



**Draft decision**

**TransGrid transmission determination**

**2015–16 to 2017–18**

**Attachment 11: Service target performance  
incentive scheme**

November 2014

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## Note

This attachment forms part of the AER's draft decision on TransGrid's revenue proposal 2015–18. It should be read with other parts of the draft decision.

The draft decision includes the following documents:

Overview

Attachment 1 – maximum allowed revenue

Attachment 2 – regulatory asset base

Attachment 3 – rate of return

Attachment 4 – value of imputation credits

Attachment 5 – regulatory depreciation

Attachment 6 – capital expenditure

Attachment 7 – operating expenditure

Attachment 8 – corporate income tax

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Attachment 10 – capital expenditure sharing scheme

Attachment 11 – service target performance incentive scheme

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## Shortened forms

Shortened form	Extended form
AARR	aggregate annual revenue requirement
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ASRR	aggregate service revenue requirement
augex	augmentation expenditure
capex	capital expenditure
CCP	Consumer Challenge Panel
CESS	capital expenditure sharing scheme
CPI	consumer price index
DRP	debt risk premium
EBSS	efficiency benefit sharing scheme
ERP	equity risk premium
MAR	maximum allowed revenue
MRP	market risk premium
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider
NTSC	negotiated transmission service criteria

Shortened form	Extended form
opex	operating expenditure
PPI	partial performance indicators
PTRM	post-tax revenue model
RAB	regulatory asset base
RBA	Reserve Bank of Australia
repx	replacement expenditure
RFM	roll forward model
RIN	regulatory information notice
RPP	revenue pricing principles
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	service target performance incentive scheme
TNSP	transmission network service provider
TUoS	transmission use of system
WACC	weighted average cost of capital

## 11 Service target performance incentive scheme

The service target performance incentive scheme (STPIS) provides a financial incentive to TNSPs to maintain and improve service performance. The STPIS aims to safeguard service quality for customers that may otherwise be affected as TNSPs seek out cost efficiencies at the expense of service quality.

The current version of the STPIS is version 4.1 which we published in September 2014.<sup>1</sup> This version replaces the previous version 4 which we had intended to apply to TransGrid in this draft decision.<sup>2</sup> Version 4.1 includes three components: a service component, market impact component and network capability component.

The service component provides a financial incentive for TNSPs to improve and maintain their service performance. This balances the incentive in the regulatory framework for TNSPs to reduce costs at the expense of service performance. A TNSP's performance is compared against the performance target for each parameter under the service component during the regulatory control period. The TNSP may receive a financial bonus for service improvements, or a financial penalty for declines in service performance. The financial bonus (or penalty) is limited to 1 per cent of the TNSP's maximum allowed revenue (MAR) for the relevant calendar year.

The market impact component provides financial rewards to TNSPs for improvements in their performance measured against a performance target. A TNSP may earn up to 2 per cent of its MAR for the relevant calendar year. Unlike the service and network capability components, the market impact component has no financial penalty. The market impact component provides an incentive to TNSPs to minimise the impact of transmission outages that can affect the NEM spot price. The market impact parameter measures the number of dispatch intervals when an outage of a TNSP's network results in a network outage constraint with a marginal value greater than \$10/MWh.<sup>3</sup> The market impact parameter performance target is an average of the previous three years of performance data. Performance will be measured as a rolling average of the most recent two years of performance data.<sup>4</sup> These targets will be published annually after we have conducted the annual review of a TNSP's STPIS performance.

The network capability component funds and incentivises TNSPs to identify and implement incremental changes that would improve the capability of the network at times when it is most needed. Except for the final year of the next regulatory control period, a TNSP will receive payment equal to 1.5 per cent of its MAR for each year of its next regulatory control period to fund the priority projects. If a TNSP achieves its priority project improvement target for each priority project, then it will receive an incentive payment of 1.5 per cent of its MAR in the final year. If it does not achieve each priority project target, then we may reduce the incentive payment in the final year. We can reduce the final payment to a maximum of – 2 per cent of MAR if the TNSP does not achieve any of its proposed priority project improvement targets.<sup>5</sup>

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<sup>1</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014. For TransGrid, there is no difference between the application of version 4 of the STPIS which was published in December 2012 and the most recent version 4.1. The recent amendment wholly relates to Directlink.

<sup>2</sup> AER, *Framework and Approach Paper, TransGrid, Transend (now TasNetworks)*, January 2014, pp. 5-13.

<sup>3</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, Appendix C.

<sup>4</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 4.2(d) and Appendix F.

<sup>5</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 5.3(c).

Our transitional decision set out how the STPIS applies during the 2014–15 transitional year.<sup>6</sup> According to the transitional rules, we are required to make a corresponding adjustment in the application of the STPIS as a result of any change in MAR determined for the 2015–18 regulatory control period as compared to the MAR determined in our transitional decision.<sup>7</sup>

## 11.1 Draft decision

We will apply all components of version 4.1 of the STPIS to TransGrid for the 2015–18 regulatory control period. We propose to apply the STPIS to TransGrid in accordance with the details set out below.

### 11.1.1 Service component

We accept TransGrid's proposed performance targets for the service component because they comply with the requirements in clause 3.2 of the STPIS. However, we do not accept TransGrid's proposed caps and collars<sup>8</sup> as the values of the parameters are not based on a sound methodology and thus do not satisfy clause 3.2(e) of the STPIS. We consider the caps and collars calculated using our principle based approach as discussed in section 11.4 will result in a materially stronger incentive to improve and maintain service performance. Table 111.1 sets out our draft decision on TransGrid's service component parameter values.

**Table 111.1 AER's draft decision on TransGrid's parameter values and weightings for the service component of the STPIS**

	Collar	Target	Cap	Weighting (% of MAR)
<b>Average circuit outage rate</b>				
Line outage – fault	22.26%	17.86%	12.38%	0.2
Transformer outage – fault	19.01%	14.92%	10.26%	0.2
Reactive plant – fault	22.73%	15.54%	9.54%	0.1
Line outage – forced outage	25.49%	14.98%	1.34%	0.0
Transformer outage – forced outage	24.15%	20.25%	15.56%	0.0
Reactive plant – forced outage	28.55%	20.39%	6.55%	0.0
<b>Loss of supply event frequency</b>				
>0.05 system minutes	4	3	2	0.15
>0.25 system minutes	2	1	0	0.15

<sup>6</sup> For the 2014–15 transitional regulatory control period, we applied version 2 of the Service Component, version 4 of the Market Impact Component (MIC) and version 4 of the Network Capability Component (NCC) to TasNetworks.

<sup>7</sup> NER, cl. 11.56.4 (c), (h) and (i).

<sup>8</sup> The cap specifies the level of performance that results in a TNSP receiving the maximum financial reward attributed to a parameter; the collar specifies the level for receiving the maximum financial penalty.



	Collar	Target	Cap	Weighting (% of MAR)
<b>Average outage duration</b>				
Average outage duration	266.53	144.49	67.97	0.2
<b>Proper operation of equipment<sup>9</sup></b>				
Failure of protection system	n/a	n/a	n/a	0.0
Material failure of SCADA	n/a	n/a	n/a	0.0
Incorrect operational isolation of primary or secondary equipment	n/a	n/a	n/a	0.0

Sources: TransGrid, *Revenue proposal 2014/15–2018/19*, p. 226; AER analysis.

### 11.1.2 Market impact component

As foreshadowed in our transitional transmission determination for TransGrid<sup>10</sup>, we have validated and confirmed the 2011, 2012 and 2013 market impact performance data which was included within TransGrid's 2015–18 revenue proposal. The validation of this performance data allows us to calculate TransGrid's market impact parameter performance target for 2014, being the average of its 2011, 2012 and 2013 annual performance. TransGrid's market impact parameter targets that will apply within the 2015–18 regulatory control period will be published annually as part of our service standards compliance reporting process.<sup>11</sup>

As a result of our audit, we made adjustments to the market impact performance values submitted by TransGrid. We adjusted TransGrid's 2011 performance from 872 to 870 dispatch intervals, its 2012 performance from 737 to 773 dispatch intervals and its 2013 performance remained at 593 dispatch intervals. Consequently, TransGrid's market impact performance target for 2014 is 745 dispatch intervals.<sup>12</sup>

### 11.1.3 Network capability component

We accept TransGrid's proposed priority projects and improvement targets because we consider they meet the requirements of the STPIS. The average total expenditure of the priority projects in each regulatory year is not greater than 1 per cent of TransGrid's proposed average maximum allowed revenue as required by clause 5.2(b) of the STPIS. We considered the Australian Energy Market Operator's (AEMO) review of TransGrid's priority projects when making our decision. Table 111.2 sets out our draft decision on TransGrid's proposed priority projects, improvement targets and project ranking.

<sup>9</sup> TransGrid noted the proper operation of equipment parameter was introduced as a reporting-only parameter. As a result, it did not propose values for these sub-parameters, but it will commence reporting against these sub-parameter from July 2015. As we are not applying any weighting on these sub-parameters, we accept the approach proposed by TransGrid.

<sup>10</sup> AER, *Transitional transmission determination 2014–15*, March 2014, p. 33.

<sup>11</sup> Our annual service standards compliance reports are available at <http://www.aer.gov.au/node/484>.

<sup>12</sup> Regarding the target for the last half of 2014, we pro-rate the performance by measuring the average 2013/2014 performance against the average 2011/2012/2013 target and then multiply by 0.5.

**Table 111.2 AER's draft decision on TransGrid's network capability priority projects (\$ 000s, 2013–14)**

Ranking	Project	Description	Improvement target	Capex	Opex	Total
1	Current Transformer Secondary Ratios - Queensland – New South Wales Interconnector	Changes to current transformer secondary ratios on 8C, 8E, 8L and 8M lines.	Full use of line thermal capacity of 1200MVA for 8C and 8E 330kV Armidale - Dumaresq circuits and 8L and 8M Dumaresq - Bulli Creek circuits during system normal conditions.	0	55	55
2	Terminal Equipment Upgrades - 67 & 68 Murray – Dederang Switchbays	Replace wave traps, disconnectors and change CT ratios and protection settings on 67 & 68 line switchbays at Murray.	Terminal equipment ratings that allow the use of dynamic rating capacity of 1486MVA for 67 & 68 Lines.	360	0	360
3	Protection & Metering Upgrades - 993 Line Protection & Metering Upgrade	Replace the secondary systems panel for 993 Line at Wagga 330 substation.	Full use of contingent capacity of 122 MVA for 993 Line.	90	0	90
4	Dynamic Line Ratings & Transmission Line Upgrading - 83 Liddell – Muswellbrook, 84 Liddell – Tamworth 330, 85 & 86 Tamworth 330 – Armidale & 88 Muswellbrook – Tamworth 330 330kV Lines	Install dynamic line ratings based on real time ambient temperatures and wind speeds on 83, 84, 85, 86 and 88 Lines.	Improved rating information based on real time ambient temperature and wind speed for these lines, which will allow increased line ratings of approximately 20% at times of favourable conditions.	1,100	0	1,100
5	Protection & Metering Upgrades - 99P Line Protection & Metering Upgrade	Change to CT ratios at Gadara. (The change to CT ratios at Tumut will be undertaken as part of the secondary systems replacement project at Tumut.)	Full use of contingent capacity of 128 MVA for 99P Line.	0	50	50
6	Dynamic Line Ratings & Transmission Line Upgrading - 65 Murray – Upper Tumut & 66 Murray – Lower Tumut 330kV Lines	Install dynamic line ratings based on real time ambient temperatures and wind speeds on 65 and 66 Lines.	Improved rating information based on real time ambient temperature and wind speed for these lines, which will allow increased line ratings of approximately 20% at times of favourable conditions.	400	0	400
7	Control Schemes - Extension of Directlink Tripping Scheme	Extend the Directlink emergency tripping scheme to include the transformers at Lismore 330kV substation, 872B bay at Armidale and 872A, 872B and 892A bays at Coffs Harbour.	Full use of line capacity of the Directlink Interconnector during outages of the Lismore transformers, 872B bay at Armidale or 872A, 872B and 892A bays at Coffs Harbour	600	0	600

Ranking	Project	Description	Improvement target	Capex	Opex	Total
8	Protection Changes - 976 Line Configuration & Protection Changes	Install disconnecter at Yass substation and change protection settings at Canberra, Yass and Queanbeyan.	Reduced likelihood of loss of supply to Queanbeyan for a second contingency. This includes a reduction in recall times for 976/1 and 976/2 Lines.	110	0	110
9	Terminal Equipment Upgrades - 94E Mt Piper 132 – Wallerawang 132 Switchbays	Replace interplant connections and change current transformer secondary ratios on the 94E Line switchbay at Wallerawang 132.	Full use of contingent capacity of 373 MVA for 94E Line.	50	0	50
10	Dynamic Line Ratings & Transmission Line Upgrading - Northern 132kV System	Install dynamic line ratings based on real time ambient temperatures and wind speeds on 967, 96R, 96T and 966 Lines.	Improved rating information based on real time ambient temperature and wind speed for these lines, which will allow increased line ratings of approximately 20% at times of favourable conditions.	1,000	0	1,000
11	Dynamic Line Ratings & Transmission Line Upgrading - Snowy – Yass & Canberra 330kV Lines	Install dynamic line ratings based on real time ambient temperatures and wind speeds on 01,2,3 and 07 Lines.	Improved rating information based on real time ambient temperature and wind speed for these lines, which will allow increased line ratings of approximately 20% at times of favourable conditions.	1,400	0	1,400
12	Control Schemes - Northern Reactive Plant Control Scheme	The installation of a reactive equipment controller with the capability to control reactive equipment at Armidale 330kV Substation. The installation of emergency overvoltage and under voltage controls on reactive equipment at Armidale 330kV Substation and Dumaresq 330kV Switching Station.	Operating of automatic reactive equipment control at Armidale Substation. Operation of emergency voltage control of QNI reactive equipment at Armidale and Dumaresq Substations.	524	0	524
13	Dynamic Line Ratings & Transmission Line Upgrading - 4 & 5 Yass – Marulan, 9 Yass – Canberra, 61 Yass – Bannaby & 39 Bannaby – Sydney West 330kV Lines	Install dynamic line ratings based on real time ambient temperatures and wind speeds on 4,5,9,61 and 39 Lines. Increase the height of transmission line conductor on 61 Line to achieve a maximum operating temperature of 100 degrees Celsius.	Improved rating information based on real time ambient temperature and wind speed for these lines, which will allow increased line ratings of approximately 20% at times of favourable conditions. The increase in maximum operating temperature of 61 Line is expected to achieve an increase in contingency rating of this line of 137 MVA.	2,600	0	2,600

Ranking	Project	Description	Improvement target	Capex	Opex	Total
14	Dynamic Line Ratings & Transmission Line Upgrading - 969 Tamworth 330 – Gunnedah 132kV Line	Install dynamic line ratings based on real time ambient temperatures and wind speeds on 969 Line.	Improved rating information based on real time ambient temperature and wind speed for this line, which will allow increased line ratings of approximately 20% at times of favourable conditions.	300	0	300
15	Terminal Equipment Upgrades - 81 & 82 Liddell – Newcastle & Tomago Lines	Replace interplant connections on 81 & 82 Line switchbays at Liddell and Newcastle, and replace wave traps and change current transformer secondary ratios at Liddell.	Full use of contingent capacity of 1646 MVA for 81 & 82 Lines.	600	0	600
16	Capacitor Banks - Beryl Capacitor Bank	Install a new capacitor bank at Beryl 132kV Substation.	The installation of a capacitor bank at Beryl substation would increase the total capacity available to the area by 6 MW in 2016. This additional capacity will reduce with load growth over time due to voltage constraints.	1,900	0	1,900
17	Travelling Wave Fault Location - Snowy Lines	Install travelling wave fault locators on Snowy lines.	Commissioning of the travelling wave fault locators on the above lines.	2,211	0	2,211
18	Travelling Wave Fault Location - North Western 132kV System	Install travelling wave fault locators on the above lines.	Commissioning of the travelling wave fault locators on the above lines.	877	0	877
19	Travelling Wave Fault Location - Northern 330kV Lines	Install travelling wave fault locators on the above lines.	Commissioning of the travelling wave fault locators on the above lines.	1,895	0	1,895
20	Travelling Wave Fault Location - Far North Coast 330kV and 132kV System	Install travelling wave fault locators on the above lines.	Commissioning of the travelling wave fault locators on the above lines.	890	0	890
21	Quality of Supply - Point-on-Wave Switching for 132kV Capacitor Banks	Replace standard circuit breakers with point-on-wave circuit breakers.	Installation of point-on-wave switching on 3 capacitor banks.	631	0	631
22	Quality of Supply - Point-on-Wave Switching for 66kV & Below Capacitor Banks	Replace standard circuit breakers with point-on-wave circuit breakers.	Installation of point-on-wave switching on 24 capacitor banks.	4,500	0	4,500
23	Research Projects - Behaviour of Residential Solar During System	Install high speed monitors on connection points with significant penetration of residential solar	Installation and commissioning of high speed monitors and fault	1,850	0	1,850

Ranking	Project	Description	Improvement target	Capex	Opex	Total
	Events	installations, and fault recorders at locations representative of various load types.	recorders at various representative connection points.			
24	Travelling Wave Fault Location - Southern 330kV Network	Install travelling wave fault locators on 63 and 51 Lines.	Commissioning of the travelling wave fault locators on the above lines.	1,347	0	1,347
25	Travelling Wave Fault Location - Western 220kV Network	Install travelling wave fault locators on the western 220kV network.	Commissioning of the travelling wave fault locators on the above lines.	877	0	877
26	Remote Information - Remote Interrogation of Protection Relays	Install remote interrogation of protection relays at 13 substations and commission production servers.	Remote interrogation of protection relay information from 13 substations operational.	1,000	0	1,000
27	Communications - Communications to Albury, ANM & Hume Substations	Installation of suitable bandwidth communications for SCADA to Albury, ANM and Hume substations.	Commissioning of the communication link to Albury, ANM and Hume substations.	4,200	0	4,200
28	Research Projects - Energy Storage	Install a pilot energy storage device in the Sydney area.	Installation and commissioning of an energy storage device to trial the concept.	4,900	0	4,900
<b>Total</b>				<b>36,215</b>	<b>105</b>	<b>36,317</b>

## 11.2 TransGrid's proposal

TransGrid proposed to apply version 4 of the STPIS in its entirety for the 2015–18 regulatory control period.<sup>13</sup>

### 11.2.1 Service component

TransGrid proposed to set the target as the historical average performance for each sub-parameter according to the method specified in the STPIS. It engaged Parsons Brinckerhoff to derive the caps and collars from the statistical distributions that best fit its historical performance under each sub-parameter.<sup>14</sup>

Table 111.3 sets out TransGrid's proposed performance targets, caps and collars for each parameter under the service component of the STPIS.

<sup>13</sup> TransGrid, *Revenue proposal 2014/15–2018/19*, p.221.

<sup>14</sup> TransGrid, *Revenue proposal 2014/15–2018/19*, pp.225-226.

**Table 111.3 TransGrid's proposed parameter values for the service component of the STPIS**

	Collar	Target	Cap	Weighting (% of MAR)
<b>Average circuit outage rate</b>				
Line outage – fault	22.46%	17.86%	13.26%	0.2
Transformer outage – fault	20.26%	14.92%	9.58%	0.2
Reactive plant – fault	23.32%	15.54%	7.76%	0.1
Line outage – forced	30.48%	14.98%	0.00%	0.0
Transformer outage – forced	25.51%	20.25%	14.99%	0.0
Reactive plant – forced	33.57%	20.39%	7.21%	0.0
<b>Loss of supply event frequency</b>				
>0.05 system minutes	5	3	1	0.15
>0.25 system minutes	3	1	0	0.15
<b>Average outage duration</b>				
Average outage duration	284.25	144.49	4.73	0.2
<b>Proper operation of equipment</b>				
Failure of protection system	n/a	n/a	n/a	0.0
Material failure of SCADA	n/a	n/a	n/a	0.0
Incorrect operational isolation of primary or secondary equipment	n/a	n/a	n/a	0.0

Source: TransGrid, *Revenue proposal 2014/15–2018/19*, pp.225-226.

## 11.2.2 Market impact component

TransGrid submitted 2011, 2012 and 2013 market impact performance data within its 2015–18 revenue proposal for validation. TransGrid's proposed performance values for 2011, 2012 and 2013 are 872, 737 and 593 dispatch intervals respectively.<sup>15</sup>

TransGrid acknowledged that the market impact parameter performance targets that will apply within the 2015–18 regulatory control period will be published by us as part of our annual service standards compliance reporting process.<sup>16</sup>

## 11.2.3 Network capability component

TransGrid proposed 28 projects totalling \$36.32 million over the 2014–18 period to improve the capability of its network.<sup>17</sup> The projects are summarised in Table 111.4 below.

<sup>15</sup> TransGrid, *Revenue proposal 2014/15–2018/19*, p.225.

<sup>16</sup> TransGrid, *Revenue proposal 2014/15–2018/19*, pp.226-227.

<sup>17</sup> TransGrid, *Network Capability Incentive Parameter Action Plan 2014/15 – 2017/18*, pp. 9-10. 28

**Table 111.4 TransGrid's proposed network capability projects (\$ 000s, \$2013/14)**

Category	Project	Estimated cost	Rank
Terminal Equipment Upgrades	67 & 68 Murray - Dederang Switchbays	360	2
	81 & 82 Liddell – Newcastle & Tomago Lines	600	15
	94E Mt Piper 132 – Wallerawang 132 Switchbays	50	9
Protection Changes	976 Line Configuration & Protection Changes	110	8
Protection & Metering Upgrades	993 Line Protection & Metering Upgrade	90	3
	99P Line Protection & Metering Upgrade	50	5
Control Schemes	Extension of Directlink Tripping Scheme	600	7
	Northern Reactive Plant Control Scheme	524	12
Dynamic Line Ratings & Transmission Line Upgrading	Snowy – Yass & Canberra 330kV Lines	1,400	11
	65 Murray – Upper Tumut & 66 Murray – Lower Tumut 330kV Lines	400	6
	4 & 5 Yass – Marulan, 9 Yass – Canberra, 61 Yass – Bannaby & 39 Bannaby – Sydney West 330kV Lines	2,600	13
	83 Liddell – Muswellbrook, 84 Liddell – Tamworth 330, 85 & 86 Tamworth 330 – Armidale & 88 Muswellbrook – Tamworth 330 330kV Lines	1,100	4
	Northern 132kV System	1,000	10
	969 Tamworth 330 – Gunnedah 132kV Line	300	14
	Western 220kV Network	877	25
Travelling Wave Fault Location	Southern 330kV Network	1,347	24
	Snowy Lines	2,211	17
	Northern 330kV Lines	1,895	19
	Far North Coast 132kV System	890	20
	North Western 132kV System	877	18
Communications	Communications to Albury, ANM & Hume Substations	4,200	27
Remote Information	Remote Interrogation of Protection Relays	1,000	26
Research Projects	Energy Storage	4,900	28
	Behaviour of Residential Solar During System Events	1,850	23
Quality of Supply	Point-on-Wave Switching for 132kV Capacitor Banks	631	21
	Point-on-Wave Switching for 66kV & Below Capacitor Banks	4,500	22

Category	Project	Estimated cost	Rank
Capacitor Banks	Beryl Capacitor Bank	1,900	16
Current Transformer Secondary Ratios	Queensland - New South Wales Interconnector	55	1

Source: TransGrid, *Network Capability Incentive Parameter Action Plan 2014/15 – 2017/18*, pp. 9-10.

TransGrid has worked collaboratively with AEMO in the development and ranking of this project plan before submitting its revenue proposal. Based on its assessment, AEMO endorses all 28 projects proposed by TransGrid under the NCIPAP scheme as they have positive net market benefits and are expected to deliver value to customers.<sup>18</sup>

## 11.3 AER's assessment approach

A revenue determination for a TNSP is to specify, amongst other things, the annual building block revenue requirement for each regulatory year of the regulatory control period.<sup>19</sup> In turn, the annual building block revenue requirement must be determined using a building blocks approach, under which one of the building blocks is the revenue increments or decrements (if any) for that year arising from the application of any STIPS (and other schemes).<sup>20</sup> As set out above, we have assessed TransGrid's proposal against the requirements of the STIPS version 4.1.

### 11.3.1 Service component

We assessed whether TransGrid's proposed performance targets, caps and collars comply with the STIPS requirements for:<sup>21</sup>

- average circuit outage rate, with six sub parameters<sup>22</sup>
- loss of supply event frequency, with two loss of supply event sub-parameters<sup>23</sup>
- average outage duration
- proper operation of equipment, with three sub-parameters<sup>24</sup>:

We must accept TransGrid's proposed parameter values if they comply with the requirements of the STIPS. We may reject them if they are inconsistent with the objectives of the STIPS.<sup>25</sup> We measure actual performance for the 'average circuit outage rate' and 'average outage duration' parameters on a two year rolling average basis in accordance with appendix E of the STIPS.

We assessed TransGrid's service component proposal against the requirements of the STIPS — that is, whether:

<sup>18</sup> AEMO, *AEMO Endorsement of TransGrid Network Capability Incentive Parameter Action Plan for 1 July 2014 – 30 June 2019*, 4 February 2014.

<sup>19</sup> NER, cl. 6A.4.2(a)(2).

<sup>20</sup> NER, cll. 6A.5.4(a)(5), 6A.5.4(b)(5) and 6A.7.4.

<sup>21</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, clause 3.2.

<sup>22</sup> Six parameters include line outage – fault, transformer outage – fault, reactive plant – fault, line outage – forced outage, transformer outage – forced outage and reactive plant – forced outage.

<sup>23</sup> They are frequency of events when loss of supply exceeds 0.10 system minutes and frequency of events when loss of supply exceeds 1.00 system minutes.

<sup>24</sup> They are failure of protection system, material failure of SCADA system and incorrect operational isolation of primary or secondary equipment.

<sup>25</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2.



- TransGrid's data recording systems and processes produce accurate and reliable data and whether the data is recorded consistently based on the parameter definitions under the STPIS<sup>26</sup>
- the proposed performance targets were equal to the average of the most recent five years of performance data<sup>27</sup>
- any adjustments to the proposed targets are warranted and reasonable<sup>28</sup>
- TransGrid used a sound methodology, with reference to the performance target, to calculate the proposed caps and collars,<sup>29</sup> and
- any adjustment to a performance target was applied to the cap and collar of that parameter.<sup>30</sup>

We assessed the distributions used by TransGrid to calculate caps and collars to determine whether a sound methodology was used.

### 11.3.2 Market impact component

We have audited TransGrid 2011, 2012 and 2013 market impact performance data using the following approach:

- independently calculating (using AEMO data) the number of dispatch intervals related to binding outage constraints and validating that the outages were attributable to the TNSP
- searching AEMO Market Notices to confirm the validity of TNSP's classification of constraints as outage related, and
- cross-checking network outage request information provided by AEMO to confirm the classification of constraints as outage related.

### 11.3.3 Network capability component

As part of its revenue proposal, TransGrid submitted a network capability incentive parameter action plan (NCIPAP).<sup>31</sup> This plan must identify the reason for limits on each transmission circuit and injection points in the network. It must also list proposed priority projects and project improvement targets that TransGrid will undertake in the 2014–18 period (including the 2014–15 transitional year) to improve the capability of the transmission circuits and injection points. We must approve a priority project if it is consistent with the requirements of the STPIS.<sup>32</sup>

We assessed TransGrid's network capability component proposal against the requirements under clause 5.2 of the STPIS — that is, whether TransGrid's NCIPAP has identified:

- for every transmission circuit or injection point on its network, the reason for the limit for each transmission circuit or injection point
- the total operational and capital cost of each priority project
- the proposed value of the priority project improvement target of each priority project

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<sup>26</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2(d).

<sup>27</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2(g).

<sup>28</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2(k).

<sup>29</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2(e).

<sup>30</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2(e).

<sup>31</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 5.2(b).

<sup>32</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 5.2.

- the current value of the limit for the transmission circuits and/or injection points which the priority project improvement target is seeking to improve, and
- the ranking of the priority projects in descending order based on the likely benefit of the priority project on customers or wholesale market outcomes
- Clause 5.2(b) of the STPIS also requires the average total expenditure of the priority projects outlined in each regulatory year must not be greater than 1 per cent of the TNSP's average maximum allowed revenue proposed in its revenue proposal for the regulatory control period.
- The priority project improvement target must result in a material benefit and the proposed priority project capital expenditure needs to meet the definition of minor capital expenditure for the purposes of the NCIPAP. The cost of the proposed priority projects must not be included in the total forecast operating or capital expenditure by the TNSP in its revenue proposal. The TNSPs must consult with the AEMO prior to submitting its NCIPAP.
- We also considered information provided by AEMO in determining the benefits of the proposed priority project improvement targets and whether the net benefit of each project resulted in a material benefit.<sup>33</sup>

#### 11.3.4 Interrelationships

The NER requires the STPIS to take into account any other incentives provided for in the Rules that TNSPs have to minimise capital or operating expenditure.<sup>34</sup> One of the objectives of the STPIS is to assist in the setting of efficient capital and operating expenditure allowances by balancing the incentive to reduce actual expenditure with the need to maintain and improve reliability for customers and reduce the market impact of transmission congestion.<sup>35</sup>

The STPIS allows us to adjust the performance targets of the service component for the expected effects on the TNSP's performance from any increases or decreases in the volume of capital works planned during the regulatory control period.<sup>36</sup> We consider planned reliability improvement works in setting the performance targets of the service component.

### 11.4 Reasons for draft decision

The following section sets out our consideration in applying the STPIS to TransGrid for the 2015–18 regulatory control period.

#### 11.4.1 Service component

TransGrid is subject to version 4.1 of the STPIS for the next regulatory control period. The new version includes a parameter called 'average circuit outage rate' introduced in version 4 of the STPIS. This parameter replaced the 'transmission circuit availability' parameter under previous versions of the STPIS.

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<sup>33</sup> AER, *Final – Service Target Performance Incentive Scheme, September 2014*, cl. 5.2(c).

<sup>34</sup> NER, cl. 6A.7.4(b)(5) of the NER.

<sup>35</sup> AER, *Final – Service Target Performance Incentive Scheme, September 2014*, cl. 1.4.

<sup>36</sup> AER, *Final – Service Target Performance Incentive Scheme, September 2014*, cl. 3.2(k).

## Performance targets

Performance targets must equal the TNSP's average performance history over the past five years unless they are subject to adjustment under clause 3.2(h) or (k) of the STPIS.<sup>37</sup> We generally approve performance targets that are the arithmetic mean of the past five years' performance data. TransGrid followed this approach for its proposed performance targets.

The CCP noted that TransGrid has consistently received bonuses under the STPIS, which indicated that TransGrid require minimal further reliability driven expenditure for the next regulatory control period.<sup>38</sup> The EMRF submitted that the replacement capital expenditure amount proposed by TransGrid has almost doubled compared to the previous period, which should result in improved service performance. In addition, TransGrid is likely to achieve better service performance through the NCIPAP process. The EMRF suggested that there should be an offsetting effect of the increased replacement capital expenditure and the NCIPAP on the service performance targets.<sup>39</sup>

Clause 3.2(h) or (k) of the STPIS allow us to set performance targets based on different period and make reasonable adjustment to the performance targets. As we are funding TransGrid to maintain its current reliability performance and have removed expenditure that is associated with performance improvement. Further, the STPIS is an incentive scheme, TransGrid can only retain rewards for sustained and continuous improvements. Once improvements are made, the performance targets will be tightened in future years. Therefore, we consider it appropriate to set TransGrid's performance targets based on its average performance history over the past five years without adjustment.

## Caps and collars

Proposed caps and collars must be calculated with reference to the proposed performance targets using a sound methodology.<sup>40</sup> In the past, we have generally accepted approaches that use five years of performance data to derive a statistical distribution, with the caps and collars set at two standard deviations either side of the mean (if using a normal distribution), or at the 5th and 95th percentiles (if using a distribution other than the normal distribution).

The distribution selected to calculate the caps and collars for a particular parameter must be conceptually sound. The following principles should be applied when selecting a distribution to calculate caps and collars:

- the chosen distribution should reflect any inherent skewness of the performance data.
- the distribution should not imply that impossible values are reasonably likely. For example, the distribution for an average circuit outage rate sub-parameter should not imply that values below zero per cent are reasonably likely.
- discrete distributions should be used to represent discrete data. For example, a discrete distribution such as the Poisson distribution should be used when calculating caps and collars for loss of supply sub-parameters. Continuous distributions should not be used.

Using standard deviations to set caps and collars is appropriate when a normal distribution is selected. However, when a normal distribution is not selected, the better measure to use is the

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<sup>37</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2(g).

<sup>38</sup> CCP, *Consumer Challenge Panel (CCP6 Sub Panel) Submission on the TransGrid Revenue Proposal*, 8 August 2014, p.3 and p.9.

<sup>39</sup> EMRF, *Submission on TransGrid's Revenue Proposal*, July 2014, pp. 77-78.

<sup>40</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 3.2(e).

percentiles. This is consistent with the EMCa's advice for the 2013 SP AusNet transmission decision.<sup>41</sup>

TransGrid has engaged Parsons Brinckerhoff (PB) in undertaking statistical analysis to set collars/targets/caps based on historical performance for the service component parameters.<sup>42</sup> Table 111.5 shows the distributions proposed by TransGrid for setting the caps and collars.

**Table 111.5 TransGrid's proposed distributions for calculating caps and collars**

Parameter	Distribution	Cap (standard deviations below target)	Collar (standard deviations above target)
<b>Average circuit outage rate</b>			
Line outage – fault	Pearson 5	2	2
Transformer – fault	Weibull	2	2
Reactive plant – fault	Weibull	2	2
Line outage – forced	Uniform	2	2
Transformer outage – forced	Weibull	2	2
Reactive plant – forced	LogLogistic	2	2
<b>Loss of supply events</b>			
> 0.05 system minutes	IntUniform	2	2
>0.25 system minutes	Poisson	2	2
<b>Average outage duration</b>			
Average outage duration	LogLogistic	2	2

Source: Parsons Brinckerhoff, *Fitting Probability Distribution Curves to Reliability Data*, 31 March 2014.

We do not accept TransGrid's proposed caps and collars as:

- the distributions from the above analysis are not normal distributions, we consider the caps and collars should be based on the 5th and 95th percentiles rather than two standard deviations from the mean.
- PB preferred the Anderson-Darling (A-D) fit statistic over the Kolmogorov-Smirnov (K-S) fit statistic as the A-D fit statistic focuses on the difference between the tails of fitted distribution and input data. PB considered distribution curve at the tails improves the calculation of the scheme measures. However, we doubt such claims can be made about more weights placed in the tails when we only have 5 data points. Given this, on balance we consider the K-S fit statistic is to be preferred due to its simplicity, especially when there is no evidence to suggest the A-D fit statistic is more appropriate in this particular case.

<sup>41</sup> EMCa, *SP AusNet technical review*, August 2013, p. 107, paragraphs 396–398.

<sup>42</sup> TransGrid noted the proper operation of equipment parameter was introduced as a reporting-only parameter. As a result, it did not propose values for these sub-parameters, but it will commence reporting against these sub-parameter from July 2015. As we are not applying any weighting on these sub-parameters, we accept the approach proposed by TransGrid.

The EMRF noted by applying TransGrid's proposed caps and collar, only two of the past performance outcomes would lie outside the bounds of the cap and collar ranges. It suggested using 1.5 standard deviations to set the caps and collars might be more appropriate.<sup>43</sup>

The cap specifies the level of performance that results in a TNSP receiving the maximum financial reward attributed to a parameter; the collar specifies the level for receiving the maximum financial penalty. We have applied the 5th and 95th percentiles rather than 2 standard deviations from the mean as the derived distributions are not normal distributions. If the collar was set at a level that is closer to the performance target, the TNSP would receive the maximum penalty once performance degraded to that level. There would then be no incentive for the TNSP to prevent or mitigate events that would further affect service performance. A collar set at the 95th percentile (or two standard deviations for a normal distribution) provides an incentive to prevent or mitigate events when performance has degraded below the 1.5 standard deviation level, as the TNSP may still be able to avoid the maximum penalty. This logic similarly applies for a cap. As such, we consider it reasonable to set the collars and caps at the 5th and 95th percentile for asymmetric distributions or 2 standard deviations for normal distributions.

Table 111.6 sets out the caps and collars derived from our preferred approach as discussed above. We consider our approach is conceptually sound and our calculated caps and collars provide a materially stronger incentive for TransGrid to improve and maintain its service performance.

**Table 111.6 Caps and collars derived from our preferred method**

Parameter	Distribution	Cap (5th percentile)	Collar (95th percentile)
<b>Average circuit outage rate</b>			
Line outage – fault	Weibull	12.38%	22.26%
Transformer – fault	Weibull <sup>44</sup>	10.26%	19.01%
Reactive plant – fault	Gamma	9.54%	22.73%
Line outage – forced	Uniform	1.34%	25.49%
Transformer outage – forced	Weibull	15.56%	24.15%
Reactive plant – forced	Triangular	6.55%	28.55%
<b>Loss of supply events</b>			
> 0.05 system minutes	IntUniform <sup>45</sup>	2	4
>0.25 system minutes	Poisson	0	2
<b>Average outage duration</b>			
Average outage duration	LogLogistic	67.97	266.53

Source: AER analysis

<sup>43</sup> EMRF, *Submission on TransGrid's Revenue Proposal*, July 2014, p.77.

<sup>44</sup> Although BetaGeneral distribution provides the lowest K-S distance statistic, it lacks A-D convergence as it requires 4 parameters and we only have 5 observations. We used Weibull distribution instead as it provides the second lowest K-S distance statistic.

<sup>45</sup> The calculated cap is 3 using the IntUniform distribution, which is equal to the corresponding performance target. This outcome is nonsensical as it would result in a situation where TransGrid could receive both the financial reward associated with the cap (maximum bonus) and target (no bonus or penalty). Therefore we adjust the cap to 2 events.

## 11.4.2 Market impact component

Our audit of TransGrid's 2011, 2012 and 2013 market impact performance data resulted in a number of adjustments. These adjustments are shown in table 11.7.

**Table 11.7 AER adjustments to TransGrid's market impact component performance data**

Constraint	AER adjustment	AER reason for adjustment
#N-Q-MNSP1_I_E (2011)	-4.5	Reduced weight from 1 to 0.5, the outage is shared between TransGrid and Directlink.
VN::DDMS (2011)	+2.5	Increase weight from 0 to 0.5, the outage is shared between TransGrid and AusNet services.
V>SML_BUDP_1 (2012)	+10	Constraint invoked to manage a network outage.
V>SML_BUDP_2 (2012)	+14	Constraint invoked to manage a network outage.
V>SML_BUDP_3 (2012)	+11	Constraint invoked to manage a network outage.
V>SML_BUDP_4 (2012)	+1	Constraint invoked to manage a network outage.

Source: TransGrid email to AER dated 9 October 2014

Given the above adjustments, we revised TransGrid's 2011 performance from 872 to 870 dispatch intervals, its 2012 performance from 737 to 773 dispatch intervals and its 2013 performance remained at 593 dispatch intervals. In arriving at this revision, we continuously engaged with TransGrid.<sup>46</sup> Consequently, TransGrid's market impact performance target for 2014 is 745 dispatch intervals.

## 11.4.3 Network capability component

We consider that TransGrid in consultation with AEMO, undertook a robust process to identify network constraints. Based on AEMO's assessment and our review of TransGrid's proposal, we accept that TransGrid's proposed priority projects and priority project improvement targets, as submitted on 30 May 2014. They are consistent with the STPIS and will lead to a material benefit.<sup>47</sup> We note the average total expenditure of the priority projects in each regulatory year is not greater than 1 per cent of TransGrid's proposed average maximum allowed revenue as required by clause 5.2(b) of the STPIS. The priority project rankings and targets are set out in Table 111.2.

The cost of the proposed NCC projects must not be included in the total forecast capital expenditure proposed by the TNSP in its revenue proposal to meet the capital expenditure objectives under clause 6A.6.7 of the NER.<sup>48</sup> We note TransGrid has proposed some projects under both the NCIPAP and the contingent capital expenditure, these include:<sup>49</sup>

<sup>46</sup> AER email to TransGrid dated 23 September 2014, TransGrid email to AER dated 9 October 2014 and AER letter to TransGrid dated 17 October 2014.

<sup>47</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, clause 5.2.

<sup>48</sup> AER, *Final – Service Target Performance Incentive Scheme*, September 2014, cl. 5.2(q).

<sup>49</sup> TransGrid, *Attachment L – Contingent Projects*, p.16; TransGrid, *Attachment AG – Network Capability Incentive Parameter Action Plan 2014/15 – 2017/18*, pp. 20-22.

- line 01 Upper Tumut to Canberra to be upgraded to 100°C
- line 39 Bannaby to Sydney West to be upgraded to 100°C
- upgrade of lines 4 and 5 Yass to Marulan to 100°C

These projects increase the ratings of lines by increasing the height of the conductor to allow a higher operating temperature. This is complementary to using dynamic ratings. There is therefore no duplication in the contingent capital expenditure. However the use of dynamic ratings will mean the requirement for new generation in southern NSW is higher than assumed by TransGrid in its proposal for the economic need for this contingent project.

The EMRF submitted that NCIPAP projects are no different to normal capital expenditure projects and there is no reason to incentivise such projects.<sup>50</sup> As discussed in the explanatory statement of the draft version 4 STPIS, given the information asymmetry, we consider these projects would not be identified in the absence of the network capability component (NCC).<sup>51</sup> They have only been identified as a result of examination of network limits required by the NCC, and have been endorsed by AEMO as having substantial benefits for consumers. In addition, unlike the capital expenditure provided in the revenue proposal, identified NCIPAP projects must be completed in the regulatory control period or penalties will apply.

The EMRF, the EUAA and Norske Skog Albury Mill (NSA) expressed their concerns with the long payback period of some of TransGrid's proposed priority projects and queried the benefit to consumers from these projects.<sup>52</sup>

In developing version 4 of the STPIS, we noted there are a range of factors that may limit the capability of assets and therefore the ability of those assets to deliver peak load and facilitate the efficient dispatch of generation in the market. We considered TNSPs are best placed to identify limitations in their networks and implement low cost solutions to address those limitations for the benefit of consumers. However, we recognised that the existing regulatory framework did not incentivise this behaviour.<sup>53</sup> The NCC is aimed to incentivise increased capability of existing assets in the network when needed most. It does this by requiring TNSPs to reveal the existing capability of their networks and to identify low cost projects to increase network capability that would provide greater value to generators and consumers. Generators benefit from improved capability because there is a lower risk of their generation dispatch being constrained, which is ultimately passed onto consumers through lower wholesale electricity prices. The NCC incentivises TNSPs to improve ability of their networks to meet peak demand without additional major augmentation capital expenditure, which also translate to lower prices for consumers.

The purpose of the annual NCC incentive payment is to fund the implementation of NCIPAP projects. If the approved NCIPAP is comprised of projects totalling approximately 1 per cent of the MAR, the TNSP will receive an incentive of around 0.5 per cent of its MAR. We acknowledge some of TransGrid's proposed priority projects have estimated payback period well in excess of 5 years. However, based on AEMO's assessment and our review, we consider those proposed priority projects still result in material benefits in accordance with clause 5.2(l) of the STPIS. Given the design of the

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<sup>50</sup> EMRF, *Submission on TransGrid's Revenue Proposal*, July 2014, p.79-80.

<sup>51</sup> AER, *Explanatory statement electricity transmission network service providers draft service target performance incentive scheme*, September 2012, p.35.

<sup>52</sup> EMRF, *Submission on TransGrid's Revenue Proposal*, July 2014, pp.79-81; EUAA, *Submission on Transgrid's Revenue Proposal 2014– 2019*, 8 August 2014, p.12; NSA, *Submission on TransGrid's Revenue Proposal*, August 2014, p.12.

<sup>53</sup> AER, *Explanatory statement – Electricity transmission network service providers, Draft service target performance incentive scheme*, September 2012, p.35.

current STPIS, the inclusion of such projects in the NCIPAP (up to a maximum of 1 per cent of the proposed MAR) will benefit consumers, provided they result in a net benefit. This is because the incentive payment under the NCC is set at 1.5 per cent of MAR each year irrespective of the total cost of the approved NCIPAP projects.