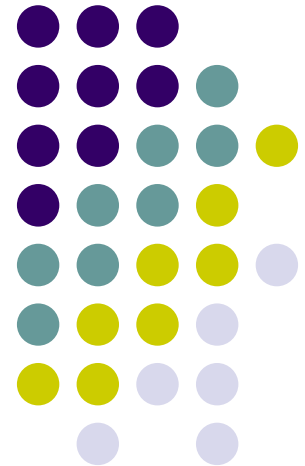


Tasmanian Frequency Standards Review



Hydro Tasmania
the renewable energy business

Hydro Tasmania Perspective June 2008



Assessment of Options



- Status quo (current standard)
 - Gunns, Tamar Valley Power (TVP) unable to connect
- TVP proposed standard
 - Imposes very onerous design and operational requirements for Tasmania
 - Basslink import severely constrained
 - Net decrease in supply with Bell Bay closure
 - Basslink stranded in export
 - Major investment required in new fast raise services (up to \$100 million)
 - Limited development of new wind in Tasmania

Assessment Conclusions



- Neither standard alone provides increased supplies for Tasmania
- TVP proposal decreases competition from Victoria by constraining Basslink
- TVP proposal results in tighter standard plus increase in contingency size which causes significant increase in FCAS requirement and cost

Reliability Panel must take a broader view to find a package of measures which work and provide long term investment certainty

Key Issues



- Tighter standard
 - Increases FCAS requirements
 - Impacts Basslink capability
 - Increases system security risk (UFLS, OFGS, SPS)
 - Add significant redesign cost (UFLS, OFGS, SPS)
- Contingency Size
 - Not covered by NER
 - Larger contingency exacerbates FCAS raise supply issues
 - No dispatch co-optimisation
 - Creates Basslink dispatch issues

FCAS R6 Requirement



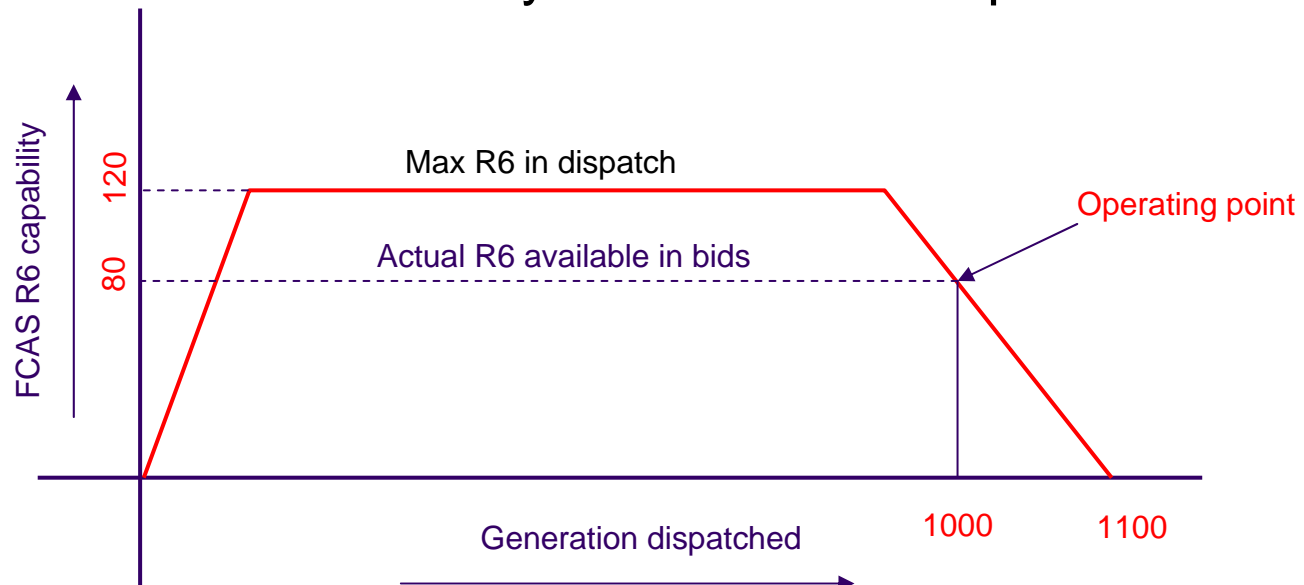
Tasmanian system					
Demand (MW)		900	1000	1400	1800
Inertia (MWs)		4500	4600	7300	9700
144 MW Contingency	47.5 Hz	95	90	67	47
	48.0 Hz	126	117	82	65
210 MW Contingency	47.5 Hz	225	211	132	109
	48.0 Hz	307	291	160	129

Source: NEMMCO advice to RP 2008

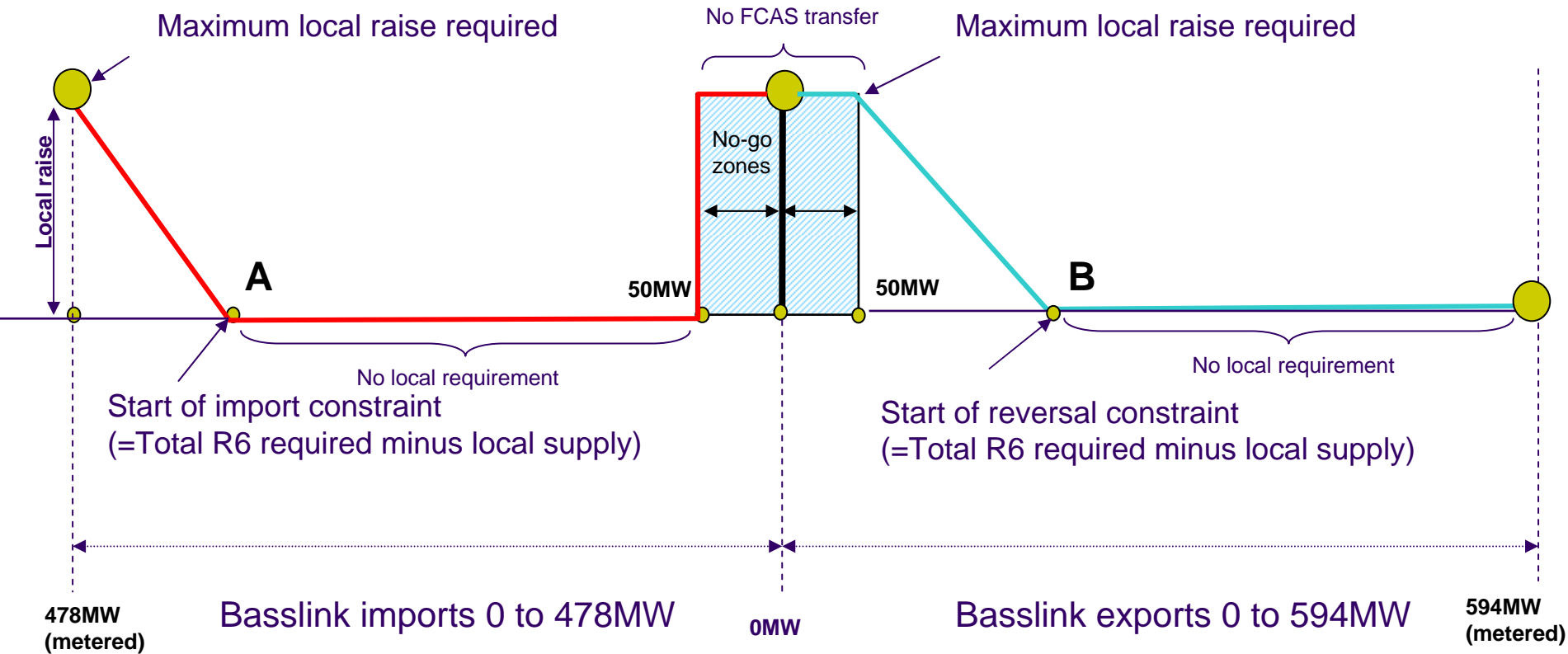
FCAS R6 Supply



FCAS (R6) trapezium for **1000MW**
Tasmanian system efficient dispatch



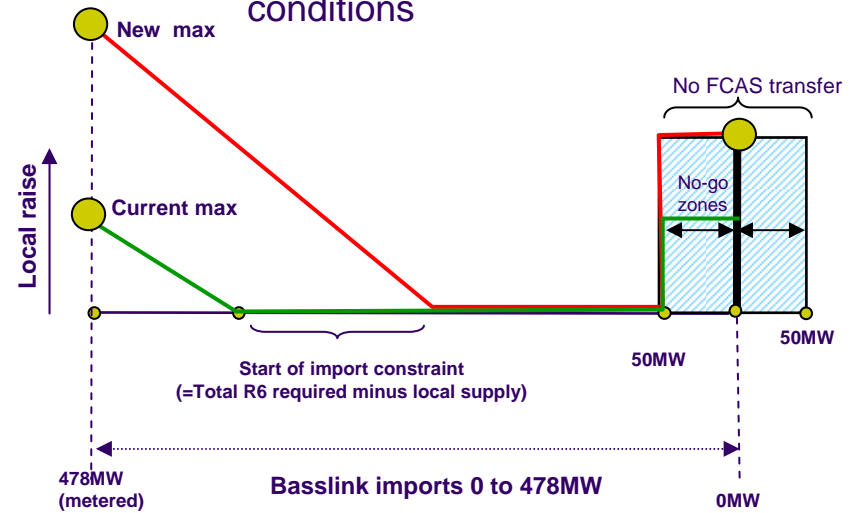
FCAS Transport on Basslink



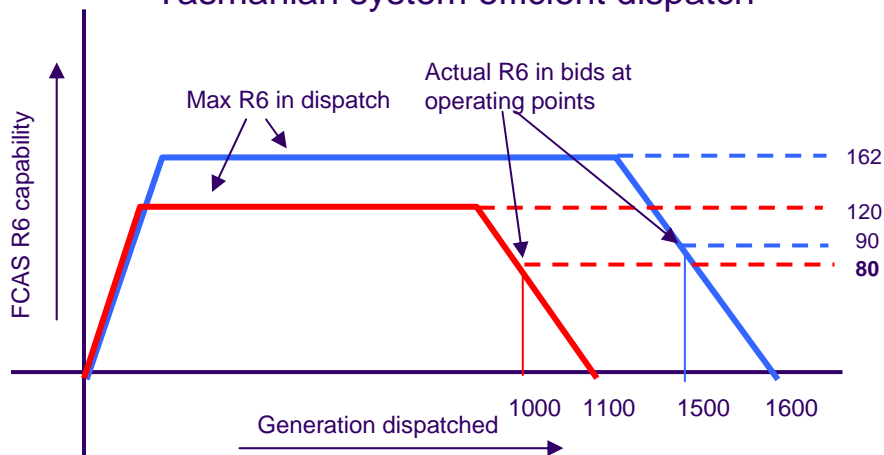
FCAS (R6) Table

Tasmanian Demand	1000	1400
Tasmanian Inertia	4600	7300
47.5Hz, 144MW loss	90	67
48.0Hz, 144MW loss	117	82
47.5Hz, 210MW loss	211	132
48.0Hz, 210MW loss	291	160

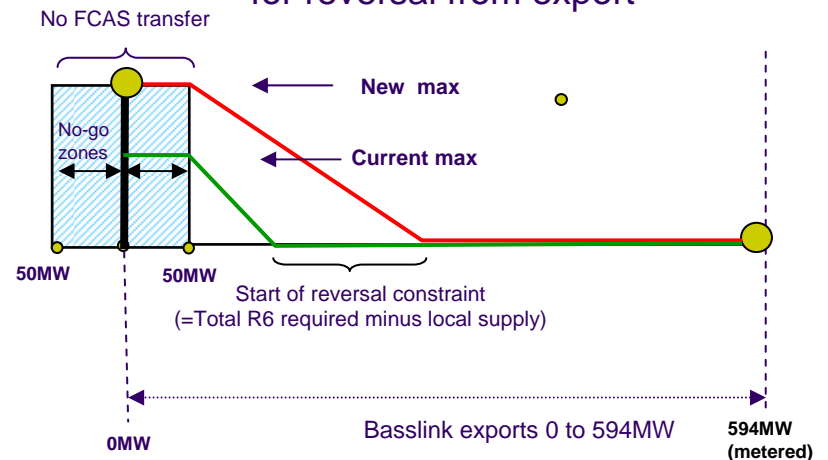
Tasmanian FCAS (Raise) requirements for generating unit contingency under import conditions



FCAS (R6) trapezium for 1000MW and 1500MW
Tasmanian system efficient dispatch



Tasmanian FCAS (Raise) requirements for reversal from export





What does all this mean?

- Basslink imports reduced by up to 200MW
- Basslink stranded in export
- Net energy supply for Tasmania may decrease

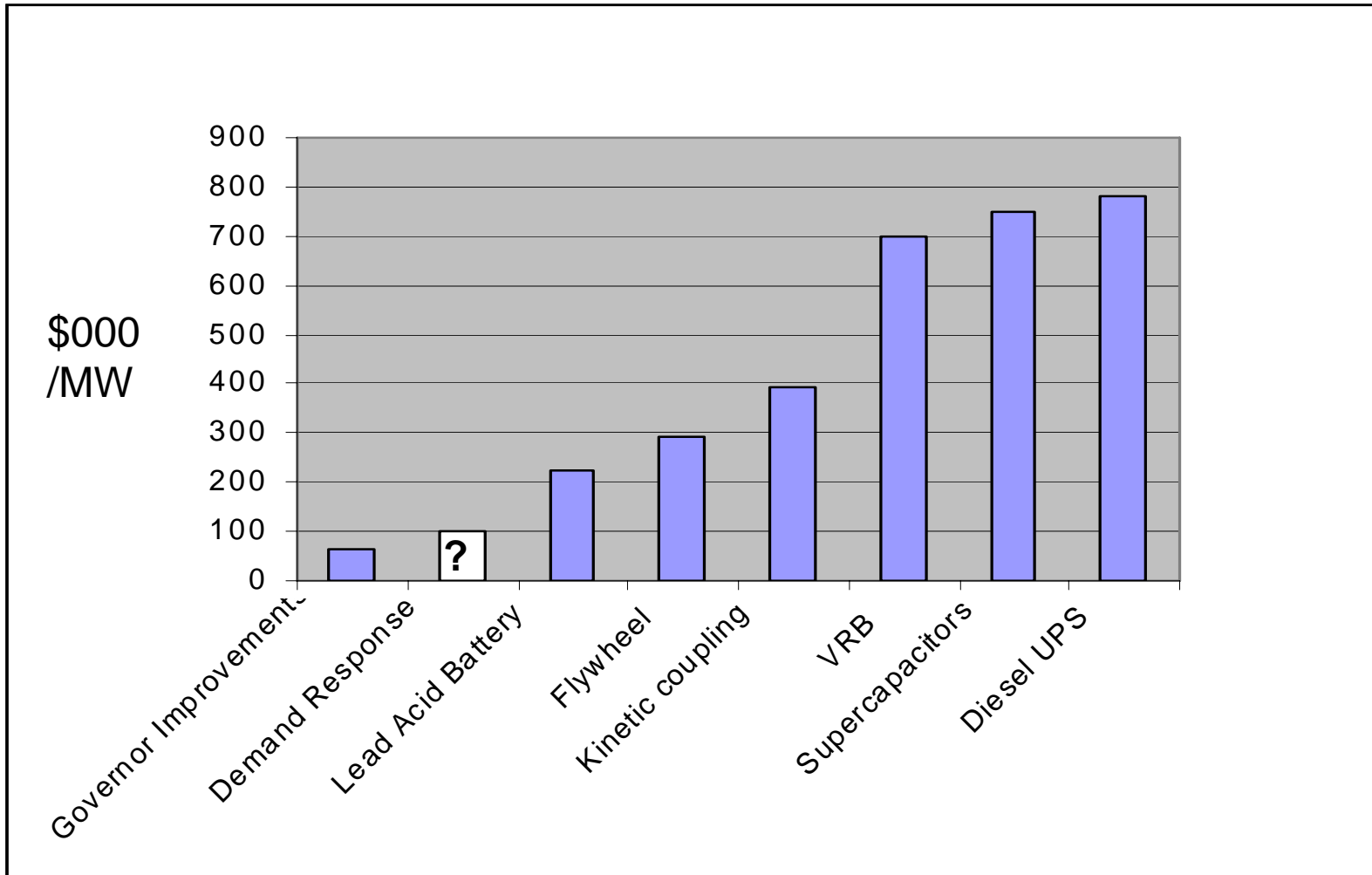
FCAS Raise Market in Tasmania



- Small revenue stream for suppliers
- Relatively high cost of supply
- Generators provide and pay for service
- Costs can only be recovered around 10% of the time when Basslink can't transport cheap mainland FCAS R6

No market incentive for investment

FCAS R6 Possible Supply Options



New Zealand Experience



- \$2bn energy & \$50-100m FCAS markets
- Costs and additional penalties (non-compliance) are attributed to the users of FCAS
- FCAS is provided by generators and interruptible loads (around 50/50 split)
- Co-optimisation of largest unit occurs as a market outcome
- UFLS is used for multiple contingency events; purchased similar to FCAS
- NZ has different features and hence different standards on each island

Summary



- **Issues**

- Tighter standard and larger contingency will cause severe R6 supply problems and operational problems
- Increased reliability risk
- Increased security risk
- Wind development in Tasmania will be constrained

- **Hydro Tasmania Proposal**

- Maintain current frequency standard
- Limit the contingency size to 144MW
- Innovative solution to allow Gunns and Tamar Valley Power to connect