Economic Regulation Authority

Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27

Attachment 3B: AA5 Capital Expenditure

9 September 2022

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Note

This attachment forms part of the ERA's draft decision on proposed revisions to the access arrangement for the Western Power Network for the fifth access arrangement period. It should be read with all other parts of the draft decision.

The draft decision includes the following attachments:

Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23-2026/27 – Decision Overview

Attachment 1 – Price control and target revenue

Attachment 2 – Regulated asset base

Attachment 3A – AA4 capital expenditure

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1. Summary

This attachment deals with forecast capital expenditure for AA5.

Target revenue for AA5 can include forecast capital costs that are reasonably expected to satisfy the new facilities investment test.

The new facilities investment test considers both the efficiency and purpose of an investment. The test ensures that prices increase only to the extent necessary to maintain the safety of the network and the reliability of provision of contracted covered services or, otherwise, there is a benefit to users that justifies an increase in prices.

The ERA has determined that $3,712 million of $4,341 million capital expenditure proposed by Western Power for AA5 is reasonably likely to meet the new facilities investment test. A summary of expenditure that did not meet the requirements of the new facilities investment test is set out below.

Table 1: Draft decision reductions to proposed capital expenditure

Program	Reduction	Reason
Network renewal undergrounding program	Reduce by $75m to $365m	This relates to the conversion of overhead areas to underground power where the overhead assets have deteriorated and require replacement. Typically, this will require a contribution from local government to make up the cost difference between overhead and underground assets. The ERA agrees it is a prudent management approach to overhead network renewal but the magnitude of the scale up raises deliverability concerns. There were significant local government and contractor constraints in AA4 that would need to be overcome to deliver the proposed significant uplift in the size of the proposed program.
Standalone power systems	Reduce by $118m to $213m	The ERA agrees standalone power systems are a prudent long term transition strategy for the rural network but considers the proposed number of units is overly ambitious and risks the realisation of cost inefficiencies. Western Power delivered 187 units during AA4 and is proposing 10 times that level (1,861) for AA5. A slower ramp up will enable realisation of learning and technology cost efficiencies in AA6. The adjusted capital expenditure is based on 1,010 installations over AA5 compared with Western Power's proposal of 1,861.
Other asset replacement	Reduce by $165m to $747m	The ERA considers that the proposed replacement investment is not supported by actual asset condition. The ERA's technical consultant considered that the failure forecasts were based on age-risk relationships greater than observed historical performance. It considered this creates an upward bias in forecast failure rates. The adjustment aligns capital expenditure with actual expenditure incurred in AA4.
SCADA/Comms IT and Cyber	Reduce by $256m to $616 m	Western Power is proposing to spend double the amount it spent in AA4. This is significantly higher than comparable companies in the NEM. The need for increased investment is not supported by an increase in failure rates and vendor

Program	Reduction	Reason
		obsolescence drivers are not justified. The ERA's technical consultant identified concerns about inefficient scale up, deliverability and limited business cases provided. The ERA recognises that ensuring cyber security is essential and that Western Power has new obligations under the *Security of Critical Infrastructure Act 2018 (Cth)*. The ERA considers the revised expenditure is sufficient to allow Western Power to comply with these requirements, noting that in addition to the planned capital investment, $17.5 million has been included in indirect costs to establish a new cyber security function. If Western Power considers additional funds are needed to ensure cyber security, it can provide details and evidence to support this in its response to the draft decision.
Corporate Support	Reduce by $31m to $115m	A significant element of the forecast depot program costs has been allocated to unplanned activities. The ERA has reduced this to reflect a more efficient cost.

The adjustments to the proposed expenditure for undergrounding and standalone power systems reflect concerns about the deliverability and efficiency of the proposed level of expenditure. However, as these programs are integral to Western Power's strategy to address the transformation, the draft decision requires them to be subject to the Investment Adjustment Mechanism.

The Investment Adjustment Mechanism ensures that, if Western Power can scale up efficiently during AA5, the target revenue for AA6 will be adjusted to reflect the additional investment. It also ensures that if Western Power does not deliver its program, target revenue for AA6 will be adjusted to reflect the underspend. This provides Western Power with the flexibility to focus activity and expenditure during AA5 to meet the challenges of the sector's transformation whilst protecting customers from incurring costs if the programs are reduced during AA5.

Western Power has proposed to accelerate its advanced metering program so that most customers will have an advanced meter by the end of AA5. The ERA's draft decision has included the accelerated metering costs. However, this is contingent on Western Power quantifying and demonstrating the benefit of the acceleration in its response to the draft decision, removing any contingency allowance and demonstrating that it will be able to deliver the program.

Table 2 below provides a comparison by investment category for AA5 and AA4. The draft decision is $455 million or 14 per cent more than was approved for AA4 and $777 million or 26 per cent more than actual net expenditure in AA4.

Table 2: Draft decision net capital expenditure including indirect costs and labour escalation (real $ million at June 2022)

	AA5 Draft decision $m	AA5 Western Power proposal $m	AA4 Actual $m	AA4 approved $m
Growth	441	436	385	641
Compliance (including reliability driven)	443	440	335	397
Asset replacement (includes undergrounding, standalone power systems and metering)	2,091	2,441	1,534	1,649
SCADA and IT	616	872	438	322
Corporate support	121	152	243	249
Total net capital expenditure	3,712	4,341	2,935	3,257

Source: ERA Analysis: Western Power and ERA target revenue model

The reasons for the ERA's draft decision on forecast capital expenditure and details of required amendments are set out in this attachment.

2. Regulatory requirements

Section 6.51 of the Access Code provides for the target revenue for an access arrangement period to include forecast capital costs that are reasonably expected to satisfy the new facilities investment test.

The new facilities investment test considers both the efficiency and purpose of an investment. The test ensures that prices increase only to the extent necessary to maintain the safety of the network and the reliability of provision of contracted covered services or, otherwise, there is a benefit to users that justifies an increase in prices.

In the case of augmentations to the network for new demand, expenditure will meet the new facilities investment test when the investment is the efficiently delivered lowest cost option and the forecast additional revenue from the augmentation does not require an increase in prices.

As required under section 6.56 of the Access Code, the ERA published a guideline on factors that will be considered in new facilities investment test determinations.

An extract of the Access Code requirements relevant to the AA5 capital expenditure is included in Appendix 1.

3. Western Power's proposal

Western Power's total proposed capital expenditure for the AA5 period (net of capital contributions and including labour cost escalation and indirect costs) is $4,341 million. A summary of the proposed expenditure is set out in Table 3 below.

Table 3: Western Power's proposed net capital expenditure for AA5 (real $ million at June 2022)

	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5
Transmission network direct capital expenditure:						
Asset replacement and renewal	63.5	62.4	55.9	55.1	56.2	293.2
Growth	88.4	72.9	52.2	51.0	27.2	291.7
Improvement in service	0.0	0.0	0.0	0.0	0.0	0.0
Compliance	36.1	36.8	39.7	26.9	21.5	161.0
Total	**188.0**	**172.1**	**147.9**	**133.0**	**105.0**	**745.9**
Distribution network direct capital expenditure:						
Asset replacement and renewal	390.7	405.5	413.8	406.0	401.8	2,017.9
Growth	166.6	156.9	151.7	154.3	144.0	773.4
Improvement in service	0.2	0.0	0.0	0.0	0.0	0.2
Compliance	43.1	42.5	43.5	43.2	42.8	215.2
Total	**600.6**	**604.9**	**609.1**	**603.6**	**588.6**	**3,006.8**
SCADA & Telecommunications direct capital expenditure	72.0	72.4	84.3	80.1	84.4	413.1
Corporate direct capital expenditure	83.6	101.1	119.5	82.5	76.7	463.3
Total gross direct capital expenditure	**944.2**	**950.5**	**960.7**	**909.1**	**864.6**	**4,629.1**
Less contributions:						
Transmission growth	(57.5)	(31.3)	(31.3)	(31.3)	(11.7)	(163.0)
Distribution asset replacement	(27.3)	(35.5)	(45.5)	(54.4)	(56.4)	(219.2)
Distribution growth	(107.0)	(107.0)	(107.0)	(107.0)	(99.9)	(528.1)
Total contributions[1]	**(191.9)**	**(173.8)**	**(183.8)**	**(192.7)**	**(168.0)**	**(910.2)**
Total net direct capital expenditure	**752.3**	**776.7**	**776.9**	**716.4**	**696.6**	**3,718.9**
Add:						
Indirect costs	130.8	129.4	129.7	127.6	125.2	642.7
Labour escalation	11.1	16.5	21.9	25.8	29.4	104.7
Less allocations to contributions:						
Indirect costs	(22.3)	(19.3)	(20.5)	(22.7)	(19.7)	(104.6)
Labour escalation	(2.2)	(2.9)	(4.0)	(5.3)	(5.4)	(19.8)
Total gross capital expenditure	1,086.2	1,096.3	1,112.4	1062.5	1,019.2	5,376.5
Total contributions	(216.4)	(196.00	**(208.40**	**(220.7)**	**(193.1)**	(1,034.5**)**
Total net capital expenditure	**869.7**	**900.2**	**903.8**	**841.6**	**825.8**	**4,341.1**

Source: ERA analysis derived from Western Power access arrangement information

[1] Excludes labour cost escalation and indirect costs. Total contributions including labour cost escalation and indirect costs is $1,034.5 million.

A comparison of Western Power's proposed capital expenditure for AA5 with actual expenditure during AA4 is set out below.

Table 4: Comparison of proposed AA5 total net capital expenditure with AA4 actual expenditure (real $ million at June 2022)

Expenditure category	AA5 proposed	AA4 actual	Increase/ (Reduction)
Transmission network direct capital expenditure:			
Asset replacement and renewal	293.2	204.4	88.8
Growth	291.7	355.2	(63.5)
Improvement in service	0.0	2.7	(2.7)
Compliance	161.0	105.9	55.1
Total	**745.9**	**668.2**	**77.7**
Distribution network direct capital expenditure:			
Asset replacement and renewal	2,017.9	1,301.1	716.8
Growth	773.4	781.1	(7.7)
Improvement in service	0.2	13.9	(13.7)
Compliance	215.2	155.1	60.1
Total	**3,006.8**	**2,251.2**	**755.6**
SCADA & telecommunications direct capital expenditure	413.1	196.4	216.7
Corporate direct capital expenditure	463.3	477.1	(13.8)
Gross direct capital expenditure	**4,629.1**	**3,592.9**	**1,036.2**
Add indirect costs and labour escalation	747.0	505.3	241.7
Less capital contributions and gifted assets	(1,035.0)	(1,049.0)	14.0
Total net capital expenditure	**4,341.1**	**3,049.0**[2]	**1,292.1**

Source: ERA analysis derived from Western Power access arrangement information

Western Power provided the following reasons for increases in forecast capital expenditure compared to the AA4 actual expenditure:

- Transmission network**:** forecast capex is expected to increase to continue to address the ageing asset base, facilitate additional capacity for customer connection (including connection of renewable generation and load to meet its carbon reduction requirements) and rationalise voltages, whilst improving network utilisation.
- Distribution network: the increase in forecast capex is driven primarily by the installation of standalone power systems, undergrounding programs (such as the Network Renewal

[2] Includes $103.2 million for AMI communications expenditure.

Undergrounding Program), acceleration of the AMI deployment and maintaining safety performance of the network (including addressing ring main unit safe operating risk issues).

- SCADA and Telecommunications**:** there is a significant increase in forecast capex for SCADA and Telecommunications driven primarily by asset obsolescence, management of cyber security risk, meeting compliance requirements and meeting investments required to implement the outcomes of the Energy Transformation Strategy (e.g. five-minute settlement and DER integration).

Further details of Western Power's proposal are incorporated in the ERA's considerations below.

4. Submissions

Matters raised in submissions relevant to the determination of the AA5 forecast capital base include:

- Insufficient information to justify the significant expenditure in areas such as SCADA and telecommunications, SPS, undergrounding and AMI.
- Concerns with the lack of investment in transmission capacity to cater to areas suitable for large renewable generation, large industrial loads and electrification of industrial and processing sectors.
- The importance of ensuring only efficient investment is approved.
- Questions over the robustness of the standalone power system business cases and seeking assurance that it was less expensive than the existing solution. Also, submissions questioned whether operating cost alternatives and outsourcing were considered by Western Power as alternatives.
- Ensuring Western Power has justified the long-term benefits and considered alternatives and the effect of obsolescence in its proposal for the SCADA and telecommunications expenditure.
- Mixed support for undergrounding expenditure, with concerns about ensuring long term benefits are demonstrated and that it is the lowest cost alternative.
- While there was some support for accelerating the rollout of advanced meters, concerns were raised whether the investment was efficient.
- Concerns about the level of spending in this proposal given the potential for additional costs such as costs related to the WA Government's Energy Transformation Strategy and transmission investment that may be needed during AA5.

Further details of stakeholder submissions are incorporated in the ERA's considerations below.

5. Considerations of the ERA

Section 6.51 of the Access Code provides for the target revenue for an access arrangement period to include capital costs calculated for an amount of forecast new facilities investment that is reasonably expected to satisfy the test in section 6.51A of the Access Code.

Western Power has determined amounts of forecast capital expenditure to be notionally added to the capital base by deriving a total amount of forecast capital expenditure and subtracting a forecast of capital contributions.

The approach taken by the ERA to assess whether the forecast capital expenditure satisfies the new facilities investment test has been to:

- Assess whether the forecast capital expenditure is reasonably expected to satisfy the efficiency test under section 6.52(a) of the Access Code
- Assess whether Western Power has made a reasonable forecast of the amount of capital expenditure that will satisfy the new facilities investment in its entirety.

The ERA's consultant, Engevity, provided advice to assist the ERA in its review. Engevity's review included an assessment of Western Power's governance processes, asset management strategies and forecasts.

Engevity advised that its review of Western Power's investment governance framework (IGF) found that it is consistent with good industry practice and has appropriate check points and approvals for investment, which, if applied appropriately, should be capable of producing prudent and efficient outcomes.

Engevity specifically considered Western Power's performance on cost estimation. Engevity reported that its detailed reviews of Western Power's application of the IGF to the AA4 historical expenditure found that:

- For a number of significant investments, the project scope was not sufficiently defined at the time of the access arrangement to deliver a "50 per cent probability of exceedance" at a portfolio level to ensure that risk is shared appropriately between the business and customers under the regulatory incentive arrangements.
- The options analysis in Business Case documents dismissed reasonable alternatives on a qualitative basis as unsuitable, without appropriate analysis of cost, timing or benefits.[3]
- Some projects included explicit or implicit cost or scope contingencies in estimates that typically equate to 8-10 per cent of overall project costs and effectively change a +/- 10% estimate to a +0%/ -10% estimate.

Engevity acknowledged that the asymmetry in governance and change thresholds is designed to encourage delivery efficiencies to be realised by project managers, however, it also introduces a clear bias towards overstating project cost that becomes problematic for regulatory forecasts. Engevity considers that without an appropriate correction for this bias in

[3] For example, the HAY-MIL switchboard project initially dismissed a refurbishment option as unacceptable whilst noting that it would be significantly lower cost, instead Western Power Proposed a $29.9m replacement option which was included in the AA4 Further Financial Decision allowance. On further investigation, the preferred replacement option was costed in the Business Case at $62.1m, resulting in Western Power investigating and adopting a refurbishment option with the original equipment manufacturer with an actual cost of $12.3m over AA4, 80% under the reported market replacement cost, 59% under the Access Arrangement budget and 8.9% under the Gate 3 Business Case cost estimate for the refurbishment option.

the regulatory capital expenditure forecasts, the total portfolio cost will also be overstated by a similar proportion.

Therefore, whilst the IGF itself represents sound governance processes, the quality of the project information and analysis unavoidably affects the accuracy of project costs and their suitability for regulatory forecasting purposes at a portfolio level.

In Engevity's opinion, the design of the stage gated approval system and change control management is comparable to processes employed by industry peers and appropriate for the works. However, the consistent application of the framework, associated processes and input information is a concern.

Engevity reviewed the application and effectiveness of the IGF through review of audits done by Western Power and a spot check of supplied project information. Engevity made the following observations in relation to an internal audit report on the IGF undertaken in 2018:

- The Investment governance audit report supplied (assumed to be the most recent report) was from 2018. Given the central role of the investment governance system as a risk management tool, there is merit in more frequent audits at least every two years if not annual reviews.
- Basic metrics such as percentage of investments compliant with IGF requirements and objectives are not supplied in the audit report. Additional metrics relating to systems effectiveness including percentage of projects falling within IGF cost, schedule and benefits tolerances are not supplied. These IGF effectiveness metrics should be collated and analysed for continuous improvement opportunities.
- With these qualifications in mind, we note our previous observations on the impact of cost and scope contingencies, the relatively poor predictability of outturn costs within the Business Case accuracy and the need to correct the inherent bias that has been observed through our review of Western Power's CAPEX portfolio in AA4 and AA5.

Engevity noted that Western Power's internal audit reporting found that the IGF design was adequate and fit for purpose and was operating effectively. However, although the internal audit indicated no major issues with the application of the IGF, it was silent on the effectiveness of the framework in meeting cost, schedule and benefits realisation tolerances at key decision milestones.

Engevity also conducted a spot check of a sample of projects supplied by Western Power to evaluate compliance with IGF rules and IGF systems effectiveness. Its observations were as follows:

- Actual costs are within 10% of Gate 3 (detailed business case) estimates four times out of nine if costs are not adjusted for scope changes.
- Many of the projects experienced material and multiple scope changes during execution. If budget costs are adjusted for scope change, actual cost is within 10% of Gate 3 estimates for two projects out of nine and not with 10% of Gate 3 estimate for seven out of nine projects.
- Five of the nine projects were completed more than 12 months after the Gate 3 approved "Asset in Service". Four projects were delivered two years beyond their original completion date.
- Many of the projects experienced material and multiple scope changes during execution.
- In Engevity's opinion, the quality of the change control documentation and detail of the new facilities investment test (NFIT) 'look-back' reports is higher than many Australian

utilities.[4] However, the reconciliation of project costs and asset quantities to regulatory models was difficult, and in some cases not possible with the information provided.

Engevity considered that, while project costs were a mixture of underruns and overruns relative to the detailed business case, the project schedule was primarily overrun. Four of nine projects were completed two years after the completion data anticipated at the time of investment decision. Engevity noted these very long delays can distort the perspective of project outcomes when looking at spend within an access arrangement period and not considering the whole of project cost. Engevity noted that, while it had not analysed the full AA4 portfolio, a systemic bias to late delivery of projects (as suggested, but not proven by the 13 NFIT projects that were reviewed) would result in a significantly overstated AA5 capital expenditure forecast.

Engevity noted the asset management framework and systems used by Western Power had previously been reviewed against ISO 55000 and the ERA asset management system requirements and found to be compliant.

Engevity acknowledged achieving ISO 55001:2014 certification is a significant achievement and demonstrates Western Power's asset management system addresses all of the elements of the standard. However, the accreditation is for the system itself and focuses heavily on the documentation of appropriate systems and processes and less on the outcomes delivered by the system (which is essentially the focus of Engevity's review). It does not provide assurance over the outcomes or the quality of the inputs to the asset management system.

Engevity highlighted the following findings from the 2020 Asset Management System Review report completed by AMCL:

> "In general, it was observed that Western Power has developed a sophisticated, well-structured and disciplined Asset Management System. Through the documentation review and tele-interview process Western Power demonstrated clear intent in its application of the system and diligence in its upkeep. AMCL observes that attaining certification to the ISO55001 standard has clearly facilitated ongoing maturity development of Western Power's approach to asset management. Documentation for policies and procedures was both comprehensive and "useable", with few gaps observed. Where gaps were observed, they mostly (with some exceptions) tended to be around their currency and application as opposed to whether documentation was lacking for key asset management processes." [5]
>
> …
>
> "… Western Power were unable to effectively demonstrate that non-asset options were routinely considered, identified and appropriately investigated at the planning stages of project development. It was not clear that the concept of non-asset options was well understood or applied consistently. Western Power were unable to demonstrate that an effective Demand Management Policy, or framework was established and operating…
>
> …Western Power were unable to provide a consistent view on the application of lifecycle costing at network investment decision making level.
>
> The ability of Western Power to demonstrate how operational costs were factored into reinvestment decisions was not clear. There appeared to be limited policy and guidance around the costing principles to be used whilst evaluating life cycle costs. This should

[4] [Engevity] expect that this is mainly due to the ex-post review of historical investment under the WA regulatory framework. In comparison the incentive arrangements under the AER regulated businesses are designed to reward outperformance on both total CAPEX and total OPEX. They limit the scope for ex-post CAPEX reviews to material overspends of the total regulatory CAPEX allowance – which has generally been avoided by networks since the introduction of the possible ex-post review.

[5] AMCL, Western Power 2020 Asset Management System Review Report, Version: v4-0, 30 November 2020, Page 6 of 204.

include consideration of ongoing or escalating operational costs and risk costs associated with time view of investment.

In particular, no overarching documentation by way of a framework or guideline was able to be identified that provided guidance on the application of lifecycle costs in asset class strategies, options analysis, investment decisions, equipment procurement, or other decisions where this should be a consideration." [6]

Engevity reviewed the inputs and forecast outcomes or the asset management plans and made the following observations:

- The risk-based approach to asset management used by Western Power is consistent with the principles of good industry practice. Western Power has applied data driven methods and expert judgement to attempt to quantify the likelihood of failure events. The conversion of failures to consequences is built on historical data but forecast trends do not reasonably align with recent performance. Monetisation of the consequences has used industry recognised methods and references, however in the case of the financial analysis prepared for the AMI program, the VCR assumption of $50k/MWh is approximately twice the AER's most recent NEM residential average. The outcomes of the risk-based approach are prioritised and optimised using a process that engages appropriate subject matter experts and executive level management.
- The risk-based approach is data intensive. In a self-assessment Western Power has indicated gaps in underlying data are contributing to conservatism in asset management planning. This has been a persistent problem and it is unclear from the current submission the extent to which it will be resolved.

Based on Engevity's analysis and advice, the ERA considers Western Power governance and planning processes are generally good. However, application of the processes in some cases is lacking and some data (particularly in relation to the risk-based planning tools) requires improvement. The ERA considers this has particular implications for the assessment of forecast expenditure on new activities such as standalone power systems, the network renewal and undergrounding program and SCADA/IT expenditure.

In making its assessment of the level of expenditure for AA5 reasonably likely to meet the requirements of the new facilities investment test, the ERA has considered the level of historical expenditure, information provided by Western Power, stakeholder submissions and advice from Engevity.

The ERA has determined some of Western Power's forecast expenditure is not reasonably likely to satisfy the new facilities investment test. In addition, for some proposed investments further evidence is needed to demonstrate the forecast expenditure is reasonably likely to satisfy the new facilities investment test. The ERA has addressed the forecast capital expenditure for growth, asset replacement, improvement in service, compliance, SCADA and corporate services separately below.

Consistent with the approach taken by Western Power in its proposal, the forecast values are presented as direct capital costs – without indirect costs and labour escalation.

[6] AMCL, Western Power 2020 Asset Management System Review Report, Version: v4-0, 30 November 2020, Page 141 of 204.

5.1 Growth

Western Power's proposed growth capital expenditure is set out in Table 5 below.

Table 5: Western Power's proposed growth capital expenditure for AA5 – excluding forecast labour escalation and indirect costs (real $ million at June 2022)

Expenditure category	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5	AA4 actuals
Transmission network							
Capacity expansion	27.4	38.9	18.2	16.9	12.8	114.2	88.2
Customer driven	61.0	34.0	34.0	34.0	14.5	177.6	267.0
Total	88.4	72.9	52.2	51.0	27.2	291.7	355.2
Less contributions	(57.5)	(31.3)	(31.3)	(31.3)	(11.7)	(163.0)	(239.0)
Net capital expenditure	**30.8**	**41.7**	**21.0**	**19.7**	**15.6**	**128.8**	**116.2**
Distribution network							
Capacity expansion	34.0	24.3	19.1	21.7	18.4	117.5	59.5
Customer driven	95.0	95.0	95.0	95.0	87.9	468.0	457.2
Gifted assets	37.6	37.6	37.6	37.6	37.6	188.0	264.3
Total	166.6	156.9	151.7	154.3	144.0	773.4	781.1
Less contributions	(107.0)	(107.0)	(107.0)	(107.0)	(99.9)	(528.1)	(631.2)
Net capital expenditure	**59.6**	**49.9**	**44.7**	**47.3**	**44.0**	**245.4**	**149.9**
Total network							
Gross capital expenditure	255.0	229.8	203.9	205.3	171.2	1,065.1	1,136.3
Net capital expenditure	90.4	91.6	65.7	67.0	59.6	374.2	266.1

Source: ERA analysis of Western Power data

Western Power states that the transmission capacity expansion investment is focused on optimising against asset condition and regional strategies.

The transmission customer driven expenditure category comprises all the capital expenditure required to augment the transmission network to facilitate customer access or customer driven projects. In terms of access, this includes where customers seek to connect new facilities and equipment, increase consumption or generation at an existing connection point, or modify their existing facilities. Facilitating customer driven projects predominantly involves asset relocations.

For the distribution network, Western Power states that the number of over-utilised feeders is forecast to increase compared to previous years that had flat or negative growth in areas. Dependent on customer responses to hot weather events, it considers investment will be required to cater for load growth and avoid premature asset ageing. Additionally, Western Power expects to continue to see PV uptake on rooftops, resulting in a continued decline in

daytime minimum load that increases the probability of localised over-voltages and requires investment to mitigate the risk of non-compliance.

Distribution customer driven capex includes all work associated with connecting customer loads or generators, and the relocation of distribution assets at the request of a third party. Projects range from small residential connections (pole to pillar), through to network extensions to cater for large industrial customers. As this category of investment generally includes high volumes of low-cost works, Western Power considers historical expenditure tends to be a good indicator of future investment.

Several concerns in relation to growth expenditure were raised in stakeholder submissions:

- Alinta Energy supports the interim and 2050 emissions reduction targets but notes that without plans for investment in transmission capacity to enable the connection of large-scale renewable generation, these targets will be untenable, especially considering the long lead times of transmission infrastructure and generation projects. Alinta also notes that the access arrangement does not include a plan for the investments required to electrify transport. Alinta notes that Western Power mentions that hydrogen and sector coupling can help decarbonise hard to abate sectors but does not detail how the network would need to evolve to enable this.[7]
- The Australian Energy Council has expressed concern about the lack of transmission network augmentation to support large renewable projects. It notes that its consultant Marsden Jacobs Associates has recommended a review of Western Power's transmission planning process and giving consideration to significant network upgrades to support the creation of renewable energy zones in the North Country, East Country, and the Muja region to facilitate efficient grid connection of large-scale renewable generators and decrease the risk of congestion.[8]
- The Chamber of Minerals and Energy seeks further clarity on how Western Power plans to support the growth and decarbonisation requirements of large industrial consumers and generators on both the transmission and distribution network, particularly as companies seek to further electrify operations, and consider expansion opportunities or new connections.[9]
- Collgar Windfarm notes that even with declining operational demand, the location of that demand is likely to vary from current patterns. It also notes that renewable resource availability is an important factor in locating new facilities, which may not align with network availability. Given this, it states that it is foreseeable that investment in transmission infrastructure will be required to service new loads and generation facilities.[10]
- Synergy wanted further clarity on why there was an increase in capacity expansion expenditure. It notes the increase in transmission capacity expansion expenditure between the AA4 and AA5 periods and given Western Power's statement that it expects peak demand will fall over the AA5 period, it seeks to understand why Western Power is forecasting a pick-up in capacity expansion capex relative to that in AA4.[11]

The ERA's technical consultant identified issues with Western Power's demand forecasts and planning for growth.

7 Alinta Energy, 20 April 22, Public submissions on issues paper, p. 3.

8 AEC, 20 April 22, Public submissions on issues paper, pp. 3, 4, online.

9 The Chamber of Minerals and Energy of WA, 22 April 22, Public submissions on issues paper, p. 3.

10 Collgar Wind Farm, 20 April 22, Public submissions on issues paper, p. 3.

11 Synergy, 20 April 22, Target Rev and price control submission, Public submissions on issues paper, p. 61.

Engevity considered the near-term tasks to sustain the existing transmission network are robust but that long-term planning was less developed.

The ERA notes the Government has commenced a comprehensive assessment of electricity demand to inform future network requirements that will be undertaken ahead of the next Whole of System Plan, which is required by 2025.[12] If the Whole of System Plan identifies that significant expenditure is required before June 2027 the access arrangement can be re-opened.

In relation to the customer and demand forecasts Engevity considered:[13]

> Western Power's energy forecasts are driven by historical relationships – for example between energy consumption and economic activity, electricity prices, and substitution factors. However, this forecasting approach is not consistent with Western Power's proposal to undertake a network transformation program to respond to the major changes in its operating environment.
>
> Western Power has not adequately considered the 'structural changes' in demand, including the adoption of new technologies like EVs [electric vehicles] and battery storage, that are not reflected in the historical data. Other factors such as:
>
> - the expected size of newly installed solar PV [photovoltaic] systems, which has increased significantly over time, with 6-10kW systems typical and 13kW+ not uncommon. Five years ago, 3-7kW systems were typical. 10 years ago, 1.5kW systems were the norm.
> - the level of saturation of rooftop PV and other forms of DER within different areas of the network, for example, it is not plausible that penetration exceeds the number of residential buildings in the area.
> - the consumption behaviour of new customers, as compared to existing.
> - customers' response to new tariff structures being proposed by Western Power.
>
> also mean assuming historical relationships will largely continue through the AA5 and AA6 periods is clearly a flawed approach.
>
> For example, increasing uptake of behind-the-meter batteries and EVs is likely to offset some of the impact of the higher solar PV penetration that is driving lower minimum demand periods. This impact will be more significant if cost reflective pricing structures are implemented to smooth demand for consumption and export services as much as possible. Western Power proposes a very low, 'super off-peak' energy price for consumption to encourage more use of the network during periods when solar panels are exporting renewable energy to the grid.[14] By design, this will encourage customers to shift load to and charge their EVs during the middle of the day where they are able.
>
> Western Power proposes new investment to overcome minimum demand issues but does not account for the above factors, nor does it include sensitivity analysis. This is a significant error. The benefits of Western Power's proposed CAPEX will be overstated – all other things being equal.
>
> Further, Western Power's approach and input assumptions do not appear to:
>
> - align with AEMO's latest forecasts (2021 ESOO) of DER [Distributed Energy Resources] uptake (e.g., PV);
> - account for potential changes in the size of future PV systems (as compared to historical);

[12] Government media statement published 24 August 2022– Assessment of electricity demand to inform WA's future network.

[13] Engevity, August 2022, Western Power AA5 Expenditure Proposal Review Executive Summary, pp. 28-29.

[14] Western Power access arrangement proposal, Tariff Structure Statement Overview, Appendix F.1, p. 3.

- contemplate how the spatial take up of PV may change over time (relative to history).

Engevity noted the effect is unlikely to be material in the near term (< 5 years) but has implications for the asset management plans prepared for AA5 for long lived assets. Further, as noted in Attachment 1 on target revenue and Attachment 11 on network tariffs, updated demand forecasts are also required for tariff modelling purposes. The ERA expects Western Power to provide updated customer and demand forecasts with its response to the draft decision that address the issues identified.

As the proposed growth expenditure is at a similar level to AA4 actual expenditure, the ERA has not amended growth expenditure in the draft decision.

5.2 Asset replacement and renewal

Western Power's proposed asset replacement and renewal expenditure is set out in Table 6 below.

Table 6: Western Power's proposed asset replacement and renewal capital expenditure for AA5 – excluding forecast labour escalation and indirect costs (real $ million at June 2022)

Expenditure category	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5	AA4 actuals
Transmission asset replacement and renewal							
Primary plant	26.3	23.0	21.9	22.0	22.0	115.1	60.3
Protection	15.0	15.0	15.0	15.0	15.0	74.8	33.2
Power transformers	14.1	15.0	12.0	11.6	11.9	64.5	42.9
Switchboards	5.7	9.4	3.4	2.4	1.6	22.5	27.8
Other	2.5	0.0	3.7	4.2	5.8	16.3	40.3
Total	**63.5**	**62.4**	**55.9**	**55.1**	**56.2**	**293.2**	**204.4**
Distribution asset replacement and renewal							
Pole management	77.7	77.9	67.1	70.1	69.9	362.7	637.7
Asset replacement	119.7	107.7	80.3	67.6	66.1	441.5	402.5
Standalone power systems	51.9	53.2	52.4	62.3	63.5	283.3	38.2
Network renewal undergrounding program	70.5	97.8	138.4	137.8	138.9	583.4	12.6
Metering	60.9	59.0	65.6	58.2	53.4	297.0	159.6
Streetlights	10.0	10.0	10.0	10.0	10.0	49.9	50.4
Total gross capital expenditure	**390.7**	**405.5**	**413.8**	**406.0**	**401.8**	**2,017.9**	**1,301.1**
Less contributions	(27.3)	(35.5)	(45.5)	(54.4)	(56.4)	(219.2)	(76.5)

Expenditure category	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5	AA4 actuals
Total net capital expenditure	**363.4**	**370.0**	**368.3**	**351.6**	**345.5**	**1,798.7**	**1,224.6**
Total asset replacement and renewal							
Gross expenditure	454.2	467.9	469.7	461.1	458.0	2,311.1	1,505.5
Net expenditure	426.9	432.4	424.2	406.7	401.6	2,091.9	1,429.0

Source: ERA analysis of Western Power data

The proposed transmission asset replacement and renewal expenditure is $88.8 million (43 per cent) higher than actual AA4 expenditure. It includes increased expenditure for primary plant, protection and power transformers offset by reduction in switchboards and other.

The proposed distribution asset replacement and renewal net expenditure is $574.1 million (47 per cent) higher than actual AA4 expenditure. This is primarily due to programs related to transformation initiatives – standalone power systems, the network renewal undergrounding program and accelerating the rollout of advanced meters.

As discussed further below, the ERA does not consider all of the proposed asset replacement and renewal expenditure is reasonably likely to meet the new facilities investment test. The adjustments the ERA has made in the draft decision are set out in Table 7 below.

Table 7: ERA adjustments to proposed asset replacement and renewal capital expenditure – excluding forecast labour escalation and indirect costs (real $ million at June 2022)

	2022/23	2023/24	2024/25	2025/26	2026/27	Total
Proposed expenditure:						
Transmission	63.5	62.4	55.9	55.1	56.2	293.2
Distribution	390.7	405.5	413.8	406.0	401.8	2,017.9
Total	**454.2**	**467.9**	**469.7**	**461.1**	**458.0**	**2,311.1**
Adjustments						
Standalone power systems	(32.6)	(25.4)	(16.3)	(17.7)	(10.6)	(102.6)
Network renewal undergrounding program	(8.5)	(11.3)	(16.8)	(15.1)	(15.0)	(66.8)
Other asset replacement:						
Transmission	(18.5)	(18.2)	(16.3)	(16.0)	(16.4)	(85.3)
Distribution	(16.2)	(15.0)	(11.5)	(9.9)	(9.7)	(62.3)
Total	**(34.7)**	**(33.2)**	**(27.8)**	**(25.9)**	**(26.1)**	**(147.6)**
Draft decision:						
Transmission	45.1	44.2	39.7	39.1	39.9	207.9
Distribution	333.4	353.7	369.2	363.3	366.6	1,786.2
Total	**378.4**	**398.0**	**408.8**	**402.4**	**406.3**	**1,994.1**

Source: ERA analysis

The reasons for the ERA's adjustments are set out below.

5.2.1 Standalone power systems

Western Power states that, consistent with its Grid Strategy and Corporate Strategy, standalone power systems (SPS) will be deployed during the AA5 period where the SPS solution is determined to be the least cost solution over the long term, as an alternative option to replacing the overhead network.

It notes the deployment sequence for SPS targets sections of the network that have the optimal balance of asset deterioration and cost efficiency. As this solution is implemented, large geographical areas of overhead network will be decommissioned.

Western Power notes that SPS has a higher upfront cost in the period it is installed, however, it considers it is cheaper than traditional network over the lifetime. Western Power considers that, not only is this solution lower cost over the long term, but it also provides greater benefits for customers in both safety and reliability performance.

Western Power plans to transition 4,000 existing connection points to either SPS or proactive supply abolishment by 2031. Approximately 1,861 units or equivalent are scheduled for deployment in the distribution area over the AA5 period. This includes 1,630 SPS equivalents for the SPS program and 230 SPS equivalents to enable microgrids.

Western Power notes that cost efficiency will be facilitated through competitive tendering processes to select vendors for the provision of turnkey SPS solutions.

Western Power states the roll out of the SPS will be undertaken over several rounds, with each round of asset replacement addressing the network risk posed by the distribution overhead assets that are in deteriorated condition and which have been identified for replacement in the relevant asset strategy.

There were several stakeholder submissions on SPS:

- The WA Expert Consumer Panel strongly agreed with the strategy of a modular grid over time but considered that the business cases should be assessed in detail to ascertain whether a time delay would result in more optimal outcomes. For example, the ERA should consider if the overhead lines connecting the SAP need to be replaced today or in ten years' time, as this is critical for justifying the business case.[15]
- Synergy's view is that it is essential WP test the contract market to determine whether operating cost provision of SPS solutions can be delivered at a lower cost than WP capex solutions.[16]
- Perth Energy's submission suggested that SPS should be regularly reviewed to assess whether the capital outlays can be justified based on savings gained during the AA5 period. If the savings are longer term, then perhaps the programs should be slowed or deferred as part of holding down prices through the coming five years.[17]
- The AEC's view is that:
  - Standalone power systems should only be installed in parts of the network where it is cheaper than maintaining the existing network.

[15] WA Expert Consumer Panel, 29 April 22, Attachment 1, Public submissions on issues paper, p. 12.

[16] Synergy, Target Rev and price control submission, 20 April 22, Public submissions on issues paper, p. 63.

[17] Perth Energy, 20 April 22, Public submissions on issues paper, p. 61.

  - The focus should be on minimising the forward-looking costs and not on historical investment costs. Even if standalone power systems are cheaper than maintaining the existing network they should not be installed if the assets they replace have not been fully depreciated and need to be written down.
  - Competition should be encouraged in the provision of stand-alone power systems and the ERA should closely scrutinise the installation of the standalone power systems to ensure that Western Power undertakes a competitive tendering process to select vendors.[18]

- Change Energy supports any initiative that reduces the cost of supply of electricity sustainably over the long term. However, it does not consider Western Power has adequately demonstrated that disconnecting customers from the network, and creating smaller, disconnected networks is in fact in the long term interests of end use consumers. Change Energy recommends the ERA seeks an economic assessment of Western Power's proposed network strategy, together with the alternative options considered. In particular, Change Energy expects Western Power to fully consider and calculate the costs and benefits of building out the network constraints, and present an unbiased comparison against a similar cost benefit analysis of the modular network. Given the potential cost and implications of making such a dramatic shift in network strategy, Change Energy considers a robust business case, tested with stakeholders, is a reasonable prerequisite.[19]
- Collgar generally supports the approach to transition to a modular network as it provides the most cost-effective solution to meet future requirements. However, Collgar has concerns about Western Power's proposed execution approach.[20]
- The Australian Microgrid Centre of Excellence considered it is questionable whether the number of SPS systems being proposed for this Access Arrangement Period represent value for money to WA consumers. It considered the development of microgrids proper would unlock economies of scale when compared to the large number of SPS systems being proposed in locations adjacent on the grid. It is unclear how Western Power is planning the actual transition to a hybrid network in regional areas in WA.[21]

The ERA's technical consultant considered that the standalone power system program is justified in principle but had concerns around the deliverability and efficiency of the proposed investment:

- The proposed expenditure has not been demonstrated to be efficient due to comparatively high unit costs for the SPS units and lack of evidence that SPS's currently offer a more cost-effective solution for supply to customers than like-for-like replacement of overhead distribution network assets.
- A reasonable range of alternative options has not been considered for the proposed investment. Engevity has not been provided with sufficient information, such as net present value (NPV) models and options assessments, to be confident that Western Power has undertaken options analysis for autonomous overhead distribution replacement that has considered the costs, risks and benefits of all options. The information provided had not shown that the scope and timing of the AA5 proposed SPS program is the most efficient solution to providing reliable, high quality supply to its customers.

[18] AEC, 20 April 22, Public submissions on issues paper, p. 3.

[19] Change Energy, 20 April 22, Public submissions on issues paper, p. 3.

[20] Collgar Wind Farm, 20 April 22, Public submissions on issues paper, p. 3.

[21] Australian Microgrid Centre of Excellence, 20 April 22, Public submissions on issues paper, p. 2.

- Western Power engaged Mainsheet Capital over two phases to quantify the potential costs and benefits of the SPS program, with phase two being completed in February 2021. In phase one, Mainsheet Capital found that a 30 year SPS program to transition 6000 connections had the lowest net present cost (NPC) of the options assessed. In phase two, Mainsheet Capital set out options to improve the efficiency of the SPS program, including potential justifications for an accelerated program. In Mainsheet Capital's words:[22]
  - Aggressive assumptions need to be applied to justify SPS acceleration from a financial perspective. If more conservative assumptions are applied, a longer transition timeframe is likely to be optimal, whilst actively continuing to progress cost reductions and supply abolishment.
- Engevity has found systemic issues with Western Power's approach to asset and risk management resulting in potential premature replacement of network assets. Engevity views this as further reason to reduce the scope of AA5 SPS investment such that Western Power can demonstrate a more robust approach to identifying efficient areas of the autonomous distribution network to replace with SPSs when proposing further investment in AA6 and beyond.
- Overall, Engevity found the SPS program is not cost efficient due to high unit costs and lack of evidence that SPSs currently offer a more cost-effective solution for supply to customers than like-for-like replacement of overhead distribution network assets. Engevity's concerns with the cost efficiency of the AA5 SPS program can be grouped into three categories:
  - SPS base unit costs are very high considering the components involved and compared to similarly sized SPS units available on the retail market.
  - Per customer costs for SPS customers not evidenced to be less than current costs based on Western Power's cost to serve (CTS) metric.
  - No evidence has been provided that the cost of AA5 SPS program is materially recovered from reduced distribution replacement costs or other benefits in AA5 or beyond.

The ERA agrees standalone power systems are a prudent long term transition strategy for the rural network but considers the proposed number of units is overly ambitious and risks the realisation of cost inefficiencies. On that basis, the ERA does not consider the proposed expenditure is reasonably likely to meet the requirements of the new facilities investment test.

As set out in Table 7, the ERA has reduced expenditure for standalone power systems by $102.6 million. The adjusted capital expenditure is based on 1,010 installations over AA5 compared with Western Power's proposal of 1,861.

The ERA has not reduced Western Power's proposed unit costs in the draft decision. As identified in Engevity's report, the proposed unit costs are high compared to similarly sized units available on the retail market. However, the costs are not well understood at this point. The reduction in the number of standalone power systems provided for in the draft decision will enable realisation of learning and technology cost efficiencies. This applies to both the cost of the standalone power systems and the ability to identify parts of the network where it is more efficient to replace overhead lines with standalone power systems.

The adjustment to expenditure reflects concerns about the deliverability and efficiency of the proposed level of expenditure. However, the ERA recognises the standalone power program

[22] Mainsheet Capital, Feb 2021, Phase two: Portfolio Benefits Evaluation, p. 22.

is integral to Western Power's strategy to address the transformation. Consequently, standalone power expenditure will be subject to the Investment Adjustment Mechanism.

The Investment Adjustment Mechanism ensures that, if Western Power can scale up efficiently during AA5, the target revenue for AA6 will be adjusted to reflect the additional investment. It also ensures that if Western Power does not deliver its program target, revenue for AA6 will be adjusted to reflect the underspend. This provides Western Power with the flexibility to focus activity and expenditure during AA5 to meet the challenges of the sector's transformation whilst protecting customers from incurring costs if the programs are reduced during AA5.

Actual expenditure during the AA5 period will be subject to an ex-post review at the next access arrangement review. Western Power will need to demonstrate that its actual unit costs are least cost and that it has only installed standalone power systems where it is more efficient to do so than maintain the overhead network. If Western Power cannot demonstrate this, it will not be permitted to recover the costs from customers through network tariffs.

5.2.2 Network Renewal Undergrounding Program

The Network Renewal Undergrounding Program (NRUP) involves the targeted conversion of overhead areas to underground power. These projects are proposed for areas in the meshed urban network where:

- the overhead assets are deteriorated and require replacement, and
- underground replacement presents a comparable cost to a like for like overhead replacement.

Where a funding gap in proposed projects is identified, Western Power states it will seek to underground the network through financial partnerships with local communities (via the relevant local governments).

Western Power considers the need for this investment is driven by a significant part of the metropolitan overhead network reaching the end of its service life. Western Power states it will invest in undergrounding only where it makes economic sense. Customers' willingness to pay any incremental costs (the capital contribution) will be determined on a case-by-case basis for each area, in consultation with the relevant local government. Project selection will take into account the required contribution from local governments to ensure external requirements are satisfied. Where the incremental cost is not supported by the local government or the community, the undergrounding project will not proceed and an alternative risk mitigation solution will be implemented.

Stakeholder submissions included the following comments:

- The WA Expert Consumer Panel's experience is that undergrounding costs can be 5 to 10 times higher than overhead construction. While the costs are being shared with councils, the panel is concerned that WA citizens may be paying too high a price for undergrounding.[23]
- WALGA understood the many positives that undergrounding brought but noted that the ratepayer contribution was increasing.[24]

[23] WA Expert Consumer Panel, 29 April 22, Attachment 1, Public submissions on issues paper, p. 12.

[24] WALGA, 20 April 22, Public submissions on issues paper, p. 9.

- The Australian Energy Council considered the undergrounding expenditure should be justified as the least cost solution, otherwise work should be deferred.[25]

The ERA's technical consultant advised that Western Power experienced significant cost and delivery time over-runs during the AA4 period due to inaccurate scoping estimates of costs, local council challenges to deliver multiple projects, local government approval processes and contractor pricing and availability issues.[26]

The ERA considers that, although the NRUP could be a prudent management approach to overhead network renewal, the magnitude of the scale up raises deliverability concerns. Deliverability encompasses both the ability to undertake the works required and that the relevant council is able to pay the contribution needed. Information provided by Western Power on potential undergrounding projects indicated undergrounding would be more costly than like for like replacement in most cases and a contribution would be required. There were significant local government and contractor constraints in AA4 that would need to be overcome to deliver the proposed significant uplift in the size of the proposed program. On that basis, the ERA does not consider the proposed expenditure is reasonably likely to meet the requirements of the new facilities investment test.

As set out in Table 7, the ERA has reduced expenditure for the NRUP by $66.8 million. This adjustment brings the proposed expenditure in line with actual expenditure during AA4 on undergrounding.

The adjustment reflects concerns about the deliverability of the proposed level of expenditure. However, the ERA recognises the NRUP is integral to Western Power's strategy to address the transformation so has made the NRUP expenditure subject to the Investment Adjustment Mechanism similar to standalone power system expenditure.

5.2.3 Metering

Western Power commenced deployment of advanced meters in 2019.[27] An estimated half a million advanced meters will be installed by June 2022 with a further 795,130 scheduled to be installed during the AA5 period.

Western Power considers advanced meters play a key role in a range of emerging network requirements which require increased visibility (and potentially control) of the distribution network. It considers advanced meters are a critical enabler for the effective integration of DER, solutions for mitigating the risk of low load, flexible tariffs and allowing customers to actively participate in the energy market.

Western Power has proposed to accelerate its advanced metering program so that most customers will have an advanced meter by the end of AA5. Under its business-as-usual approach (i.e. installing advanced meters in new properties, meter replacements and meter exchanges initiated by customers) most properties would have an advanced meter by the end of AA6 (2032). The proposed acceleration will bring that date forward by five years to 2027.

Western Power's business case for the accelerated advanced metering program indicated the incremental capital expenditure for acceleration was $115. 6 million and that the difference in net present cost when comparing full deployment by 2027 (based on the accelerated program)

[25] AEC, 20 April 22, Public submissions on issues paper, p. 8.

[26] Engevity, August 2022, Western Power AA5 Expenditure Proposal Review Executive Summary, p. 13.

[27] Western Power describes advanced meters as being digital meters with a communication device installed. Western Power states the advanced meters can automatically and remotely read electricity flows and provide early detection of connection faults and supply issues including power quality data, voltage and current levels and how much renewable energy is being fed back into the network.

and 2032 (based on business as usual) is $21 million. The business case described benefits that would arise from acceleration but did not include quantification of such benefits.

The ERA's technical consultant considered Western Power had not justified the benefits of accelerating the advanced metering program and that it had included contingency allowances in its cost estimate. The consultant was also concerned that Western Power would not be able to deliver the full program during AA5.

Given the relatively small difference in net present cost terms and time-period, the ERA's draft decision has included the accelerated metering costs. However, this is subject to Western Power quantifying and demonstrating the benefit of the acceleration in its response to the draft decision, removing any contingency allowance and demonstrating that it will be able to deliver the program in AA5.

5.2.4 Other asset replacement and renewal

As discussed above, a large part of the increase in proposed asset replacement and renewal compared with actual AA4 expenditure is due to expenditure for standalone power systems, NRUP and accelerating the rollout of advanced meters. In relation to the remaining asset replacement and renewal expenditure, the ERA's technical consultant's analysis suggests the need for asset replacement has been overstated and that assets are being replaced earlier than required.

Similar views were expressed by the WA Expert Consumer Panel's consultant, Dynamic Analysis, who considered that the level of replacement expenditure increase is very high for distribution assets, and the replacement rate appears to be higher than networks in the NEM. Evidence of prioritisation based on risk quantification was not observed and Dynamic Analysis considered there may be opportunities to 'sweat assets' which have low consequences of failure.[28]

The ERA's technical consultant's advice included the following points:[29]

- Western Power uses a risk-based approach to determine when assets require replacement, balancing criticality and condition and basing decisions on risk reduction and whole of lifecycle costs.
- [Engevity is] concerned about Western Power's approach to risk management and the identification of assets to be replaced. From the information provided, [Engevity] found Western Power's risk and failure volume forecasting algorithms consistently output increasing asset risk and failure volumes on almost every transmission and distribution asset category. This is not consistent with the experience of other networks in which each asset class follows different failure curves that range between a propensity for early failure, increasing end of life failures and relatively constant failures over an asset's life. Whist [Engevity] were not provided with the models or details of the algorithms, the outputs of the modelling suggest that asset aging significantly outweighs condition information in the calculation.

Engevity analysed the trends in forecast failure rates and how the actual failures for each asset class compared to Western Power's asset management targets. Its key findings included:[30]

[28] WA Expert Consumer Panel, 29 April 22, Attachment 1, Public submissions on issues paper, p. 12.

[29] Engevity, August 2022, Western Power AA5 Expenditure Proposal Review Executive Summary, p. 14.

[30] Engevity, August 2022, Western Power AA5 Expenditure Proposal Review Attachments, pp. 285, 286.

- Failure rates without Western Power network intervention are expected to increase over almost all Tx and Dx asset classes. In some cases, the failure rates are expected to double or more.
- As of June 2020, most asset classes were experiencing actual failure rates at or below Western Power's asset management targets. This suggests there is no imminent need for asset replacements to occur across most asset classes, yet Western Power's proposed REPEX across both transmission and distribution is relatively flat across AA5.

> Engevity recognises that accurate failure and risk forecasting is a difficult task, however the field experience of actual failure rates and failure trends should outweigh expert assumptions and the output of predictive tools used by networks. In most cases, assets degrade gradually, and periodic inspections will identify and prioritise emerging issues. Where inspections are occurring, defect rates are stable, failure rates are stable and field condition is reported as sound, there is little reason to expect a step change in replacement requirements other than factors such as common issues affecting a certain type of asset. Even so, in cases where the failure mode is not inherently dangerous or the reliability value of the asset is low, assets could remain in service until failure, inspection defects, or demonstrable economic obsolescence render them unserviceable. This approach will tend to maximise the life of assets and minimise the cost to customers as the value provided by older, fully depreciated assets is maximised. These operational practices can be coupled with properly calibrated predictive tools to further refine the forecasting approach – indeed that is what most network businesses do.

Consequently, Engevity considers that Western Power's risk management algorithms that inform the asset replacement programs are underestimating asset condition and therefore overstating the scope of replacement required.

Engevity recommended:[31]

> … an overall adjustment to the total proposed replacement expenditure for transmission and distribution to align it with actual expenditure incurred in AA4. This is supported by the fact that Western Power's AA4 expenditure has been found sufficient to meet it network performance requirements and to maintain a level of safety and reliability that is high enough such that customers are content and, on the whole, do not value additional investment to improve these levels.

Based on the advice of its consultant, the ERA does not consider the proposed asset replacement and renewal expenditure is reasonably likely to meet the new facilities investment test. As set out in Table 7, the ERA has reduced the proposed transmission and distribution asset replacement and renewal expenditure by $85.3 million and $62.3 million respectively in line with Engevity's recommendation.

5.3 Compliance

Transmission - compliance

Western Power's proposed transmission compliance capital expenditure is set out in Table 8 below.

[31] Engevity, August 2022, Western Power AA5 Expenditure Proposal Review Attachments, p. 291.

Table 8: Western Power's proposed transmission compliance capital expenditure for AA5 – excluding forecast labour escalation and indirect costs (real $ million at June 2022)

Expenditure category	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5	AA4 actuals
Poles & towers	9.3	9.3	9.3	9.3	9.3	46.3	52.4
Substation security	6.9	6.7	6.7	6.7	4.8	31.8	21.3
Substation building upgrades	4.8	2.3	2.3	2.3	2.4	14.0	4.3
Cables	1.5	4.0	6.5	2.0	0.0	14.0	0.0
Cross-arm replacement	1.9	1.9	1.9	1.9	1.9	9.3	7.4
Transformer compliance	2.1	1.5	1.1	1.0	1.0	6.7	11.1
Other	9.7	11.2	12.0	3.8	2.2	38.9	9.5
Total capital expenditure	36.1	36.8	39.7	26.9	21.5	161.0	105.9

Source: ERA analysis of Western Power data

The forecast investment is $55.1 million more than that incurred during the AA4 period. The increase in transmission compliance capex during the AA5 period is due mainly to increases in transmission cable compliances and other transmission compliance (such as asbestos removal and substation security).

The proposed expenditure relates to compliance requirements and obligations. The ERA's technical consultant has not recommended any adjustments. While the ERA notes that the expenditure proposed by Western Power for AA5 is 52.1 per cent higher than the AA4 actual expenditure, it recognises that the actual expenditure in AA4 was ~34 per cent lower than forecast due to reprioritisation to deal with unexpected transformer issues and substation security improvements being delayed.[32,33] The ERA also recognises the dynamic environment that Western Power needs to deal with in relation to grid stability. As such, the ERA considers the proposed expenditure would reasonably be expected to meet the requirements of the new facilities investment test.

Distribution - compliance

Western Power's proposed distribution compliance capital expenditure is set out in Table 9 below.

[32] Western Power, Feb 2022, AAI – Attachment 5.1 – AA4 Capital Expenditure Report, p. 22.

[33] Western Power, Feb 2022, AAI – Attachment 8.1 – AA5 Forecast Expenditure Report, p. 37.

Table 9: Western Power's proposed distribution compliance capital expenditure for AA5 – excluding forecast labour escalation and indirect costs (real $ million at June 2022)

Expenditure category	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5	AA4 actuals
Bushfire management	2.6	2.4	2.3	2.3	2.3	12.0	10.3
Pole management	18.0	18.2	17.6	17.8	17.9	89.4	54.1
Reliability compliance	8.5	6.7	8.1	7.9	7.3	38.6	14.8
Power quality compliance	3.8	5.0	5.0	5.1	5.1	23.9	16.5
Conductor management	3.1	3.1	3.1	3.1	3.1	15.5	9.3
Connection management	4.5	4.5	4.6	4.6	4.7	22.9	43.2
Other distribution compliance	2.6	2.6	2.8	2.5	2.5	12.9	6.9
Total	43.1	42.5	43.5	43.2	42.8	215.2	155.1

Source: ERA analysis of Western Power data

The major distribution compliance programs for the AA5 period include:

- bushfire management: focused on mitigating the risk of overhead conductors coming into contact with each other (conductor clashing) and causing either conductor failure, damage to the conductor or causing sparks that could lead to ground fires. It includes, proactively installing LV spreaders on bays that are likely to clash, proactively treating spreader defects and reactively treating HV and LV bays that have clashed in service
- pole management: covers the replacement of cross arms, insulators and stays that support the overhead infrastructure. Failure of these assets may lead to range of adverse safety impacts including ground fire, electric shock, physical injury and property damage, as well as service disruption. The objective of this expenditure is to maintain safety & reliability at historical AA4 levels. Western Power states the proposed expenditure is required to address:
  - deteriorating stay performance & condition
  - high proportion of cross arm failures in metro and urban areas with high public exposure
  - assisted and unassisted failures of insulators requiring reactive replacement
- reliability compliance: covers projects to address locations with reliability performance well below the network category average and below the specified minimum service standards under the Access Code. Western Power submits increased expenditure in AA5 is required to meet service standard benchmark requirements, which emerged in the later part of the AA4 period.
- power quality compliance: covers investment to address customers' power quality related complaints. These complaints typically stem from issues such as over voltage, undervoltage, overloading, voltage imbalance and harmonics on the LV network
- connection management: covers the replacement of overhead customer service connections (OCSCs) that have failed or are in poor condition as identified through

routine inspections or through service connection condition monitoring (SSCM) using AMI. This expenditure also covers underground residential distribution (URD) pillars that are replaced under failure conditions and the maintenance of cable pits located in road reserves. Western Power notes service connections are the largest contributor to electric shock counts on the distribution network. It considers the use of SSCM via AMI has been established as a prudent option to monitor and manage the electric shock risks posed by service connections. Investment in this technology in conjunction with the continuation of the AMI program has allowed Western Power to reduce expenditure required to manage public safety relating to service connections (also refer to notes under AMI for further context).

The proposed expenditure relates to compliance requirements and obligations. The ERA's technical consultant has not recommended any adjustments.

While the ERA notes that the expenditure proposed by Western Power for AA5 is 38.8 per cent higher than the AA4 actual expenditure, it is required to meet reliability and compliance obligations. The largest increase in proposed expenditure from AA4 levels is in the reliability and pole management compliance subcategories, which are focus areas for Western Power to improve service standards. On that basis, the ERA considers the proposed expenditure would reasonably be expected to meet the requirements of the new facilities investment test.

5.4 SCADA and corporate ICT

Western Power's proposed SCADA and telecommunications capital expenditure and corporate ICT expenditure is set out in Table 10 below.

Table 10: Western Power's proposed SCADA and corporate ICT capital expenditure for AA5 – excluding forecast labour escalation and indirect costs (real $ million at June 2022)

	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5	AA4 actuals
SCADA and telecommunications							
Asset replacement	34.5	34.2	26.7	31.5	34.2	161.2	77.5
Master station and operating system	19.4	16.6	26.0	24.5	26.5	112.9	64.0
Compliance	8.2	12.2	19.7	20.5	19.9	80.4	13.9
Other	9.9	9.4	11.9	13.6	13.8	58.6	41.0
Total SCADA and telecommunications	**72.0**	**72.4**	**84.3**	**90.1**	**94.4**	**413.1**	**196.4**
Corporate ICT	60.9	66.4	65.8	72.7	66.9	332.8	255.9
Total SCADA and corporate IT	**132.9**	**138.8**	**150.1**	**162.8**	**161.3**	**745.9**	**452.3**

Source: ERA analysis of Western Power data

Western Power's SCADA and Telecommunications assets provide the services required to protect, operate, and manage the Western Power Network and the WEM. The SCADA and telecommunications system is comprised of:

- The SCADA master station – operated from the control centre from where Western Power centrally operates and manages the transmission and distribution networks.
- Substation SCADA and distribution automation – field monitoring and control of electronic equipment to operate plant and equipment at every substation (as well as across overhead and underground distribution networks).
- The telecommunications network – providing the voice and data infrastructure required to transfer information between the electricity network, substations, depots and the control centre.

Corporate ICT covers investment in various enterprise systems used by Western Power as well as investment in core IT infrastructure including computers, operating systems and desk top applications.

Western Power states that the SCADA and Telecommunications network has grown and evolved over the past 40 years through a combination of technological advancement and because of organic growth and augmentation of Western Power's networks. However, the infrastructure deployed during the 1980s was mainly analogue and now needs to be upgraded to integrate with the digital network.

Western Power considers much of the early digital technology is also at the end of its useful life or is no longer compatible with current requirements. It notes that, in general, the mean replacement life of SCADA communications assets is about one-third that of transmission and distribution assets, so SCADA assets need to be renewed approximately three times during the life span of these other assets.

Western Power states that its SCADA and Telecommunications network has historically been maintained on a reactive basis. It considers it has now reached the point where technical obsolescence has become an issue for almost 70 per cent of SCADA assets, meaning that support for the assets is becoming increasingly difficult to source. Western Power considers the condition of the SCADA and Telecommunications network has also affected the reliability of those assets, with most operating will below their target availability.

Forecast capital expenditure on corporate ICT during the AA5 period is split between infrastructure and maintenance (34 per cent) and business driven (66 per cent), covering network planning and asset management, growth, corporate and customer.

Western Power has established IT programs of work for the AA5 period to deliver the following goals:

- Infrastructure: to build a flexible and responsive infrastructure capability, focused on continuous improvement and improving productivity for Western Power's technology investment
- Applications: maintain currency of IT applications within vendor support parameters to leverage new and updated technology capabilities that deliver operation improvements and lower costs
- Cyber Security: contain cyber security risk within Western Power's corporate risk appetite by achieving an improved cyber security Maturity Indicator Level (MIL) across Australian Energy Sector Cyber Security Framework domains, and consider additional amendments proposed to the *Security of Critical Infrastructure Act 2018* (Cth).

Stakeholder submissions included the following matters relevant to SCADA and telecommunications expenditure and corporate ICT expenditure:

- The Chamber of Minerals and Energy recommends further information is shared regarding the relative benefits of the proposed level of investment (e.g. 110 per cent increase) in SCADA and Telecommunication and any analysis of the supporting business case against alternatives, such as increasing the level of investment in transmission infrastructure. It also seeks to understand what provisions have been employed to mitigate risks of rapidly changing technologies rendering assets obsolete or unsupported.[34]
- Synergy is concerned whether all the SCADA expenditure meets the criteria of expenditure for covered services. They seek clarity as to the extent to which some of WP's investment program is proposed to support WEM reforms, given that the WEM reform activities may require significant investment in SCADA and communications systems.[35]
- Perth Energy notes the proposed expenditure of around $500 million on SCADA and the telecommunications network. Around 40 per cent of this is stated as being required to replace equipment that is obsolete or unsupported. It is important that expenditure of the remaining $300 million is task-driven rather than technology-driven. That is, this sum is necessary to continue providing long term cost reductions to customers rather than being nice-to-have.[36]
- The Australian Energy Council submits that Western Power is proposing to update its SCADA and Telecommunications network during the AA5 period to support the digital network and enable the integration of distributed energy resources. Western Power say that this investment will enable the introduction of new and emerging technologies. The AA5 proposal includes $483.4 million of capital expenditure of which only $188.4 million is needed to replace equipment that is obsolete and unsupported. Given the uncertainties of the future electricity system and the possibility of a large amount of additional costs during AA5, the AEC encourages the ERA to consider whether the full SCADA upgrade is necessary at this time or if a portion of the proposed SCADA works can be delayed limiting some of the price increases during the AA5 period.[37]
- Alinta Energy is concerned by the proposed increase in capex net of asset replacement costs, especially on SCADA and IT infrastructure, and its effect on customers. They consider that it is not clear whether this expenditure has a business case and would be in the long-term interest of customers per the ENAC objective. Further, they note that the equipment's short asset life, and flow-on effects to operating costs amplify the costs to customers. Finally, Alinta Energy questions whether the significant capex allocated to introducing more "sophisticated operating systems to enable increasing levels of renewable and distributed energy resources" as part of the "modular network", and "support orchestration of DER" would be efficient.[38]
- The AEC notes that IT costs are forecast to significantly increase during the AA5 period. Western Power's proposal shows that IT capex will jump 32.2 per cent from $251.8 million in AA4 to $332.8 million in AA5. The majority of this investment is in various enterprise systems used by Western Power. This is a substantial increase in capex that needs to be justified. If any portion of this IT capex is not necessary at this time then it is suggested that the expenditure is delayed. The AEC also notes that if so many systems are replaced in one period, then it is likely they will be due for replacement in another single period in 10 to 15 years.[39]

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34 The Chamber of Minerals and Energy of WA, 22 April 22, Public submissions on issues paper, p. 3.

35 Synergy, 20 April 22, Target Rev and price control submission, Public submissions on issues paper, p. 63.

36 Perth Energy, 20 April 22, Public submissions on issues paper, p. 4.

37 AEC, 20 April 22, Public submissions on issues paper, p. 8.

38 Alinta Energy, 20 April 22, Public submissions on issues paper, p. 1.

39 AEC, 20 April 2022, Public submissions to Issues paper, p. 9.

- Change Energy notes that cyber security has become a significant risk in the energy industry, in particular with an increase in remote operations[40] such as remote disconnections. The upgrades proposed by Western Power appear prudent, but Change Energy submits that it has seen, across the industry, IT projects are prone to scope creep and cost blowouts. Change Energy recommends the ERA satisfies itself that the proposed costs are market tested and reflect a prudent scope of works.[41]
- Perth Energy notes the emphasis being placed on cyber security and supports this. The move to advanced metering means that cyber security will need to include protection of metering data being transferred from customers. The cyber implications of remotely curtailing output of domestic solar PV systems will also need to be considered. However, Perth Energy does not want "safety issues" to be used as justification for any over-expenditure. All expenditures should be based on the need to meet real issues and to comply with legislative obligations.[42]
- WA Expert Consumer Panel's consultant Dynamic Analysis notes that ICT has the greatest impact on short term prices. It considered that only projects with maximum value should be approved.[43]

The ERA's technical consultant provided the following advice:[44]

- Western Power is forecasting a significant increase of 73 per cent in ICT program actual expenditure from AA4 or 171 per cent increase on the approved expenditure in the same period.
- [Engevity] recognise and support the intent of Western Power's ICT strategy as well the moderate increase in the volume of works delivered by Western Power to date in AA4. However, we consider the scale of the AA5 ICT program is excessive and not adequately justified. Most notably, there is an absence of a clearly defined scope for the program that is aligned to identified network needs beyond the assertion that systems need to be modernised or need replacement once they are no longer supported by the vendor. There is also a clear issue that the accelerated timing of the current ICT program and increased expenditure is not aligned with a prudent and cost-efficient approach to electricity network ICT delivery and it is not clear how this acceleration minimises costs to customers. For example:
  - [Engevity's] review found that assets are forecast to be replaced on a conservative asset age basis, rather than an actual asset condition or risk basis. Western Power has not demonstrated that ICT cost forecasts have been estimated with reference to efficient industry benchmarks or comparable implementations of major ICT systems in other networks. These are fundamental market assessment measures that would have clearly highlighted that the scale of the program is excessive for an Australian network.
  - [Engevity] also found that the acceleration of SPS and AMI deployment was not supported and is reasonably expected to face deliverability issues over AA5. The associated adjustment to these programs reduces the need and timing for some of Western Power's ICT capex program.
  - The Project Symphony trials are still at an early stage and Western Power should not pre-empt this project's findings by including substantial expenditure for large scale implementation. Should further expansion of Project Symphony

40 For example, an increase in the use of remote disconnections increases the risk of a cyber-attack resulting in the disconnection of a significant number of connections in the SWIS.

41 Change Energy, 20 April 22, Public submissions to Issuer paper, p. 5.

42 Perth Energy, 20 April 22, Public submissions to Issuer paper, p. 6.

43 WA Expert Consumer Panel, 29 April 22, Public submissions to Issuer paper, Attachment 1, p. 12.

44 Engevity, August 2022, Western Power AA5 Expenditure Proposal Review Executive Summary, pp.15-16.

be required, the system would likely provide benefits that are partially, or completely funded out of OPEX and capex efficiencies. Noting Western Power's demonstrated ability to reprioritise its AA4 network replacement program to accommodate over $180 million of SCADA additional investment beyond the level approved by ERA for AA4, [Engevity] consider that there is sufficient flexibility in the overall capex portfolio to manage both network risk and prioritise emergent ICT capex needs.

- Western Power has not demonstrated the capability and resources to deliver its proposed ICT program for the AA5 period in a cost-efficient manner – especially given the scale of approved expenditure overruns experienced in AA4. Whilst [Engevity] recognise the need for investment in ICT systems to support the network transformation strategy, it is critical that they are delivered in an efficient manner to ensure that the substantial investment in ICT systems delivers the expected benefits for customers whilst managing costs within the business case forecast that was justified by those benefits.

The ERA has considered the information provided by Western Power, Engevity's advice and stakeholder comments and notes the following:[45]

- A clear case that reliability is falling below acceptable levels due to obsolescence and non-compliance of IT, SCADA and Communication assets has not been made. Engevity points to the Network Management Plan[46] which shows a relatively flat historic availability of SCADA and Telecommunication networks and forecasts an increase in reliability for CBD automation in the future.
- Engevity notes there is limited evidence of business case/investment evaluation plans for the total AA5 SCADA and ICT investment program.
- Engevity's benchmarking study shows that Western Power's forecast is significantly higher than other regulated networks.
- Engevity has found systemic issues with Western Power's approach to asset and risk management. Engevity notes that mean replacement age (MRL) is heavily relied on as the indicator of replacement need for an asset, not the asset's current condition or performance.[47] This may mean that some ICT assets may be considered for replacement prematurely.

Taking account of these issues and Engevity's advice, the ERA does not consider the proposed expenditure for SCADA and telecommunications and corporate ICT is reasonably likely to meet the new facilities investment test. Based on the benchmarking and other analysis provided by Engevity, the ERA considers the proposed expenditure should be reduced by $223.7 million in total as set out in Table 11 below. The ERA considers the draft decision does includes sufficient expenditure to allow Western Power to comply with its cyber security requirements. If Western Power considers additional funds are needed to ensure cyber security, it can provide details and evidence to support this in its response to the draft decision.

45 Ibid, pp. 304 -318.

46 AAS - Attachment 8.2 - Network Management Plan, pp. 317-319.

47 Western Power, 2021, Distribution Structures Asset Management Strategy, p. 10.

Table 11: ERA adjustments to Western Power's proposed SCADA & telecommunications expenditure and corporate ICT expenditure - excluding forecast labour escalation and indirect costs (real $ million at June 2022)

	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5
Proposed expenditure:						
SCADA & telecommunications	72.0	72.4	84.3	90.1	94.4	413.1
Corporate ICT	60.9	66.4	65.8	72.7	66.9	332.8
Total	132.9	138.8	150.1	162.8	161.3	745.9
Adjustments:						
SCADA & telecommunications	(21.6)	(21.7)	(25.3)	(27.0)	(28.3)	(123.9)
Corporate ICT	(18.3)	(19.9)	(19.7)	(21.8)	(20.1)	(99.8)
Total	(39.9)	(41.6)	(45.0)	(48.8)	(48.4)	(223.7)
Draft decision						
SCADA & telecommunications	50.4	50.7	59.0	63.1	66.1	289.2
Corporate ICT	42.6	46.5	46.1	50.9	46.8	233.0
Total	93.0	97.2	105.1	114.0	112.9	522.2

Source: ERA analysis

5.5 Corporate

Western Power's proposed corporate capital expenditure is set out in Table 12 below.

Table 12: Western Power proposed corporate capital expenditure for AA5 - excluding forecast labour escalation and indirect costs (real $ million at June 2022)

Expenditure category	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5	AA4 actual
Business support	22.7	34.6	53.7	9.7	9.7	130.5	221.2
ICT	60.9	66.4	65.8	72.7	66.9	332.8	255.9
Total capital expenditure	83.6	101.1	119.5	82.5	76.7	463.3	477.1

Source: ERA analysis of Western Power data

The business support category includes expenditure on corporate real estate and property plant and equipment.

Forecast investment in corporate real estate is focused primarily on the Depot Program, which commenced at the start of the AA4 period. During the AA5 period, Western Power is proposing to deliver the following depots:

- Balcatta Depot – redevelopment of Western Power's northern metropolitan depot
- Forrestfield Depot – the location of a new dedicated Western Power training facility to replace the aged Training Facility currently located in Jandakot

- Picton Depot – redevelopment of the Western Power depot in the major regional town of Bunbury
- A number of small regional depots, the location of which will be determined once the full impact of the modular grid is known.

Other proposed corporate real estate investments in the AA5 period include:

- expanding the capacity of the Hope Road logistics facility in Jandakot, which currently has insufficient warehouse space available
- redeveloping regional depots and supporting accommodation for staff with the sequencing of these developments to align with operational requirements
- undertaking capital maintenance work on the head office building.

The proposed investment in property, plant and equipment is based on historical spend. The forecast investment is required for low value capital equipment that is used by Western Power's operational workforce in delivering the annual works program. The equipment is generally replaced at the end of its useful life or if new technology emerges that can be utilised in delivery.

In its review of Western Power's proposed depot expenditure, Engevity identified that approximately $42.8 million (32 per cent of the total corporate real estate regulatory activity) had been assigned to unplanned or general projects. Engevity recommended it be reduced by $27.6 million to retain approximately $15 million for unplanned or general depot projects to be more in line with industry practice.

Based on Engevity's advice, the ERA considers the level of unplanned or general project expenditure included in the proposed depot expenditure is not reasonably likely to meet the requirements of the new facilities investment test. As set out in Table 13 below, the ERA requires that the business support expenditure be reduced by $27.6 million.

The ERA's total adjustments to the proposed corporate expenditure are set out in Table 13 below. The adjustment to ICT was discussed in section 5.4.

Table 13: ERA adjustments to Western Power's proposed corporate capital expenditure - excluding forecast labour escalation and indirect costs (real $ million at June 2022)

	2022/23	2023/24	2024/25	2025/26	2026/27	Total AA5
Total proposed by Western Power	83.6	101.1	119.5	82.5	76.7	463.3
Reductions:						
Business support	(0.1)	(8.1)	(8.2)	(5.7)	(5.6)	(27.6)
IT	(18.3)	(19.9)	(19.8)	(21.8)	(20.1)	(99.8)
Total	**(18.4)**	**(28.0)**	**(28.0)**	**(27.5)**	**(25.7)**	**(127.4)**
Draft decision	65.3	73.1	91.6	55.0	50.9	335.9
Allocated to:						
Transmission	23.9	25.8	30.0	16.7	14.4	110.7
Distribution	41.5	47.3	61.6	38.2	36.5	225.2

Source: ERA analysis

5.6 Summary of revised capital expenditure

The ERA has calculated revised values for AA5 forecast capital expenditure in accordance with the ERA's determination under the draft decision on whether the forecast of new facilities investment may, under section 6.50 of the Access Code, be taken into account in the determination of total costs and target revenue.

As discussed in the operating expenditure attachment, the ERA has revised Western Power's proposed indirect costs. In addition, the ERA's amendments to direct capital expenditure and operating expenditure affect the allocation of indirect costs and labour escalation across different categories of expenditure.

The revised values are shown in Table 14 below.

Table 14: Draft decision capital expenditure for AA5 (real $ million at June 2022)

	2022/23	2023/24	2024/25	2025/26	2026/27	Total	Western Power proposal
Transmission direct capital expenditure							
Asset replacement and renewal	45.1	44.2	39.7	39.1	39.9	207.9	293.2
Growth	88.4	72.9	52.2	51.0	27.2	291.7	291.7
Improvement in service	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Compliance	36.1	36.8	39.7	26.9	21.5	161.0	161.0
Total	**169.5**	**154.0**	**131.6**	**116.9**	**88.6**	**660.6**	**745.9**
Distribution direct capital expenditure							

	2022/23	2023/24	2024/25	2025/26	2026/27	Total	Western Power proposal
Asset replacement and renewal	333.4	353.7	369.2	363.3	366.6	1,786.2	2,017.9
Growth	166.6	156.9	151.7	154.3	144.0	773.4	773.4
Improvement in service	0.2	0.0	0.0	0.0	0.0	0.2	0.2
Compliance	43.1	42.5	43.5	43.2	42.8	215.2	215.2
Total	**543.3**	**553.1**	**564.4**	**560.8**	**553.4**	**2,775.1**	**3,006.8**
SCADA and Telecommunications							
Transmission	27.9	28.5	33.5	33.1	34.9	157.9	225.6
Distribution	22.5	22.2	25.5	30.0	31.1	131.3	187.5
Total	**50.4**	**50.7**	**59.0**	**63.1**	**66.0**	**289.2**	**413.1**
Corporate							
Transmission	23.9	25.8	30.0	16.7	14.4	110.7	158.3
Distribution	41.5	47.3	61.6	38.2	36.5	225.2	305.0
Total	**65.3**	**73.1**	**91.6**	**55.0**	**50.9**	**335.9**	**463.3**
Total gross direct capital expenditure	**828.6**	**830.8**	**846.6**	**795.8**	**758.9**	**4,060.8**	**4,629.1**
Contributions (direct costs)							
Transmission growth	(57.5)	(31.3)	(31.3)	(31.3)	(11.7)	(163.0)	(163.0)
Distribution asset replacement	(27.3)	(35.5)	(45.5)	(54.4)	(56.4)	(219.2)	(219.2)
Distribution growth	(107.0)	(107.0)	(107.0)	(107.0)	(99.9)	(528.1)	(528.1)
Total	**(191.9)**	**(173.8)**	**(183.8)**	**(192.7)**	**(168.0)**	**(910.2)**	**(910.2)**
Total net direct capital expenditure	**636.7**	**657.0**	**662.8**	**603.1**	**591.0**	**3,150.6**	**3,718.9**
Indirect costs							
Transmission	38.3	35.6	33.8	28.7	24.4	160.8	
Distribution	87.6	87.0	87.8	89.0	89.4	440.9	
Total	**125.9**	**122.6**	**121.5**	**117.7**	**113.9**	**601.7**	**642.7**

	2022/23	2023/24	2024/25	2025/26	2026/27	Total	Western Power proposal
Labour escalation							
Transmission	3.5	5.0	6.6	6.6	6.7	28.3	
Distribution	6.4	9.5	12.8	16.0	19.0	63.7	
Total	**9.9**	**14.5**	**19.4**	**22.6**	**25.7**	**92.0**	**104.7**
Indirect costs allocated to contributions							
Transmission	(9.2)	(4.8)	(4.7)	(4.9)	(1.8)	(25.4)	
Distribution	(15.4)	(16.2)	(17.3)	(19.2)	(18.7)	(86.9)	
Total	**(24.6)**	**(21.1)**	**(22.0)**	**(24.1)**	**(20.6)**	**(112.3)**	**(104.6)**
Labour escalation allocated to contributions							
Transmission	(0.8)	(0.6)	(0.8)	(1.0)	(0.5)	(3.7)	
Distribution	(1.5)	(2.3)	(3.2)	(4.3)	(5.0)	(16.2)	
Total	**(2.2)**	**(2.9)**	**(4.0)**	**(5.3)**	**(5.4)**	**(19.9)**	**(19.8)**
Total AA5 capital expenditure							
Gross capital expenditure	964.4	967.9	987.5	936.1	898.5	4,754.4	5,376.5
Contributions	(218.7)	(197.8)	(209.8)	(222.1)	(194.0)	(1,042.3)	(1,034.5)
Net capital expenditure	745.7	770.2	777.7	714.0	704.5	3,712.1	4,341.1

Source: ERA analysis

Required amendment 1

Forecast capital expenditure must be amended to be consistent with the ERA's draft decision.

Appendix 1 Code extract of sections relevant to AA5 capital expenditure

6.51 For the purposes of section 6.4(a)(i) and subject to section 6.49, the forward-looking and efficient costs of providing *covered services* may include costs in relation to *forecast new facilities investment* for the *access arrangement period* which at the time of inclusion is reasonably expected to satisfy the test in section 6.51A when the *forecast new facilities investment* is forecast to be made.

6.51A *New facilities* investment may be added to the *capital base* if:

(a) it satisfies the *new facilities investment test*; or

(b) the *Authority* otherwise approves it being added to the *capital base* if:

(i) it has been, or is expected to be, the subject of a *contribution*; and

(ii) it meets the requirements of section 6.52(a); and

(iii) the *access arrangement* contains a mechanism designed to ensure that there is not double recovery of costs as a result of the addition.

New facilities investment test

6.52 New facilities investment satisfies the *new facilities investment* test if:

(a) the *new facilities investment* does not exceed the amount that would be invested by a service provider *efficiently minimising costs*, having regard, without limitation, to:

(i) whether the *new facility* exhibits economies of scale or scope and the increments in which capacity can be added; and

(ii) whether the lowest sustainable cost of providing the covered services forecast to be sold over a reasonable period may require the installation of a *new facility* with capacity sufficient to meet the forecast sales; and

(iii) if it is not a *priority project*, alternative options to the new facility (including the capital costs and non-capital costs that would be incurred in respect of that alternative option);

and

(b) one or more of the following conditions is satisfied:

(i) either:

A. the anticipated incremental revenue for the new facility is expected to at least recover the new facilities investment; or

B. if a modified test has been approved under section 6.53 and the new facilities investment is below the test application threshold – the modified test is satisfied;

or

(ii) the new facility provides a net benefit in the covered network over a reasonable period of time that justifies the approval of higher reference tariffs; or

(iii) the new facility is necessary to maintain the safety or reliability of the covered network or its ability to provide contracted covered services; or

(iv) the new facility is in respect of a *priority project*.

The provisions in relation to a modified test do not apply as Western Power has not requested a modified test to be approved.

A “priority project” is a project specified as a priority project in a “whole of system plan”. A whole of system plan is the document published by the Minister from time to time as the Whole of System Plan for the efficient development of the SWIS over a 20-year period.

6.54 In making a determination under section 6.52 the Authority must have regard to:

(a) if the new facilities investment is in respect of a *priority project*, for the purposes of considering the amount invested or recovered under section 6.52(a), the unit costs of the service provider’s actual new facilities investment only; and

(b) whether the new facilities investment was required by a written law or a statutory instrument.

6.55 Section 6.54 does not limit the matters to which regard must or may be had in making a determination under section 6.52.

6.55A If the Authority makes a determination under section 6.52, it must provide reasons for its determination in its draft decision and final decision, and such reasons must provide detail on how the Authority applied the guidelines referred to in section 6.56 in making its determination.