

# Market Code Consultation WS 9

Capacity payments / market

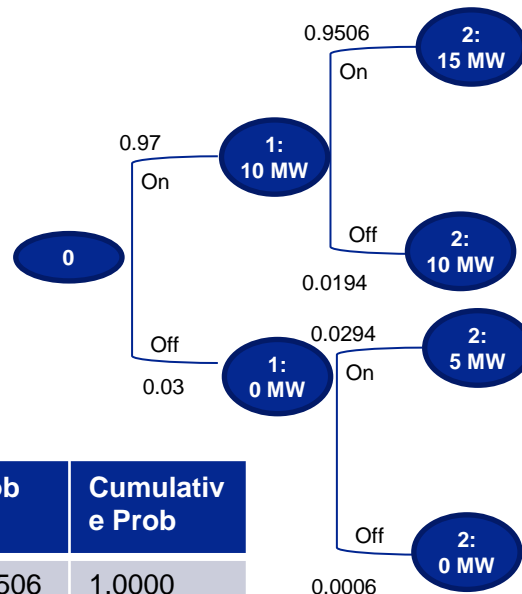


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# Short term capacity signal – key concepts

- Loss of load probability (**LOLP**): The probability of a state during which loss of load may occur at a particular point in time (as a result of supply being lower than demand).
- Effective Load Carrying Capability (**ELCC**): Additional amount of peak load that a system can serve as a result of adding a generating unit whilst providing the same level of reliability.

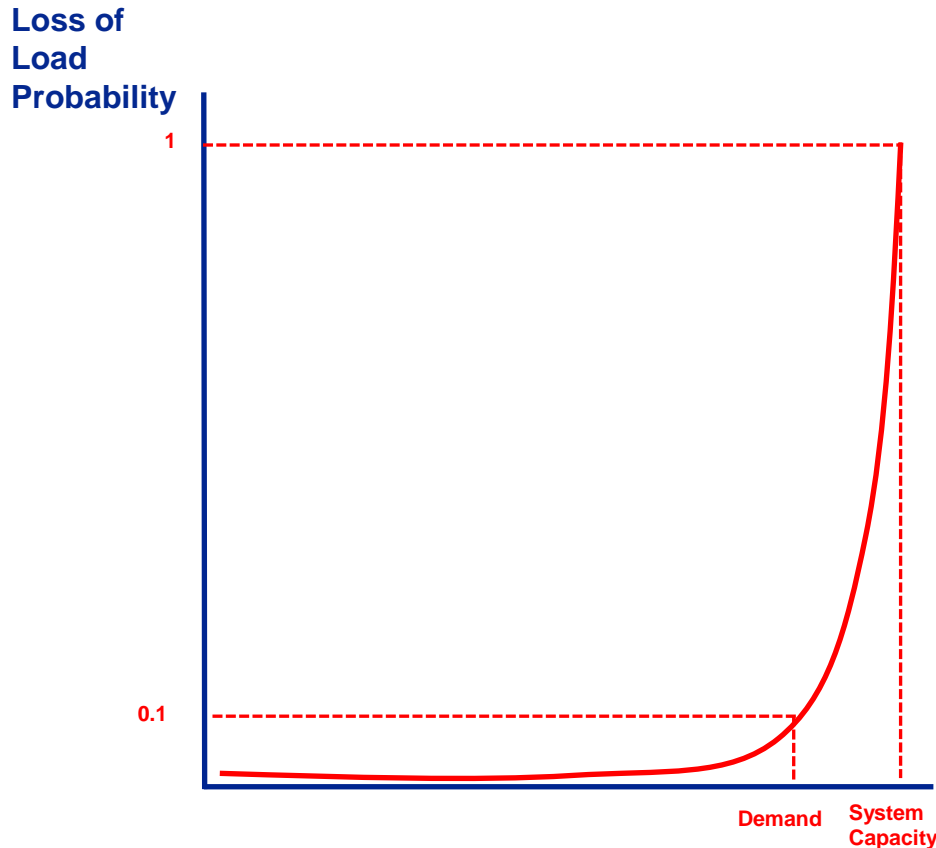
G1: 10 MW 0.03 FOR  
G2: 5 MW 0.02 FOR



Demand	Prob	Cumulative Prob
15	0.9506	1.0000
10	0.0194	0.0494
5	0.0294	0.0300
0	0.0006	0.0006



# Short term capacity signal – LOLP



- LOLP is exponential, indicating tightness of the system as demand approaches system capacity
- Used extensively in energy planning, optimal outage coordinate and adequacy assessment

Capacity /  
Demand



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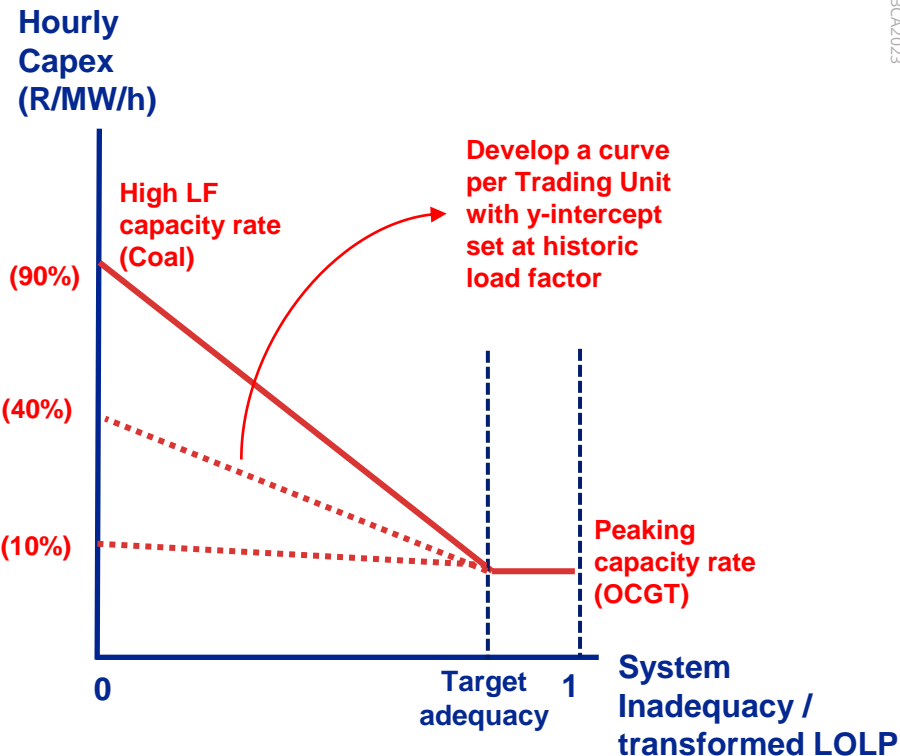
# Short term capacity signal – key concepts

- Calculating ELCC for each Trading Unit
  - Start of each calendar year based on historic data (effective availability/UCLF)
  - Calculate per hour of a typical day in each month
- Calculating LOLP for each hour
  - Calculating day-ahead based on capacity offered in day-ahead market against expected demand
  - Using historic effective availability/UCLF for each Trading Unit
  - LOLP used to determine Capacity Price
- Capacity payment (calculated ex-post) for each Trading Unit for each hour =  
Effective Capacity \* (ELCC/Rated Capacity) \* *Capacity Price*



# Short term capacity price

- Annual capacity price curve calculated at start of each calendar year
  - Y-axis: calculated annualised capacity costs (R/MW/year) for high and low factor options divided by 8760 hours
  - X-axis: *transformation* of LOLP (which is highly exponential and needs to be linearalised)
- When LOLP is  $\rightarrow 1$  (high probability of loss of load) can expect SMP to be high (set by expensive marginal generator). Marginal generator (OCGT) not recovering full cost ("missing money") compensated by capacity rate
- When LOLP  $\rightarrow 0$  (low probability of loss of load) SMP likely to be low; generators recover cost through capacity rate



# Long- or medium-term certainty

- Capacity contract auction
  - Auction held every *five* years (three years before contracts come into effect) with contract for capacity for *five* years
  - Obligation on retailers and consumers to contract for future capacity needs (or willing buyers only?)
  - Generator capacity price set to the offer price for the Trading Unit; Consumers / retailers price set at the weighted average capacity rate
  - Rate used as a hedge against the short-term capacity rate

