Attachment 07.1

Connection Capex Justification

Capital Expenditure – Connections (Standard Control Services)

Contents

1 Purpose of this document

This document explains and justifies our connections capital expenditure (capex) for our Standard Control Services (SCS) for the next regulatory period (1 July 2019 to 30 June 2024). This document references other supporting documents for further detail.

Unless otherwise stated, capex is presented in real 2018-19 dollars ($RY2019) and is expressed as direct costs (i.e. excludes escalations and overheads).

2 Structure of this document

This document is structured as follows:

- Section 3 details our connections capex profile for the previous, current and next periods;
- Section 4 explains the conceptual nature of connections capex and why it is necessary;
- Section 5 explains and justifies our forecasting methodology for connections capex for the next period;
- Section 6 details our connections capex forecast for the next period;
- Section 7 explains how we consider that our connections capex forecast meets the capex objectives and criteria in clause 6.5.7 of the Rules; and
- Section 9 details the supporting documentation relevant to our connections capex forecast.

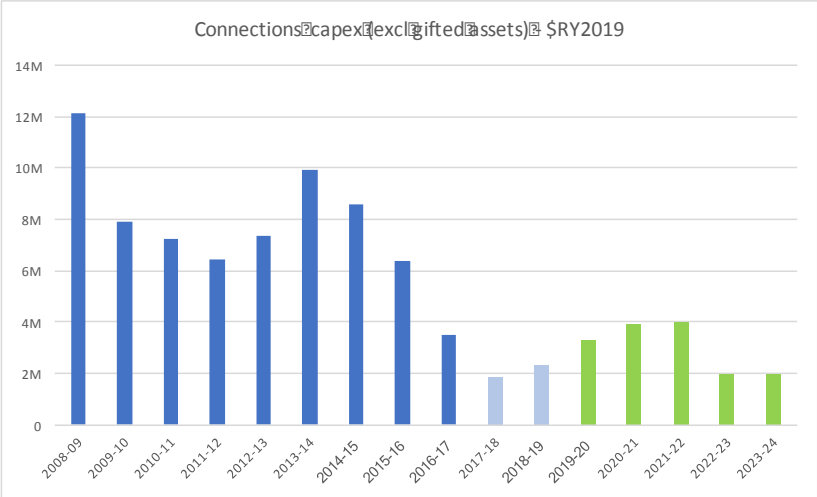
3 Expenditure Profile Trends

This section details the profile of our connections capex and customer contributions for the previous, current and next periods to provide a longitudinal overview of expenditure trends.

3.1 Connections Capex

The historical and forecast trend in capex that we directly incur ourselves in providing connection services without deducting any contributions made by connection applicants is illustrated in figure 1.

Figure 1 - Gross Connections Capex Trend (excluding gifted assets)



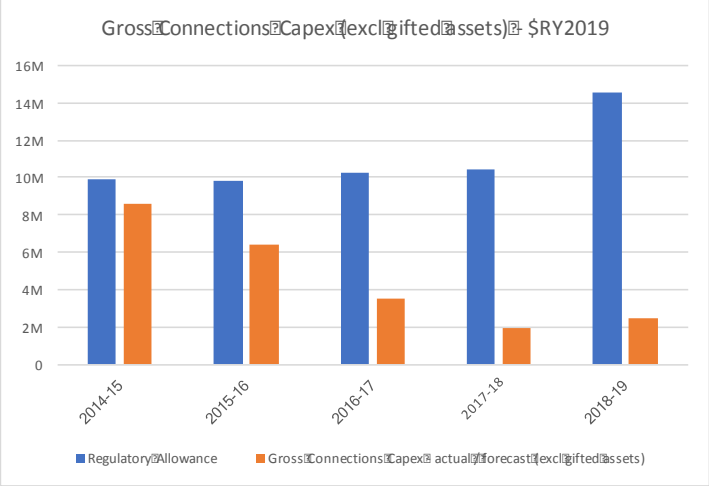
The forecast connections capex that we have incurred is significantly lower than previous periods and is 34% lower than the current regulatory period, reflecting the economic outlook for the NT. This is due to a lower new connections forecast over the 2017 to 2024 period than we have experienced historically. Our new connections forecast was prepared by the Australian Energy Market Operator (AEMO).

The following table and graph compares our actual and estimated connections capex for the 2014-19 regulatory period against the regulatory allowance set by the Utilities Commission (UC).

Table 1 - Current Regulatory Period Actual / Forecast Connection Capex (excluding gifted assets)

$M, Real 2018-19	2014-15	2015-16	2016-17	2017-18	2018-19	Total
UC Determination	10.0	10.0	10.6	11.0	15.7	57.3
Actual / Forecast	8.6	6.4	3.5	2.0	2.5	22.9
Variance	-1.4	-3.6	-7.2	-9.0	-13.2	-34.4

Figure 2 - Gross Connections Capex Current Regulatory Period



Based on the AEMO total connection numbers forecast, we expect to underspend the UC gross capex allowance by around 34%. This is also approximately the same for net capex, which (for this purpose) is calculated by deducting capital contributions from gross connection capex. The differences between the regulatory allowance and actual / forecast for both gross and net capex have increased to a plateau post 2014-15.

Previous forecasts have primarily been calculated by extrapolating historical connection volumes. As noted above, the forecast for the next regulatory period is based on AEMO's independent forecast, which incorporates econometric factors that are expected to better reflect the future forecast growth of the NT economy.

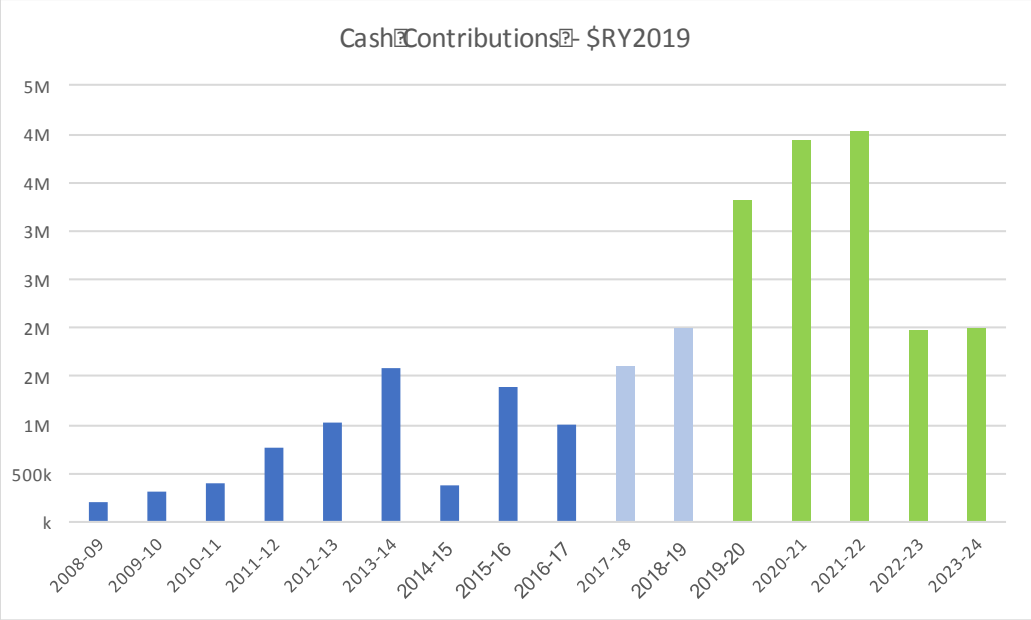
3.2 Customer Contributions

Customer connection projects that are funded in part or wholly by our customers are referred to as customer contributions. There are two types of customer contributions:

- Cash contributions – these are payments that we receive from customers where the incremental cost of the connection is greater than the incremental revenue; and
- Gifted (or contributed) assets – these are assets that are built by an accredited third party and gifted to us to operate and maintain.

Cash contributions are largely affected by our proposed Customer Connections Services Policy (Connections Policy). As explained in section 4.4, we are proposing to revise our Connections Policy so that all customers connecting to our network pay the full cost of doing so, which is a change from our current policy (which applies a cost-revenue test). The net result – as evidenced in the figure below – is that our cash contributions are expected to increase over the next regulatory period, despite the lower connection (and connection capex) forecast for that period.

Figure 3 - Cash Contributions Trend



In contrast, gifted assets are not affected by our proposed change to the Connection Policy. Gifted assets are forecast to remain at current levels (in real terms) – which means that they are forecast to be (on average) three times greater than cash contributions over the next

regulatory period. As such, the expected change to the level of cash contributions will not significantly affect our total capital contribution forecast.

4 Nature of expenditure

This section explains the conceptual nature of our connections capex and why it is necessary.

4.1 Our obligations to connect customers

All connections are initiated, and carried out, at the request of customers. The timing and volume of connections is therefore largely outside of our control.

Clause 6 of the NT Electricity Networks (Third Party Access) Act obliges PWC as the licensed network provider to use all reasonable endeavours to accommodate the requirements of those seeking access to the electricity network.

4.2 Contestability of connection and augmentation works

Connection works involving the design and installation of assets between the existing network and the connection applicant (i.e. extensions and augmentation on the customer premises) are undertaken by us, but also can be undertaken by accredited third parties. The NT has an emerging market of accredited service providers for the provision of design and / or construction of electricity distribution connection assets. We allow qualified service providers to design and construct distribution connection assets provided they are electrically isolated from the energised network, changes can be performed safely and the resulting installation meets our standards.

For example, real estate developers typically engage accredited service providers to design and install distribution assets within developments and high voltage (HV) supply cables up to zone substations. The only work that we have a mandated monopoly on is the final connection (testing and energisation) to customers. Basic connection services by their nature also fall into this type of work.

We currently perform all transmission and distribution network augmentation work as a monopoly service provider. Such augmentation expenditure (augex) is not included within our connections expenditure.

4.3 Mapping our connection activities to the Australian Energy Regulator's (AER's) service classification

Despite there being an emerging level of contestable accredited service providers in the connections space, the provision of connection services by third parties has only been evident in real estate developments. The AER Framework and Approach paper has determined that all connections services should be classified as SCS. We do not propose to change that classification.

The only exception to this classification is the circumstance where a connection applicant has decided to tender connection work where we have submitted and successfully won the tender. In that circumstance, the works would be classified as non-regulated. The distribution system assets would then be gifted to our regulated network as if a third party

had installed the assets. This scenario has not arisen to date but has been included for completeness.

4.4 Application of the AER's Connection Charge Guidelines and Framework and Approach

This section provides the background and rationale to the key features of our proposed Connection Policy.

The proposed Connection Policy to apply during the next regulatory period has the following key features:

- Connection charges only apply to extension works performed by us to benefit a single connection applicant and – importantly – the full costs of the extension works are recovered from that applicant (i.e. there is no cost – revenue test applied), which results in net capex of zero over a regulatory period;
- A consistent approach is applied to capital contributions for all connection applicants (i.e. real estate developers and retail customers);
- Connection works undertaken by accredited third party providers must be gifted to us and must satisfy our standards;
- There is a Pioneer scheme and Equalisation scheme in place to mitigate the effects of "first mover disadvantage" that ensures that the initial connection costs are fairly shared among both the initial customer and those that subsequently benefit from the originally installed connection assets; and
- There is no augmentation charge for any connection applicant provided that the requested increase in demand is within our network planning forecast demand tolerances and planning horizon. As noted above, augex is a separate expenditure category that results from network planning studies and is fully funded by us and recovered through SCS tariffs.

In summary, connection charges apply to extension works to the existing shared network that we perform and chosen to fully recover from connection applicants.

The proposed Connection Policy has been developed to conform with the AER's Connection Charge Guideline, AER Framework and Approach and Northern Territory National Electricity Rules (NT NER) Chapters 5A and 6.

Particular relevant excerpts are as follows:

NT NER 5A.E.1 (c) (6)

> *"however, a capital contribution may only be required in the circumstances described in subparagraphs (1) to (5) if provision for the costs has not already been made through existing distribution use of system charges or a tariff applicable to the connection." ;*

AER Framework and Approach, pages 22 & 23

> *"The nature of basic connection services is that in most instances, the customer requesting the service will benefit from the provision of that service. As such, the costs are directly attributable to identifiable customers. However, application of our Connection Charge Guideline provides a safety net for the broader customer base. That is, the requirement of the requesting customer to make a*

capital contribution to a service protects the broader customer base from incurring additional costs for services of no benefit to them."; and

AER Connection Charge Guideline

"PWC may only seek a capital contribution from a customer when the incremental cost of the standard control connection service exceeds the estimated incremental revenue expected to be derived from the standard control connection service."

"Although we classify separate components of connection services in some other NEM jurisdictions, we do not consider it the most appropriate approach for the NT. This is because PWC may recover costs through shared network charges to the extent that costs have not been recovered as capital contributions under Chapter 5A of the NER."

Our rationale for the proposed Connection Policy are:

- Our interpretation of NT NER sub-clauses 5A.1E (c) (1) through (6) is that for each cost element that makes up a connection charge, we have discretion to choose how to recover the efficient costs incurred when connecting a customer that are not already recovered through SCS tariffs or other fees. In applying that discretion, we have elected to:
  (a) fully recover actual costs for any work between the connection applicant and the existing network that directly solely benefits the connection applicant; and
  (b) all upstream shared network capacity augmentation is recovered by all customers via distribution use of system charges.

  By definition we are not recovering and costs associated with (a) via use of system charges.

- Requiring connection applicants to fully fund works performed by us means that existing customers are not cross subsidising new customers;
- Assets that are fully funded via cash contributions or gifted assets go into the regulated asset base (RAB) at zero value, which means that new customers do not pay twice for them, as by definition they only pay their share of the shared distribution network assets;
- Applying different charges for connection work to augmentation work is consistent with our understanding of the intent and example in NT NER 6.7A.1 (2)(ii);
- Our Connection Policy is likely to result in lower SCS tariffs for all customers than would result if we instead apply a cost-revenue test to determine required cash contributions (which is typically less than the full cost of the connection);
- Not using the cost-revenue test removes the need for – and uncertainty inherent in – forecasting future SCS revenues and consumption out 15-30 years;
- Seeking upfront capital charges for the full cost of connection works is more transparent and easier to administer than applying the cost-revenue test; and
- Having single user connection applicants fully reimburse connection works is consistent with our existing Connection Policy as applied to real estate developers. Assuming that connection charges applied to real estate developers are passed onto

individual customers within the development as blocks are sold, the proposed policy provides a more equitable approach from an end user retail customer perspective.

4.5 Regulatory treatment of Connections capital expenditure and customer contributions

Our forecast customer contributions (including gifted assets) are deducted from our gross connections capex to determine our net connections capex. It is this net capex that is rolled in our RAB. In this way, our customer contributions are excluded from the RAB used to determine our SCS tariffs.

5 Expenditure forecasting method for forthcoming period

We prepared our connections expenditure forecast to comply with the AER's Final RIN Main Notice for PWC.

5.1 Gross Connections Capex Forecast

The AER defines gross connections expenditure as the connections expenditure incurred by us, excluding any connection applicant contributions.[1] Further, the AER's RAB template requires a measure of gross capex that includes the value of gifted assets, while the RIN defines capex as excluding gifted assets.

All costs incurred by us in undertaking customer connections post enquiry stage are capitalised for statutory and regulatory reporting purposes.

Connections capex is forecast for each connection type by multiplying the cost per connection (unit rate) by the incremental change in the number of connections (volume) in the NT each year, as follows:

1. The unit cost for each connection type was calculated using our actual data for 2016-17 by dividing its annual cost by the number of connections (again for that connection type).[2]

   This data is provided in Tables 2.5.2 and 2.5.3 of our response to the category analysis RIN template. Each unit rate (based on actual 2017 costs) was then indexed to $RY2019.

2. The annual volume per connection type was developed using two data sources – (1) AEMO's forecast of connection volumes in its demand and connections forecasting report[3], and (2) RY2017 PWC CA RIN table 2.5.3.

   The AEMO total connection forecast was developed using 10 years of historical customer numbers[4] provided by us and applying regression coefficients based on Gross

[1] As per clause 2.31 of Basis of Preparation instructions in the AER Final RIN Main Notice for PWC.

[2] This is an "off the point" (meaning taking the most recent time series data point) value on the basis that it is the most recent and reliable data. Further, a sensitivity check was undertaken using a 4 year average which resulted in a 10% increase over the off the point value.

[3] AEMO, Power and Water Corporation – Maximum Demand, Energy Consumption and Connection Forecasts – 2017 Implementation of Forecasting Procedure, September 2017.

[4] These are "active" connections that reflect the cumulative number of new connections less disconnections. Note – it will be a smaller number than new connections.

State Product and population growth. We used the change in this forecast total customer numbers to estimate the number of new connections each year using the following formula:

$$NC_t = \left(\frac{AFN_t - AFN_{t-1}}{AFN_{t-1}}\right) \times NC_{t-1}$$

Where:

NC_t = Number of new connections per connection type in year t.

NC_{t-1} = Number of new connections per connection type in year t-1. (base year being the PWC 2017 CA RIN data point)

AFN_t = Total number of active connections sourced from the AEMO report in year t.

AFN_{t-1} = Total number of active connections sourced from the AEMO report in year t-1.

3. The gross connections capex forecast is then derived by multiplying the unit rate derived in step one by the annual new connections derived in step two for each year in the 2017-24 forecast period.

5.2 Gifted Assets

Our forecast for gifted assets considers recent history and has been taken off the point by using the actual value of gifted assets for 2016-17 and holding this constant over the 2017-24 before applying inflation and real input cost escalation.

The reason for this is that gifted assets are predominantly provided via real estate developers and historical data – and our experience – indicates that there is not a close correlation between gifted assets and connections capex. We therefore held our forecast at a constant value in the absence of a suitable driver.

5.3 Cash Contributions

Our proposed Connection Policy requires full cost contributions from connection applicants, either directly from original connection applicants or from subsequent applicants via the pioneer or equalisation scheme. This means that over a regulatory period our forecast cash contributions equals the costs that we expect to incur in undertaking connection works.

5.4 Justification of expenditure forecasting method

We consider that our proposed expenditure forecasting method is the best available method of forecasting our connections capital expenditure because:

- It is based on trend analysis, which is consistent with the AER's proposed approach to assessing connections capital expenditure, as set out in the Expenditure Forecast Assessment Guideline;
- We have attempted to benchmark[5] cost per connection type unit rates with peer NEM

[5] Refer to Appendix A

distribution network service providers (DNSP's) using RIN Category Analysis table 2.5 cost and volume data for the 2016/17 reporting period. The conclusion is that data quality or interpretation of requirements is quite variable across the DNSP peer group. Notwithstanding this, our calculated unit rates for connection types of higher volume and expenditure generally fall within the range of the peer group; and

- We relied on AEMO as an independent credible expert to provide a connection number forecast to use as our connections volume driver and are using the same forecast in other aspects of our regulatory proposal (e.g. opex rate of change).

6 Expenditure forecasts

This section details our forecast connections capital expenditure for the forthcoming period.

6.1 Forecast Connections Capex

Table 2 details our forecast gross connections capex for the forthcoming period. For transparency we have provided the gross forecasts with and without gifted assets. Our forecast average annual expenditure is $3.1 million (Real 2019), which is 34% lower than our actual / estimated average annual expenditure of $4.6 million (Real 2019) in the current period as previously discussed in section 3.1.

Table 2 - Gross Connections Capex Forecast ($RY2019)

$M, Real 2018-19, unescalated	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Gross Connections capex (excluding gifted assets and cash contributions)	3.4	4.0	4.1	2.0	2.0	15.6
Gifted assets	9.1	9.1	9.1	9.1	9.1	45.6
Gross Connections capex (including gifted assets and excluding cash contributions)	12.5	13.1	13.2	11.1	11.1	61.1

6.2 Forecast Customer Contributions

Table 2 details our customer contributions forecast for the next period based on the AER's Connection Guidelines and our proposed Connection Policy. As shown, the cash contributions forecast equals the costs that we expect to incur, reflecting the full cost recovery required by the proposed Connection Policy.

Table 3 - Cash Contributions Forecast ($RY2019)

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Cash Contributions	3.4	4.0	4.1	2.0	2.0	15.6

7 Meeting Regulatory requirements

7.1 The capital expenditure objectives

Our SCS capex includes connection services as stated in the AER's Framework and Approach for PWC. Our proposed connections capex is required to provide these connection services.

Meeting and managing expected demand for connection services, as required by NT NER clause 6.5.7(a)(1), is the predominant objective of our proposed connections capital expenditure.

Our proposed connections capex is necessary to comply with all applicable regulatory obligations or requirements associated with the provision of connection services – which are set out in section 4.1 above – as required by NT NER clause 6.5.7(a)(2).

Accordingly, our proposed connections capex is required to meet or manage demand for connection services in accordance with our distribution licence.

7.2 The capex criteria

The NT NER sets out the expenditure criteria that are relevant to our connections capital expenditure forecast for the forthcoming regulatory control period. Clause 6.5.7(c) is:

> *"(c) The AER must accept the forecast of required capital expenditure of a Distribution Network Service Provider that is included in a building block proposal if the AER is satisfied that the total of the forecast capital expenditure for the regulatory control period reasonably reflects each of the following (the capital expenditure criteria);*
>
> *(1) the efficient costs of achieving the capital expenditure objectives;*
>
> *(2) the costs that a prudent operator would require to achieve the capital expenditure objectives; and*
>
> *(3) a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives."*

We developed our connections capex forecast using the method set out in section 5.1. Section 5.4 explains why we consider this is the best available forecasting method and results in forecast capex that is prudent and efficient.

7.3 AER Final RIN Main Notice

NT NER clause 7.1 has been addressed in Section 5.1.

Clause 7.2 requires the following in regard to customer contributions:

> *"7.2 PWC must provide its estimation of customer contributions based upon the estimated life and revenue to be recovered from connection assets, including:*
>
> *(a) the expected life of the connection;*
>
> *(b) the average consumption expected by the customer over the life of the connection; and*

(c) any other factors that influence the expected recovery of the distribution network use of system charge to customers."

Our proposed connection policy does not include, by design, a cost-revenue test for connections work. Rather, our policy requires connection applicants to contribute the full cost of connection works undertaken by us prior to commencement of work. Therefore, the requirements of clause 7.2 are not applicable.

8 Supporting documentation

Our connections capex forecast has regard for the following documents:

Attachment 4.4 | AEMO - Power and Water Corporation Maximum Demand, Energy Consumption and Connection Forecasts – 2017 Implementation of Forecasting Procedure, September 2017

As discussed for augex, we commissioned AEMO to prepare this report. It forecast our total connections, residential connections and commercial and industrial connections based on historical connection numbers for our three networks – Darwin–Katherine, Alice Springs and Tennant Creek.

Attachment 7.2 | Proposed Customer Connections Services Policy

This is a new document that we have submitted to the AER with our regulatory proposal. This document contains the information, and addresses the matters, required by clause 6.7A.1 of the NT NER. Amongst other things, it details:

- the categories of persons that may be required to pay a connection charge and the circumstances when this may apply;
- the aspects of a connection service for which a connection charge may be payable;
- the basis on which our connection charges will be determined;
- the manner in which connection charges are to be paid; and
- the threshold below which a retail customer will not be liable for a connection charge for an augmentation other than an extension.

Attachment 12.17 | Connection Capex and Contribution Forecast Model

As discussed for other capex categories, this model is an Excel spreadsheet that calculates and supports our connections capex forecast.

9 Appendix A – Comparison of DNSP Cost / Connection Type

The following cost per connection type was calculated from the RIN Category Analysis data (volumes and total cost) submitted by each DNSP for the 2016-17 reporting period.

CONNECTION SUBCATEGORY	CONNECTION CLASSIFICATION	PWC	SAPN	Ergon	Energex	Tasnetworks	Endeavour	Essential	Ausgrid	Powercor	Citipower	United Energy
RESIDENTIAL	Simple connection LV	$868	$997	$546	$198	$451	$297	$452	$51,208			$1,079
	Complex connection LV	$112	$14,103	$4,877	$6,641	$7,754				$7,159	$19,750	
	Complex connection HV	$33,957		$12,784	$9,016	$19,031			$15,436	$30,729	$353,608	
COMMERCIAL/INDUSTRIAL	Simple connection LV	$2,118	$1,940	$1,925	$176	$451		$528	$39,739		$93,435	$5,546
	Complex connection HV (customer connected at LV, minor HV works)	$65,325	$53,024	$32,761	$49,541		$2,963		$378,832			$20,734
	Complex connection HV (customer connected at LV, upstream asset works)		$139,074	$102,176	$16,716	$59,393			$86,898	$80,048	$345,058	$207,801
	Complex connection HV (customer connected at HV)	$111,179	$75,245	$172,497		$6,481			-$26,956	$153,566	$1,349,687	$14,866
	Complex connection sub-transmission			$60,357	$44,434				$657,875			
SUBDIVISION	Complex connection LV	$815	$12,904	$6,168	$1,294	$2,626						$4,089
	Complex connection HV (no upstream asset works)	$70,988	$63,070	$19,244	$257							$20,930
	Complex connection HV (with upstream asset works)		$95,712	$24,218		$5,491	$570		$24,414	$36,697		