

Expanding Transmission Capacity: Options and Implications

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The Transmission Design Challenge

- General Problem Statement for Transmission Study
 - Minimize transmission capital costs, generation capital costs and system energy costs while maintaining system reliability
- Problem solution subject to sometimes competing constraints or goals:
 - Minimize investment risk (seek shorter payback horizon)
 - Maximize carbon reduction (replace coal production)
 - Maximize local economic development (install wind directly within RPS State)
 - Maximize economic value (seek lowest cost to customer)

Policy Matters

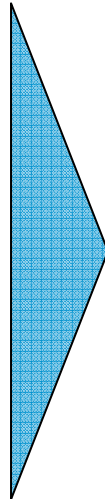
- The level of uncertainty that exists around future policy decisions creates difficulty for those involved in the planning function and causes hesitancy for those with the resources to undertake transmission expansion projects.
- To minimize the risk involved with planning a system under such conditions, the process must consider projects in the context of all potential outcomes
- Identifying transmission plans that result in the least regrets regardless of policy decisions will help to alleviate the impacts of those future outcomes

Transmission Planning Approach is Evolving

In order to achieve its planning objectives , the Midwest ISO has transformed its transmission expansion planning model; this process will continue to mature as experience is gained

Reliability-Based Model

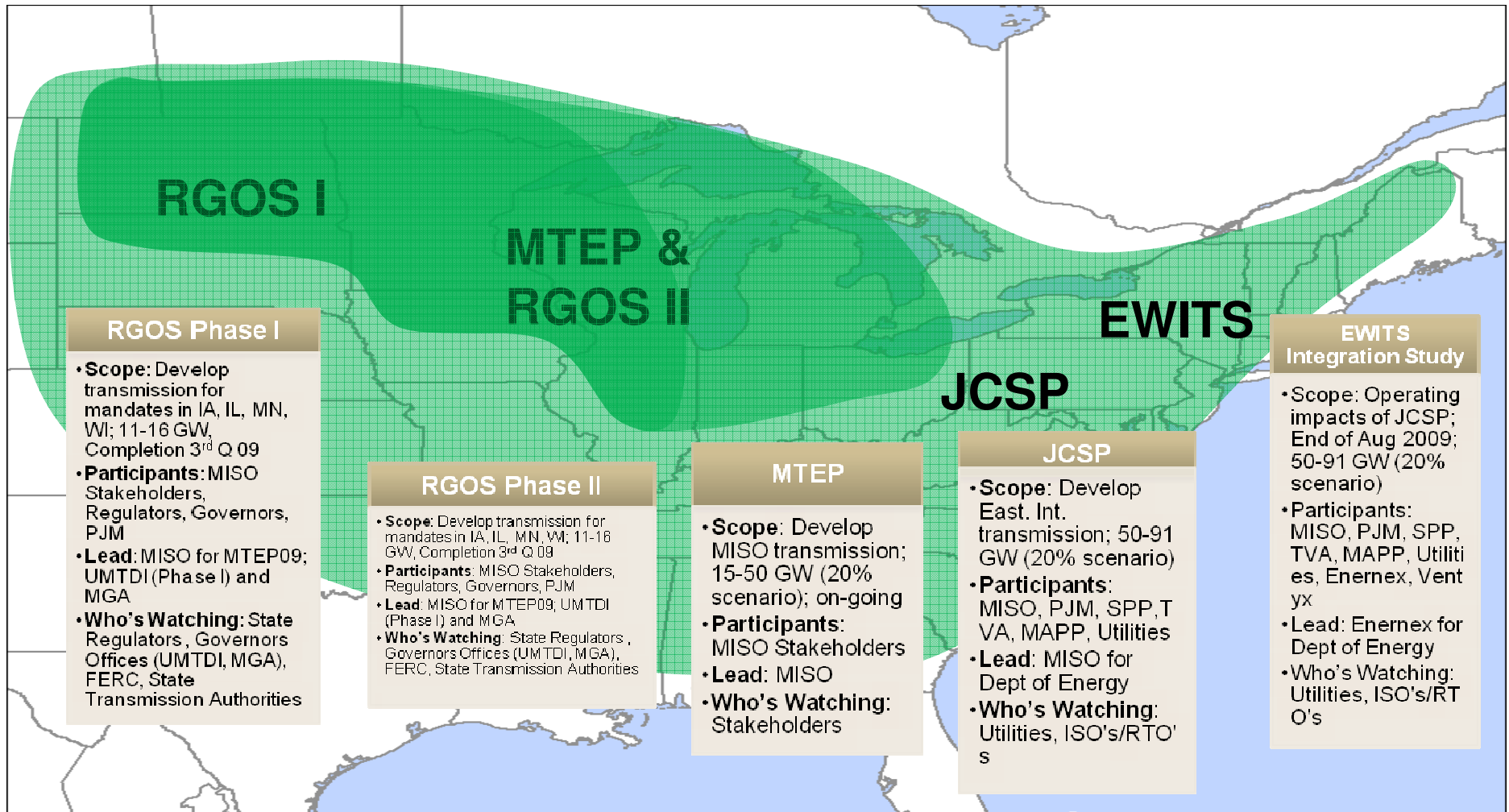
- Focused primarily on grid reliability
- Typically considers a short time horizon
- Seeks to minimize transmission build



Value-Based Model

- Focused on value while maintaining reliability
- Reflects appropriate project time scales
- Seeks to identify transmission infrastructure that maximizes value
- Identification of the comprehensive value of projects

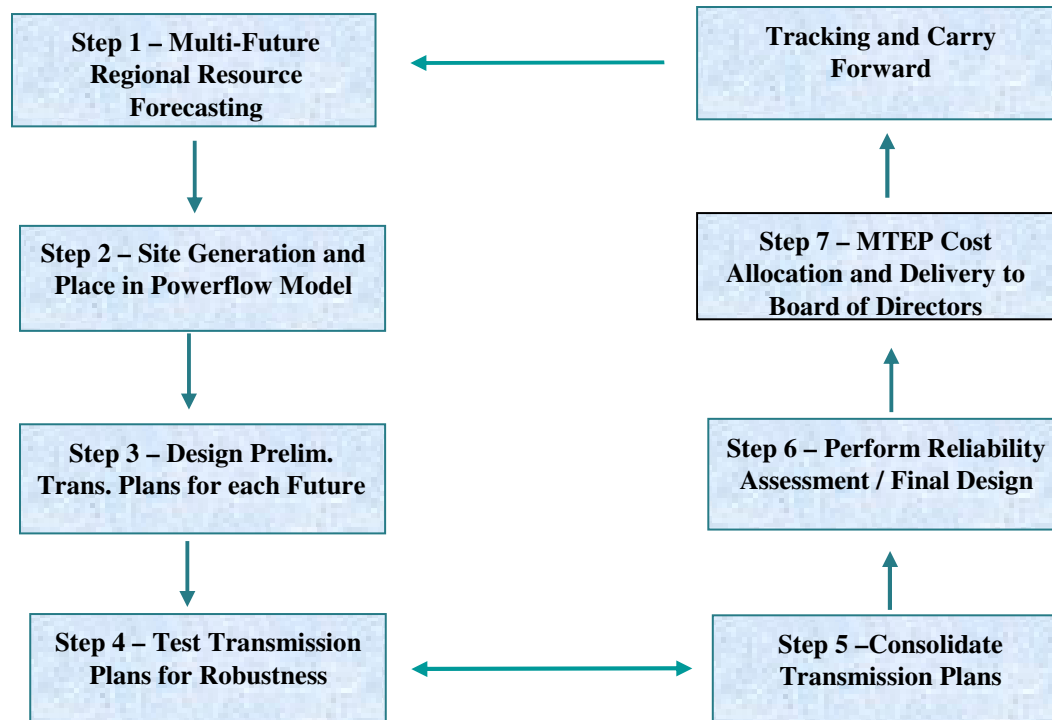
Midwest ISO is actively engaged in planning from regional to national level



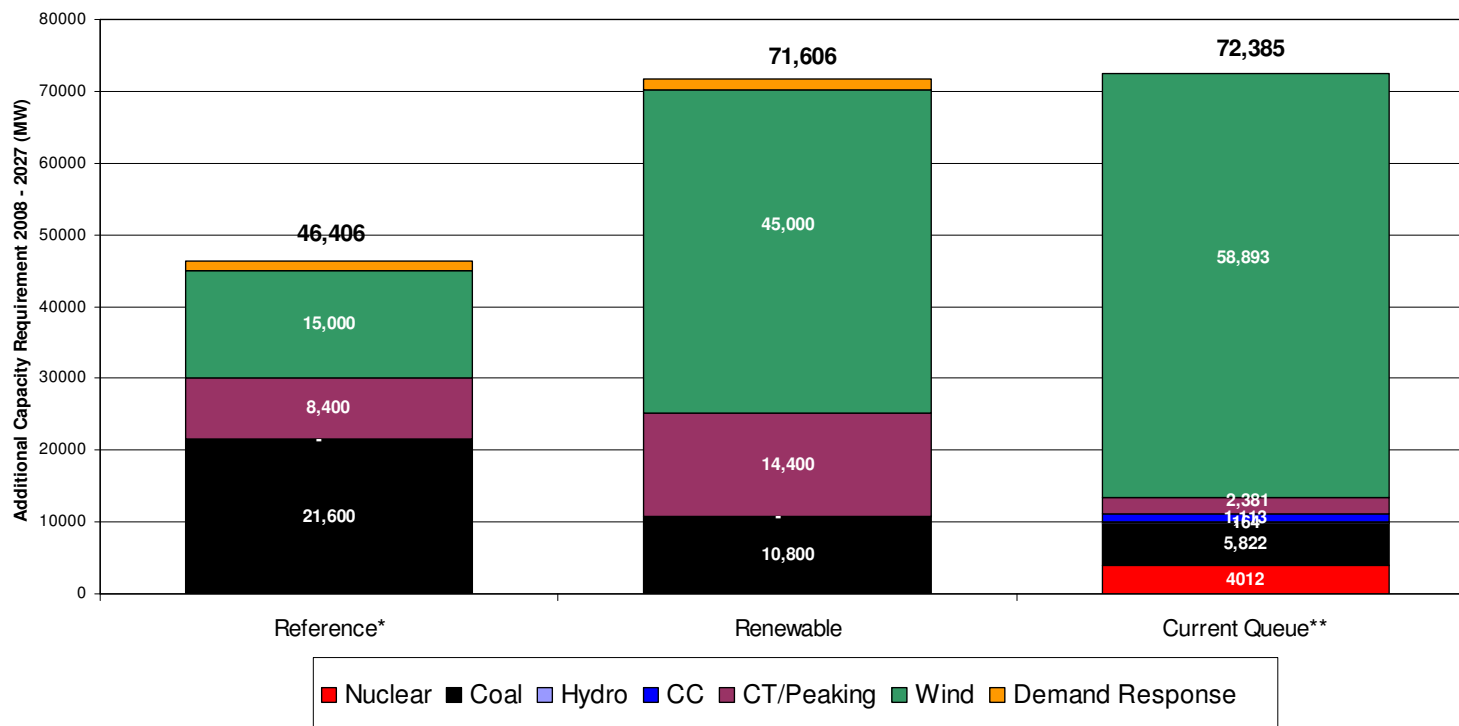
RGOS = Regional Generation Outlet Study
MTEP= Midwest ISO Transmission Expansion Plan
JCSP = Joint Coordinated System Plan
EWITS = Eastern Wind Integration and Transmission Study

Value-Based Planning Process

The below process flow represents the steps undertaken to develop top-down, value-based transmission plans to support economic and reliable energy delivery under a wide range of potential energy policy outcomes – or Future scenarios

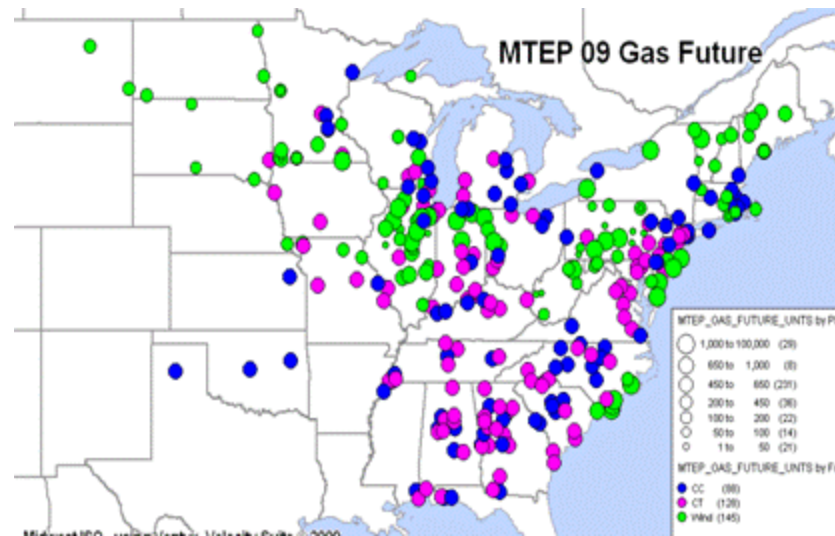
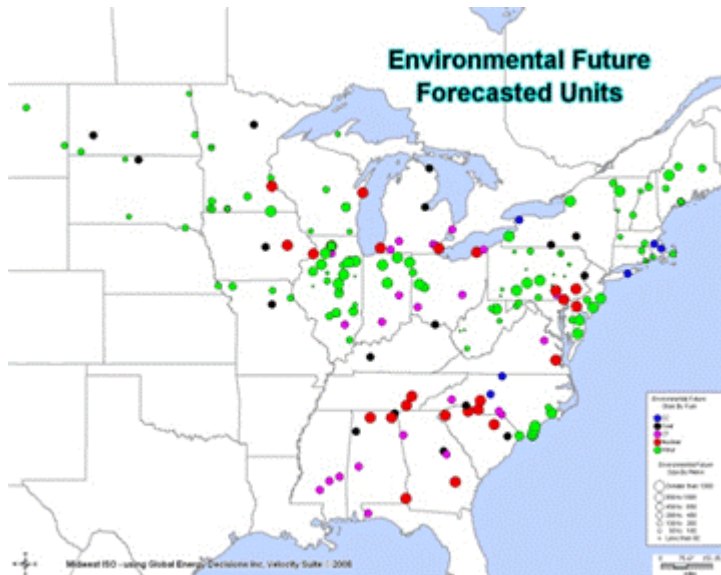
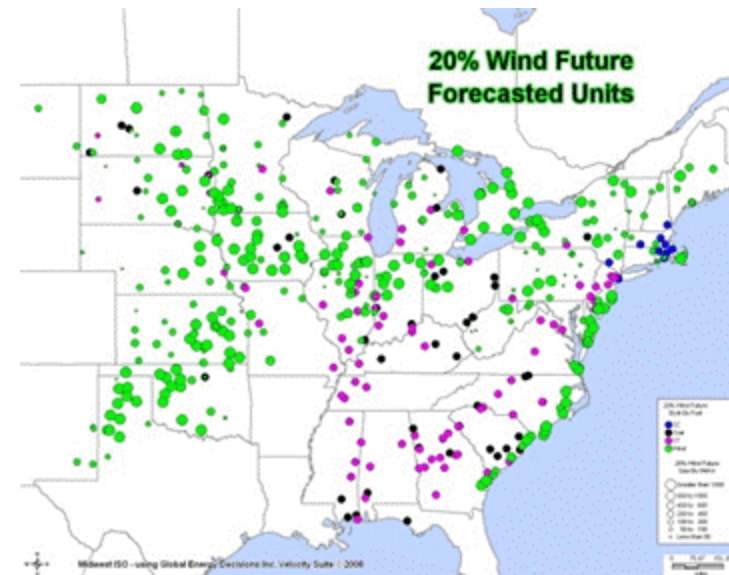
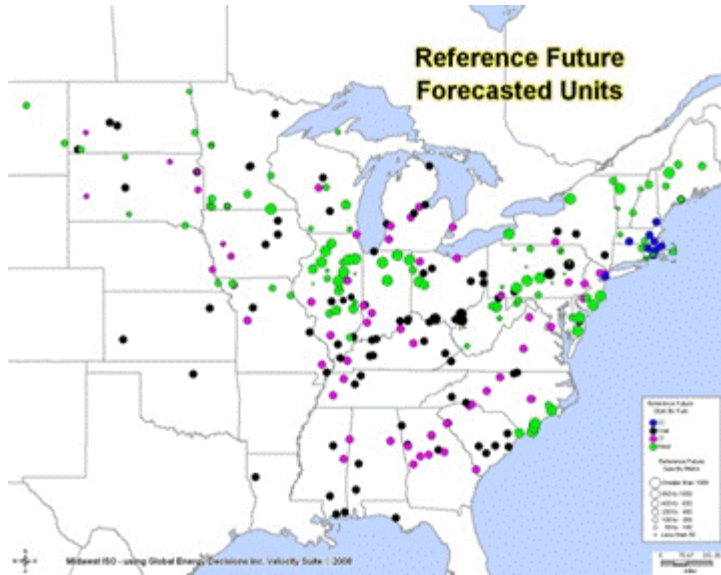


Renewable Portfolio Standard Impacts on Generation Requirements

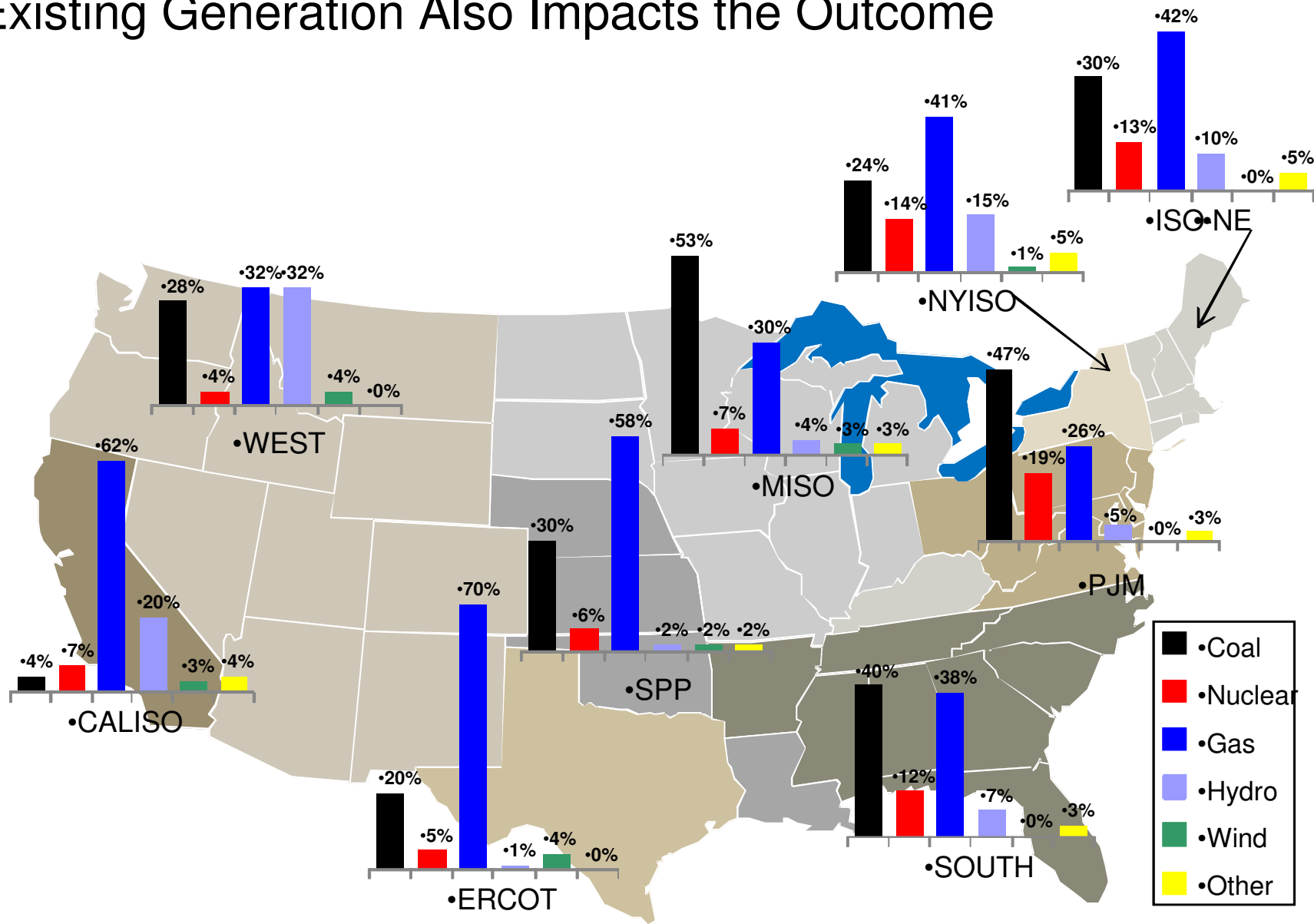


- Renewable case reflects 20% Midwest ISO Renewable Portfolio Standard (RPS)
- 20% national RPS would result in increased levels of wind generation in Midwest ISO to meet Eastern Interconnect Goals

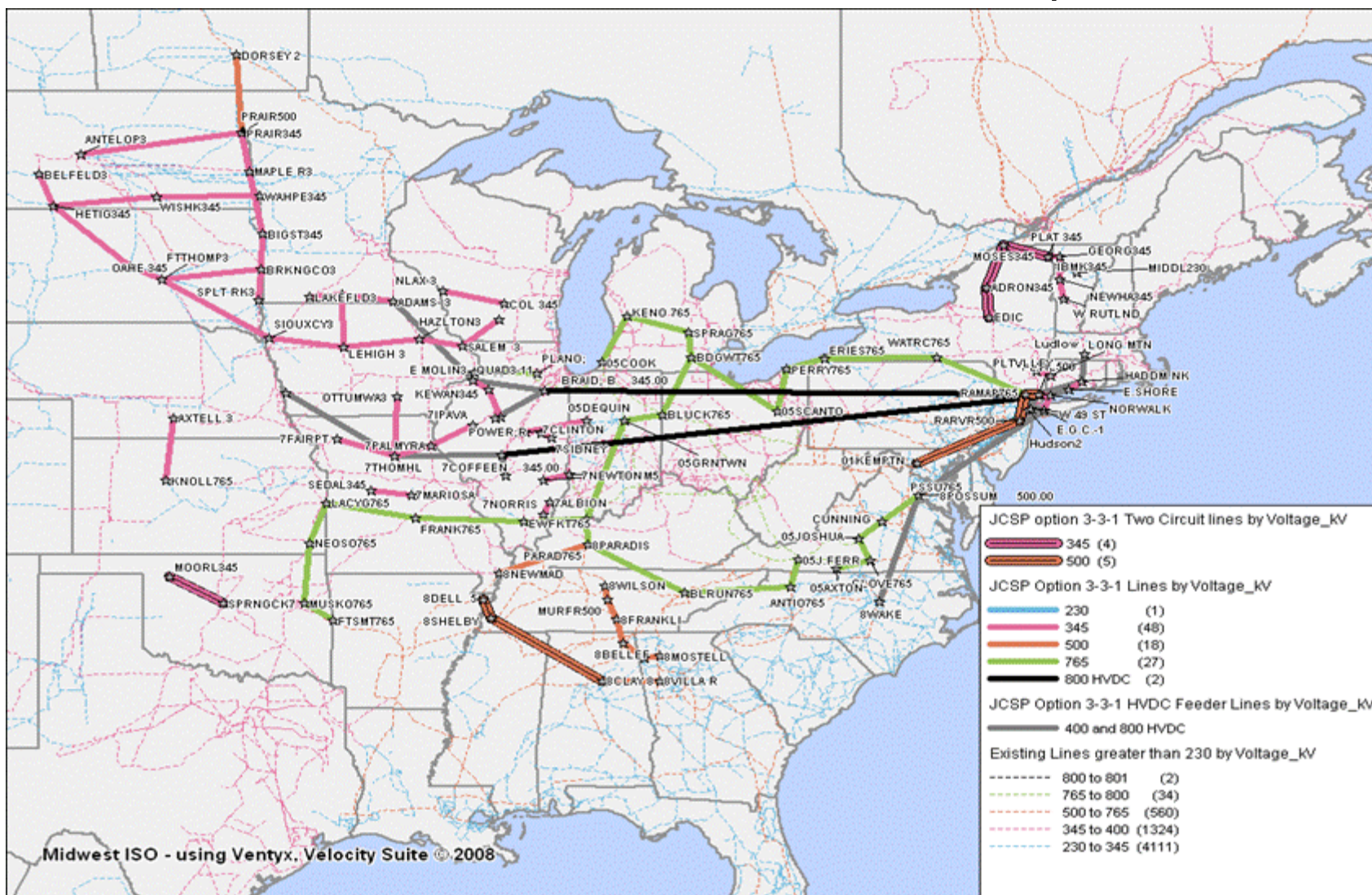
Different policy assumptions result in very different siting outcomes with different transmission system requirements.



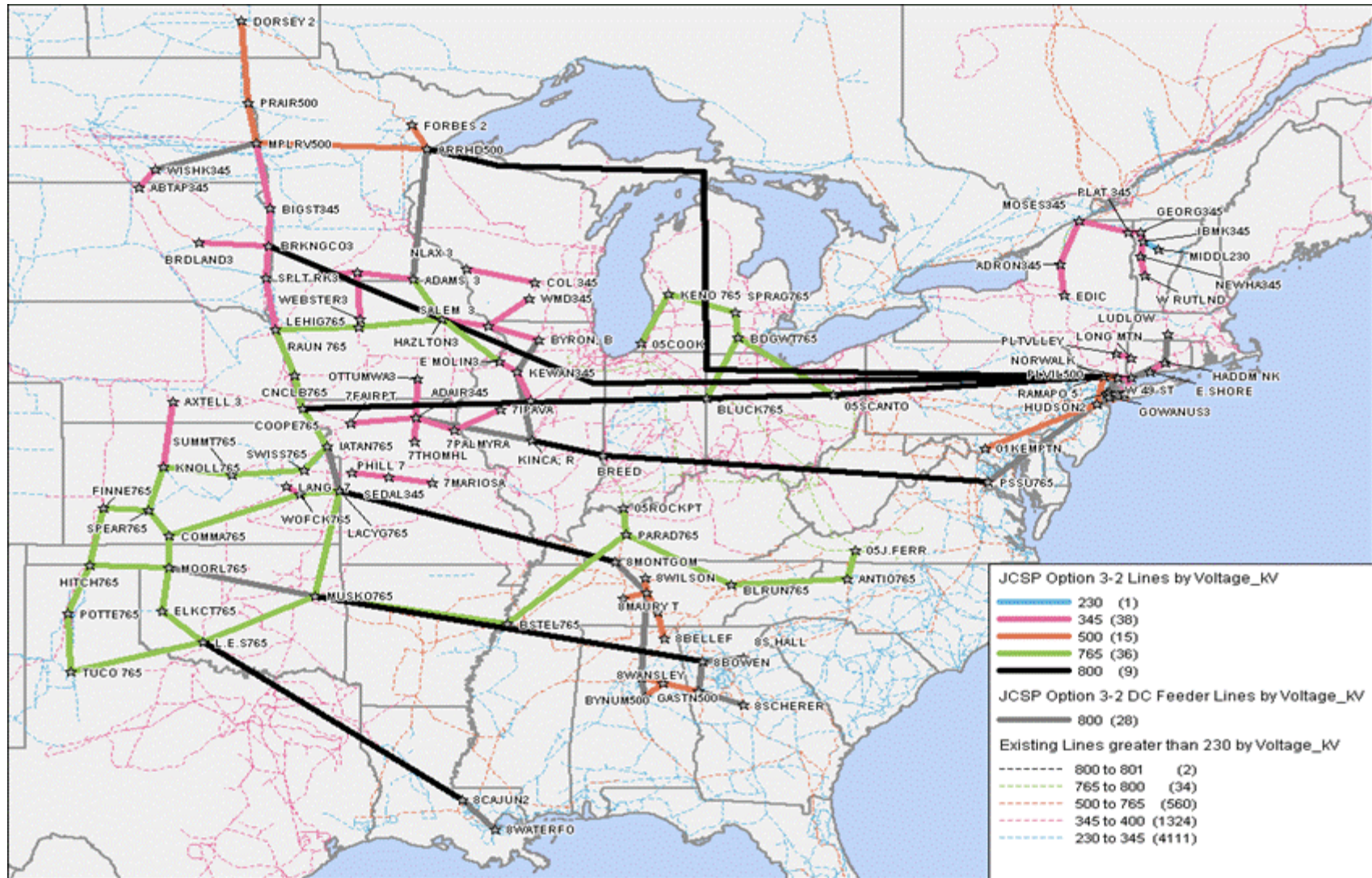
Existing Generation Also Impacts the Outcome



The transmission overlay for the Reference Case (Status Quo) establishes the need for some backbone development...



...While the 20% Wind Energy Case highlights the need for substantial transmission backbone development



Conceptual Progression of Plans

1 year

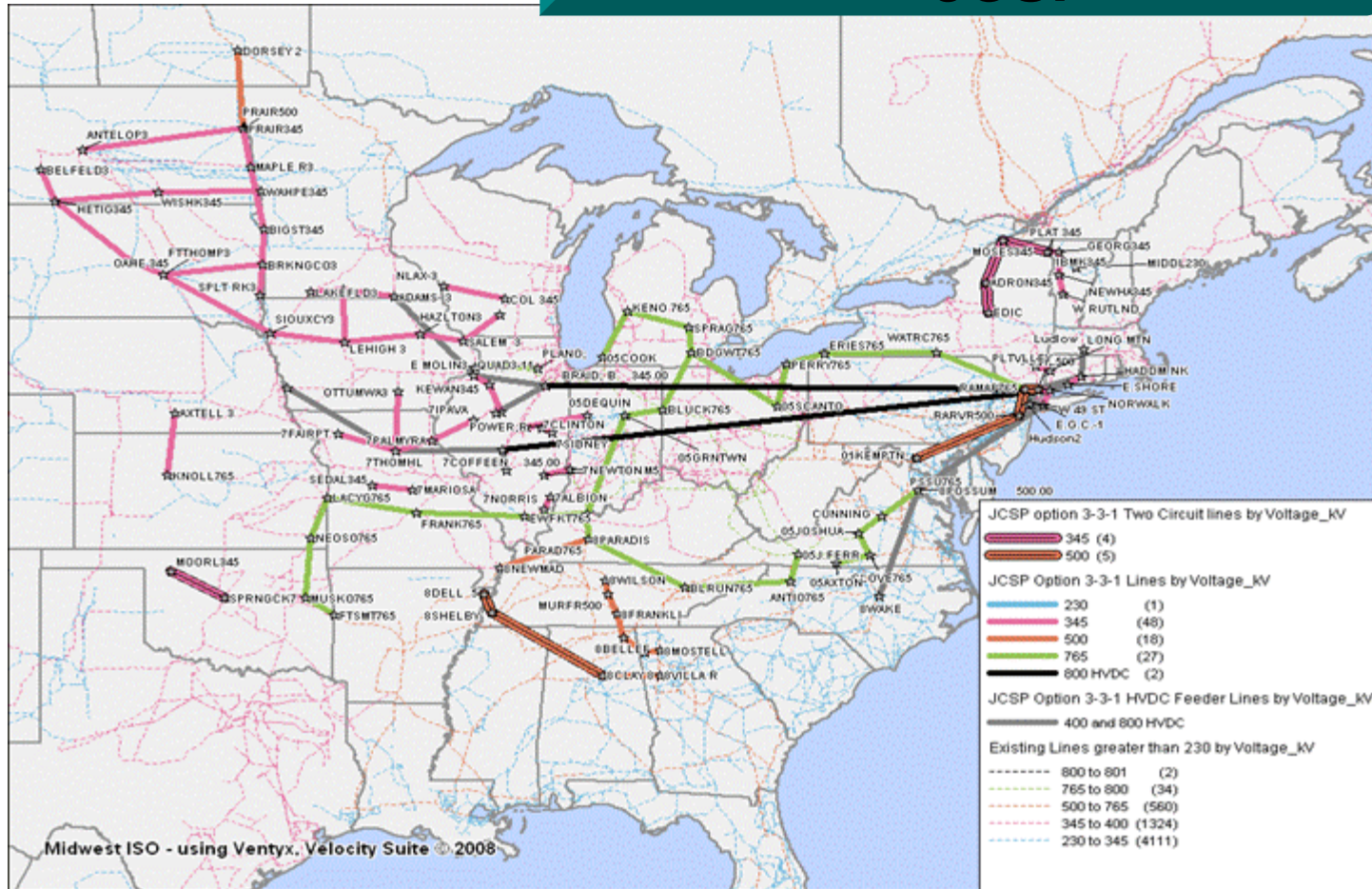
Planning Horizons

20 year

Queue

RGOS

JCSP



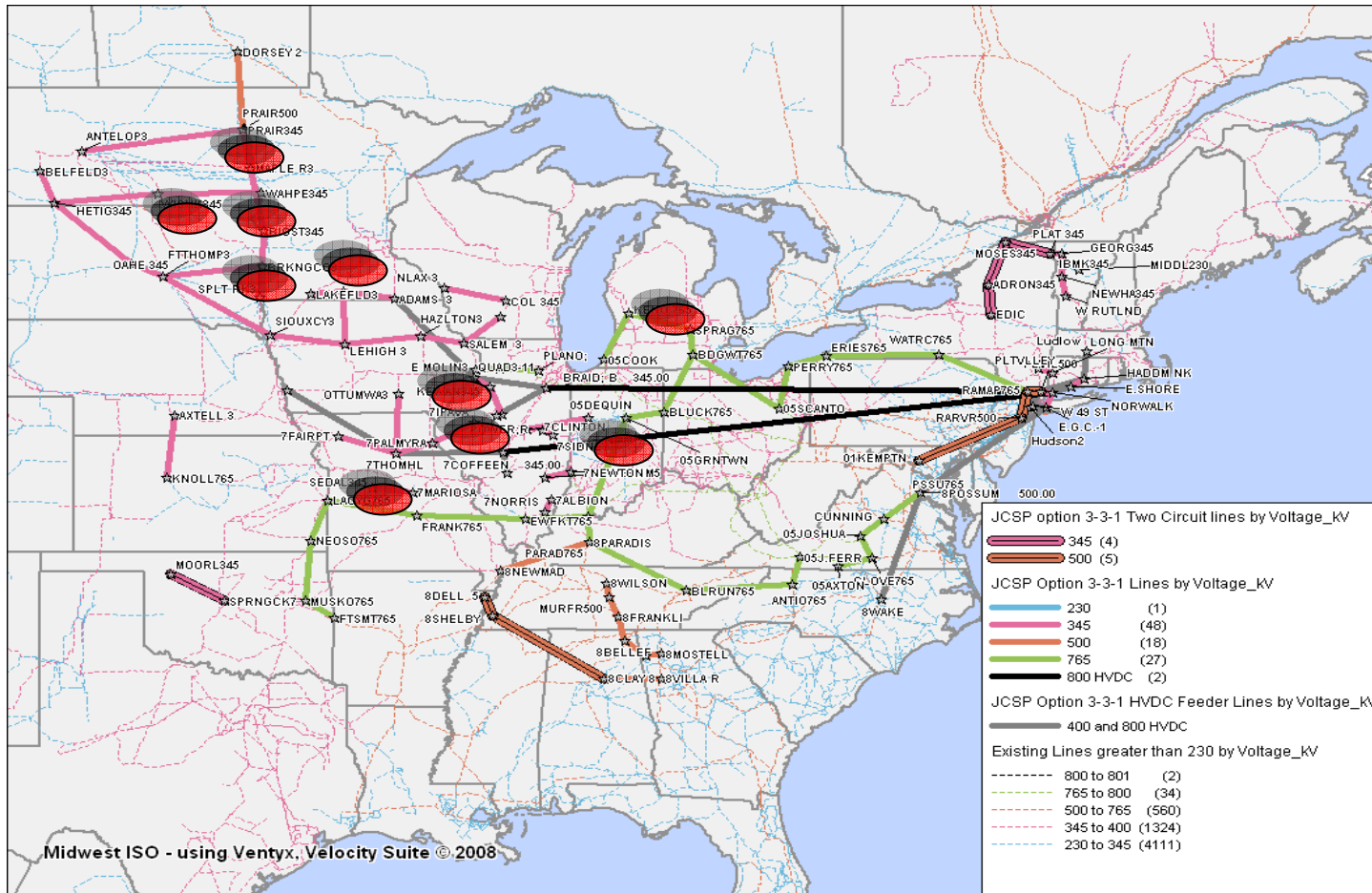
Queue Development Continues with near term upgrades ...

1 year

Planning Horizons

20 year

Queue



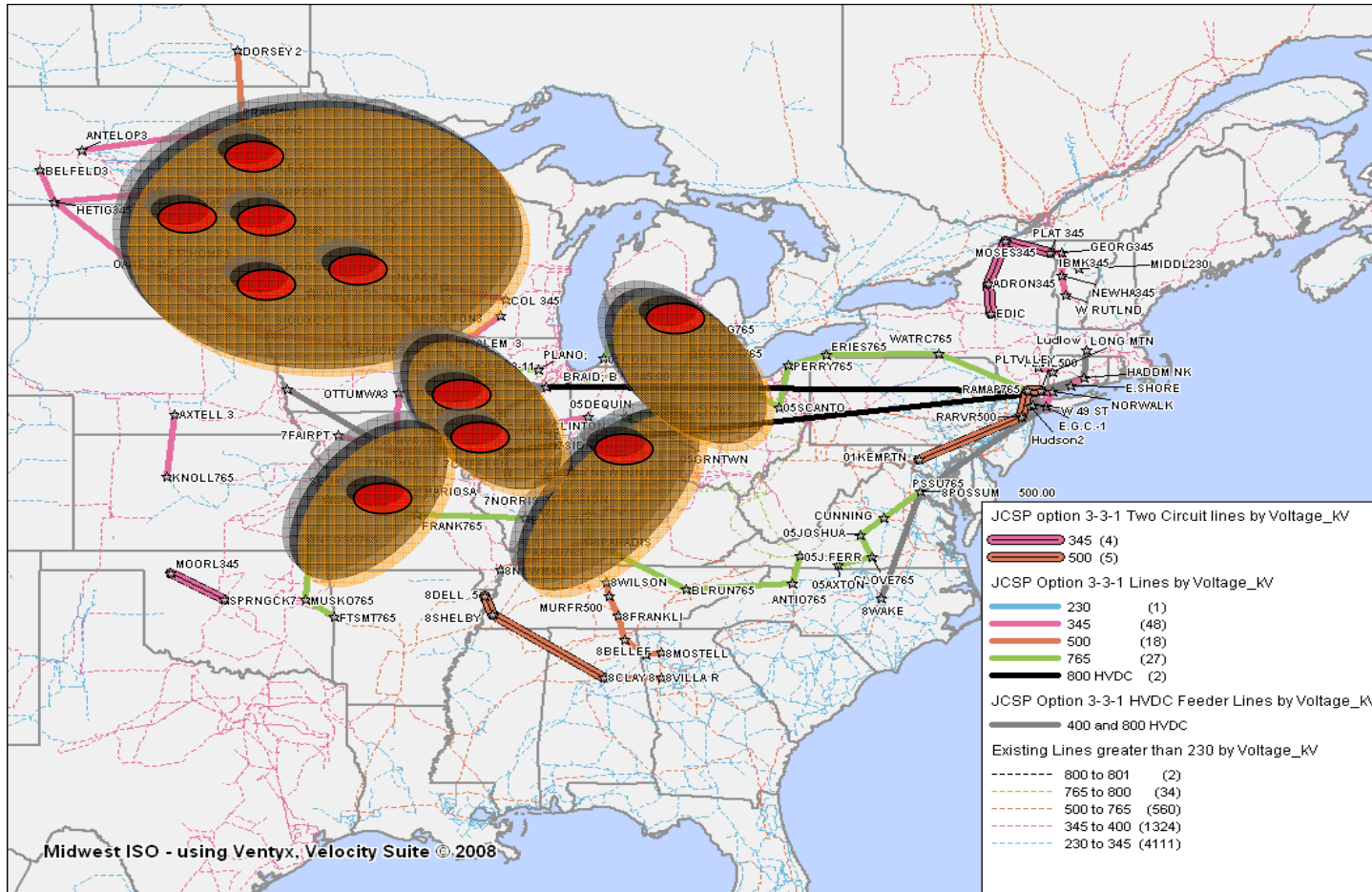
... Until RGOS Aggregate Plans better inform ...

1 year

Planning Horizons

20 year

RGOS

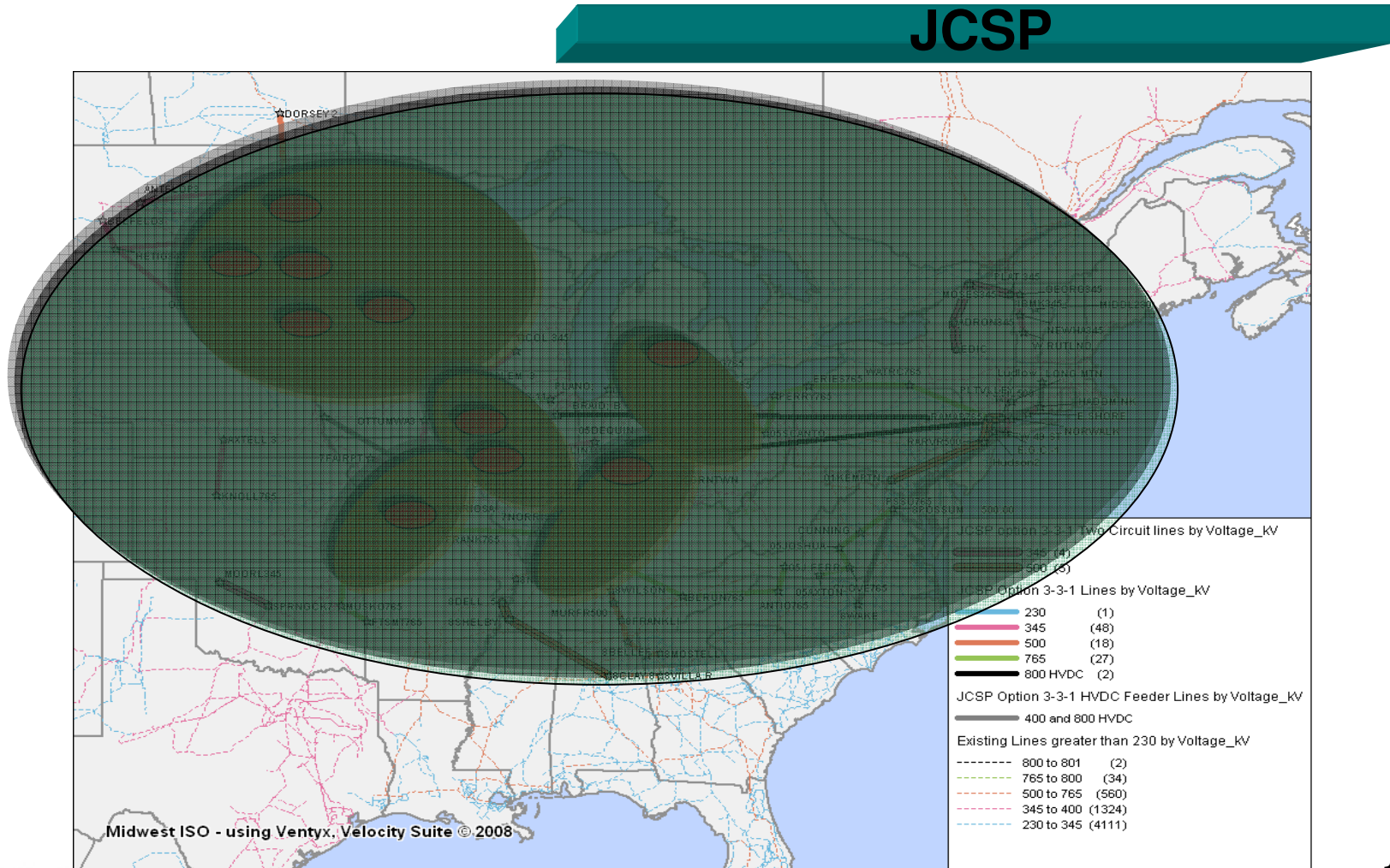


... Consistent with an inter-regional plan with a longer term view

1 year

Planning Horizons

20 year



State Regulatory Initiatives

- State regulators are increasingly working on a regional or subregional basis to address cost allocation questions within the context of regional plans
- UMTDI:
 - Upper Midwest Transmission Development Initiative
 - 5 State initiative (ND, SD, IA, MN, WI)
 - 2 goals by year end 2009
 - Regional Generation Outlet Plans to meet RPS'
 - Cost Allocation for those plans
- CARP:
 - MISO-wide state initiative to review Cost Allocation and Regional Planning principles
 - Eye towards impact of existing and possible state and federal renewable standards, and carbon reduction legislation

Conditions Precedent to Increased Transmission Build

- A robust business case for the plan
- Increased consensus around regional energy policy
- A regional tariff that matches who benefits with who pays over time
- Cost recovery mechanisms that reduce financial risk