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

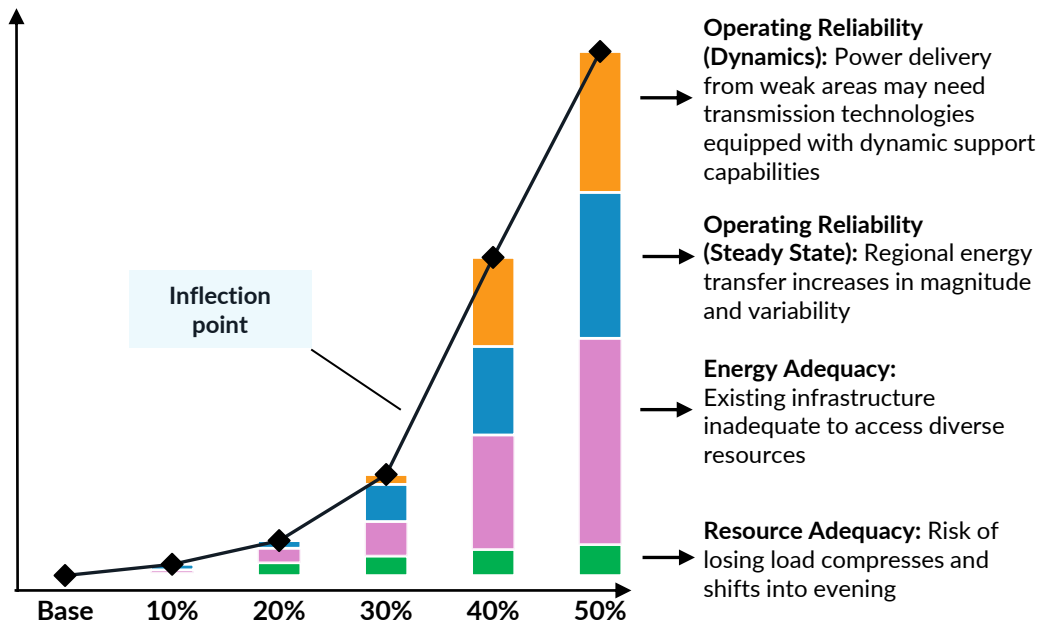Ability to withstand unanticipated component losses or disturbances

Energy Adequacy

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

Resource Adequacy

Having sufficient resources to reliably serve demand

Inflection point

Operating Reliability (Dynamics): Power delivery from weak areas may need transmission technologies equipped with dynamic support capabilities

Operating Reliability (Steady State): Regional energy transfer increases in magnitude and variability

Energy Adequacy: Existing infrastructure inadequate to access diverse resources

Resource Adequacy: Risk of losing load compresses and shifts into evening

Base   10%   20%   30%   40%   50%

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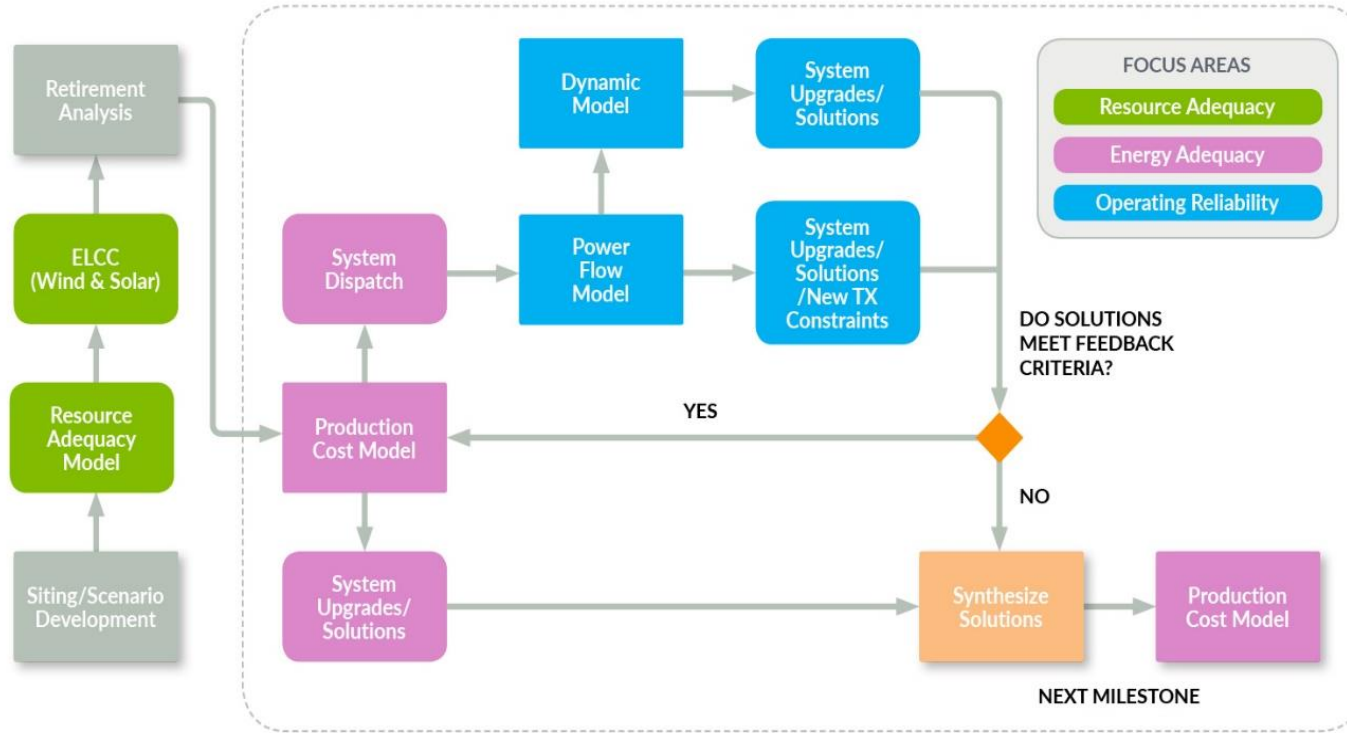

System dispatch results passed along from **Energy Adequacy** while keeping the retirement assumptions developed based on data received from **Resource Adequacy**;

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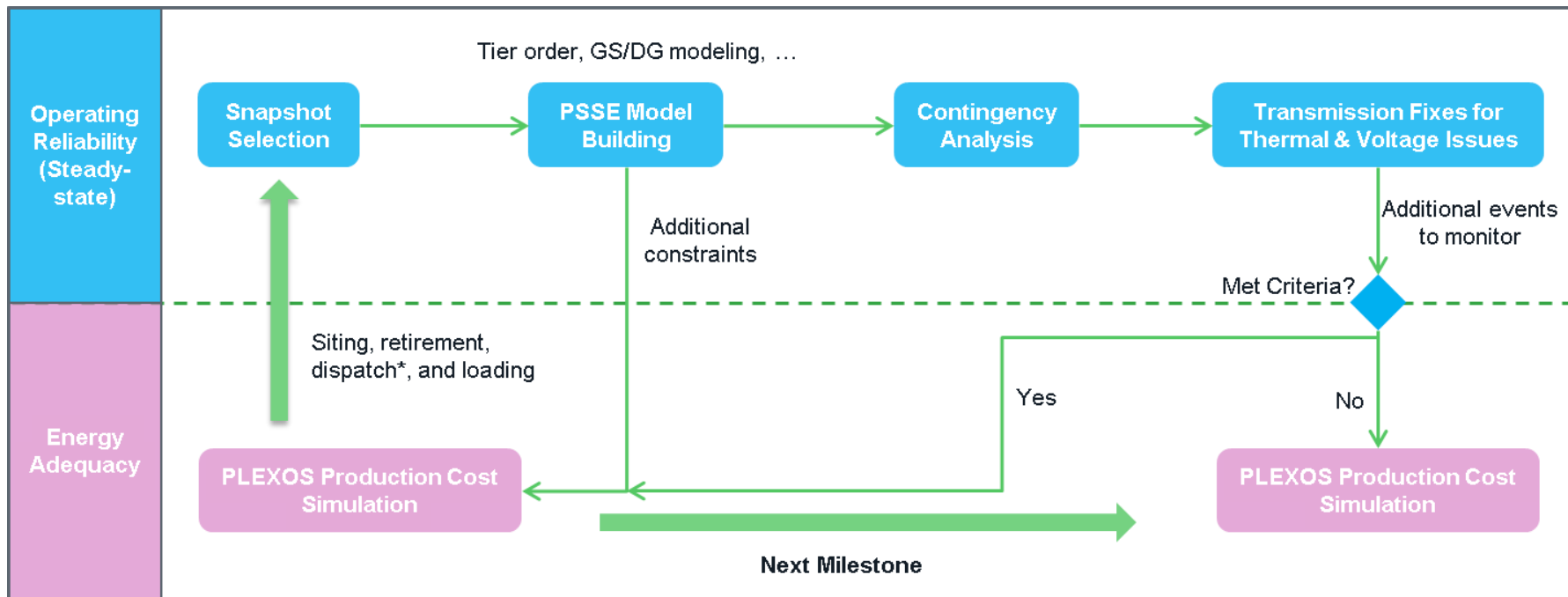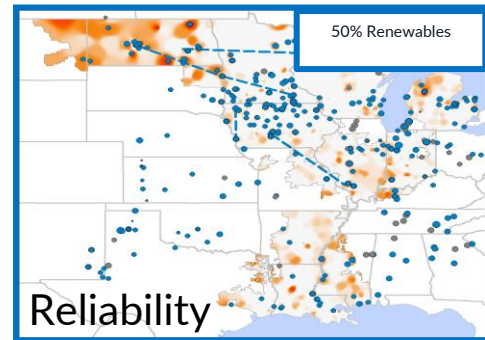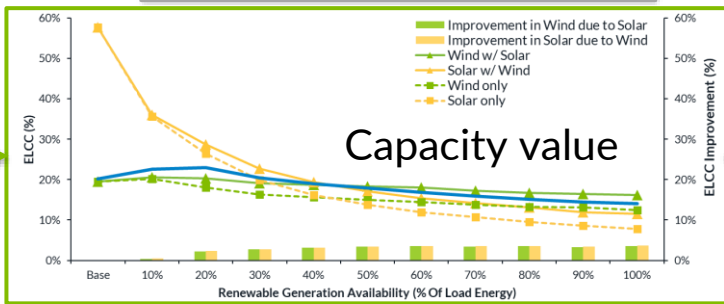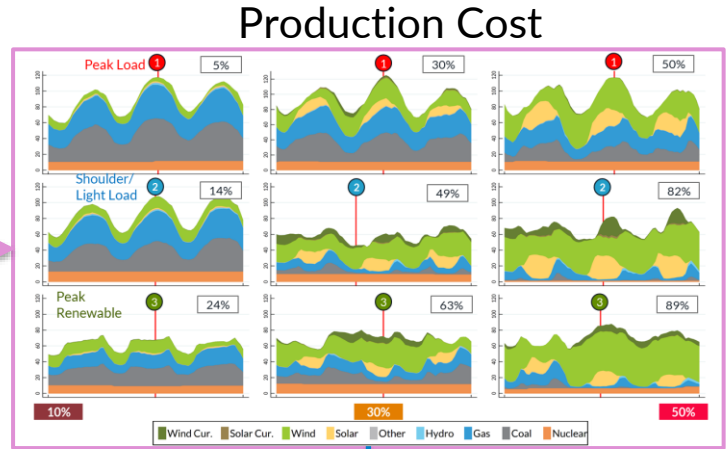
Linking tools in RIIA required a data management process with robust automation and visualization features

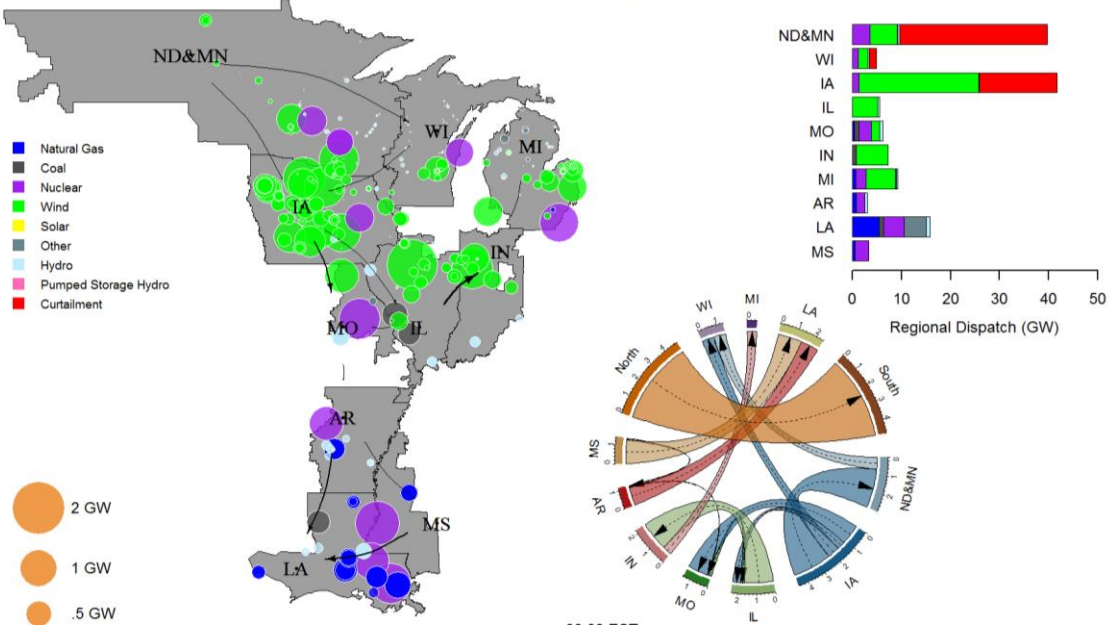What's the location and mix of renewables?

Siting
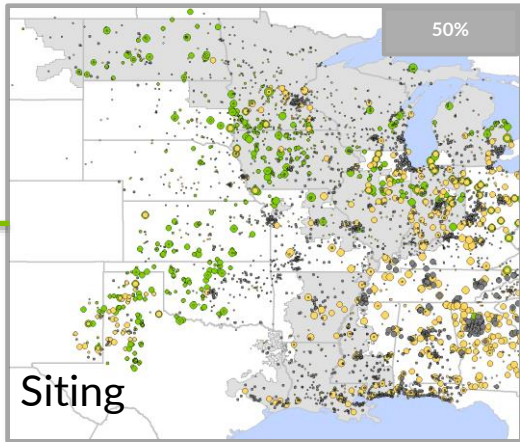
How much retirements?

Production Cost

Which "risky" conditions?

Capacity value

Reliability

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
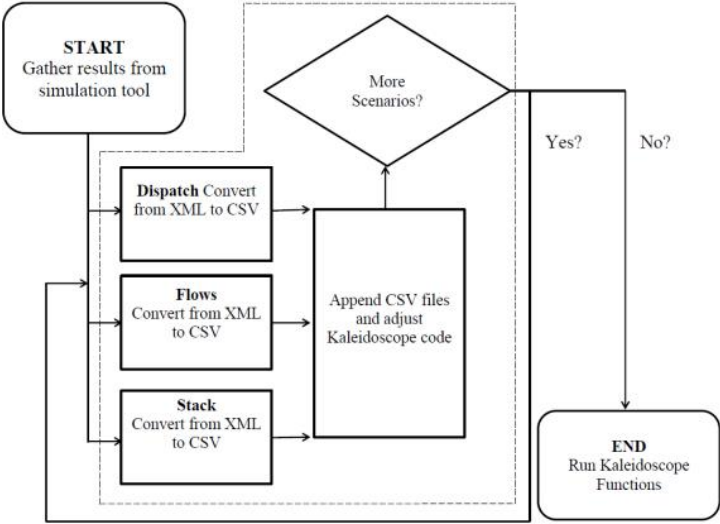
Lessons learned

- 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

MISO

Thank you!

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