

2023-27

POWERLINK QUEENSLAND REVENUE PROPOSAL

Appendix 15.02 – PUBLIC

Energy Networks Australia STPIS Review Letter

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3 February 2020

Mr Sebastian Roberts
General Manager – Transmission and Gas
Australian Energy Regulator
GPO Box 520
Melbourne VIC 3001

Cc: Slavko Jovanoski, Director
Adam Petersen, Director
David Chan, Director

Dear Sebastian,

Proposed Review of the Service Target Performance Incentive Scheme for Electricity Transmission

Transmission Network Service Providers (TNSPs) have participated in the Service Target Performance Incentive Scheme (STPIS) administered by the Australian Energy Regulator (AER) for approximately 13 years. During this period the scheme has provided incentives for TNSPs to maintain or improve network performance against parameters set by the regulator, in accordance with the STPIS principles in the NER¹ and for improved customer outcomes.

Changes to the STPIS have typically been made incrementally and approximately every few years to ensure that the scheme remains fit-for-purpose and continues to provide both clarity and better target incentives for customers and participants in the market, and the TNSPs.

TNSPs have identified a significant issue with Version 5 of the scheme, in particular, with the method applied for future target setting.

The rapid change to the generation mix and location of these new generators across the National Electricity Market (NEM) since the finalisation of Version 5 of the scheme has presented a challenge in dealing with market constraints due to both changes in topology and the recognition and management of system strength limitations in parts of the network. The level of constraints experienced and expected into the future are potentially significant multiples higher than current target setting mechanisms would allow for using historic data.

In addition, there is an increase in market price volatility caused by sharp increases in natural gas wholesale prices in conjunction with the generation changes, which has increased the exposure of regional electricity prices to wholesale gas prices.

These factors are outside a TNSP's control and it is considered that the use of historical performance for target setting will not reflect possible future outcomes.

¹ NER clause 6A.7.4(b)

Powerlink, AusNet Services, TransGrid, ElectraNet and TasNetworks have coordinated to better understand the experiences of each of the TNSPs in light of the current operating environment and on the need for a review of the STPIS. In particular, this has focussed on changes in the market that impact a TNSPs' ability to provide good customer outcomes through improvement of behaviours appropriately incentivised by the Market Impact Component (MIC) of the scheme.

While TNSPs are broadly supportive of the existing scheme design of the Service Component (SC) and Network Capability Component (NCC) under Version 5 of the STPIS, the recent dramatic changes experienced in the electricity market make the use of historical data unfit for future target setting for the MIC. On this basis, Energy Networks Australia considers that the AER should undertake a review of the current scheme that will apply to their next revenue determinations.

This letter provides evidence to support this request, specifically regarding the Market Impact Component (MIC), and proposes a range of potential changes and improvements to Version 5 of the STPIS for the AER's consideration.

TNSPs consider that the basis for a review of the STPIS is:

- rapid changes have occurred within the energy market post-2015, when the current Version 5 STPIS was introduced. This includes significant changes in power flows and generation mix across the NEM, which are outside a TNSP's control;
- these changes have resulted in system strength issues and constraints in the NEM, which impact a TNSP's ability to actively respond to the incentives provided by the MIC; and
- the MIC uses historical performance data for future target setting. Due to the extent and speed of the changes which have occurred more recently, and are expected to occur, at pace, over the longer-term, the current scheme design, including the target setting methodology, is not fit-for-purpose for upcoming regulatory periods. This is particularly pressing in relation to AusNet Services and Powerlink.

These changes have been observed in all NEM jurisdictions. This outcome would not appear to promote the long term interests of customers in accordance with the National Electricity Objective and is inconsistent with the principles upon which these incentive schemes have been established by the AER - to provide genuine financial incentives for improvements in market performance.

A number of TNSPs have engaged with their customers regarding the STPIS and will continue to seek input from customers and other interested stakeholders should a review of the scheme commence.

As the AER is aware, Powerlink engaged with its customer Revenue Proposal Reference Group on 31 January 2020 to discuss the issues experienced in the Queensland operating environment and to gain input and feedback on whether they would support a review of the scheme. The discussion identified that if left unaddressed, the scheme could create perverse incentives and had the potential to increase whole-of-system costs. Customer representatives supported a review of the STPIS.

A summary analysis of the data from Powerlink, TransGrid and AusNet Services is provided below.

Powerlink

Constraints emerging in 2019 due to generation mix changes

Powerlink's current STPIS MIC target is 333 Dispatch Intervals (DIs), with a floor of 666 DIs. This applies to Powerlink until the end of its current regulatory period, namely 30 June 2022. Powerlink's STPIS MIC result for 2019 was 12,620 DIs or 127 times more than the average of the previous four year period.

Powerlink has categorised constraints experienced in 2019 in two ways:

1. **Increase in “traditional” constraints** – approximately 9,000 of the DIs observed in 2019 were due to a significant increase in flows on critical transmission lines which connect North and South Queensland. This was a result of increased generation located within North Queensland compared to previous years, with over 1,300 MW of new wind and solar generation connected since 2017. The increase in north-south flows has created a situation where system normal constraints are binding more often and, in turn, severely restrict outage windows. Powerlink has categorised this as a “traditional” type of constraint to separate it from “new” system strength related constraints.
2. **Emergence of “new” constraints** – approximately 3,000 of the DIs observed in 2019 were due to system strength related constraints. In May 2019, the Australian Energy Market Operator's (AEMO) National Electricity Market Dispatch Engine (NEMDE) first began applying system strength constraints in Queensland after engagement with Powerlink. System strength constraints were not recognised in Queensland up until this point and therefore are not reflected in any historical constraint data (i.e. prior to May 2019).

The driver of the increase in both “traditional” and “new” constraints is the rapid change in generation mix and location. These changes are outside Powerlink's control and the constraints arising from these changes are expected to continue into the future.

This is evidenced in AEMO's Draft 2020 Integrated System Plan, which shows that generation capacity will more than double over the next 20 years, with thermal generation being displaced by a mixture of wind, solar and storage. This includes the deployment of an additional 30-47 GW of variable renewable generation (VRE), which comprises utility-scale solar, wind, battery and other energy resources, up from the 6 GW of VRE currently installed.²

² AEMO Draft 2020 ISP, p.41

In this light, relying on the rebasing of the target at each determination to ameliorate these impacts is unlikely to be effective, and creates a risk that the target will continually lag market changes. This is demonstrated below in the context of the forthcoming regulatory period.

MIC target setting

Under Version 5 of the STPIS, the AER’s Final Decision for Powerlink’s MIC target for the next (2023-27) regulatory period is expected to be the median five-year average from the seven years between 2015 and 2021.

Figure 2 shows Powerlink’s performance over the 2015 to 2019 period, including a forecast of performance for 2020 and 2021. Given that the rapid change in generation mix and location is anticipated to continue into the next few years, there is considerable uncertainty in forecasting potential MIC results within the current operating environment. Accordingly, Powerlink’s estimate for 2020 and 2021 reflects its 2019 result carried forward.

Figure 1: Calendar Year DIs – History and Forecast

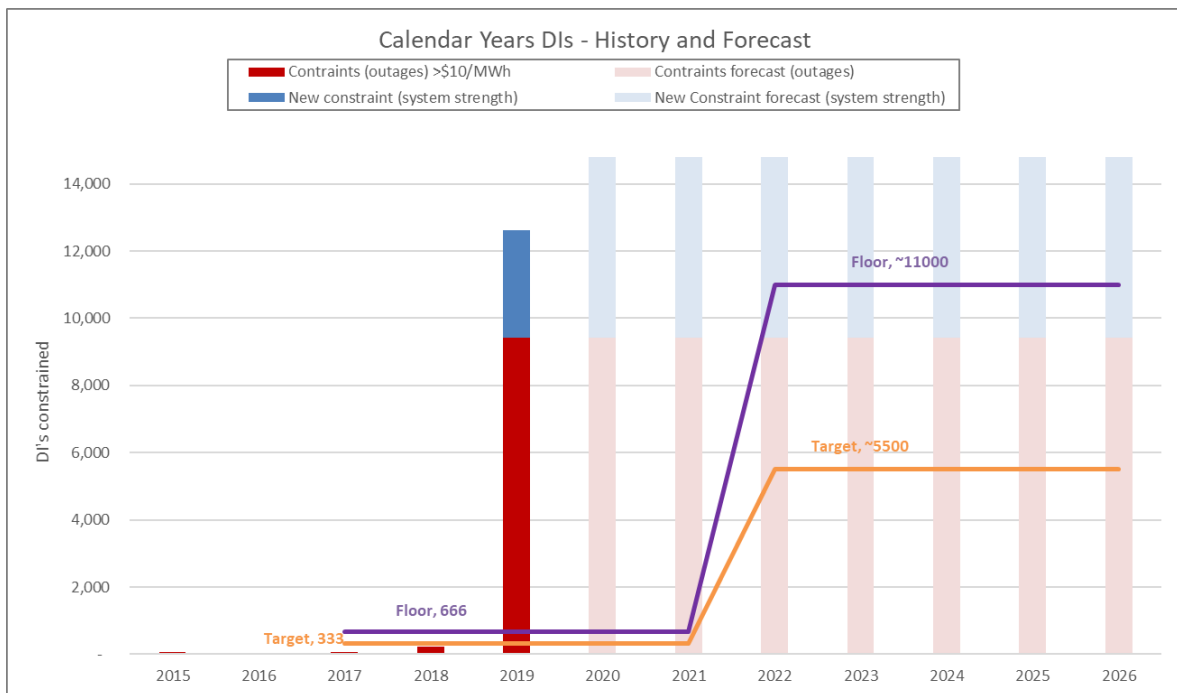


Figure 1 explanatory notes:

- Red = “traditional” STPIS reportable DIs.
- Blue = “new” constraints related to system strength.
- Light red (2020 and 2021) = estimated number of “traditional” constraints, based on 2019 year actuals.
- Light blue (2020 and 2021) = estimated number of “new” constraints, based on 2019 year actuals.
- Target 333 and floor 666 = current DI targets, which are applicable to Powerlink until 30 June 2022.

The increase in DIs from 12,635 in 2019 to approximately 14,000 in 2020 and 2021 is related to “new” constraints. In 2019, system strength constraints only emerged in the period May-December 2019 (8 months, after system strength constraints were recognised in AEMO’s NEMDE) and equated to 3,000 DIs. For the full 12 month periods in 2020 and 2021, Powerlink has estimated constraints related to system strength will be approximately 5,000 DIs.

Powerlink’s estimate is based on continued growth in asynchronous generation during the 2023-27 regulatory period and the view that no current committed capital expenditure projects within the 2023-27 timeframe would significantly alleviate the number of constraints in the network.

Based on the 2015-2021 MIC actuals and forecasts, and using the V5 target setting process, Powerlink has estimated its target for the 2023-27 regulatory period would be approximately 5,500 DIs, with a floor of approximately 11,000 DIs.

Given actual annual performance for 2019 is 12,000 DIs, and this is anticipated to increase in 2020 and 2021 to over 15,000 DIs, Powerlink estimates that it will exceed the maximum penalty (the forecast ~11,000 floor) for the entire 2023-27 regulatory period.

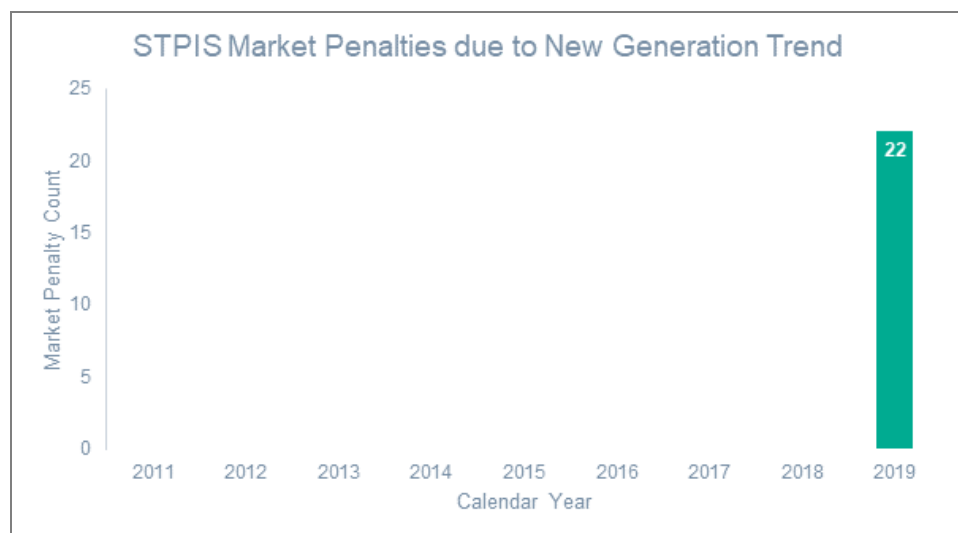
Powerlink’s view is that this potential result supports the proposal that the Version 5 STPIS target setting methodology is not fit-for-purpose for the next regulatory period and will result in a target that is not reflective of the current operating environment.

TransGrid

TransGrid is encountering two main issues with the STPIS Market Component as described in the current STPIS Version 5 scheme definition:

- 1) A manifestation of binding constraint instances resulting in market penalties during 2019, due to the connection of new renewable generation which are not accounted for in the STPIS target (shown by Figure 2), detailed below; and
- 2) A sustained step change in binding constraint marginal values occurring since 2016, which correlates closely with increasing natural gas wholesale prices. This issue is detailed in the separately provided ‘STPIS Market Component Marginal Value Issue’ report.

Figure 2: TransGrid Market Penalty DIs due to new (i.e. commissioned subsequent to the target measurement period) generation

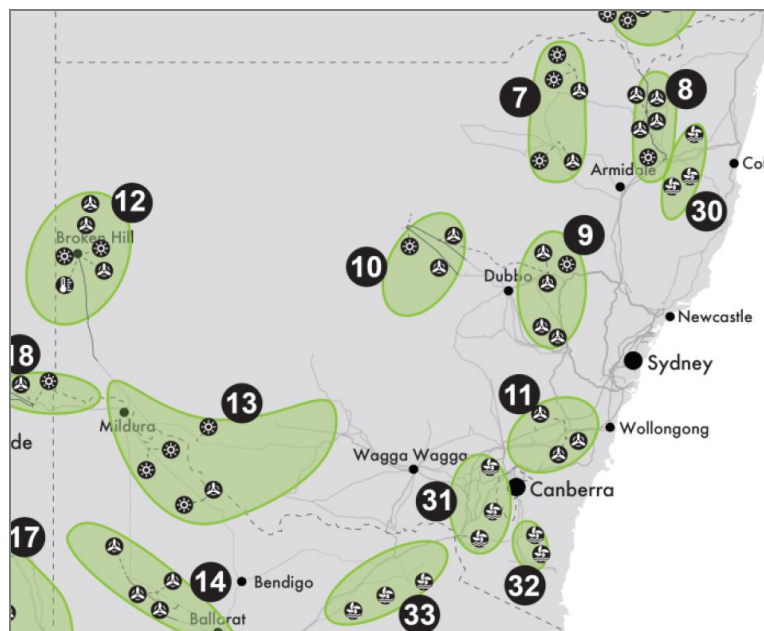


It is evident from the AEMO ISP that a rapidly increasing volume of renewable generation will be connected to TransGrid’s network over the coming years and decades. Additional market constraints become necessary to address the increase in network utilisation, specifically attributable to the connection of new generation. As a result, it is anticipated that the phenomenon of increasing market penalties due to new generation is an emerging one, expected to exacerbate over the coming decades and unlikely to ‘self-correct’ as performance targets are reset. Table 1 lists the TransGrid network elements identified as being impacted by new generation either currently or in the near future, while *Figure 3* illustrates the future NSW renewable energy zones according to the ISP.

Table 1: TransGrid network elements impacted by new generation (with year commissioned)

Network Outage Element:	Limited Generation:
Uranquinty - Finley Line 99A	<ul style="list-style-type: none"> Solar Farm A (2019) Solar Farm B (2018)
Finley - Mulwala Feeder Bay 9R4	
Albury - Corowa Feeder Bay 997/1	
Wellington - Orange North Line 947	NSW Central West Generation (Anticipated - Near Future)
Wellington - Mount Piper Line 72	
Wellington - Wollar Line 79	

Figure 3: Future NSW Renewable Energy Zones³



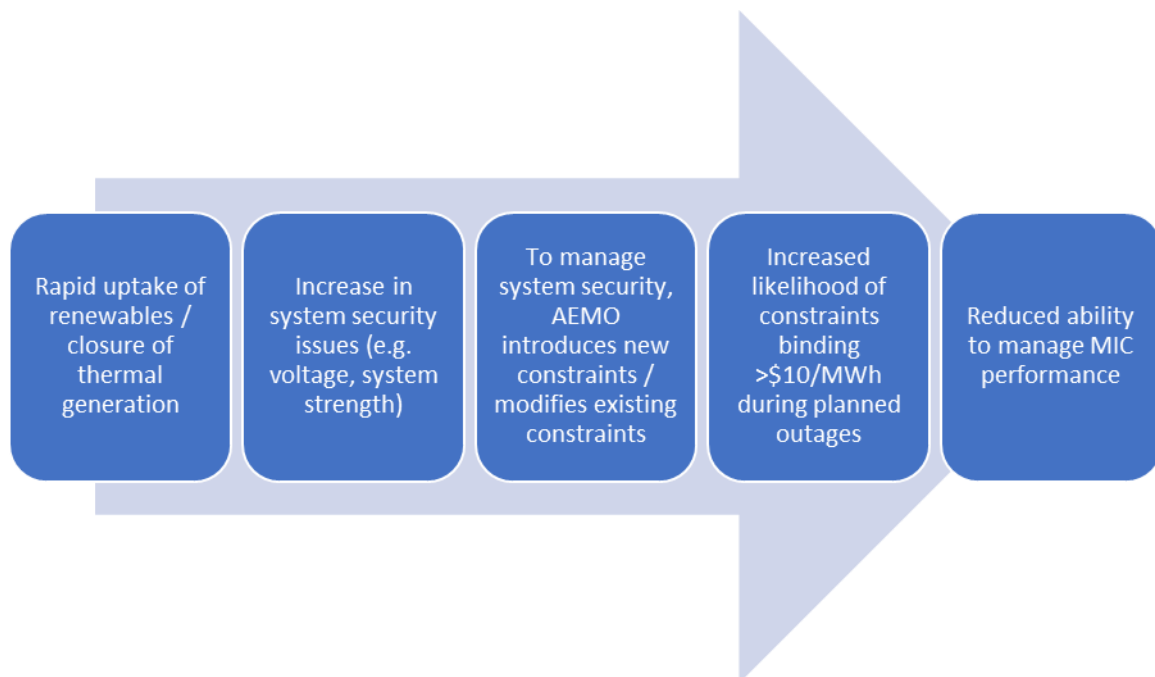
TransGrid considers that both issues listed above, unless addressed, will continue to pose a hurdle to achieving the AER’s objectives for STPIS, through blunting the incentive for TNSPs to undertake measures and innovation to improve consumer market outcomes in managing network outages. The act of minimising market impacts, often at the expense of the TNSP, provides consumers a tangible benefit in the form of reduced electricity costs.

³ AEMO Integrated System Plan: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/ISP/2018/Integrated-System-Plan-2018_final.pdf

AusNet Services

Several, dramatic changes in generation mix have occurred in recent years within Victoria. In particular, the closure of thermal generation (e.g. Hazelwood Power Station) and the dramatic increase in renewable generation (particularly in North-Western Victoria) are having substantial implications for how AEMO manages system security in Victoria. The effect of changes such as these is a significantly increased likelihood of constraints binding with a marginal value of greater than \$10/MWh, which directly impacts AusNet Services’ performance under the MIC. This is demonstrated by the figure below.

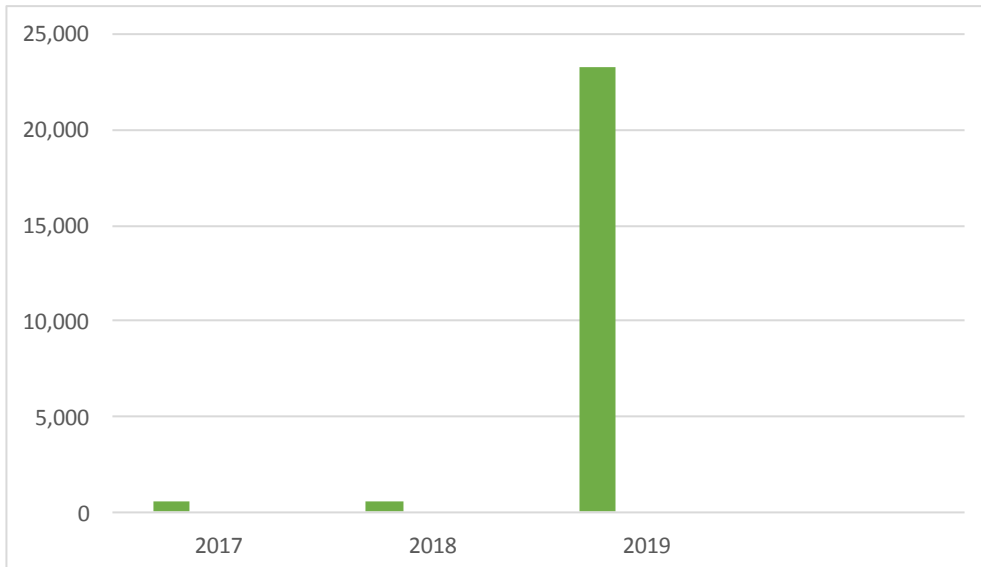
Figure 4: How the rapidly changing generation mix directly impacts the ability to manage the MIC



As an example of these recent, significant changes, in contrast to its historical practices AEMO has been applying individual generator constraints on occasions when the level of intermittent generation is causing system security issues, e.g. an outage on the Ballarat Terminal Station to Waubra Terminal Station line can constrain 13 individual generators. As these (renewable) generators do not as actively bid in the market (they tend to play “a set and forget” bid), a 1 day outage on this line (e.g. for delivery of crucial NCIPAP projects) has the potential to result in the maximum penalty being reached in a single day. These circumstances demonstrate that the scheme has become unworkable and unable to keep pace with market changes.

The figure below shows the sharp uptake in recent years of binding DIs (>\$10/MWh) associated with individual generator constraints (before exclusions). The sharp increase in 2019 is representative of the way in which the transforming energy system is directly impacting the way AEMO manages system security and, therefore, the MIC. While AusNet Services employ sophisticated planning and operational measures, these unprecedented system security impacts, which are outside of its control, significantly limit its ability to respond to the MIC.

Figure 5: DIs associated with individual generator constraints



This is further evidenced by AEMO’s release in December 2019 of a technical update on power system limitation in North West-Victoria / South West New South Wales. The report demonstrates that the significant uptake in renewable generation is having major implications for the way AEMO manages power system security, including the application of constraints. The report states:⁴

“The rapid scale and pace of inverter-based renewable generator connections in remote areas of the National Electricity Market (NEM) is resulting in unprecedented technical issues impacting grid performance and operational stability. The nature, extent and causes of these issues are only becoming apparent with the advanced and very detailed modelling capability that is now essential for technical assessments in weak areas of the grid.

The area of the Victorian and NSW power system bounded by Ballarat, Dederang, and Darlington Point (referred to as ‘West Murray’) has attracted significant investment in grid-scale solar and wind generation, despite being a remote and electrically weak part of the NEM. Put simply, the transmission infrastructure in this part of the network is insufficient to allow access to all the generation that is seeking to connect, and is capable of construction in a matter of months. Transmission infrastructure investments to progressively address these issues have been identified, but will take a number of years to proceed through regulatory approval processes, procurement and construction.”

Importantly, AEMO has also declared a system strength gap in north-west Victoria. This is just the third system strength gap identified for the NEM, following South Australia and Tasmania in October 2017 and November 2019, respectively. Again, this signals that the changing wholesale market is putting considerable pressure on AEMO’s ability to manage system strength, necessitating a range of short-term and

⁴ AEMO, *Power System Limitations in North Western Victoria and South Western New South Wales*, December 2019, p.4

longer-term solutions, including increased application of existing and new constraints. These changes are expected to continue to occur throughout future regulatory periods.

Potential changes and improvements to STPIS Version 5

The STPIS is intended to provide incentives for each TNSP to provide greater reliability of the transmission system at all times. The scheme is also intended to improve and maintain the availability of transmission system elements most important to determining spot prices.

TNSPs consider that, consistent with the underlying principles of the scheme, target setting arrangements need to reflect the current NEM operating environment and adapt to significant changes in it, such as those observed across the NEM.

Energy Networks Australia recognises the AER's view that the STPIS is expected to be reviewed as part of the Coordination of Generation and Transmission Investment (COGATI) reforms currently proposed. Energy Networks Australia also notes the recent deferral of the COGATI Final Report to March 2020, and the likely deferral of the implementation of COGATI-related reforms beyond June 2022. These revised COGATI timeframes mean that any Rule change that may stem from COGATI that requires the AER to develop a new MIC scheme will come far too late to address the significant issues being experienced under the current version of the MIC.

In light of these circumstances, Energy Networks Australia is of the view that the STPIS should be reviewed now and the continuation of the current STPIS arrangements into the 2023-27 regulatory periods for Powerlink and AusNet Services would not present an appropriate outcome for the market, TNSPs or customers.

TNSPs have developed a range of potential options that could be considered and explored further as part of a review of STPIS Version 5.

- Progress changes to target setting/measurement of performance methods to enable TNSPs to influence operational work and timeframes and provide benefits to customers. This option may consider and bring forward potential changes considered within COGATI, such as nested caps which were first outlined in the Optional Firm Access Final Report⁵.
- Expand the suite of exclusions to reflect current circumstances. A specific exclusion (holiday/exemption) for impact due to new generation and closure of thermal generators ("new limits" causing restrictions in the market). This exclusion could be applied to the actual performance while historical data builds up to enable sensible future target generation.
- Re-define the marginal value of >\$10/MW to better reflect current market trends.

⁵ *Final Report – Volume 2 Optional Firm Access, Design and Testing*, AEMC, 9 July 2015, pp.118-123.

- Consider applying the “alternative target setting methodology” clauses⁶ that are currently available for the Service Component of the STPIS to the MIC, and enable TNSPs to propose alternative target setting arrangements which are reflective of the current operating environment.

Conclusion

Energy Networks Australia considers that a review of the current version of the STPIS is warranted and should be progressed and applied to the 2023-27 Revenue Determination processes for Powerlink and AusNet Services, and subsequent revenue determination processes for TransGrid, ElectraNet and TasNetworks. Energy Networks Australia welcomes the opportunity to work further with the AER, customers and other interested stakeholders on this matter.

Should you have any questions regarding this submission, please contact Jennifer Harris from Powerlink at the details below.

Yours sincerely,



Andrew Dillon
Chief Executive Officer

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Email: jharris@powerlink.com.au

Attachment:

Energy Networks Australia Submission Appendix - STPIS Market Component Marginal Value Issue by TransGrid

⁶ AER electricity transmission service target performance incentive scheme (STPIS) version 5 (corrected) clauses 3.2(g), (i) and (j), AER, 1 October 2015, p.6.