



Data management and linking tools

Lessons learned from MISO's Renewable Integration Impact Assessment (RIIA)

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Three major technical areas were analyzed in RIIA to understand the challenges of increasing renewable energy



Operating Reliability

Ability to withstand unanticipated component losses or disturbances



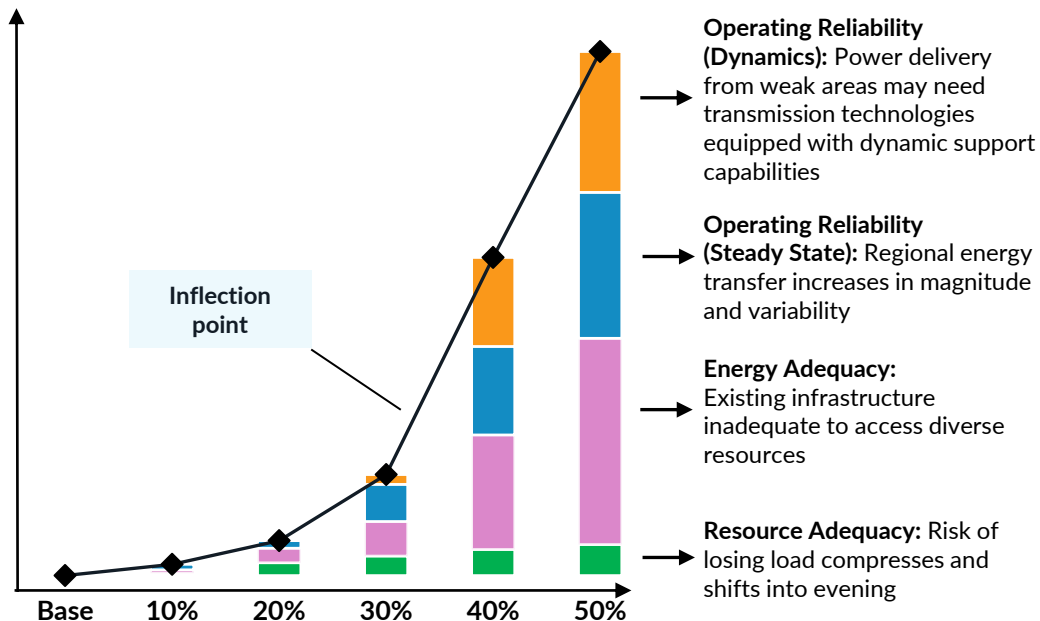
Energy Adequacy

Ability to provide energy in all operating hours continuously throughout the year

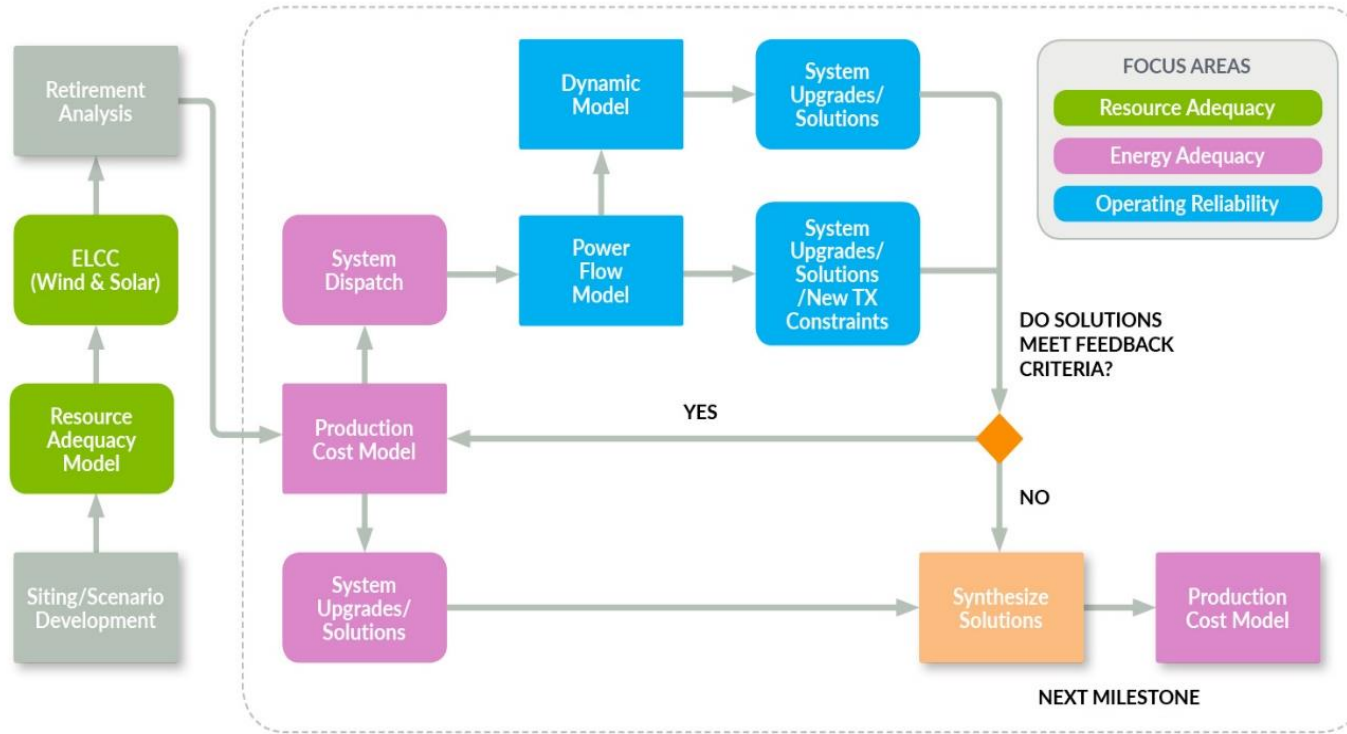


Resource Adequacy

Having sufficient resources to reliably serve demand



A robust data management process was developed to link tools and, more broadly, to coordinate between the RIIA focus areas

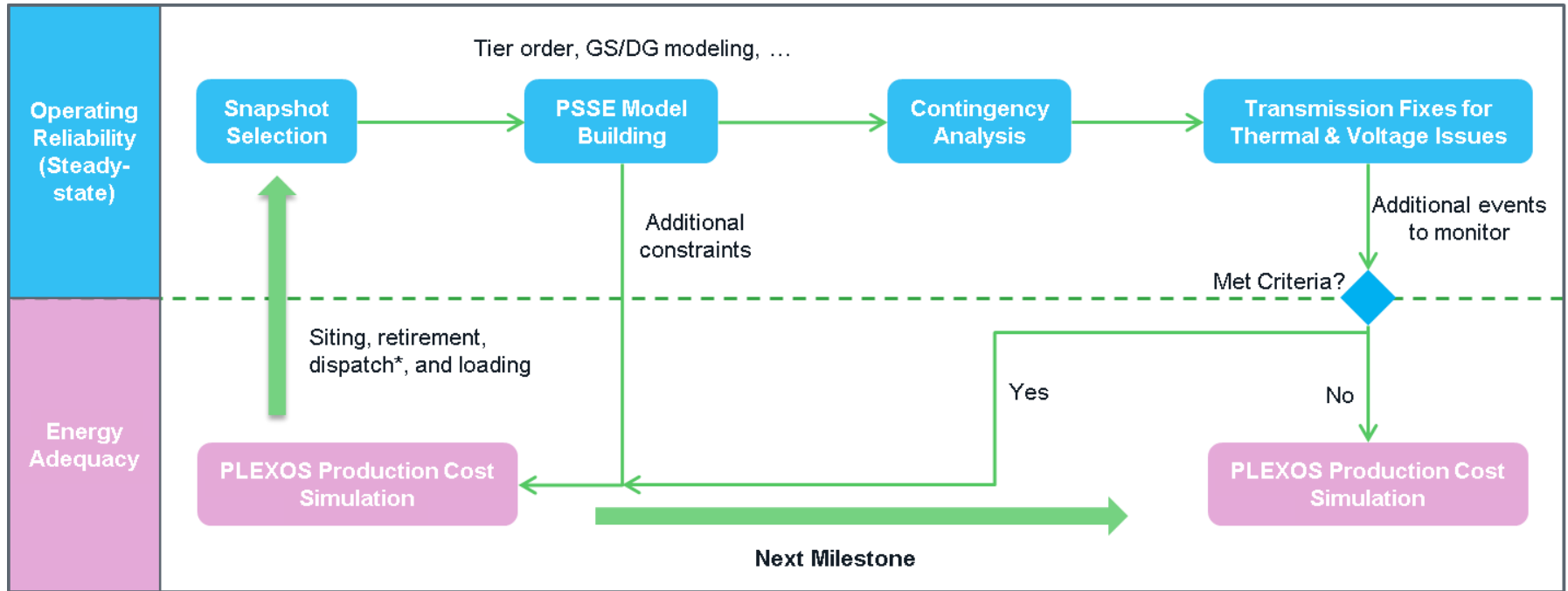


System dispatch results passed along from **Energy Adequacy** while keeping the retirement assumptions developed based on data received from **Resource Adequacy**;

Operating Reliability analyzed the dispatch, identify thermal, voltage and dynamic issues;

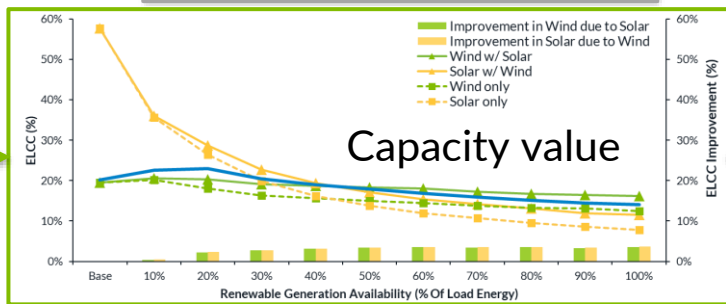
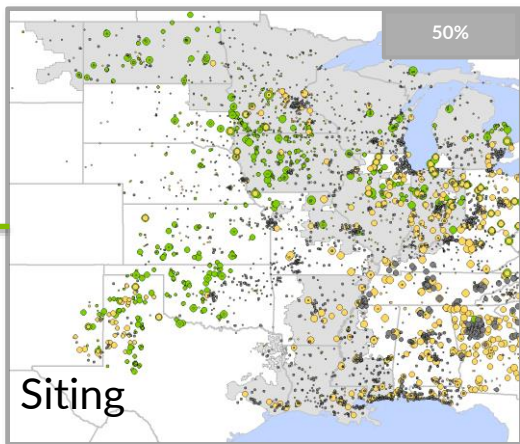
System upgrades/solutions are developed for reliability issues identified in each milestone in **Operating Reliability**, including but not limit to reconductor, new circuit, adding dynamic devices, etc.

One of the most data & process intensive parts of the RIIA process was the production cost-to-operating reliability loop

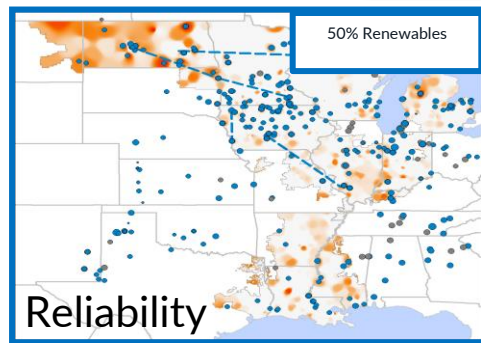
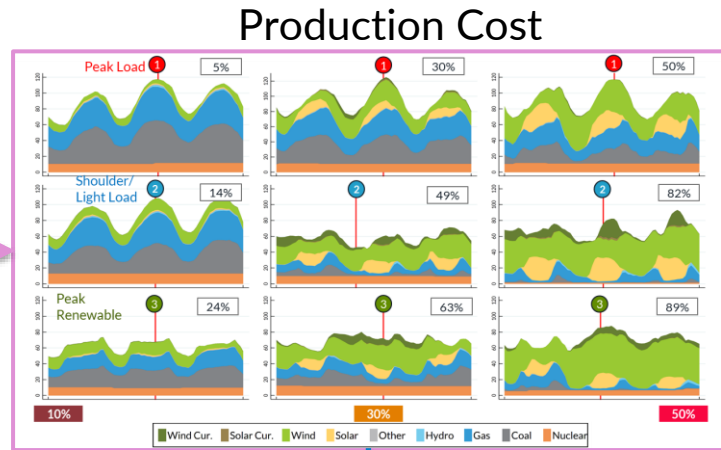


Linking tools in RIIA required a data management process with robust automation and visualization features

What's the location and mix of renewables?



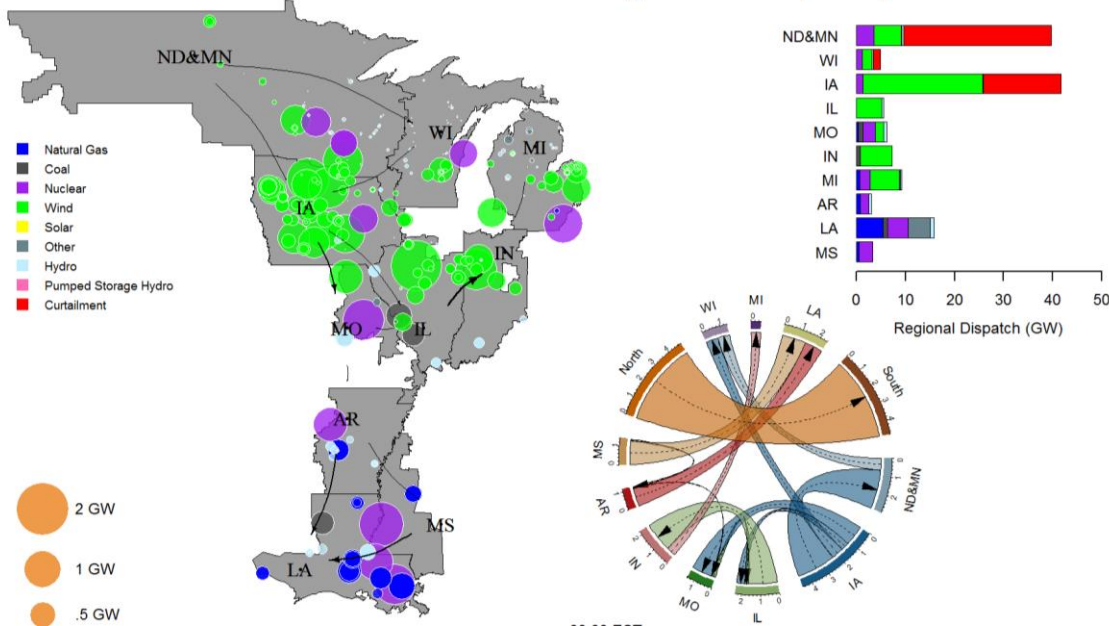
How much retirements?



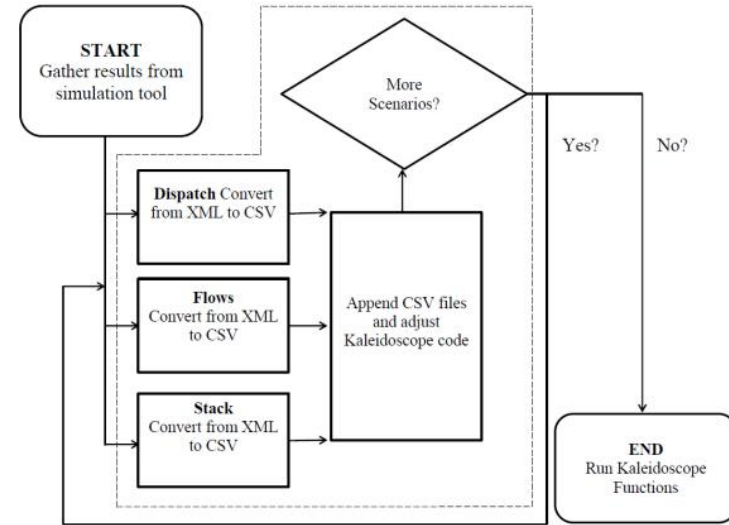
Which "risky" conditions?

Visualization and automation within & between focus areas significantly enhanced the data management and tool linking processes

Visualization of renewable integration complexity in MISO



Data verification and visualization process



Lessons learned

- Harmonizing input data at the front-end of the process and using synchronized weather years of load and renewables are a must
- The use of different tools provided insights to specific questions and added a layer of verification
- Visualization and automation is key
- Leveraging open-source codes from NREL allowed for a better understanding of the input and output data



Thank you!

All RIIA-related documents can be found on MISO's web page.
[Home > Planning > Policy Studies> Renewable Integration Impact Assessment](#)