System Dynamics view of what it takes Energy Storage to succeed

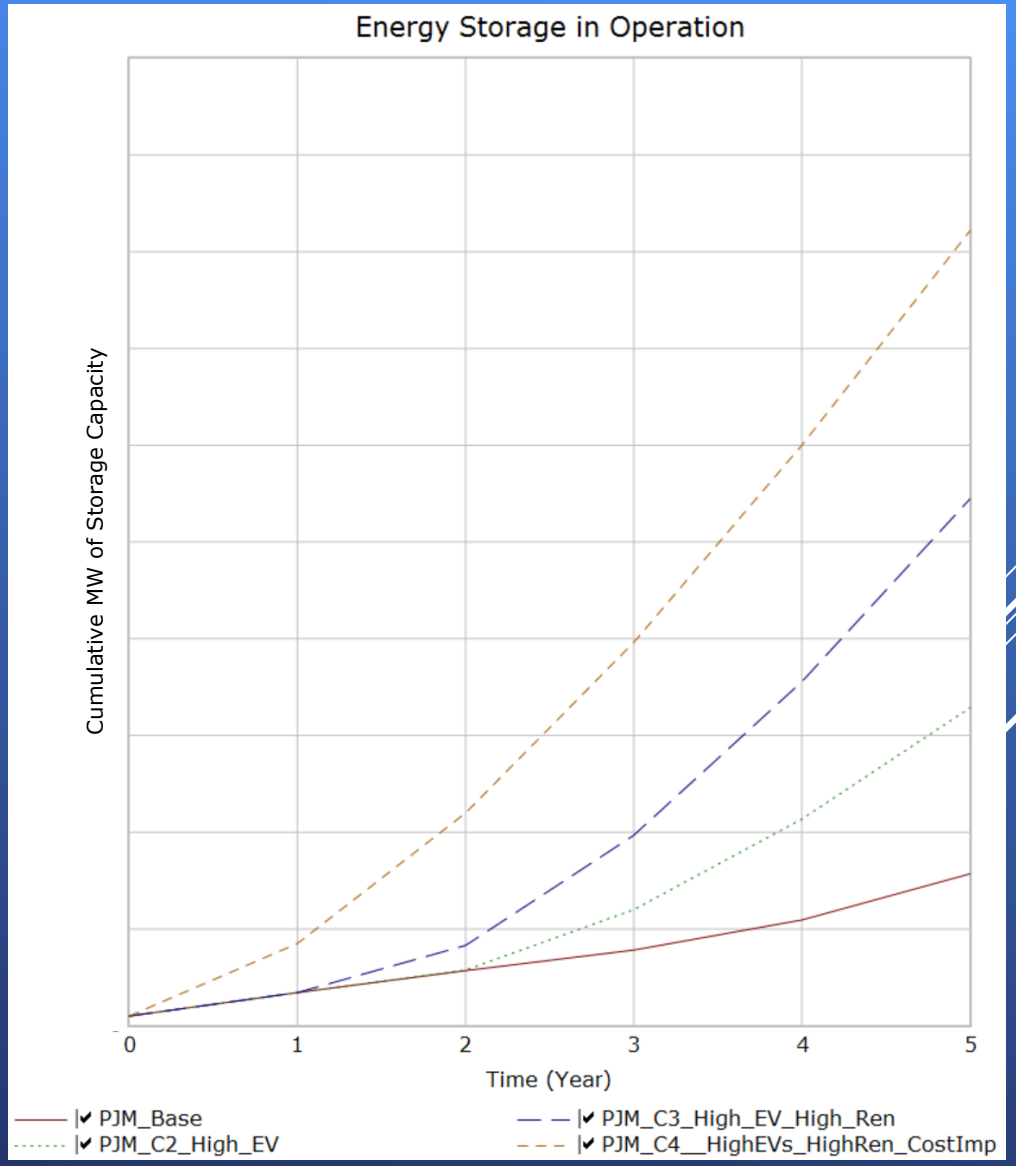
Examination of a PJM sized market and analysis of drivers of storage adoption

Results of a pseudo-PJM storage growth driver analysis

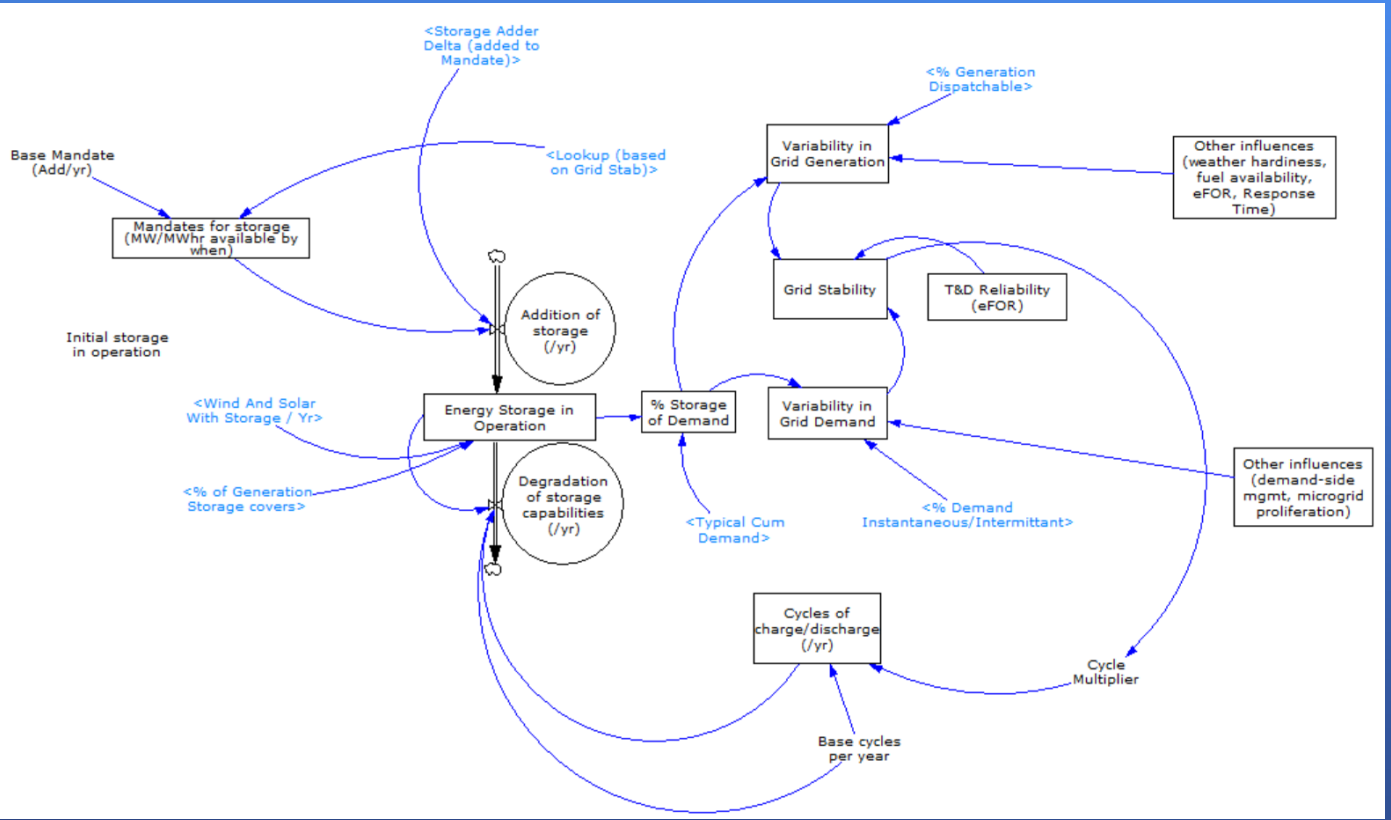
High level takeaways:

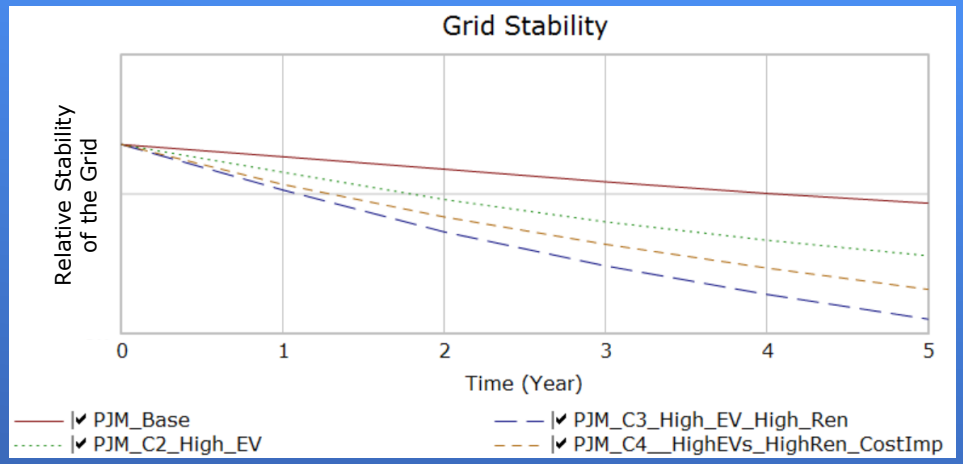
- **Generation mix evolution is a stronger driver for than demand evolution**
- **However, economics are still the chief determinant in storage adoption**

Variable modified for the case	1 - Base	2 - High Electric Vehicle (EV) Adoption	3 - High Renewable Additions	4 - Storage Cost Improvement
Number of EV's sold into the market per year	—	↗	↗	↗
Gas Power Plant Additions	—	—	↘	↘
Wind and Solar Additions	—	—	↗	↗
Cost per MW of Storage	—	—	—	↘



Top Level View of Model Structure

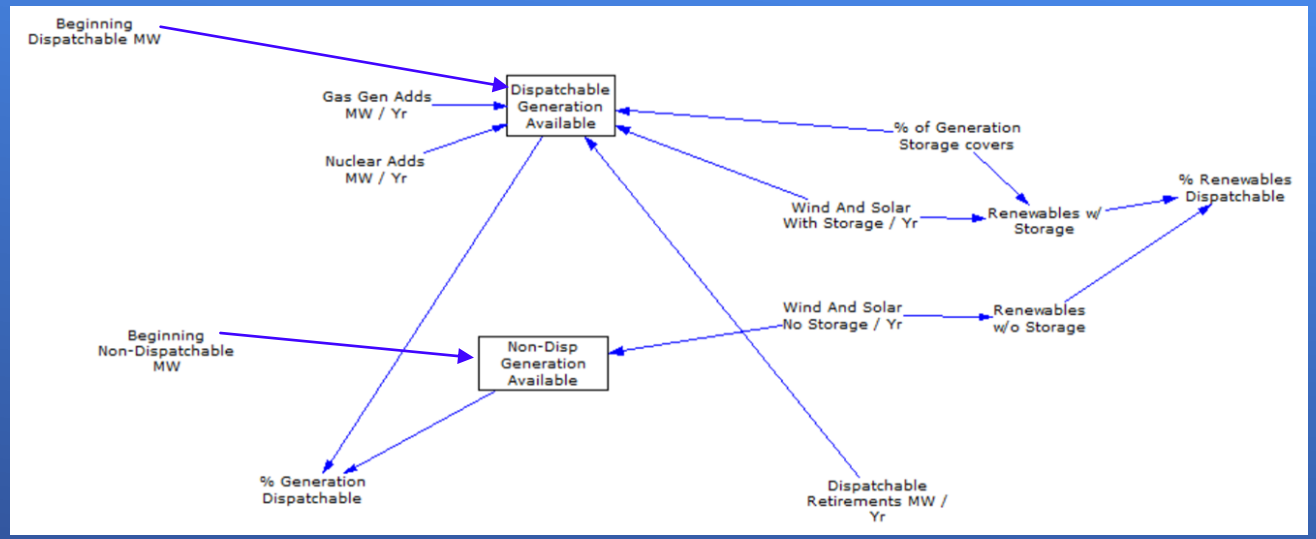


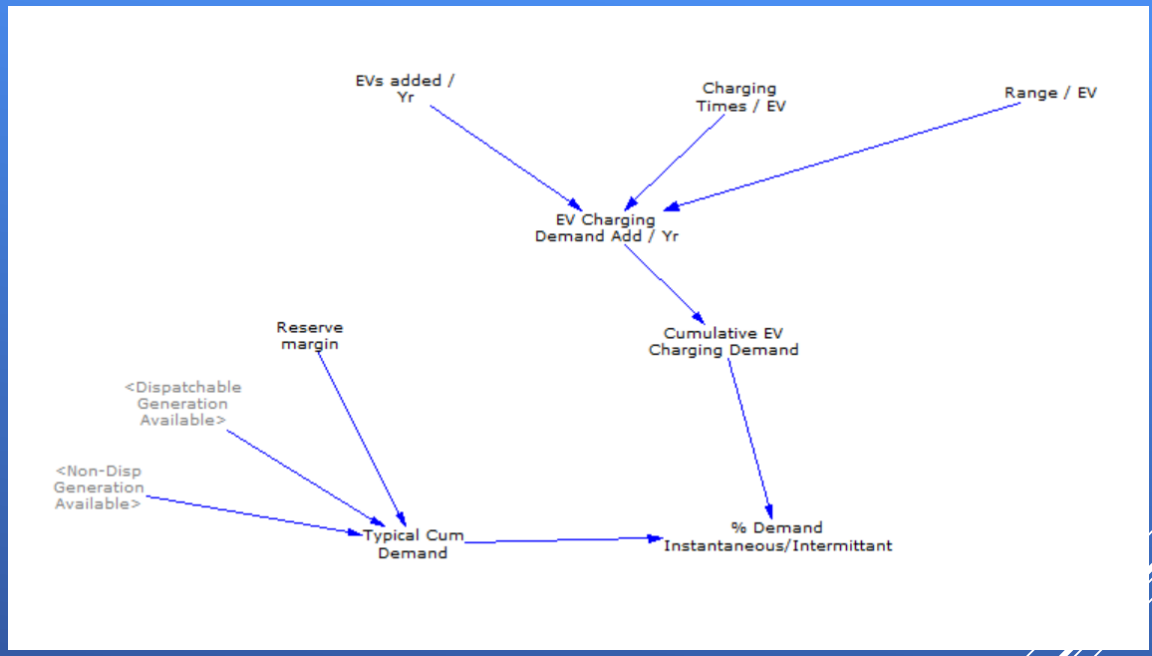


1 - Base	2 - High Electric Vehicle (EV) Adoption	3 - High Renewable Additions	4 - Storage Cost Improvement

Cost reductions are critical for storage to be the answer for countering increased instability of the grid driven by additions of renewables (intermittent generation) to the grid

Generation and Demand Views of Model

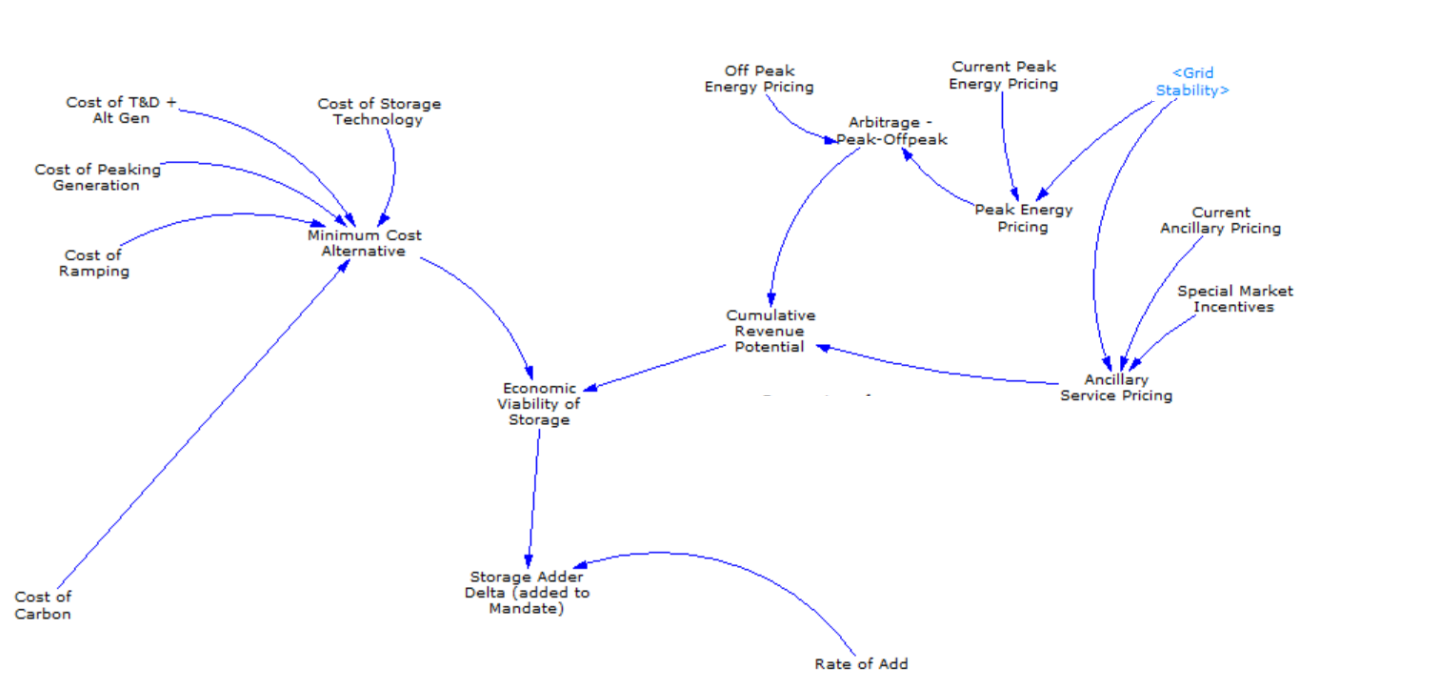


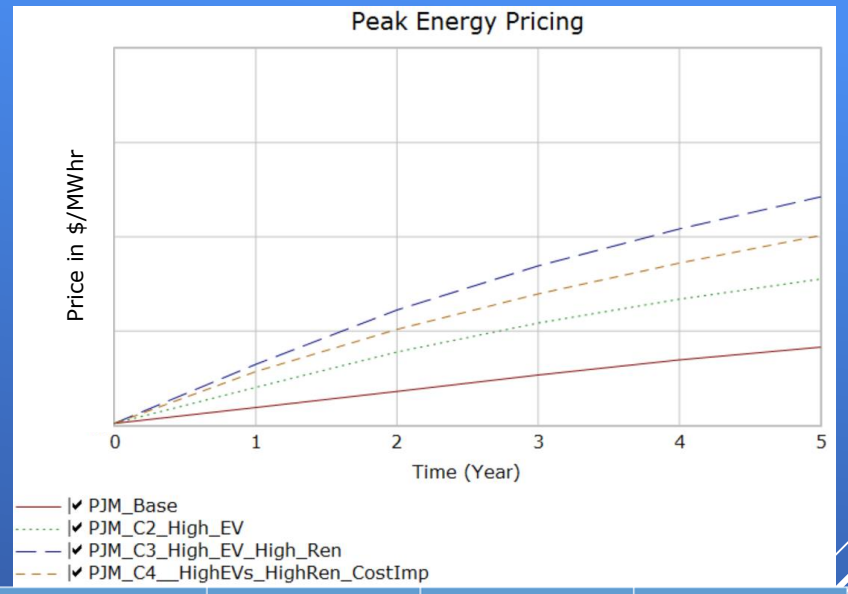


Intermittent Generation (wind & solar) combined with storage is considered dispatchable – this will foster increased revenue potential and growth of this pairing

The ability to supply instantaneous and short duration load will be an ever increasing demand of the grid as EVs grow in number and range, while charge times decrease

Economic View of Model





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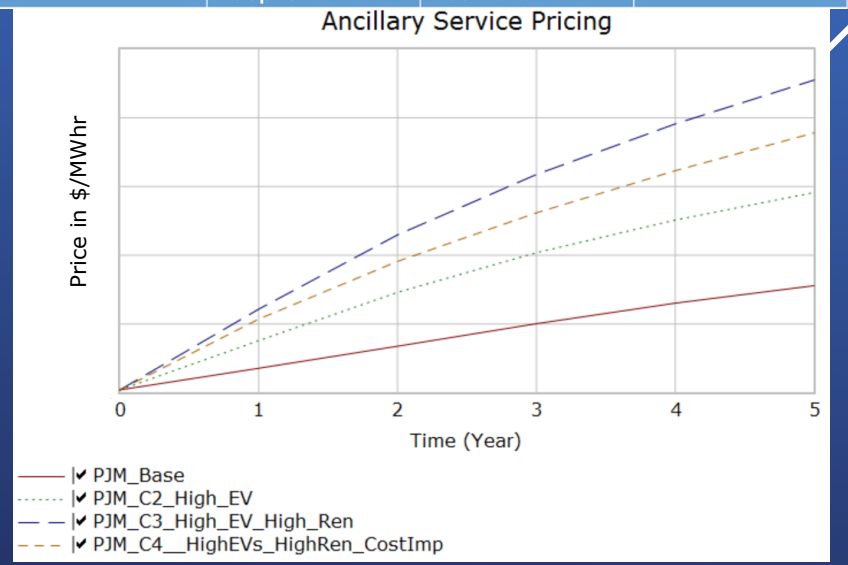

The cost position of storage impacts deployment likelihood as well as potential from multiple revenue streams – profit volume will be a more important consideration than % as storage proliferation improves grid stability