## CAN RENEWABLE ENERGY MEET 'BASELOAD' POWER?

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- "Base-load" means a generator has a relatively low short-run variable cost
- "Intermittency" means a generator's output is not readily predictable
- Solar and Wind are both of these
- A more interesting question might be... Can renewable energy provide reliable and secure supply?

### DISTINCTION BETWEEN SECURITY AND RELIABILITY



- Security is the integrity of the overall power system to cope with unexpected, sudden and credible disturbances.
  - If these can occur without plant damage or significant disruption, the power system is considered secure.
- *Reliability* is the adequacy of installed generation supply to meet demand, particularly peak demand.
  - The NEM uses a probabilistic measure of reliability, or reliability standard which targets 99.998% of all customer demand to be supplied at the wholesale level.

#### 2015 ESOO – WHAT IS NEEDED TO MAINTAIN RELIABLE SUPPLY?





### CAN RENEWABLE ENERGY PROVIDE RELIABLE SUPPLY?



- Need to manage intermittency
  - o Energy storage?
    - ➢ How do we predict availability?
  - Increase transmission?
    - To capture potential geographic diversity
  - o Improve predictability?

#### AND/OR

- rethink need for a reliability standard
- consumers will presumably have the option of making price / reliability tradeoffs
  - accepting a lower reliability (being interruptible) in exchange for price relief
  - o reliability becomes increasingly market driven

# IS THERE REALLY GEOGRAPHIC DIVERSITY?





#### FINDING THE BALANCE



Policy Makers are faced with a range of issues;

Achieving all of these wants is ideal, unfortunately, they are in conflict. Accomplish any two of them impacts the third



High Reliability and Low Price – High Emissions

Low Price and Low Emissions– Low Reliability

High Reliable and Low Emissions– High Price

#### AND ITS NOT JUST ABOUT RELIABILITY -CAN WE OPERATE THE SYSTEM SECURELY?



The transition to a low carbon future is presenting the energy industry, governments and all Australians with enormous opportunities and challenges.

AEMO's vision is to provide energy security for all Australians.





- Can AEMO balance supply and demand at all times?
- Can AEMO maintain system frequency within standards?
- Can AEMO manage the rate of change of frequency?

