



TransGrid



AEMO

AUSTRALIAN ENERGY MARKET OPERATOR

VICTORIA TO NEW SOUTH WALES INTERCONNECTOR UPGRADE

Project Assessment Draft Report

Industry Consultation Forum - 4 October 2019

Agenda

1. Context and overview
2. Market modelling overview and preferred option
3. Market modelling outcome - benefits and sensitivities
4. Indicative project timelines

Context and overview

Victoria to New South Wales Interconnector: ISP

- AEMO's 2018 Integrated System Plan (ISP) set out a strategic, long-term, coordinated approach to future generation and transmission development in the National Electricity Market (NEM).
- The ISP identified that immediate action was required on several projects designated as **priority 'Group 1'**, including the need for increased transfer capability between Victoria and New South Wales.
- The Victoria to NSW Interconnector (VNI) is currently restricted by **thermal, voltage stability, and transient stability limitations**.
- These limits are expected to impact long term market costs due to the increasing cost of generation dispatch, and cost of future investment in generation capacity.

Victoria to NSW Interconnector Upgrade RIT-T

- AEMO and TransGrid are jointly undertaking a Regulatory Investment Test for Transmission (RIT-T) to assess the technical and economic feasibility of relieving these constraints **to facilitate more efficient sharing of generation** between states.
- A Project Specification Consultation Report (PSCR) was published in Nov 2018, which identified the need for additional export capability from Victoria and sought feedback on the proposed credible options.
- **A Project Assessment Draft Report (PADR) was published on 30 August 2019**, which included options assessed, market benefits and a proposed preferred option.
- This work is consistent with recommendations in the 2018 ISP, 2019 ISP Insights report, 2019 Victorian and NSW Transmission Annual Planning Reports.

Updates since the Project Specification Consultation Report (PSCR)

- Several changes have occurred since the publication of the PSCR – these are reflected in the PADR modelling:
 - Feb 2019 Planning and Forecasting Consultation Paper **modelling inputs and assumptions** adopted.
 - **New renewable generation** committed to connect in Victoria and NSW (2000 MW and 1200 MW respectively).
 - 2018 ESOO demand forecast utilised.
 - The Commonwealth Government has committed to constructing Snowy 2.0, placing additional focus on the economic merits of augmentation between Snowy, Melbourne and Sydney.

Update to identified project need

- The PSCR identified the need for investment to lift the Victoria to New South Wales stability limit.
- PADR analysis considered the impacts of the proposed preferred options of other advancing RIT-Ts.
- **Other advancing RIT-Ts will increase the VNI stability limit**, including the Western Victoria Renewable Integration and Project Energy Connect.
- The proposed preferred option for VNI does not include additional investment to further address Victoria to NSW stability limits at this stage.
- This will be re-assessed in the PACR, subject to the outcome of other RIT-Ts.

Submissions to the PSCR – Key Themes

- Nine public submissions were received and are published on AEMO's website.
- One confidential submission was also received.

Non-traditional and non-network solutions

- Assessment included non-traditional and non-network solutions, including battery storage and Modular Power Flow Controller technology.

Relationship between PSCR and ISP

- AER RIT-T guidelines suggest RIT-T proponents should use sources such as AEMO's ISP inputs and assumptions.
- Detailed assumptions and inputs information included in the PADR for clarity.

Submissions to the PSCR – Key Themes (2)

Scale of interconnector options

- Broad range of credible options were assessed, including non-network, incremental, and major transmission infrastructure.
- Including bring forward one leg of HumeLink

Cost of outages

- Cost of network outages required for upgrades have been fully considered for each option.
- Preferred option minimises outage duration.

Submissions to the PSCR – Key Themes (3)

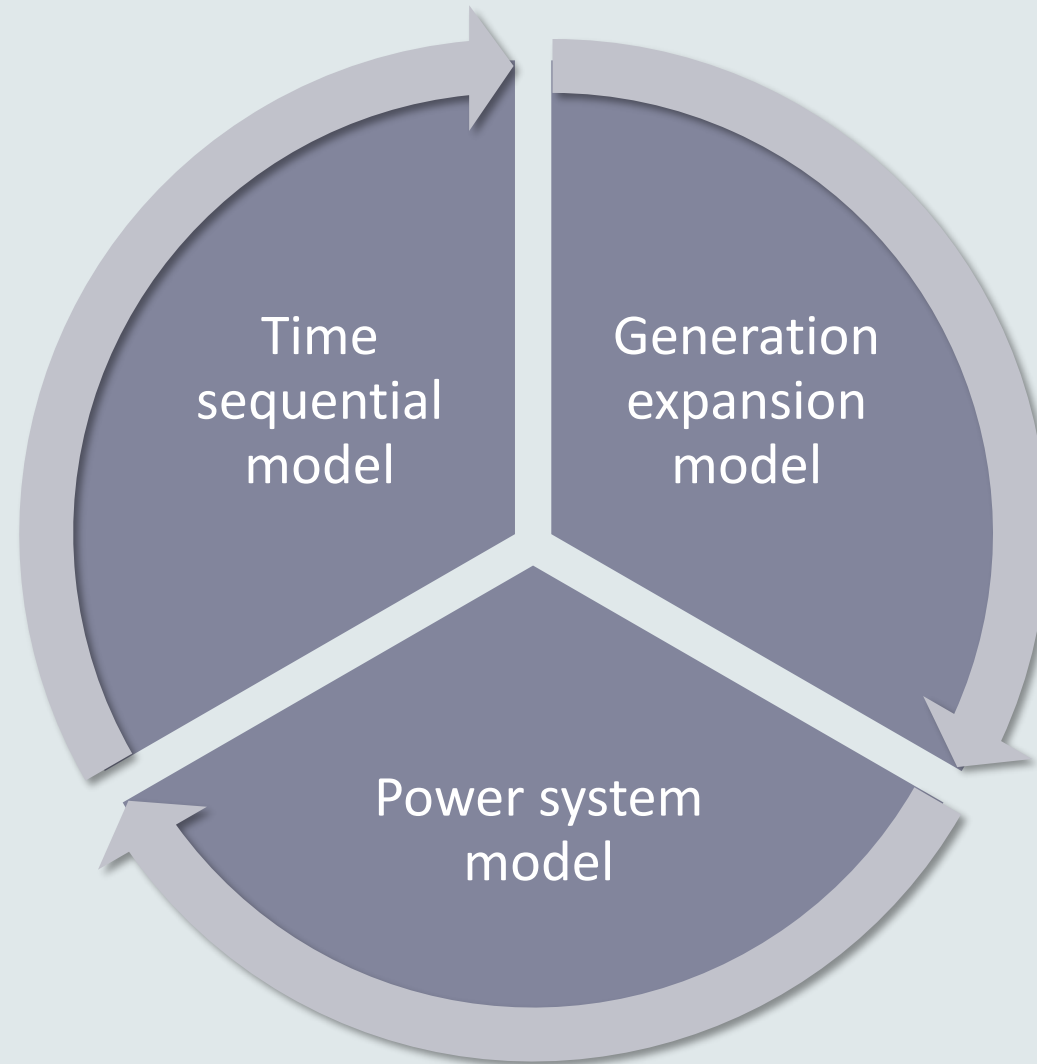
Support for bi-directional capacity increase

- PADR analysis considers transfer capacity in both directions
- Two import constraints will be relieved in the short term

- NSW - Victoria import capacity is primarily limited by:
 - Murray – Dederang 330 kV thermal limit
 - South Morang – Dederang 330 kV thermal limit - relieved
 - Victorian voltage stability limit - relieved
- Murray – Dederang limit is expected to bind under typical operating conditions and **requires major augmentation**.
- **Short term need for import to erode** as renewable generation is installed.
- Import need **returns following closure of coal-fired generation** in Victoria.
- A RIT-T will commence shortly to increase import capacity in the long term.

Market modelling overview and preferred option

Market modelling methodology



Scenarios assessed

PADR cost-benefit analysis considered three reasonable scenarios of future supply and demand, based on the AEMO Planning and Forecasting Consultation Paper published in February 2019.

Scenarios

Neutral

Fast change

Slow change

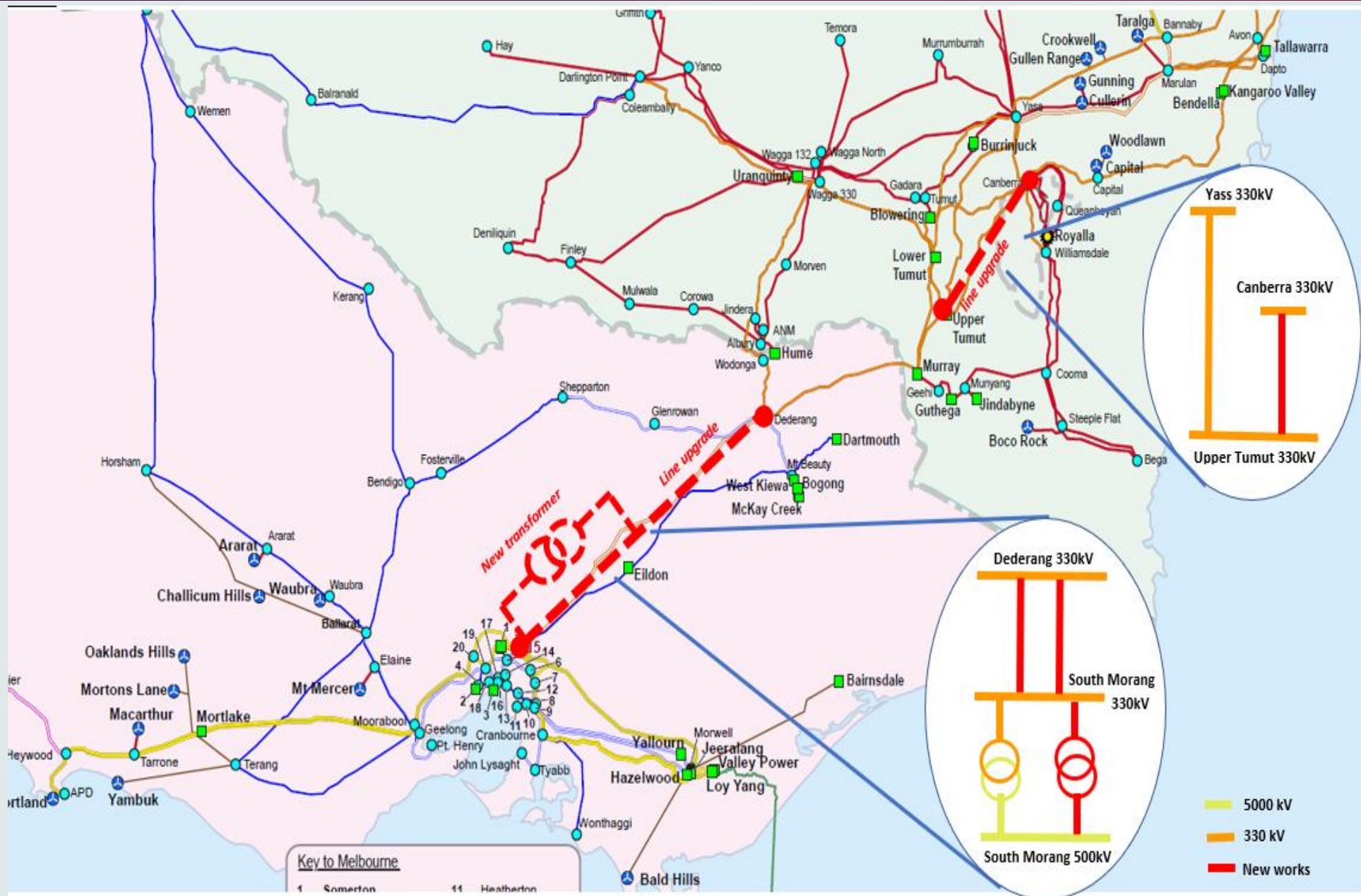
Sensitivities

\pm 30% Option cost

8.6% to 3.2%
Discount rate

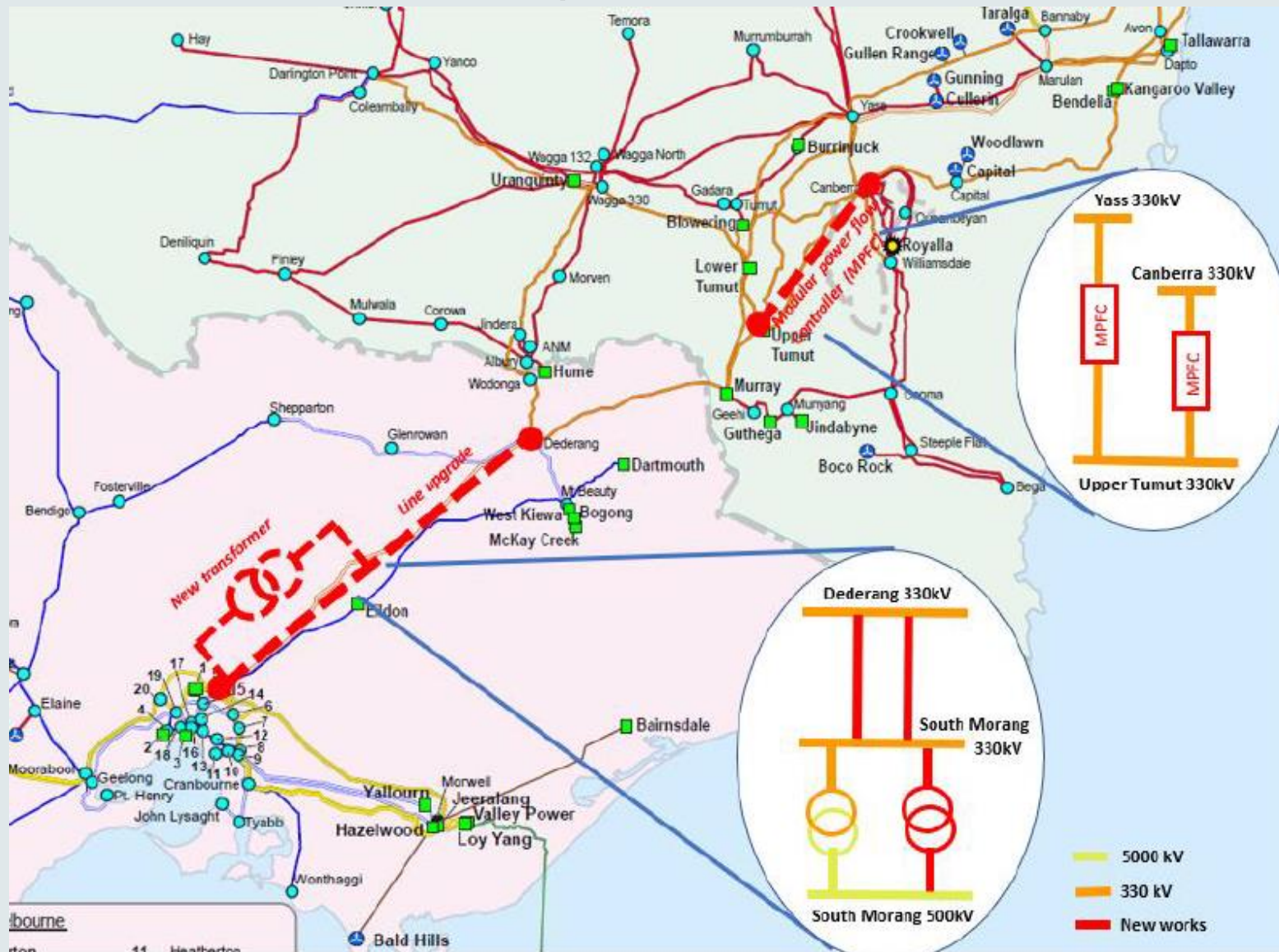
Multiple scenario
weightings

Option 1: ISP Base Option

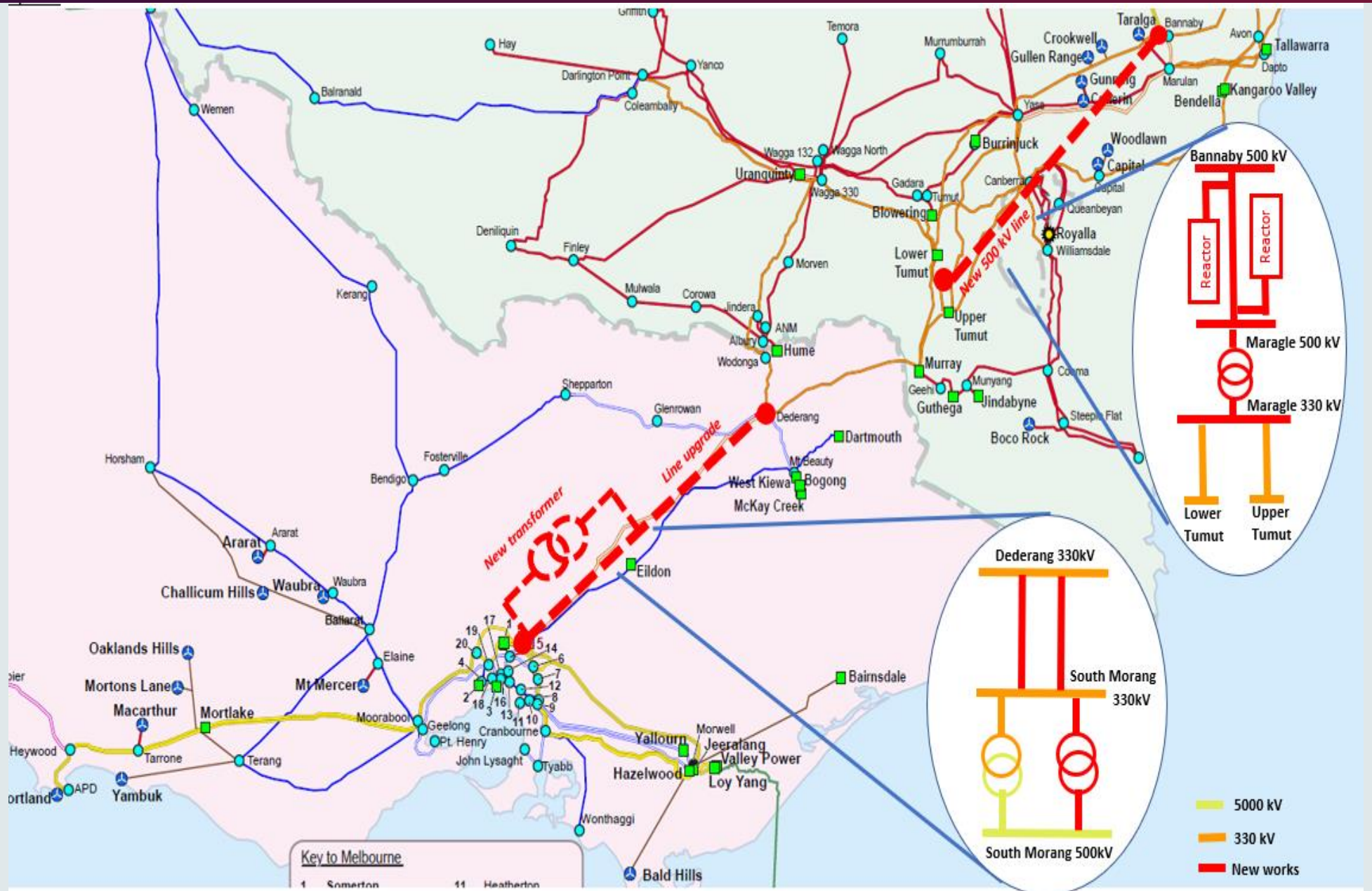


Option 2: ISP base option with modular power flow controller

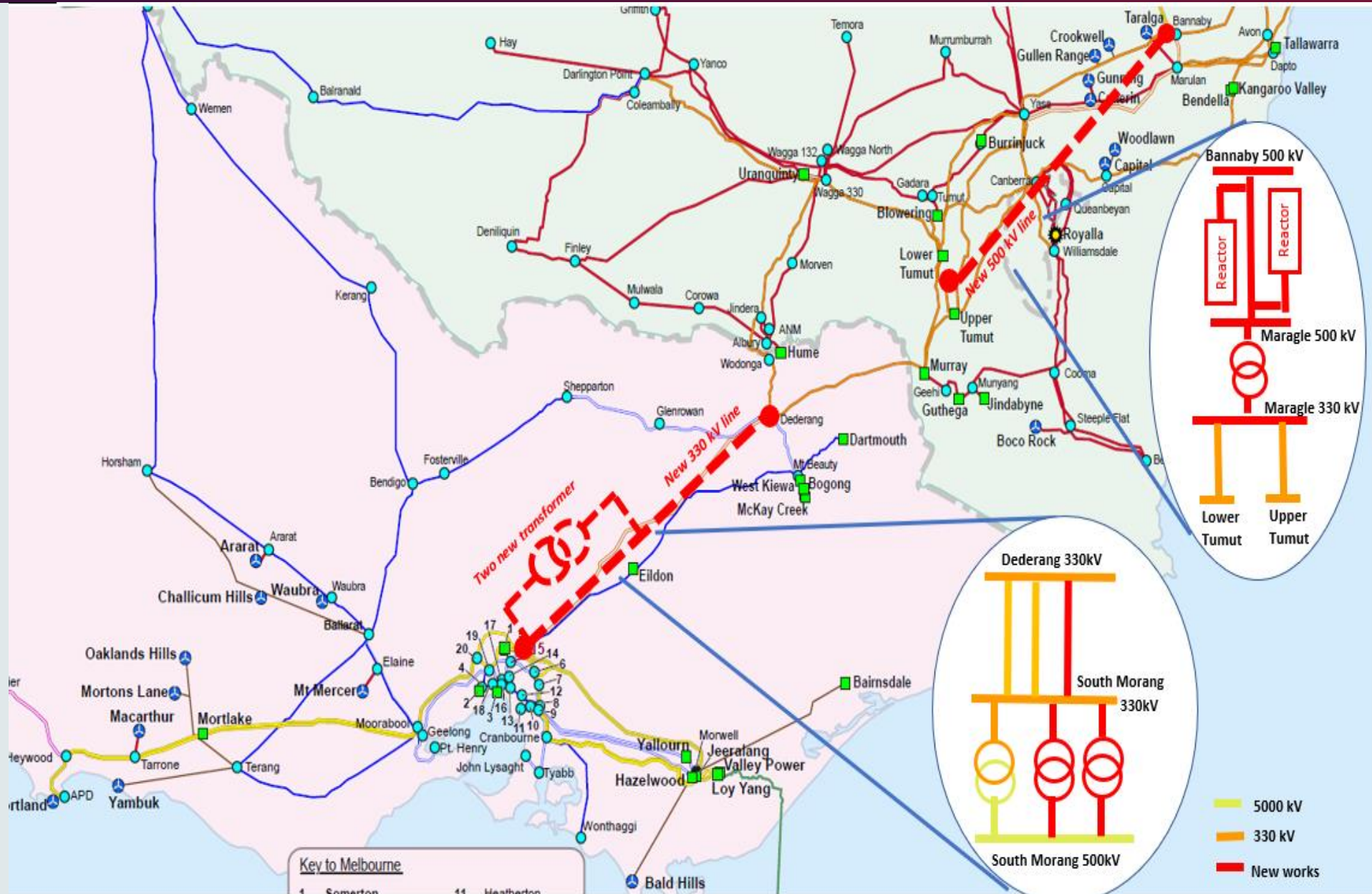
- Non-traditional variation of Option 1 based on PSCR consultation.



Option 3: Additional higher capacity upgrades in NSW



Option 4: Additional higher capacity upgrades in NSW and Victoria

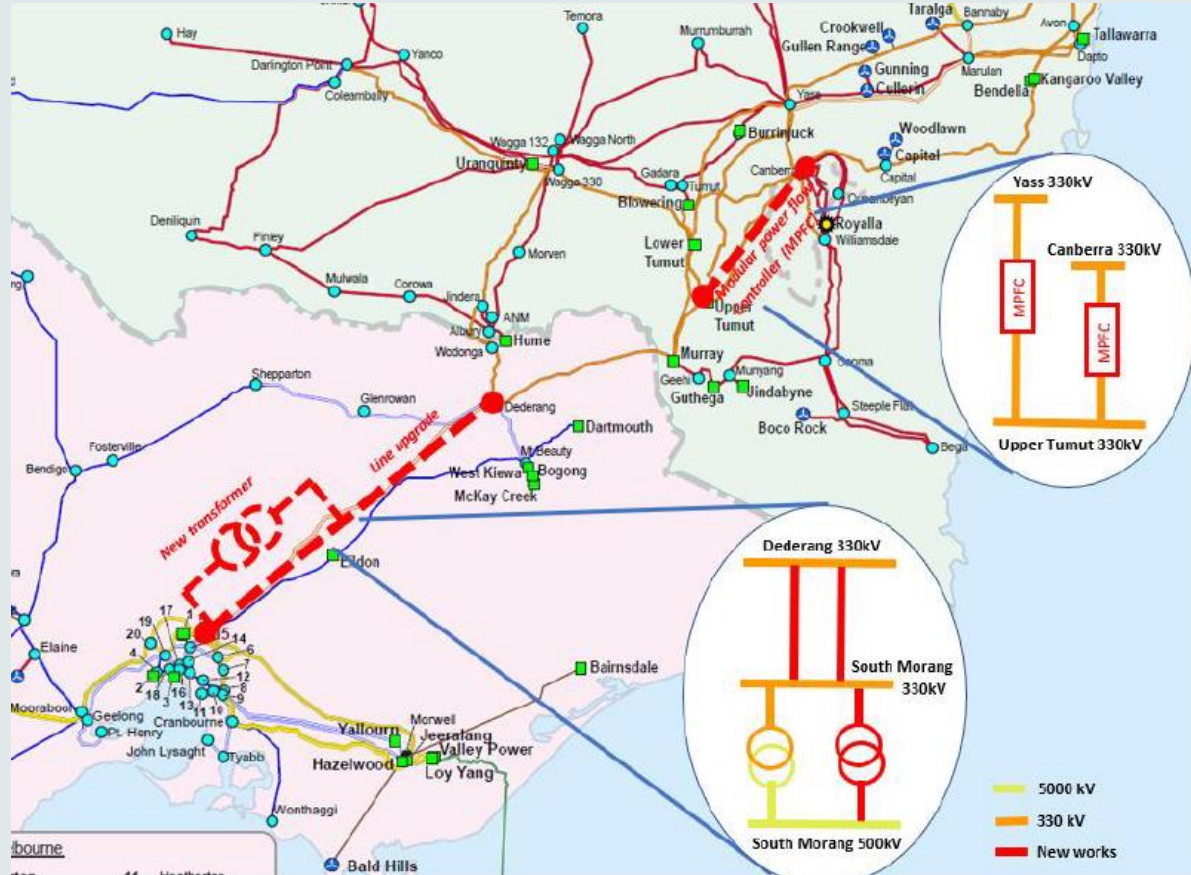


Economic analysis

Option	Description	NPV Cost (\$M)	Weighted net market benefit (\$M)
Preferred Option: Option 2	ISP base option with modular power flow controller (subject to detailed control interaction studies)	68	286
Option 1	ISP base option	84	270
Option 3	Additional higher capacity upgrades in NSW	447	187
Option 4	Additional higher capacity upgrades in NSW and Victoria.	763	-53

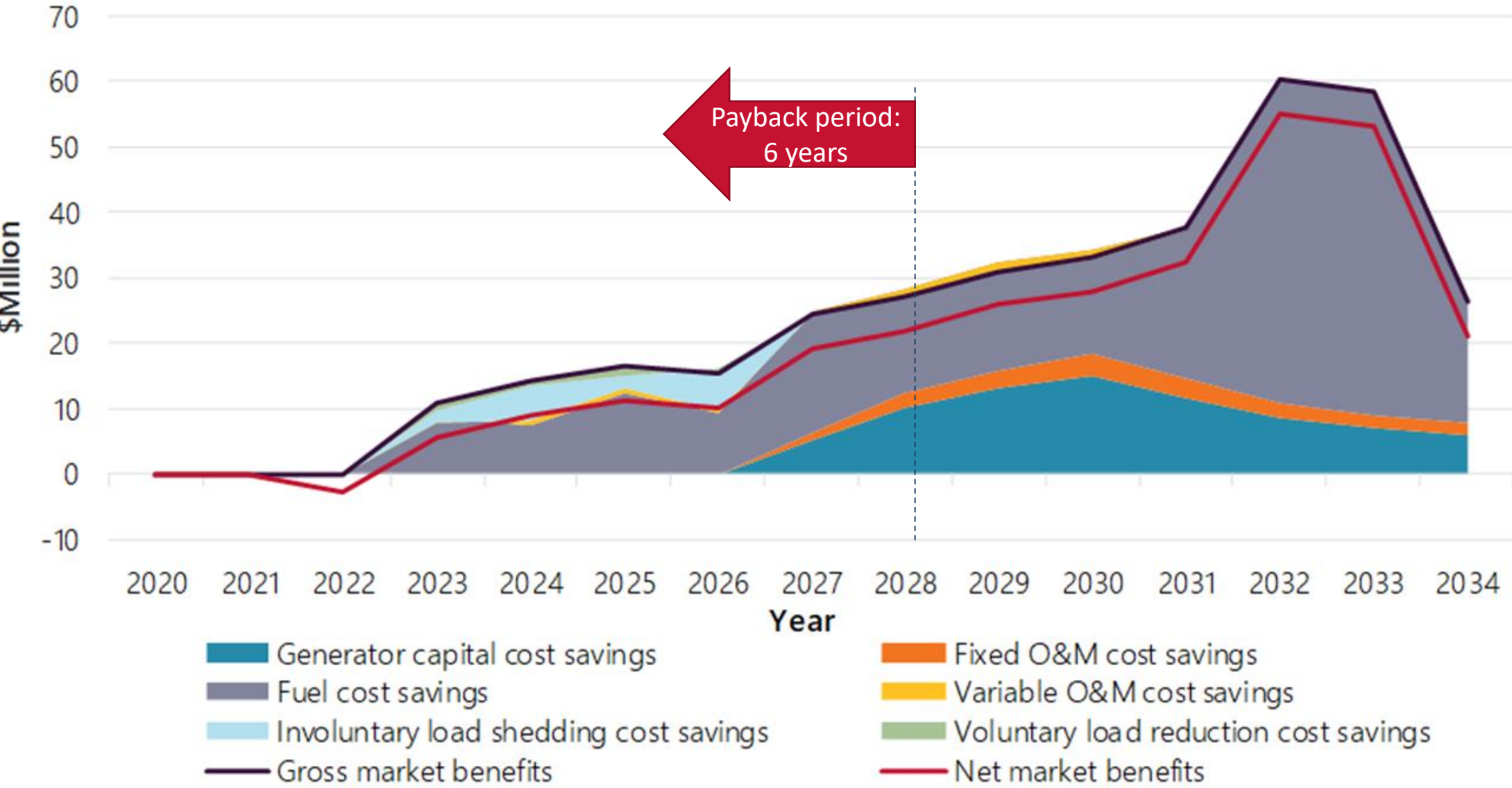
Proposed Preferred Option: Option 2

- PADR proposes implementing the augmentations **by 2022-23**
- Estimated to deliver **net market benefits of \$286 million** (in present value terms).
- Delivers the **highest net market benefits** under all scenarios and sensitivities considered.
- Consistent with the 2018 ISP proposed solution, with modular power flow controllers and without the stability component.
- Subject to detailed power systems analysis for the PACR.

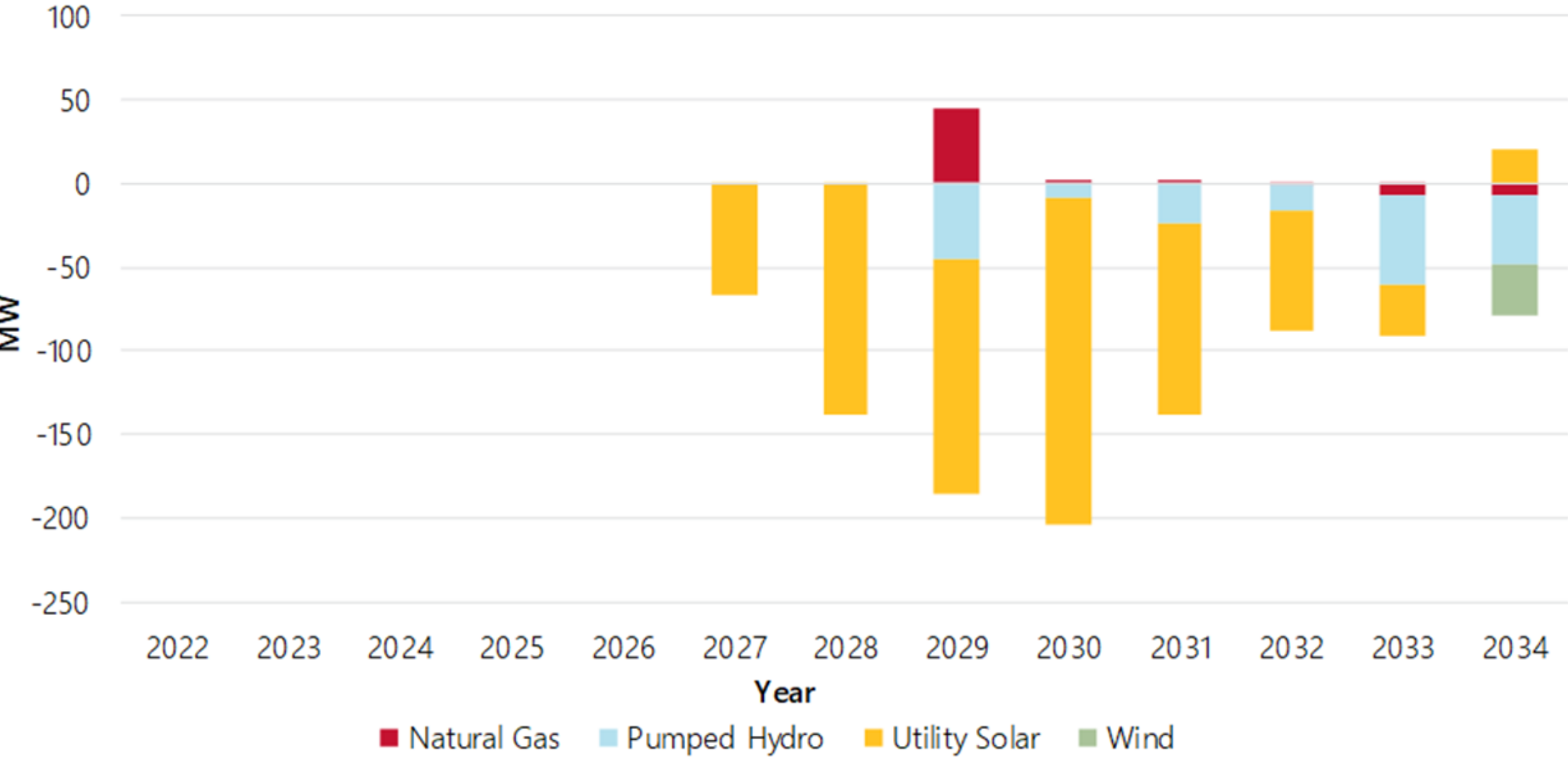


Market modelling outcome - benefits and sensitivities

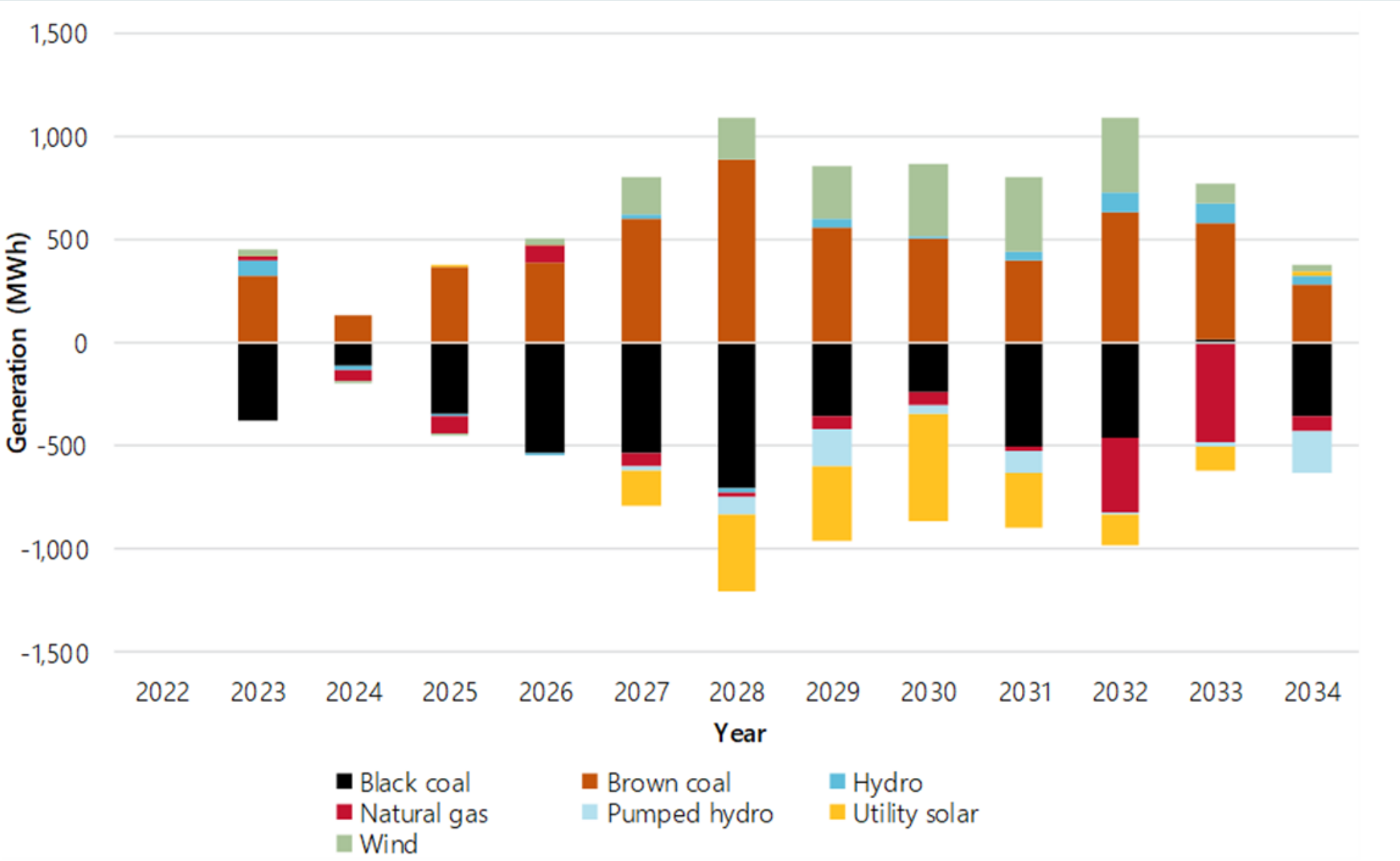
Proposed preferred option – gross and net market benefits (Neutral)



Proposed preferred option – changes in generation development (Neutral)



Proposed preferred option – changes in generation dispatch (Neutral)



Proposed preferred option – net benefit sensitivities

	Base	High discount rate	Low discount rate	High cost	Low cost	Slow weighting	Fast weighting
Option 1	270	157	485	247	294	300	260
Option 2 (proposed preferred option)	286	172	503	268	307	316	276
Option 3	187	76	399	131	243	128	177
Option 4	-53	-154	192	-204	99	-112	-53

- The proposed preferred option delivers the highest net market benefits under all scenarios and sensitivities considered.

Indicative timeline and next steps

Indicative project timeline

 <p>RIT-T</p>	<ul style="list-style-type: none">• PADR consultation• Publish Project Assessment Conclusions Report (PACR)	6 months	Q1 2020
 <p>Tendering & Procurement</p>	<ul style="list-style-type: none">• Develop technical designs• Negotiate and award delivery contracts	6 months	Mid 2020
 <p>Development approvals</p>	<ul style="list-style-type: none">• Conduct detailed design & planning studies• Secure development approvals	12-18 months	Mid 2021
 <p>Delivery</p>	<ul style="list-style-type: none">• Build and deliver• Install and commission	1 year	Q3 2022

Next steps

Regulatory approval under the RIT-T:

- Consultation period open until 11 October 2019
- PACR publication: targeting Q1 2020

For any further queries please contact:

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