

Revenue Proposal Reference Group (RPRG) Meeting #5

26 March 2020, 12:45pm – 3:00pm



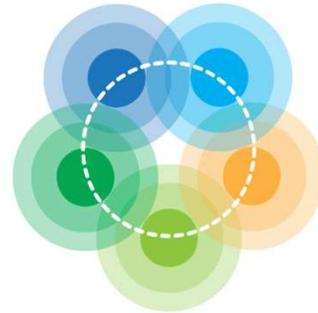
A large, light gray circular graphic in the background containing a map of Queensland. The map shows the state's outline and a network of white lines representing power lines or transmission routes across the region.

Discussion with Powerlink's Board Chair

Kathy Hirschfeld AM

- Involvement in engagement activities (e.g. Co-Design Workshop, Transmission Network Forum and RPRG and Customer Panel where appropriate).
- Regular updates on progress of the Revenue Determination process (e.g. development of Revenue Proposal and key items, indicative forecasts and engagement activities).
- The Board also has an obligation under the National Electricity Rules to certify key assumptions that underlie capital and operating expenditure forecasts as being reasonable.

- New Better Together initiative as part of The Energy Charter.
- Opportunity to have the voice of the customer amplified at a Board level to appropriately influence strategic direction.
- Working group to be formed consisting of Chairs of Energy Charter signatories and customer representative groups.
- Publish a report in late 2020 outlining options and better practice examples to improve how the customer voice can be embedded at a Board level.



The Energy Charter

- In December 2019, the RPRG asked about risk and the role of Powerlink's Board.
- The Board determines Powerlink's risk profile and is responsible for overseeing and approving risk management policies, internal compliance and controls.
- Powerlink's Board and Audit, Risk & Compliance Committee (ARCC) provides oversight of the risk framework, structure and review. The [ARCC Terms of Reference](#) provide further detail on the Committee's role.
- Powerlink also operates within the [Queensland Governance Corporate Governance Guidelines for Government Owned Corporations \(the Guidelines\)](#). These guidelines are based off the ASX [Corporate Governance Council Corporate Governance Principles and Recommendations](#).

- Powerlink has a range of high-level risk appetite statements, as well as a set of key strategic risks. These are periodically reviewed, assessed and endorsed at a Board level.
- High level risk themes include:
 - changing role of transmission networks;
 - information security disruption (e.g. physical or cyber);
 - regulation/policy arrangements; and
 - network disruption (e.g. due to a weather event).
- Potential climate change impacts and potential customer impacts are considered within the range of strategic risks, rather than as standalone risks.
- Today's capex presentation includes a section on risk as it relates to asset investment decision-making.

COVID-19 implications

Kev Kehl

A large, light gray circular graphic in the background contains a map of Queensland. Overlaid on the map is a network of white lines representing power lines, with several circular nodes at key points along the network.

Governance and previous actions

Matthew Myers

- Powerlink is seeking input from the RPRG on its Preliminary F&A Paper submission. This is due to the AER on 30 March 2020 and will be provided in draft form to the RPRG on 25 March 2020.
- Powerlink also welcomes submissions from the RPRG/Customer Panel/individual members directly to the AER.
- **Please provide any feedback on Powerlink's proposed Preliminary F&A Paper submission prior to 30 March 2020.**

A large, faint, light-colored map of Queensland is centered in the background, enclosed within a large, light-colored circle.

Network capital expenditure: Investments and risk/cost methodology

Greg Hesse

- Provide awareness to the RPRG of Powerlink's business as usual approach to risk / cost assessments.
- Provide practical examples of Powerlink's network reinvestment decision-making.

- Powerlink's investment decisions are guided by our asset management policy, strategies and methodologies.
- We assess a range of options and associated risk/cost prior to making an investment decision. Options could include:
 - **Repex** – asset retirement, non-network alternatives, life extension, network reconfiguration or asset reinvestment.
 - **Augex** – non-network alternatives, uprating, reconfiguration or investment.
- Network investment decisions >\$10m require Board approval.
- We consider our network investment drivers holistically and not as separate, discrete requirements.

Note: for background, Chapter 4 of Powerlink's [Transmission Annual Planning Report 2019](#) provides a high level overview of our asset management approach.

- Since late 2017 the RIT-T has applied to network asset reinvestment planning for projects >\$6m.
- The AER has developed a guideline to assist NSPs in demonstrating the prudence and efficiency on reinvestment decisions (*Industry Practice Application Note – Asset Replacement Planning, January 2019*). This guideline is not binding.
- Powerlink’s reinvestment decision making and RIT-T’s have continued to evolve based on insights gained through the development of the AER guideline and ongoing learnings across NSPs.
- To improve consistency of application and transparency of decision-making, Powerlink developed an Asset Intervention Criteria – analogous to N-1-50 MW planning criteria.
- We sought input from the Customer Panel during 2019 to inform our approach.

- Powerlink's reliability obligation (N-1-50 MW) under its Transmission Authority is the primary trigger for reinvestment activities.
- Powerlink practice is to identify an asset compliance threshold, which provides a deterministic trigger for reinvestment timing.
- This asset compliance threshold is derived from relevant regulatory obligations including NEL, NER and Queensland jurisdictional requirements, including specific Electrical Safety Regulations.
- This can result in some reinvestments that have negative NPV – the cost of the investment is greater than the benefit from the reduction in asset failure risk.
 - Most common for secondary systems, which are driven by obsolescence and lack of technical/vendor support.

Practical example – Secondary Systems risk/cost



Secondary systems can suffer from a reduction in supportability of its hardware or software over time. If this causes delays greater than 24 hours, this will result in the primary network assets being taken out of service.

Supportability degradation can be defined by the degrading levels of support assets may be provided, for example:

1. End of Supply – OEM ceases production
2. End of Repair – OEM ceases to repair
3. End of Stock – No repair stock available

3 Regulations

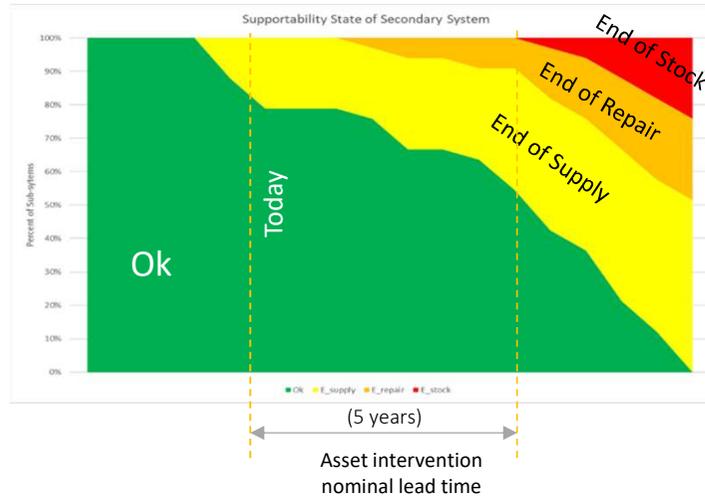
AEMO Power System Security Guidelines (2016)

In the event of an unplanned outage of a secondary system, AEMO's Power System Security Guidelines require that the primary network assets be taken out of service if the fault cannot be rectified within 24 hours

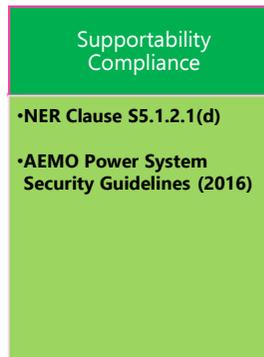
NER Clause S5.1.2.1(d)

The NSP must ensure that all protection systems for lines at a voltage above 66 kV... are well maintained so as to be available at all times

5 Asset Condition Limits



2 Asset Intervention Categories



4 Failure Events

Functional Failure	Detection and control of primary assets
Local Effect	Failure to repair secondary system due to lack of parts causing downtime greater than 24 hours
System Effect	Primary systems taken out of service causing network impacts.
Failure Mechanism	Supportability
Asset Condition Indicator	Support system state / polling of suppliers
Powerlink Intervention Limit	End of stock within 5 years
Condition Limit	0 spares available

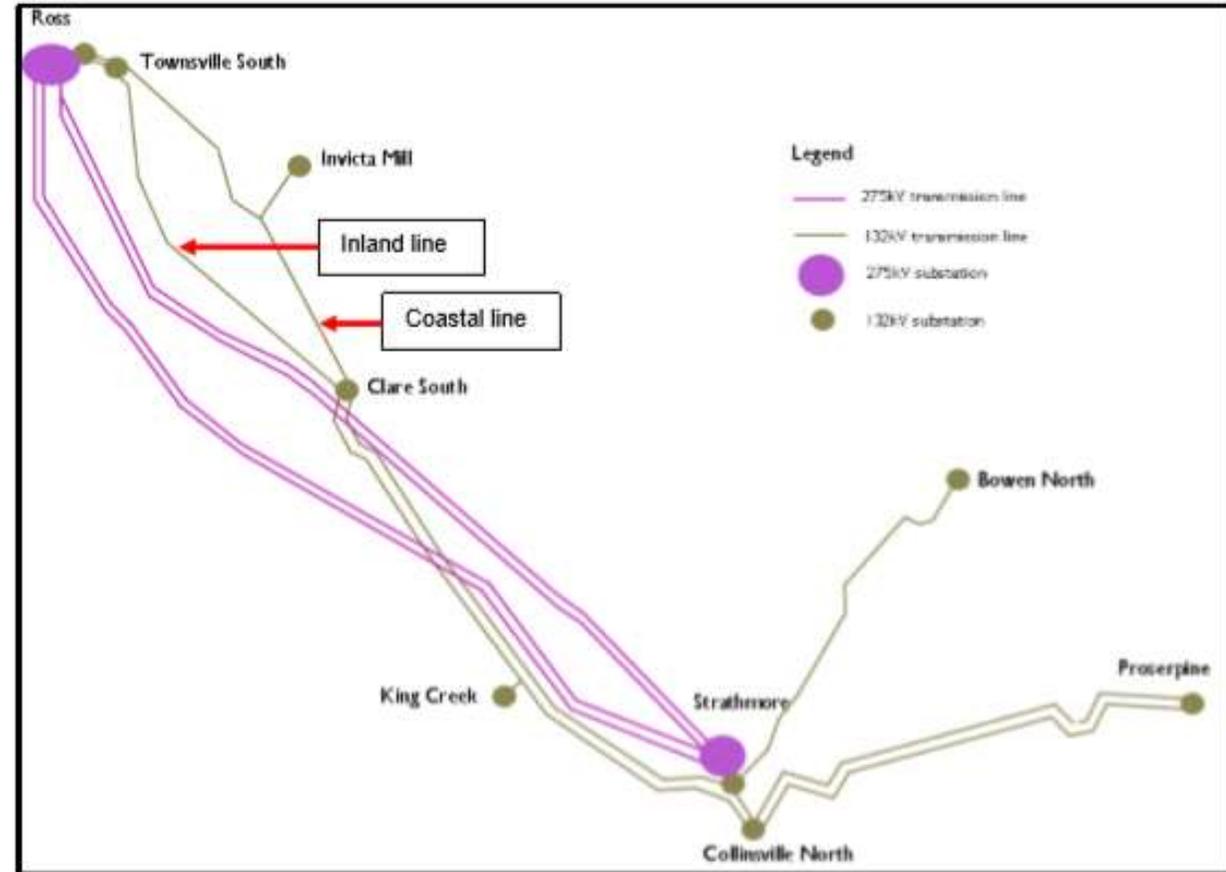
1 Customer Values



The delivery of safe, cost-effective and reliable transmission services to customers

Practical example – assessing investment options

- The recent [Clare South-Townsville South RIT-T](#) is an example of considering different options.
- The lowest cost option that retained the 132kV network configuration was life extension works (repex) estimated to cost ~\$67 million to 2035.
- The option chosen is estimated to cost ~\$45 million over the same period and involved augmentation of transformers at Strathmore (near Collinsville) to reinforce supply, as well as retirement of the oldest 132kV lines between Townsville South-Clare South.
- The lowest cost non-network alternative was more expensive than either network option.



A large, faint, light gray circular graphic containing a map of Queensland, Australia, serves as a background for the text.

Network capital expenditure: Cut 2 forecast Greg Hesse

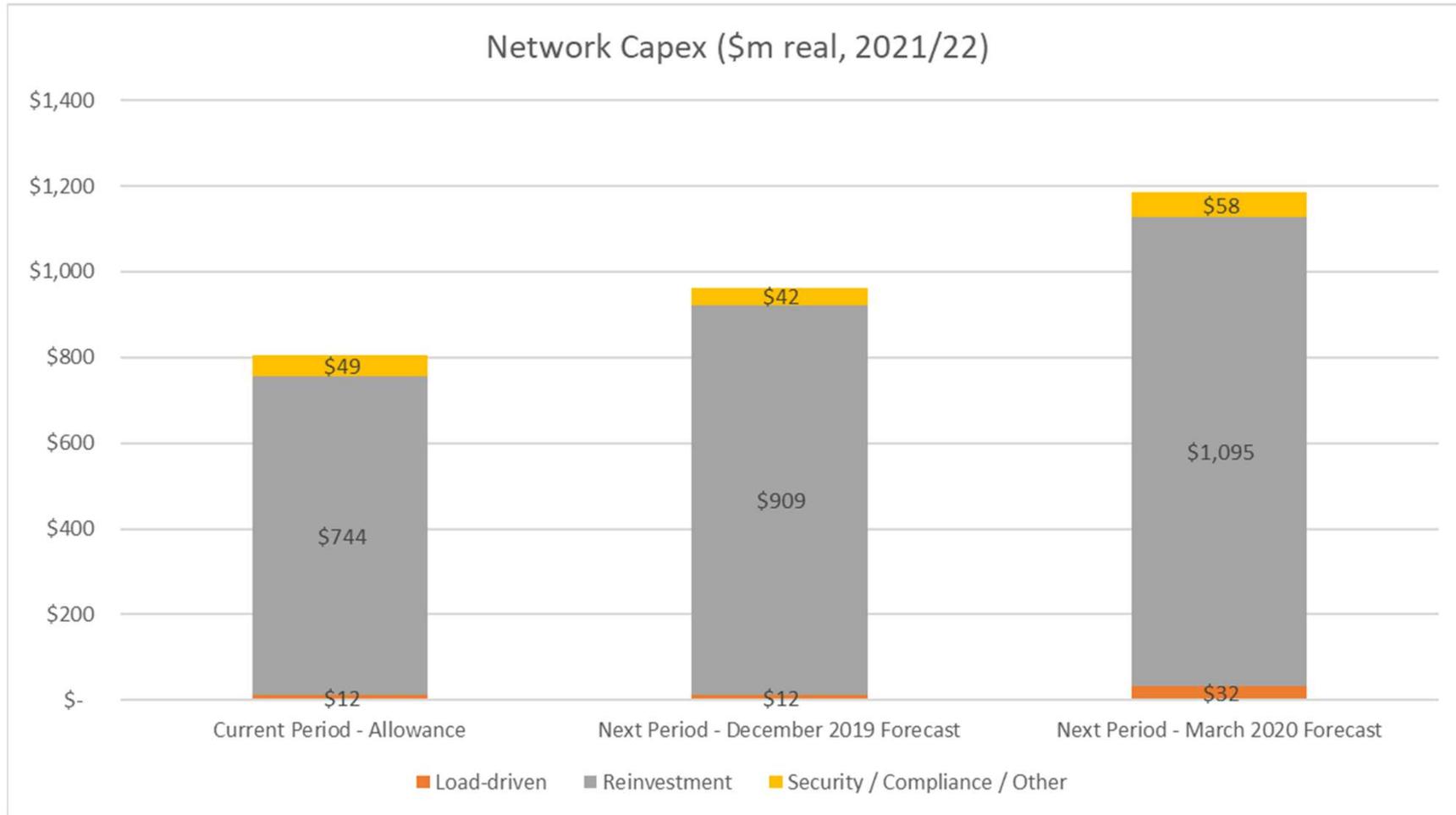
- Provide an update to the RPRG on the current status of the Cut 2 network capital expenditure forecast. This is the ex-ante capex forecast i.e. it excludes contingent projects.
- Seek feedback from the RPRG on the following items proposed for the Cut 2 indicative forecast (due April 2020. Cut 1 was released in December 2019):
 - Treatment of QNI Medium Upgrade project.
 - Ex-ante forecast and contingent project triggers to deal with declining system strength and minimum demands (e.g. synchronous compensators and reactors).
 - Use of AER Final Decision (April 2017) asset lives as input to Repex Modelling.

- From a reinvestment perspective, this forecast is the **very first view based on the Repex Model**. The purpose of this discussion is to bring the RPRG on the journey with us.
- The Repex Model provides a ‘top down’ view, based on Powerlink’s current asset profile and the parameters applied in the AER Final Decision for the current period.
- Powerlink will then integrate the ‘top down’ view with ‘bottom up’ forecasting of ~60% of its forecast network capital expenditure program. The ‘bottom up’ work is ongoing and not taken into account within this forecast.
- Cut 2 is the first forecast for next period using the Repex Model, whereas Cut 1 used the project planning listing from the 2019 Transmission Annual Planning Report (TAPR).

- Cut 2 'central case' forecast capex is \$1,299m, comprising:
 - \$32m for network load-driven;
 - \$1,154m for network non load-driven; and
 - \$113m for non-network.
- For comparison:
 - Cut 1 'central case' forecast was \$1,081m; and
 - Current regulatory period (2018-22) allowance is \$917m.
- Today's focus is on network capex.

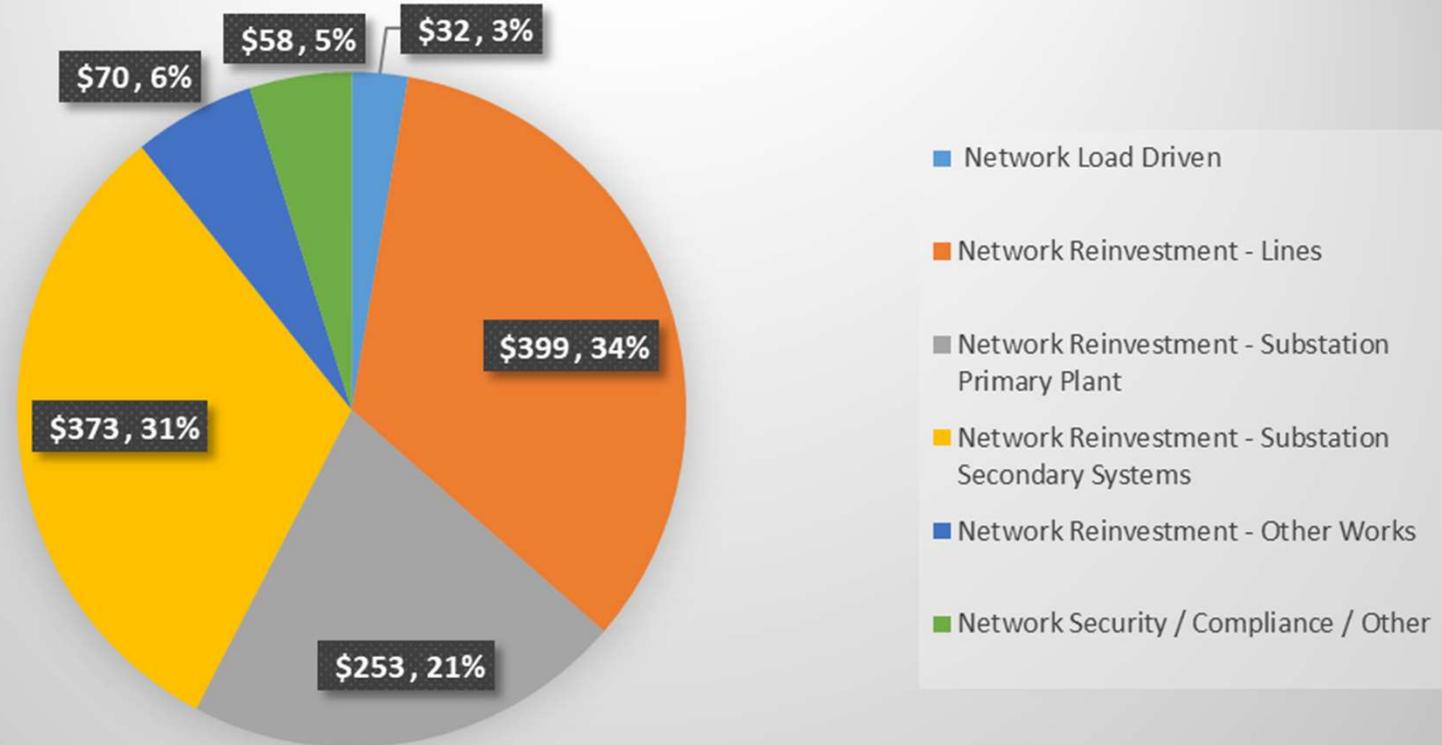
Item	Key points
QNI Medium	<ul style="list-style-type: none"> While the Draft 2020 ISP identifies this as an actionable project there is considerable uncertainty around project cost estimates and potential changes to the sources of benefits. Propose to leave all non-preparatory expenditure, ~\$300 million, as a contingent project pending Final 2020 ISP recommendation in June 2020.
Contingent Repex	<ul style="list-style-type: none"> Propose that Wurdong Tee – Gin Gin rebuild, ~\$80 million, be treated as a contingent project.
Voltage Control and Fault Levels	<ul style="list-style-type: none"> Two emerging factors – declining system strength and declining minimum demands. Assume the immediate issues are dealt with in the current period.. Allow for 3 x 120 MVAr reactors in SEQ, ~\$15 - \$30 million (\$ nominal) in total, in ex-ante forecast for next period. Propose to include contingent project triggers based on further fault level shortfalls and further declines in minimum demands.
Asset Mean Replacement Lives	<ul style="list-style-type: none"> AER Final Decision for the 18-22 period accepted all of Powerlink’s Repex Modelling lives except for transmission line refits where AER increased lives between 0.8 years (severe corrosion zones) and ~7 years (mild corrosion zones). Propose to adopt the AER Final Decision lives as representing the basis for a forecast of the prudent and efficient capital expenditure required to meet the capital expenditure objectives

Cut 2 network capex comparison



Note – Cut 1 and Cut 2 forecasts reflect the ‘central’ scenario and are high-level, indicative only.

Network capex by investment driver (\$m real, 21/22)



Note – refer to the background slides for detail on some of the reinvestment drivers.

Are the proposed inputs to the capital expenditure forecasts appropriate?

What are your initial views about our risk/cost methodology?



Background reading

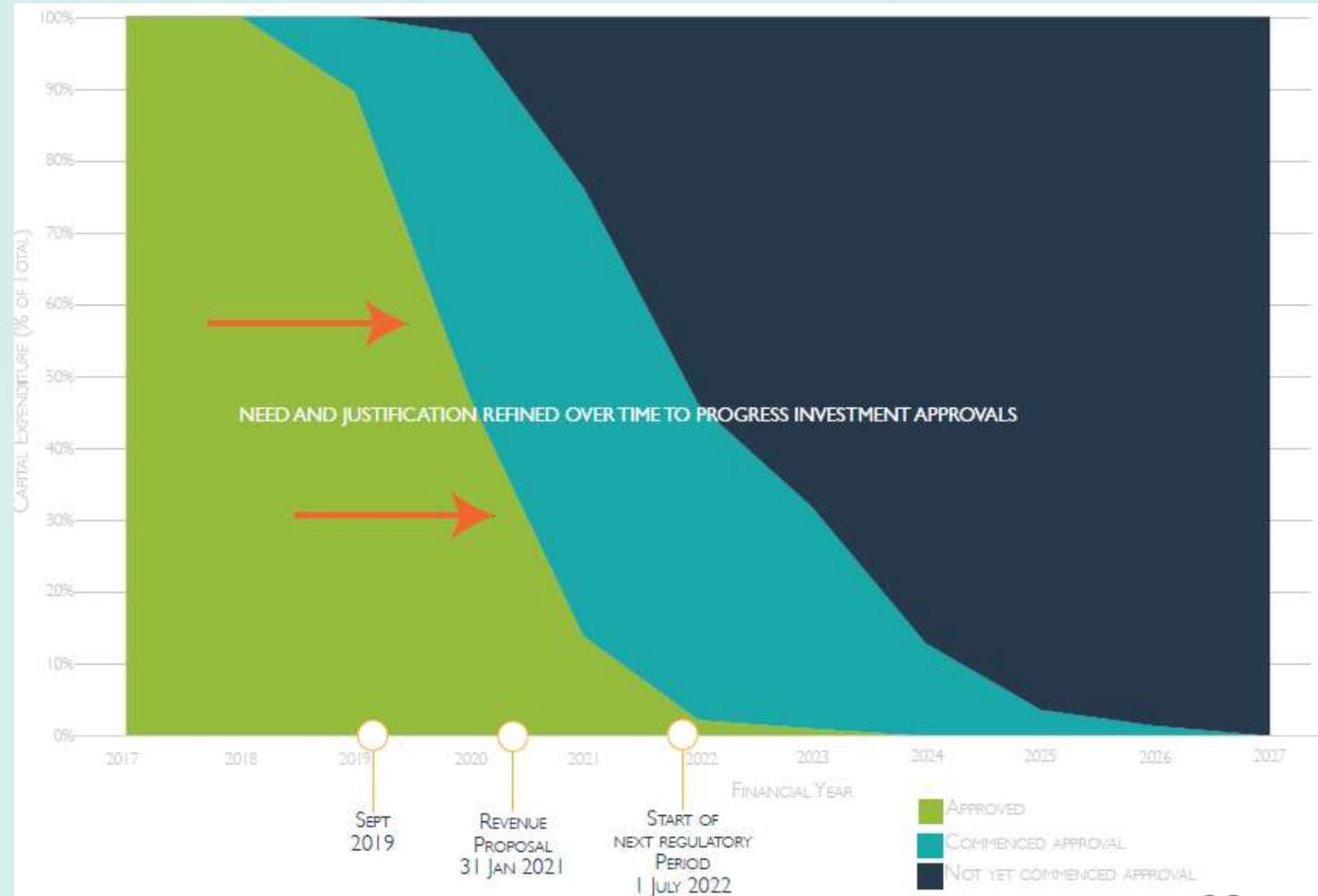
Capital expenditure forecasting approach (Hybrid+)

- The NER and related AER Guidelines do not prescribe any specific methodology to be used for developing capex forecasts.
- Three options considered and discussed with the RPRG in October 2019:
 - full bottom-up;
 - Hybrid (a mix of top-down and bottom-up); and
 - Hybrid+ (per Hybrid but with additional bottom-up forecasts and justifications for any 'lumpy' investments e.g. large line refits).
- We have decided on utilising a **Hybrid+** methodology.

Why Hybrid+?

- Fit-for-purpose and reflects our asset management practices.
- Recognises the AER approves a capex allowance, not a fixed investment program.
- Enables a more efficient, transparent and streamlined Revenue Proposal process.
- Provides customers a forecast that is simpler to understand and more accessible.
- Allows a more straightforward comparison with Powerlink's previous hybrid forecast.

Capital expenditure forecast from 2019 TAPR – as at October 2019



Bottom-up

- Approved projects
- Load driven
- Power transformers
- Significant network needs (indicative ~60% threshold)
- Major one-off needs
- ISP / Contingent projects (note: not part of the ex-ante forecast)

Repex model

- Remaining network assets incl.:
 - transmission lines
 - substations (excl. transformers)
 - secondary systems and telecoms

Trend analysis

- Security / Compliance
- Other



A large, light gray circular graphic containing a map of Queensland. Overlaid on the map is a network of white lines and circles representing a power transmission network.

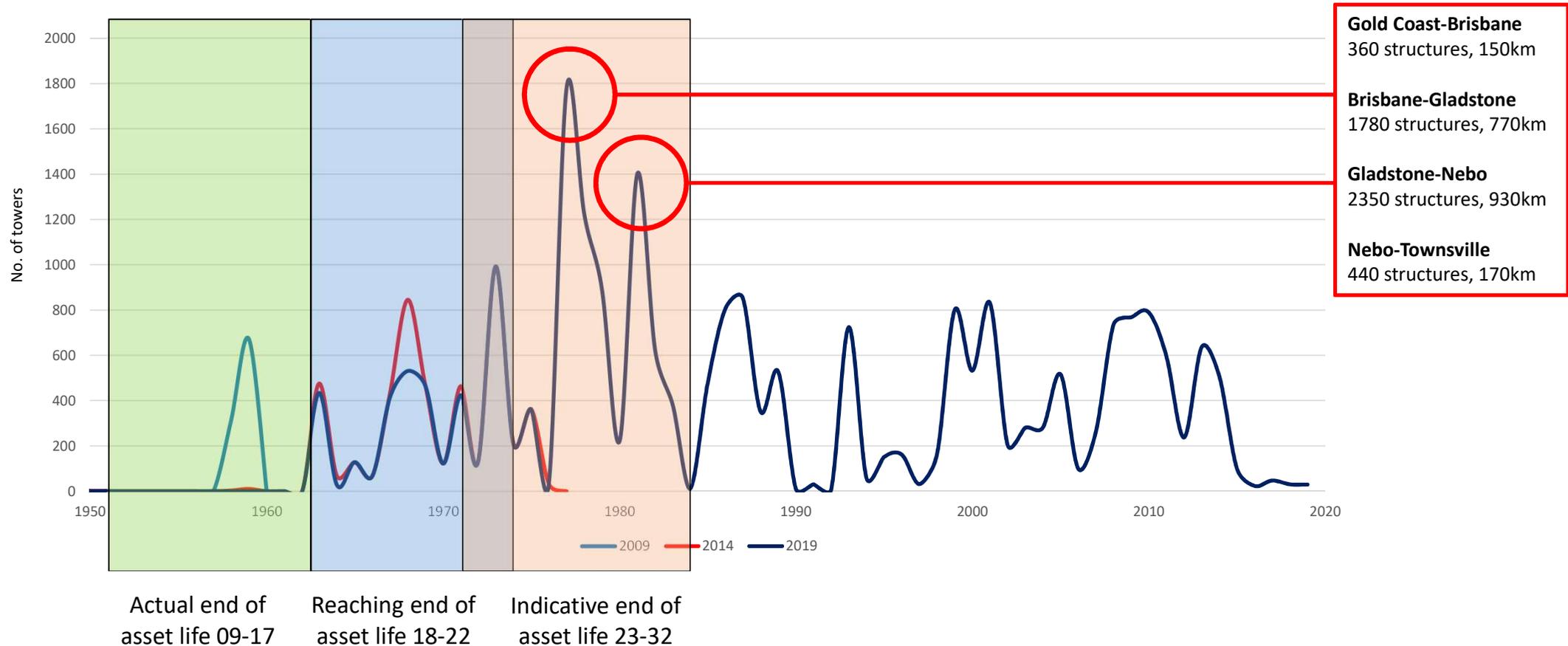
Background reading

Network reinvestment drivers

Reinvestment capex drivers – towers



Transmission towers age profile



- Substation primary plant includes items such as circuit breakers, power transformers, instrument transformers, isolators and busbars.
- The driver for reinvestment of substation primary plant is its continuing ability to withstand faults on the network and to perform its function.
- Powerlink has around 950 high voltage circuit breakers, 200 power transformers, 4,300 instrument transformers and 4,100 mechanical isolators across its network.
- The average age of this equipment is currently 17 years, with reinvestment typically required around 35 - 40 years of age.
- A typical substation primary plant reinvestment project would range from \$5m - \$25m (\$real 2021/22).

- Secondary systems provide the critical protection and control function within the overall power system. These systems gather data and detect faults on our network, and remove affected plant from service to protect it from any further incident or damage.
- The driver for reinvestment in secondary systems equipment is typically obsolescence / lack of technical and vendor support.
- Powerlink has over 1,300 secondary systems across its network. The average age of this equipment is currently 11.5 years, with reinvestment typically required around 20 years of age.
- A typical secondary systems project, including metering asset reinvestment, ranges from \$3m - \$20m (\$real 2021/22).
- Powerlink is exploring ways to effectively manage delivery of secondary systems reinvestment work.