Presentation by
Snowy Hydro, AGL, and Hydro Tasmania to
AEMC on
Ramp Rates
Draft Rule Determination

Sydney, 19 Nov 08

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Agenda

- Re-affirm support for minimum ramp rates;
- Proportional and equitable share of minimum ramp rates;
- Materiality of the issue;
- Affect of proposed draft determination on Aggregated Generator Units.

The need for minimum ramp rates

- The Group supports the need for minimum ramp rates;
- Setting the level of minimum down ramp rates is a balance between system security concerns and addressing the commercial driver of generators to maintain output at times of transmission constraints;
- It should be noted that the need for this rule change is mainly due to Large thermal generators using low ramp down rates to maintain their output at times of transmission constraints.
    - Yet these larger generators now receive a relatively favourable outcome under the Draft Determination.

The need for minimum ramp rates

- The draft Rule with the lower ramp rate set at the lower of 3MW/minute or 3% of registered generator unit size favours larger generators over smaller generators. As a consequence:
  - This is not equitable;
  - Nor is this efficient as larger generator units often have better ramping capabilities;
  - Imposing disproportionally higher ramp down obligations on smaller generator units results in more degradation of plant, less efficient operation, less system reliability, and is therefore not in the long term interest of consumers.

3MW / minute or 3% of unit size

- The following table highlights the disproportional obligation of down ramp rates depending on generator unit size.

Generator	Unit Capacity (MW)	% of Unit Capacity @ 3MW/minute	Ramp Down rate at 3%	Ramp Down rate Obligation (MW/minute)*
Bayswater, Eraring etc	660	0.45%	19.8	3
Liddell	510	0.59%	15.3	3
Tarong, Stanwell, Callide B etc	350	0.86%	10.5	3
Braemar	168	1.79%	5.04	3
Murray 1	95	3.16%	2.85	3
Somerton	40	7.50%	1.2	2

* Assume rounded up.

- Smaller generator units are disadvantaged
  - Carry a greater proportional share of the ramp down rate;
  - This is a double hit as in general these smaller generators are often less efficient than larger generators at ramping.

Materiality of the issue

- The following is a simplified example.
  - Two competitors behind a binding constraint
  - Competitor A has 1 generator unit of 600MW, Competitor B has 10 times 60MW units total of 600MW (Both the same overall capacity)
  - Ramp down obligations:
    - Competitor A = 3MW/minute
    - Competitor B (3%) = 2MW/minute
  - Resultant reduction in dispatch (for the next 5 minute dispatch interval):
    - Competitor A = 3MW * 5 minutes = -15 MW
    - Competitor B = 10 units * 2MW * 5 minutes = -100MW
    - Difference in dispatch = 85MW
      - If the Spot price was $10,000 for the dispatch period, Competitor B is disadvantaged by over $70,000 per dispatch interval.
- Clearly, the above example highlights this is not equitable.

Proposed solution

- The group proposes a compromise solution of the minimum of 3MW/minute or **0.5%** of generator unit or Aggregated generator unit available capacity.

Generator	Unit Capacity (MW)	Ramp Down rate at 0.5%	Ramp Down rate Obligation (MW/minute)*
Bayswater, Eraring etc	660	3.3	3
Liddell	510	2.6	3
Tarong, Stanwell, Callide B etc	350	1.8	2
Braemar	168	0.8	1
Murray 1	95	0.5	1
Somerton	40	0.2	1

* Assume rounded up.

- Under the proposed percentage of 0.5%, the Group proposes a lower bound for each generator unit or Aggregated generator unit to provide at least 1MW/minute.

Proposed Solution

- Should still meet NEMMCO's system security requirements
  - If the amount of ramp down capability is not sufficient then BOTH the 3MW/minute and the 0.5% should be scaled up in equal proportion:
    - Eg. If NEMMCO requires on balance 33% more minimum ramp down capability, 3MW/minute would increase to 4MW/minute and the 0.5% would increase to 0.67%.
    - This would increase overall ramping down capability AND maintain the equity between large and small generator units.
- Results in a more equitable and efficient solution.

Aggregated generator units

- Aggregated generator units are an efficient mechanism to allocate generation to multiple generator units that share a common fuel resource;
- NEMMCO have had no issues with the use of aggregated units
- For example, the Murray aggregated generator has 14 units for a total aggregated capacity of 1500MW
  - The Murray aggregated generator receives a dispatch target for the next dispatch interval. This target is to be provided by any combination output of the 14 individual generator units
  - Hence at any time between 0 and 14 generator units are physically on line (this is dynamic and depends on optimisation of the 14 individual units)
    - Hence can NOT have ramp down capability based on physical units
    - Imposing ramp down based on individual generator units would negate the efficiency benefits form using Aggregated units in the first instance and would be impractical to implement

Aggregated generator units

- The proposed solution is for the minimum ramp down rate for all Aggregated Generator Units to be fixed and set at 0.5% of the *available capacity* of the Aggregated generator.
  - Using the Murray Aggregated Generator
    - If the *available capacity* is 1500MW
    - Then the ramp down rate is 1500 MW * 0.5% = 7.5 MW / minute
- This would be an equitable outcome;
- Maintains the efficiency benefits of using Aggregated generator units.

Conclusion

- The Group supports the objective behind the rule change;
- For market efficiency and equity reasons the ramp down rate should be set at:
  - For individual generator units
    - The lower of 3MW/minute or 0.5% of *available capacity*
    - The lower bound for the ramp down rate is 1MW / minute
  - For Aggregated generator units
    - 0.5% of *available capacity*
    - The lower bound for the ramp down rate is 1MW / minute
- If Nemmco believes the ramp down capability is insufficient then the 3MW/minute and 0.5% should be proportionally scaled up;
- This proposed change would result in better market efficiency and a more equitable outcome for ALL generators of varying sizes.