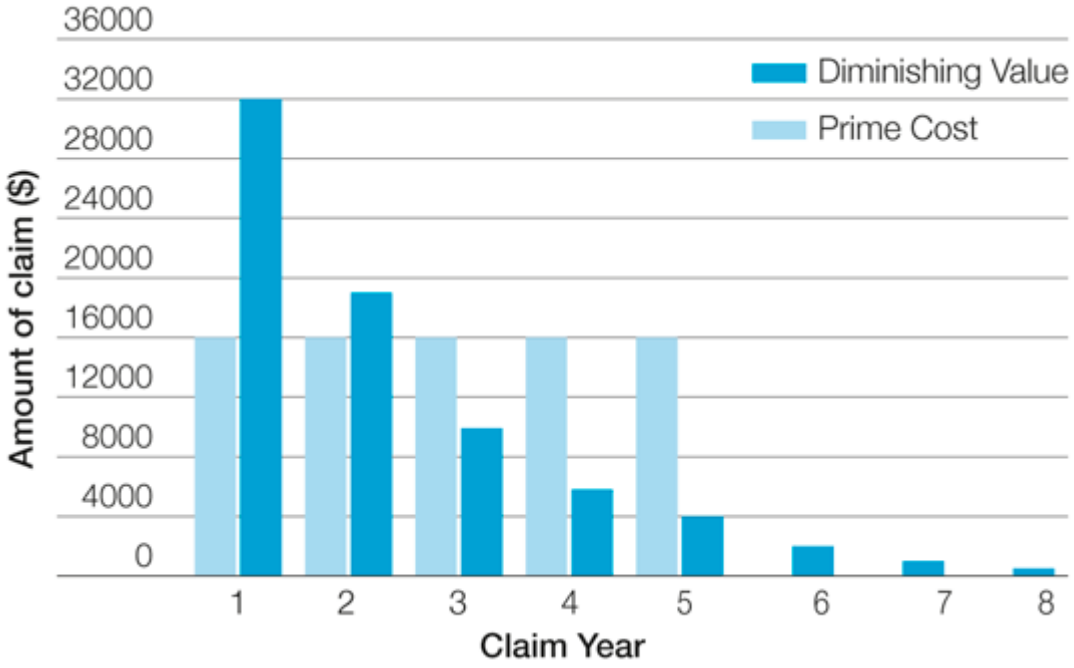
Straight-line depreciation applies an equal amount of depreciation each year to the *starting value of the asset*. The amount of depreciation is one divided by the economic life of the asset. So, for example, an asset with a life of five years is depreciated by one-fifth of its value each year for five years. Once an asset is fully depreciated, it is valued at zero and no longer earns a depreciation allowance.

The diminishing value method doubles the amount of depreciation in the first year compared with the straight line approach, and then calculates depreciation for subsequent years based on its value at the start of that year.[12] So under this approach, an asset with a life of five years is depreciated by 2/5ths of its starting value in the first year, but 2/5ths of its remaining 3/5ths value in the second year and so on. Graph 1 below shows the comparable depreciation approaches and amounts for an asset with a standard life of five years. Graph 2 shows how the two approaches compare in terms of the time profile of depreciation claimed for an asset with a standard life of 45 years and a $100 starting value.[13]

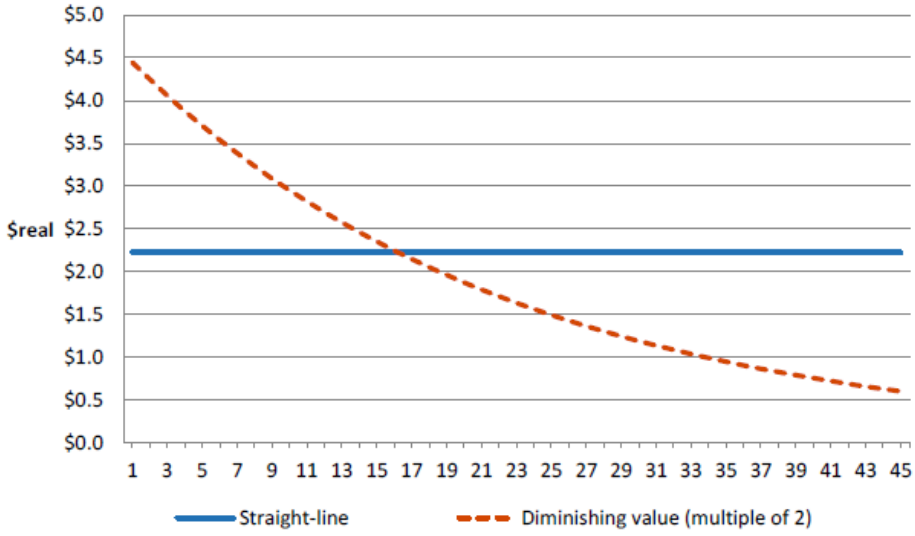
[12] It is possible for the depreciation to be adjusted by a different amount to doubling, such as triple or one and a half times the value of straight line depreciation in the first year. Doubling is the typical approach. Changing the multiple from double changes the angle at which the asset depreciates (faster for a higher multiple and slower for a lower multiple) but diminishing value depreciation overall accelerates the rate of depreciation during the early part of the life of the asset.

[13] AusNet 5-40, figure 5.7

Graph 1: Depreciation profiles under straight line and diminishing value methods[14]



Graph 2: Time profile of straight line depreciation compared with diminishing value depreciation



It can be observed that the straight line (or prime cost) method provides constant depreciation allowances each year, while the diminishing value method provides high allowances in the early years followed by low allowances in the later years. The diminishing value method also stretches out the total period over which depreciation occurs and results in a small residual amount of asset value at the end of the asset's economic life which has yet to be depreciated. The AER notes that the "diminishing value method leaves a residual value for the asset after it is expected to expire,

[14] Australian Tax Office website at https://www.ato.gov.au/Business/Depreciation-and-capital-expenses-and-allowances/General-depreciation-rules---capital-allowances/Prime-cost-(straight-line)-and-diminishing-value-methods/, accessed on 19 September 2016

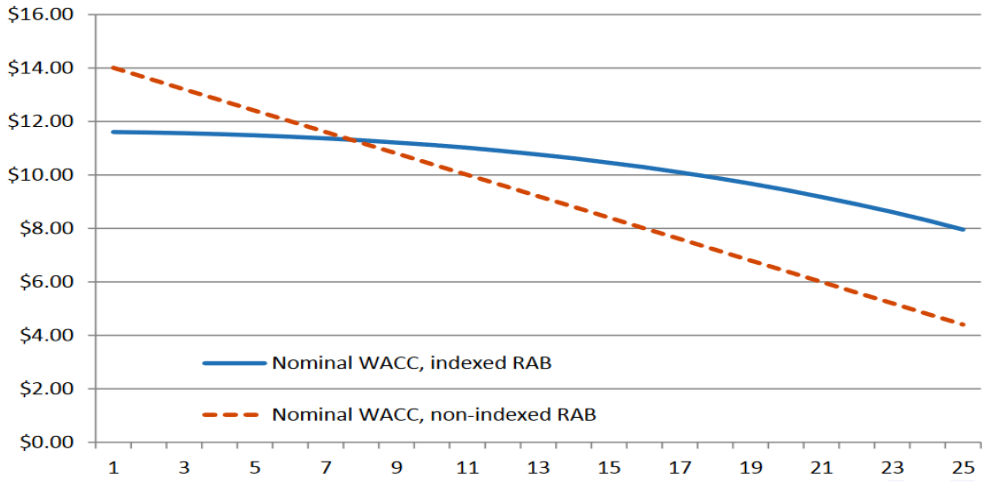
[which] requires an ad hoc adjustment at the end of the asset's useful life to remove the remaining value or the life is effectively extended indefinitely".[15]

Overall the two approaches change the rate and timing of depreciation but should not change the total depreciation allowance.[16]

The AER has generally applied the straight line method in regulatory decisions, and has stated that straight line depreciation is its "standard approach".[17]

The annual depreciation allowance is also affected by whether the RAB is indexed or not for the purposes of calculating depreciation. If the RAB is not indexed, then in the early to medium term depreciation is lower as it is calculated on a lower RAB. If the RAB is indexed then the depreciation allowance is higher in the early to medium term but falls faster with the increased depreciation of the early to medium term (see graph 3 below).

Graph 3: Revenue path example – indexed versus unindexed RAB ($ nominal)[18]



The AER's standard approach is to calculate depreciation using straight line depreciation applied to an indexed RAB and then to subtract the full amount of indexation of the RAB to arrive at an allowance for depreciation known as 'regulatory depreciation'.[19] The AER prefers this approach as:[20]

> *Indexation of the RAB and the offsetting adjustment made to depreciation results in smoother revenue recovery profile over the life of an asset than if the RAB was un-indexed.*

3. The AER's standard approach to depreciation in more detail

At the start of the process, the AER calculates and applies depreciation as part of the post-tax revenue model (PTRM). Networks must complete the PTRM as part of their regulatory proposal.

[15] AusNet, 5-41
[16] See *Application by APA GasNet Australia (Operations) Pty Limited (No 2)* [2013] ACompT 8 paragraph 181 and AusNet, 5-39
[17] For example, AusNet, 5-10
[18] AusNet, 5-13, Figure 5.1
[19] AusNet, 5-11 to 5-12
[20] AusNet, 5-12

Networks are typically regulated every five years. The process starts with a regulatory proposal from the network setting how much regulated revenue it proposes to earn during the regulatory control period,[21] including the opening valuation of the capital base at the start of the period, the proposed rate of return, new capital and operating expenditure, depreciation arrangements, and the proposed closing asset base at the end of the period.

In terms of the depreciation arrangements, networks are free to propose any method that meets the requirements of the National Electricity Rules (NER) or National Gas Rules (NGR). The AER must accept a method proposed by a network if it meets the requirements of the NER or NGR.[22]

Typically the AER has approved approaches by networks as being consistent with the NER or NGR where:

1. Assets are grouped into asset classes;
2. Useful lives are assigned to those asset classes;
3. For a given year, and for each asset class, depreciation from the previous year is removed, and forecast new capital expenditure is added;
4. For the purposes of calculating the return on capital, the asset class is indexed by inflation and the return on capital is calculated on the indexed sum of all the asset classes (i.e. the RAB);
5. For the purposes of calculating depreciation, straight-line depreciation is applied to the entire balance of assets within an asset class. Then regulatory depreciation is determined by subtracting the inflation of the RAB to avoid double compensation for inflation.[23]

The above approach highlights the interaction between depreciation and the return on capital. Faster depreciation through some form of acceleration can bring forward the depreciation allowance earned by the network, but it also means that the return on capital is lower because it is calculated on a lower value.[24] Generally an approach of more rapid depreciation and lower return on capital compares neutrally with an approach of slower depreciation and higher return on capital in terms of the net present values[25] of the revenues earned by the network under either approach.[26] However, faster depreciation leads to higher revenues early in the life of an asset and lower revenues late in its life.

Section 5 below discusses some of the issues that have arisen for consideration in network proposals and the extent to which they meet the regulatory requirements.

[21] Known as an access arrangement period for gas networks
[22] For example, United Energy Overview, p. 25
[23] The AER notes that, "Because inflation on the RAB is accounted for in both the return on capital — based on a nominal rate — and the depreciation calculations — based on an indexed RAB — an adjustment must be made to the revenue requirement to prevent compensating twice for inflation": AusNet, 5-11
[24] AusNet, 5-36
[25] Net present value measures the present value of a revenue stream by deflating future revenue back to present terms by a discount rate. The discount rate could be equal to inflation, the network's return on capital, or a standard rate.
[26] *Application by APA GasNet Australia (Operations) Pty Limited (No 2)* [2013] ACompT 8 paragraph 181 and AusNet, 5-39

The AER has generally rejected accelerated depreciation because it considers that the NER and NGR oblige it to recover depreciation over the useful (or economic) life of the asset. It notes that an implicit assumption of this approach is that the asset will remain useful for its technical life and therefore the depreciation should, in effect, be over the technical life. As the rate of use over the technical life of the asset is difficult to predict, an assumption of even usage over that period is generally adopted. Where networks can convincingly demonstrate an alternative pattern of use of an asset over its technical life, then the AER is open to adopting a different depreciation profile.[27]

4. NER and NGR requirements in relation to depreciation

The NER sets out the approach that the AER must take in relation to depreciation. For electricity distribution assets, NER clause 6.5.5(b) provides that:

- The depreciation profile must reflect "the nature of the assets or category of assets over the economic life of that asset or category of assets";
- The sum of the real value of depreciation over the life of the asset must be equivalent to the original value of the asset; and
- The economic life of the assets and the depreciation method and rates must be consistent within a regulatory control period.

Similar provisions apply in the NER to electricity transmission assets.[28]

The AER has stated that it considers it is bound to accept an approach to depreciation proposed by an asset owner which meets the requirements of the NER.[29] That is, where an electricity transmission or distribution operator proposes a depreciation method that meets the NER, the AER considers that it must accept that method and cannot substitute a more preferable method.[30]

The NGR set out the approach to depreciation for gas transmission and distribution pipelines at rules 88 to 90. Gas network assets tend to be very long-lived even compared to electricity assets, which some significant asset classes having standard lives up to 80 years.[31] Moreover, demand for gas transport services can be slower to build up over time given demand for gas is more discretionary than for electricity. Consequently, the approach to depreciation is more flexible, allowing more discretion for postponement of depreciation. Overall, the approach to depreciation reflected in the depreciation schedule should be over the economic life of the asset and such that the asset is only depreciated once. However, in addition, the depreciation schedule can be allowed to vary to promote growth in the market (e.g. by setting low depreciation charges in the early years of the

[27] However, where use is seen to be over the early part of the asset's life, then the question would need to be asked as part of the assessment of new capital expenditure whether it would be better for the network to invest in an asset with a lower cost and shorter life.
[28] Compare NER 6A.6.3. The transmission rules require that the straight line depreciation method must be used in relation to transmission assets valued over $20m that are dedicated to a single user or small group of users. This presumably is to prevent large depreciation allowances that might arise under the diminishing value method or under accelerated depreciation.
[29] United Energy Overview, p. 25
[30] See, for example, United Energy Overview, p. 25
[31] For example, see APT Petroleum Pipelines Pty Limited 2012 at page 9, which is the 2012-17 Access Arrangement Information for the Roma to Brisbane Pipeline.

asset's life followed by higher charges in later years), and to allow for the network's reasonable cash flow needs.[32]

It is not entirely clear that the differences in approach between the gas and electricity rules are significant in practice. For example, APA GasNet challenged the AER's standard electricity practices as applied to gas transmission assets before the Australian Competition Tribunal, but the AER's practice was upheld.[33]

As for the NER, the AER's discretion to adjust an approach proposed by a network is limited, meaning that it cannot a network's proposed approach to depreciation where that approach meets the requirements of the NGR.

5. Regulatory experiences with depreciation

As noted above, the AER's standard approach is to identify assets by class, determine a useful life, and apply straight-line depreciation. The AER has not generally deviated from this approach.

However, the AER has accepted alternative approaches in certain cases. The AER identified that it is inclined to accept proposals to accelerate depreciation in circumstances where:

- Shorter useful asset lives have been established based on revised technical performance. This occurred where Envestra demonstrated that its gas meters were not likely to last for their originally determined useful life;
- Where *specific* assets were destroyed by natural disasters e.g. Ergon's assets that were destroyed by Cyclone Larry were depreciated in one regulatory control period;
- It is clear that *specific* assets are no longer being used, e.g. AusNet had certain transmission assets at Morwell Power Station that were no longer required after closure of the power station, and synchronous condensers at Fishermans Bend, Brooklyn, and Templestowe were retired prior to the end of their useful life.[34] The AER accepted that these assets were no longer required and were unlikely to re-enter service and therefore accepted accelerated depreciation of them. The AER stated that they considered it was "reasonable to depreciate assets that have been removed from service relatively quickly so they don't impact revenues and distort prices well into the future".[35]

The AER has also considered some rarer situations where the network is effectively proposing to slow depreciation for particular assets. In its 2014-19 regulatory proposal, Transend[36] proposed "to increase the remaining asset lives of the 'Transmission lines and cables' and 'Transmission substations' asset classes to 34 years and 32 years from the [roll forward model for deriving the opening RAB] derived lives of 16 years and 23 years, respectively".[37] Lengthening asset lives for these two major asset classes would have an effect of deferring depreciation by stretching depreciation over a longer period.

[32] NGR rule 89
[33] See *Application by APA GasNet Australia (Operations) Pty Limited (No 2)* [2013] ACompT 8
[34] AusNet Transmission Services 2015a, p. 178
[35] AusNet 5-32 to 5-33
[36] Transend is the transmission element of TasNetworks
[37] Transend, 5-10

The AER accepted the proposal to lengthen the lives of these asset classes as they were satisfied that the proposed increases to the remaining asset lives were "reasonable as they better reflect the expected economic lives of the transmission lines, cables and substations assets".[38] The AER noted that this reduced the "total forecast revenue requirement over the 2014–19 period by about $64 million".[39]

These situations typically concern specific assets within a RAB. The AER has also accepted accelerated depreciation of the *whole* RAB on rare occasions where the assets appeared likely to be stranded.[40] The AER notes that allowed accelerated depreciation for the Amadeus Gas Pipeline (AGP).[41] In the 2001-11 access arrangement determination for the AGP in the Northern Territory, the asset owners proposed to accelerate depreciation over the ten years from 2001 to 2011 to take the asset's value from $228.5m at July 2001 to under $62m in 2011, and thereafter standard straight line depreciation until the end of the pipeline's useful life in 2066.

The AER accepted the pipeline's arguments about the future risk of stranding and agreed to the accelerated depreciation profile. The arguments were that there was considerable uncertainty about future demand for the AGP after 2011 given doubt about the longevity of the gas reserves in the Amadeus gas basin, the major foundation contract was due to expire in 2011, and gas reserves from the Timor Sea were likely to emerge.[42]

The AER has since noted that the AGP was not stranded after 2011. Timor Sea gas did not emerge between 2001 and 2011, the major customer recontracted after 2011, and the Amadeus gas basin reserves did not run out.

A number of networks sought in recent regulatory proposals to accelerate depreciation of their stock of accumulation meters e.g. Ergon, Endeavour. This is because these meters may be replaced prior to the end of their useful life by smart meters, which have additional functionality.

For example, Ergon proposed to depreciate existing accumulation meters over 5 years, and any new accumulation meters in 3 years.[43] Accumulation meters typically have an assigned standard asset life of 15 years. The AER considered there was merit in Ergon's arguments that accelerated depreciation "would promote efficiency because shorter asset lives would better align the cost recovery of its metering assets and the value that those assets provide to customers".[44] The AER ultimately decided not to accelerate depreciation because the Australian Energy Market Commission

[38] Transend, 5-13
[39] Transend, 5-13
[40] Stranding in an economic or financial sense occurs where an asset owner cannot recover the total costs of an asset due to reductions in consumer demand for the services of that asset.
[41] AusNet, 5-37
[42] Australian Energy Regulator 2002, *Final Decision: Access Arrangement proposed by NT Gas Pty Ltd for the Amadeus Basin to Darwin Pipeline*, p. xii
[43] AER 2015, 16-33
[44] AER 2015, 16-33

had yet to finalise new rules in this area that would open up competition in meter installation[45], and competition was not likely to emerge quickly in Ergon's rural area of operation.[46]

AusNet Transmission in Victoria proposed for the 2017-22 regulatory control period an approach where existing assets would continue to be subject to straight line depreciation while new assets would be subject to diminishing value depreciation.[47] The AER rejected AusNet's proposal for diminishing value depreciation of new assets because they did "not consider this approach results in a depreciation profile that reflects the nature of these assets over their economic lives".[48] The AER did not consider the assets would be likely to be utilised over their lives on the same trend line as the diminishing value line. The AER noted AusNet had not provided evidence to support forecast utilisation trends for the new assets that was different to existing assets so as to explain a different approach for new assets. The AER also noted that AusNet had not addressed how to deal with the residual value left at the end of the asset's lives under the diminishing value method. The AER estimated this residual value at 12.9 per cent of the asset's initial value.[49] This was not consistent in the AER's view with the NER requirement that an asset's value be recovered over its economic life.[50]

GasNet proposed an approach for the GasNet gas transmission network in Victoria where the RAB was not indexed. The depreciation allowance would therefore be higher than under the standard AER approach where depreciation is first calculated on the unindexed value of the RAB and then the indexation of the RAB is subtracted from this to determine the final depreciation allowance.[51] This effectively equated to higher depreciation but a lower return on capital, because the return on capital is calculated on the lower, non-indexed asset base. The outcome would have been NPV-neutral but brings forward depreciation. The AER rejected the approach because it was likely to raise prices in the short to medium term in a way that would inhibit growth in demand in the market.[52] GasNet sought a review by the Australian Competition Tribunal. The Tribunal could not identify any errors in the AER's approach, and rejected the review on this ground by GasNet.[53]

One variant that the AER has accepted on its general approach has been to permit a year-by-year tracking approach in calculating depreciation.[54] Under the year-by-year tracking approach, capital expenditure within each asset class is disaggregated by year of expenditure and separately depreciated. This contrasts with the general AER approach of grouping all assets within a class together and calculating an average remaining life for the purposes of calculating depreciation.

[45] At the time, the Australian Energy Market Commission was considering a new rule that would separate metering from the rest of the network's asset base, and introduce competition in the installation of new meters.
[46] AER 2015, 16-34
[47] See AusNet 5-13 to 5-28 for the AER's analysis of the proposal and the AER's response.
[48] AusNet, 5-14.
[49] AusNet, 5-19
[50] AusNet, 5-19
[51] Assume, for example, a new asset worth $100 with a life of 10 years where forecast inflation is 3%. Depreciation is 10% or $10. However, indexation due to inflation is 3% of the asset base or $3. Therefore regulatory depreciation in the first year of the life of the asset is $10-$3 or $7. If the asset base is not indexed, then regulatory depreciation would be $10.
[52] *Application by APA GasNet Australia (Operations) Pty Limited (No 2)* [2013] ACompT 8, paragraph 185
[53] *Application by APA GasNet Australia (Operations) Pty Limited (No 2)* [2013] ACompT 8, paragraphs 166-226
[54] For example, AusNet transmission services: see AusNet, 5-31

Year-by-year tracking is only possible if the regulated entity maintains a sufficiently detailed asset register.

In the United Energy determination, the AER also accepted year-by-year tracking. The AER noted that:[55]

> *The use of WARL remains our preferred approach because it meets the requirements of the NER and avoids the additional complexity inherent in year-by-year tracking. However, because year-by-year tracking also meets the requirements of the NER, we must accept … this approach.*

The difference in the United Energy decision between the WARL approach and year-by-year tracking for the 2016-2020 regulatory control period was $106.5 million, and the year-by-year tracking approach was about 34 per cent more than the WARL approach.[56] It needs to be noted that both approaches should be neutral in net present value terms over the life of the network assets, and the year-by-year tracking approach simply brings forward some of the depreciation rather than increases it in an overall sense. Though year-by-year tracking is more complex to apply, it more accurately applies the principle of depreciating specific assets against their use over time.

6. Arguments for accelerated depreciation

Some networks and peak bodies have proposed an approach of accelerated depreciation.[57] Accelerated depreciation would involve shortening the time over which depreciation is claimed. Accelerated depreciation would lead to asset values being depreciated to zero earlier than their standard life. It would also increase user charge during the period of accelerated depreciation and lower charges thereafter for the period that the asset remained in use.

The ENA proposed in a paper in August 2015[58] some challenges to the AER's common approach of applying straight line depreciation. The ENA is the industry body for electricity and gas distribution networks.

The ENA points out that straight line depreciation spreads the depreciation allowance equally over the projected useful life of assets and this presumes that "future consumers will meet a substantial proportion of capital costs of major investments that are being made today".[59] This is because many distribution and transmission assets have lives of 40 or more years, meaning that straight-line depreciation will recover the depreciation allowance in equal payments over that life of 40 years or more.

[55] United Energy, Overview, p. 25
[56] United Energy, Overview, p. 24, table 8
[57] On occasion this has been described as seeking greater flexibility in depreciation approaches, but the AER notes that on each occasion where a change has been sought by a network it has been to accelerate depreciation: AusNet, 5-37: "In all cases, however, the proposals are aimed at increasing (or accelerating) the rate at which funds are recovered by the service provider". In fact, this is not entirely accurate as Transend sought longer asset lives for two asset classes which resulted in a slowing in depreciation for its 2014-19 regulatory control period.
[58] ENA 2015
[59] ENA 2015, p. 3

The ENA is concerned that changes in energy markets make it unclear whether there will be strong future demand for energy supply services, and certainly over a timeframe of 40 years or more for particular assets. The ENA notes for example that changes such as the introduction of solar PV and energy efficiency measures have for the first time in 50 years started to reduce average use per household, with average residential use falling from around 8000 kilowatt hours (kWh) to 6000 kWh in the five years to June 2015.[60] While batteries are expensive at present, battery prices are coming down. There is the potential if battery prices continue to decline that significant numbers of users may choose to install solar PV plus batteries to meet more or even all of their power consumption needs. As the costs of providing the network do not decline as use of the network declines, reduced use of the network from consumers switching to this option tend to increase the price per kWh of electricity.[61] Over time, if users face higher prices for electricity supplied by the grid, this could exacerbate the trend away from using electricity supplied by the grid towards power supplied by solar PV and batteries.

The essence of this argument is that future technologies may strand or partially strand existing networks.[62] Stranding in this sense means that it is difficult to recover the full value of depreciation after some future time due to changes in the market that weaken demand for and the prices that users will pay for network services.

The ENA notes that changes to depreciation allowances do not result in changes in required revenues (even on a net present value basis). Rather, they change the time when the revenue is earned. This means that changes in the approach to depreciation will not result in users paying more or less – such changes will only change the timing of payment by users, either by bringing it forward or pushing it back.[63][64]

The ENA argues that networks commonly have a statutory obligation to connect and supply users, which means that they must make customer-specific investments.[65] It could be argued that where a network has an obligation to supply, it is unreasonable for there to be any risk of non-recovery of depreciation charges.

The ENA argues for greater flexibility in setting depreciation schedules, including permitting both accelerated depreciation and deferred depreciation.[66] It could be argued that accelerated depreciation brings forward charges to the short or medium term, when users are willing to pay those charges.

[60] ENA 2015, p. 5
[61] ENA 2015, p. 5
[62] Stranding in this sense means that the assets are totally or significantly under-used compared to their capabilities.
[63] ENA 2015, p. 8. Changing the timing therefore changes whether current or future users of the asset pay the regulatory depreciation allowance on the asset.
[64] The timing of depreciation is only revenue-neutral if there is no possibility of non-recovery
[65] ENA 2015, p. 6
[66] Noting that deferred depreciation is foreshadowed and permitted under the NGR but is not referred to in the NER.

The ENA's key arguments for permitting more flexible approaches to depreciation are:

- To permit recovery of charges over the short to medium term when user demand is clear, rather than pushing back a significant element of depreciation to the longer term when user demand is less clear due to changes to technology and other factors;
- To align cost recovery with other cost drivers to ensure overall price stability.[67] The ENA argues that the current low cost of capital (circa 2015) provides an historic opportunity to accelerate depreciation without unduly increasing the overall cost of electricity and gas transportation services.

The ENA also argues that more flexible approaches to depreciation would de-risk networks by reducing the risk of non-recovery.[68] This could occur from a rapid collapse of the market as new technologies such as solar and storage combined to cause users to rapidly exit the market, leaving remaining users to pay more than it is economically possible for them to pay. The ENA notes that accelerated depreciation could help ease the transition in such a scenario by recovering more of the total charges now and less in the future.[69]

The AER nominates a number of additional arguments raised by networks in regulatory proposals during electricity determinations or gas access arrangements.[70] These include:

- Rationing demand as networks become more constrained by raising prices through accelerated depreciation. Rationing in this sense means raising prices in order to find those customers that are willing to pay the highest prices for service rather than expanding the network by building out the constraint; and
- Improving network financeability by changing the profile of cash flows over the life of assets. Bringing forward depreciation is said to improve certain finance metrics, such as funds from operations to debt. Funds from operations (FFO) to debt reflect the positive cash flows above cost from operating activities compared to corporate debt levels. Networks argue that as accelerated depreciation brings forward depreciation allowances it increases funds in the earlier years of an asset and so FFO to debt during the period of accelerated depreciation.

7. Analysis of arguments for accelerated depreciation

A key concern raised by networks is the risk that an asset could become stranded, resulting in the asset owner not being able to recover its costs. Accelerated depreciation is said to at least enable an asset owner to recover the depreciation element of its forecast revenues prior to the risk of stranding crystallising.

The main problem with this argument is that in regulated markets stranded assets do not go uncompensated. Under the NER and NGR, the sum of the real value of depreciation must be equal to the value at which the asset was first included in the regulatory asset base.[71] This means that

[67] ENA 2015, p. 11
[68] ENA 2015, p. 12
[69] ENA 2015, p. 12
[70] See AusNet, 5-42 to 5-56
[71] For example, NER clause 6A.6.3(b)(2) and NGR rule 89(1)(d)

assets cannot become stranded and that depreciation allowances will always be able to be recovered.

The AER notes that some user groups argue for stranding as an important market discipline on over-investment, in the sense that the risk of stranding may cause networks to take greater care in making new investments.[72] However, the AER posits that the provisions in the NER and NGR to protect against stranding by requiring assets to be fully depreciated is part of a regulatory compact to encourage networks to make long-term investments in network assets:[73]

> *The regulatory framework allows [networks] certain benefits that may not be available in competitive markets (such as being allowed a return on assets that may only be partially utilised), such benefits are traded off so that [networks] are willing to make large sunk investments in the first place.*

The rules against stranding were introduced in 2006. Prior to that time, the AER was permitted to optimise the RAB to remove any assets that were not considered necessary to deliver services.

Once it is recognised that the regulatory framework does not expose networks to the risk of stranding, it becomes difficult to argue for accelerated depreciation to protect against the risk of stranding.

The ENA's next argument is to permit more flexibility in depreciation approaches, such as accelerated depreciation, to permit greater recovery where user demand is clear, or to smooth prices at times when other cost elements such as the cost of capital are low.

First, it is not clear that the NER permits this level of flexibility.[74] The NER provides that the depreciation schedules must depreciate using a profile that reflects the nature of the assets … over the economic life of those assets.[75] The AER has interpreted this to mean that the assets must be depreciated over their economic or useful life (that is the period over which the assets offer useful service before it is more sensible from a cost perspective to replace them than retain them). The AER's position was upheld by the Australian Competition Tribunal in the GasNet case.[76]

The AER assumes that in general assets are assumed to have an economic or useful life that is the same as their technical life (that is the period the asset could be expected to last in service without breaking down). Sometimes advances in technology may make it sensible to replace assets before the end of their technical life, meaning that their economic life is shorter than their technical life.[77] However, the AER notes it is very difficult to predict with confidence that particular assets may become redundant and therefore reach the end of their economic life before the end of their technical life. As a result, the AER prefers to apply the straight-line depreciation approach which effectively assumes equal use of the asset over its useful life. The AER also argues that, even where

[72] For example, the Energy Users Coalition of Victoria in the context of the AusNet transmission 2017 determination: AusNet, 5-32
[73] AusNet, 5-46
[74] As noted earlier, the NGR does permit this level of flexibility.
[75] NER clause 6A.6.3(b)(1)
[76] *Application by APA GasNet Australia (Operations) Pty Limited (No 2)* [2013] ACompT 8, paragraphs 166-226
[77] For example, computers may be built to last 10 years, but are often replaced after 3-5 years because new computers have additional computing power that justifies upgrading.

particular assets or asset classes become redundant, it is difficult to argue for an approach of accelerated depreciation that applies across a whole network.

The ENA argument for using accelerated depreciation to raise prices and therefore 'ration' demand as networks become more constrained is accepted at a theoretical level by the AER.[78] However, accelerated depreciation applies across the network and so it does not result in higher prices only on constrained parts of the network. In addition, networks are entitled to propose augmentation capital expenditure (augex) to build out constraints, and the AER will approve augex in the absence of cheaper alternatives.

The ENA's other argument is to permit accelerated depreciation to improve cash flow and therefore the network's financial metrics. The AER conducted an analysis that suggested that the network's metrics such as funds from operations to debt[79] improved early in the asset's life but then declined compared to applying straight line depreciation.[80] This would suggest that any improvement in metrics is relatively temporary.

8. User concerns about accelerated depreciation

Users may be concerned about accelerated depreciation for a number of reasons.

First, accelerated depreciation increases the cost of depreciation and therefore prices in the short to medium term, while reducing the cost of supply in the long term (i.e. nearer the end of an asset's life). This means that users in the short to medium term pay for the depreciation costs of the asset while users in the longer term do not. It transfers wealth from current users to future users to the extent that the asset remains in use after it has been fully depreciated.

The AER noted in its AusNet transmission draft determination that while the overall outcome may be neutral in net present value (NPV) terms for the network, it may not be NPV-neutral for users, giving that users consume electricity and gas transportation services for a limited time, often less than the life of those assets (say 40 years).[81]

Second, users are concerned that predictions about the future are inherently uncertain and so an assumption that an asset will become stranded may not come to pass. This would bring forward depreciation costs unnecessarily. Straight line depreciation assumes equal use over the life of the asset while accelerated depreciation assumes greater use of the asset early in its life. The AER remarks that it permitted accelerated depreciation of the Amadeus Gas Pipeline when in the event the pipeline did not end up being stranded. The AER notes that "[f]orecasting is uncertain, particularly across a number of regulatory control periods as there is more scope for things to change over multiple periods".[82] Arguably the risk that early users will overpay under a scenario of

[78] AusNet, 5-44
[79] This is a measure of the ability to pay debt out of operating revenues.
[80] AusNet, 5-48 to 5-51
[81] AusNet, 5-43
[82] AusNet, 5-46. It is noted that assumptions about depreciation occur in the context of a broader set of decisions and assumptions about an asset, for example reasonable rates of return. These broader assumptions can potentially swamp the impact of assumptions and forecasts made for the purpose of determining the depreciation allowance.

accelerated depreciation means that robust proof should be required to move away from the assumption of equal use over the life of the asset implied in the use of straight line depreciation.

Third, accelerated depreciation may remove an asset owner's incentive to use the asset once it is depreciated. This is because under the NER and NGR two of the major building blocks are depreciation allowances and the return on the asset. Once the asset is fully depreciated, then these revenue streams are closed, and the asset owner only earns revenue on its costs of operating the asset (i.e. operating expenditure). There is a concern that asset owners may not properly maintain assets and/or seek to replace assets early once they are depreciated.

Current capex disciplines in the NER and NGR provide somewhat of a check against over-investment. First, the AER approves each network's proposed new capital expenditure program as part of a regulatory determination (generally every 5 years). The AER applies the Expenditure Forecast Assessment Guideline to determine the prudent and efficient level of forecast capex.[83] Even after a capex budget is approved, specific projects above a threshold must meet the RIT-D or RIT-T test which provides that new distribution or transmission expenditure must be evaluated against non-network options (e.g. demand response, local generation).

Nonetheless there may still be residual risk of over-investment as:

- Regulators have clearly stated they are not responsible for specific investment choices, so the level of scrutiny of capex does not reach down to each project once the overall capex budget is approved;
- Investments below the RIT-D and RIT-T thresholds are not subject to scrutiny;
- Utilities have a level of informational asymmetry which means it is difficult to detect over-investment.

9. Overall conclusions

Accelerated depreciation has merits for specific assets that prematurely reach the end of their life due to damage from natural disasters, or technical obsolescence. It is more difficult to justify accelerated depreciation across whole networks. The AER's overarching principle that the depreciation profile should align with forecast use is a strong one.

Points of concern for consumers around accelerated depreciation include:

1. Accelerated depreciation won't change overall returns but will change the time at which those returns are earned and therefore the impact on customers using the asset early in its life. For a long-lived asset like most electricity and gas distribution and transmission assets, this time-shift in collection of returns can be very significant.
2. Once an asset is fully depreciated, the asset owner/manager faces reduced incentives to want to continue to manage the asset. As rules against over-investment are not perfect, there is a residual risk that asset owners will propose replacement of an asset that still provides useful services.

[83] Australian Energy Regulator 2013, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November, p. 24.

3. Accelerated depreciation involves forecasts about the future use of assets. Those forecasts can be very difficult to make. Some forecasts have been wrong in the past, for example, the AER's 2002 determination in respect of the Amadeus Gas Pipeline. In theory, the approach should be to apportion the depreciation of an asset over a number of periods in accordance with the use of the asset in each period. The use of straight line depreciation reflects a forecast that demand is equal over the life of the asset. Deviating from straight line depreciation requires a robust evidentiary base.

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