Coordinating between GENESYS and RPM using ASCC

When is a System Adequate?

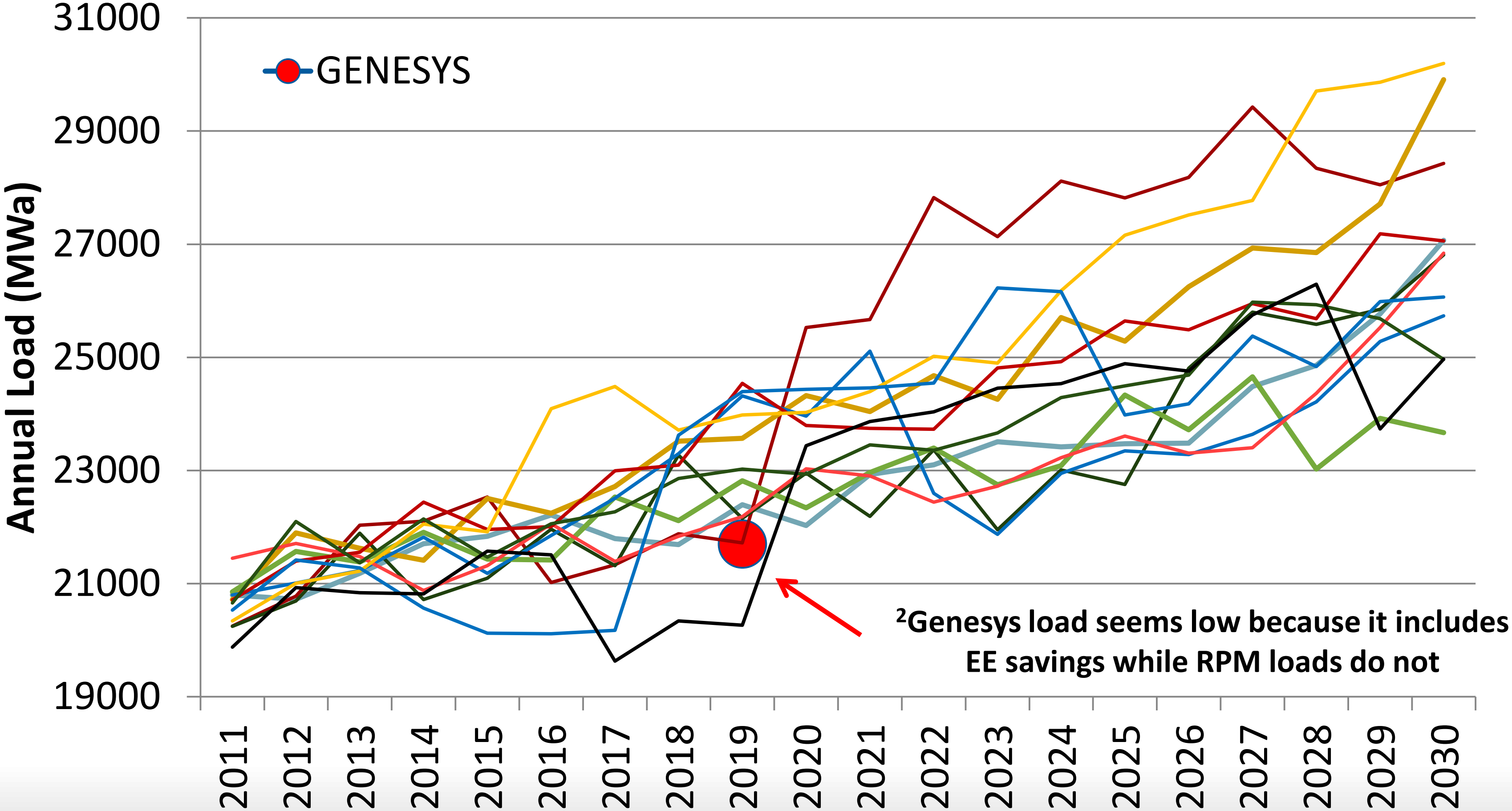
- Incremental loads and incremental resources meet standards / risk appetite / historic line in the sand …
- Adequacy Reserve Margin = (Resources – Load) / Load
  - E.g. what percentage of resource compared to load is needed
  - “Standardizing” allows for reducing model complexity

Sample ARM Calculations

Capacity - Adequacy Reserve Margin (ARM_C)		
Resource	**ARM_C Calculation**	**Jan-Mar**
Thermal	Winter Capacity * (1 – Forced outage rate)	11594
Wind	5% of Nameplate	227
Hydro	10-hr Sustained Peak (1937)	18785
Firm contracts	1-Hour Peak	-167
Additional Capacity		4,000
Total Resource		**34438**
Load	1-Hour Expected Peak	33521
L/R Balance	Resource - Load	917
ARM_C	**(Resource - Load)/Load**	**2.7%**

Energy - Adequacy Reserve Margin (ARM_E)		
Resource	**ARM_E Calculation**	**Jan-Mar**
Thermal	Winter Capacity * (1 – Forced outage rate * (1 - Maintenance))	10963
Wind	30% of Nameplate	1360
Hydro	Critical Year Hydro (1937 FELCC)	10642
Firm contracts	Period Average	-200
Additional Energy		50
Total Resource		**22813**
Load	Period Average (weather normalized)	23536
L/R Balance	Resource - Load	-722
ARM_E	**(Resource - Load)/Load**	**-3.1%**

Example: RPM vs. GENESYS Loads[1,2]



Northwest **Power** and **Conservation** Council

[1]Sample of 11 futures out of 750

SEVENTH NORTHWEST POWER PLAN

Associated System Capacity Contribution

- Associated System Capacity Contribution (ASCC) is based on the reduction in system peak resource deficit associated with adding an incremental resource
- Resources dispatched rarely at high cost such as DR supply limited energy and thus do not change the hydro/storage dispatch
- Resources that supply significant energy can reduce energy requirements on hydro/storage allowing output to be more shaped to system peak needs

Why ASCC Why?

- ASCC reframes the system requirement in terms of capacity while accounting for energy content
- ASCC allows for modeling independent evaluation of energy and capacity requirements greatly reducing the complexity of the constraint
- Systems with significant hydro, thermal or energy storage and variable energy generation must be adequate for both energy and capacity and do not fit well into traditional capacity planning methods

How ASCC Is Calculated?

- Use GENESYS to estimate LOLP without resource additions (for an inadequate supply, i.e. LOLP > 5%)
- Using the curtailment record, calculate the amount of capacity-only needed to get to an LOLP of 5%
- Use GENESYS to determine how much nameplate resource is needed to get to an LOLP of 5%
- ASCC = Capacity Needed/Resource Nameplate Capacity

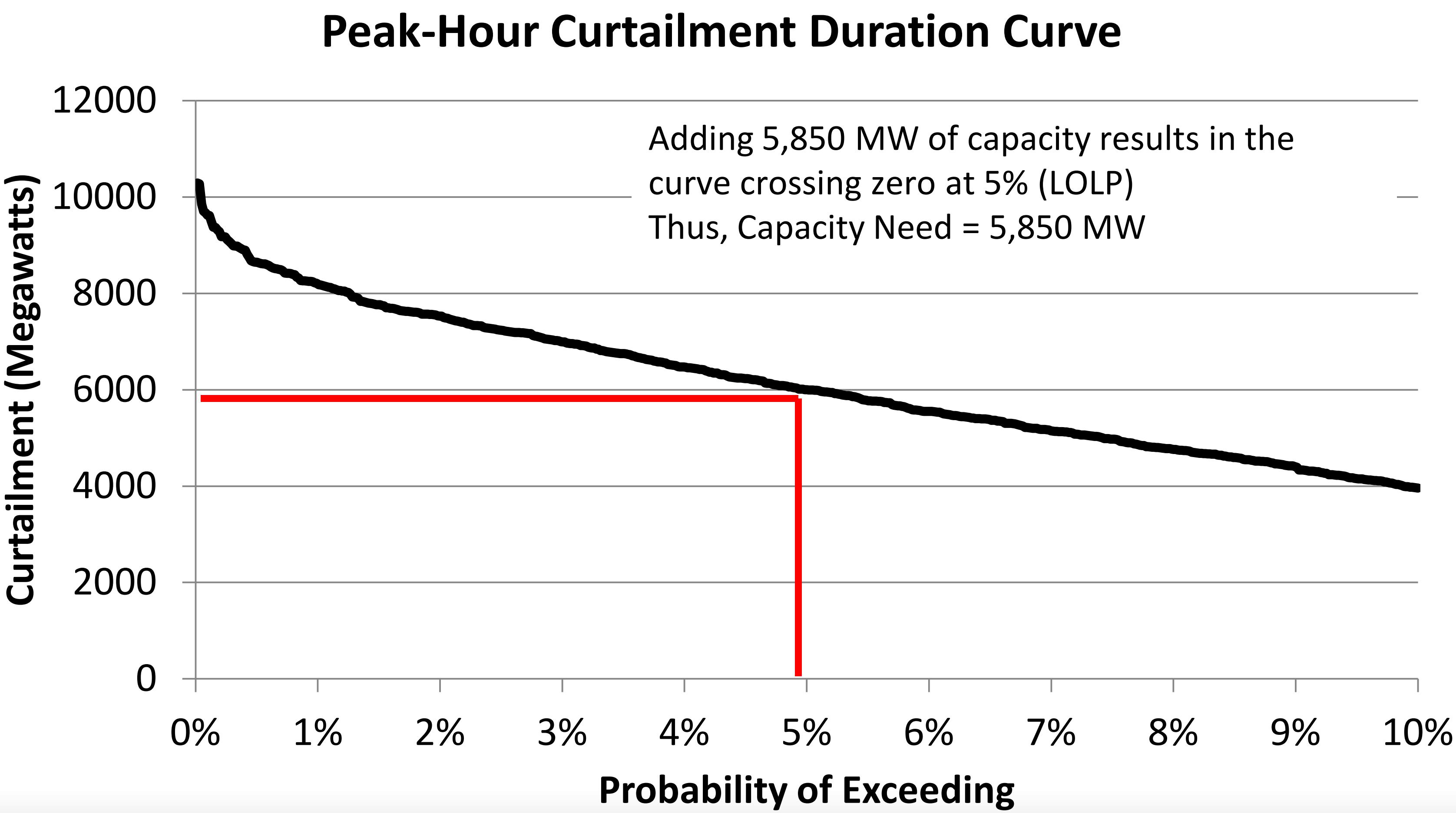
Examples of ASCC

- 2026 high load case with existing resources only – LOLP = 50%
- Use curtailment record to assess needed capacity – 5,850 MW
- Same case with sufficient CCCT for LOLP of 5% – 4,400 MW

- ASCC (CCCT) = 5,850/4,400 = 130% * MW Nameplate

- Same process for EE
- ASCC (EE) = 5,850/4,900 = 120% * Peak MW

Estimating Capacity-Only Need



Verification of ARM and ASCC

- Using only the ARMs in the RPM
- Using game 781 resource build out in GENESYS yields an LOLP of 0.3%
- Result = overbuilding

- Use ARMs and ASCC in RPM
- Game 781 LOLP is 4.4%
- Within the acceptable range (3-5%)