

Congestion Assessment and Resource Integration Study

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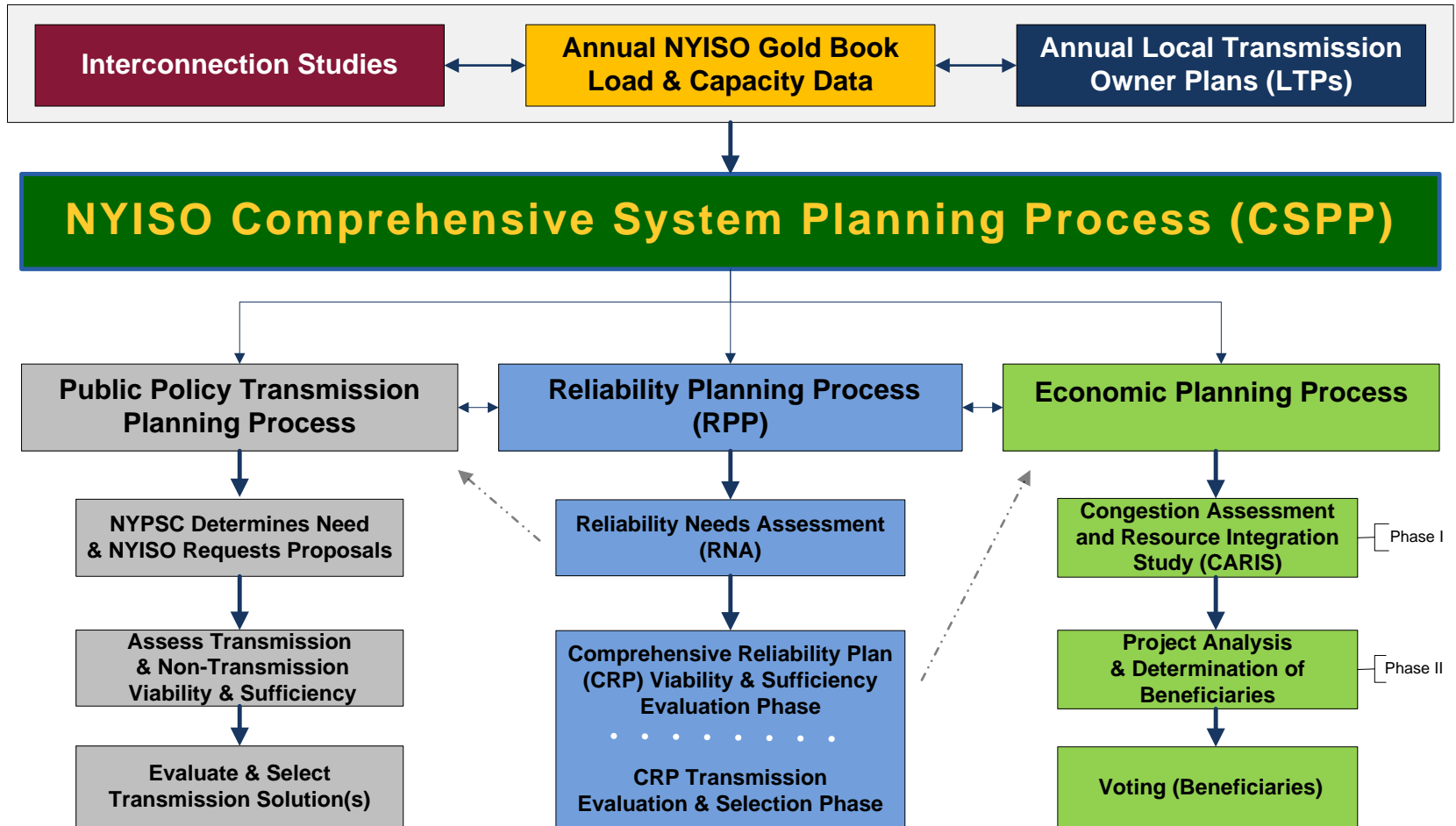
CARIS Public Forum

*December 17, 2015
Rensselaer, NY*

Today's Topics

- ◆ **NYISO Planning**
- ◆ **CARIS Objectives**
- ◆ **CARIS Process**
- ◆ **2015 CARIS Phase 1 Report**
- ◆ **Next Steps - Congestion Relief Solutions**

NYISO Planning



NYISO Planning Activities

NYISO Ongoing Activities

- *Providing system reliability and market efficiency information*
- *Supporting market design that fosters new investment*
- *Tariff administration with regard to interconnection, planning and cost allocation and recovery for approved transmission*

NYISO Project Evaluations

- *Reliability Planning Studies (CRPP)*
- *Economic Planning Studies (CARIS)*
- *Public Policy Transmission Planning Studies (PPTPP)*
- *Interregional Planning*
- *Interconnection Studies – Feasibility Study, System Reliability Impact Study, and Class Year Facilities Study*
- *Transmission Expansion and Reinforcement Studies – System Impact Studies*

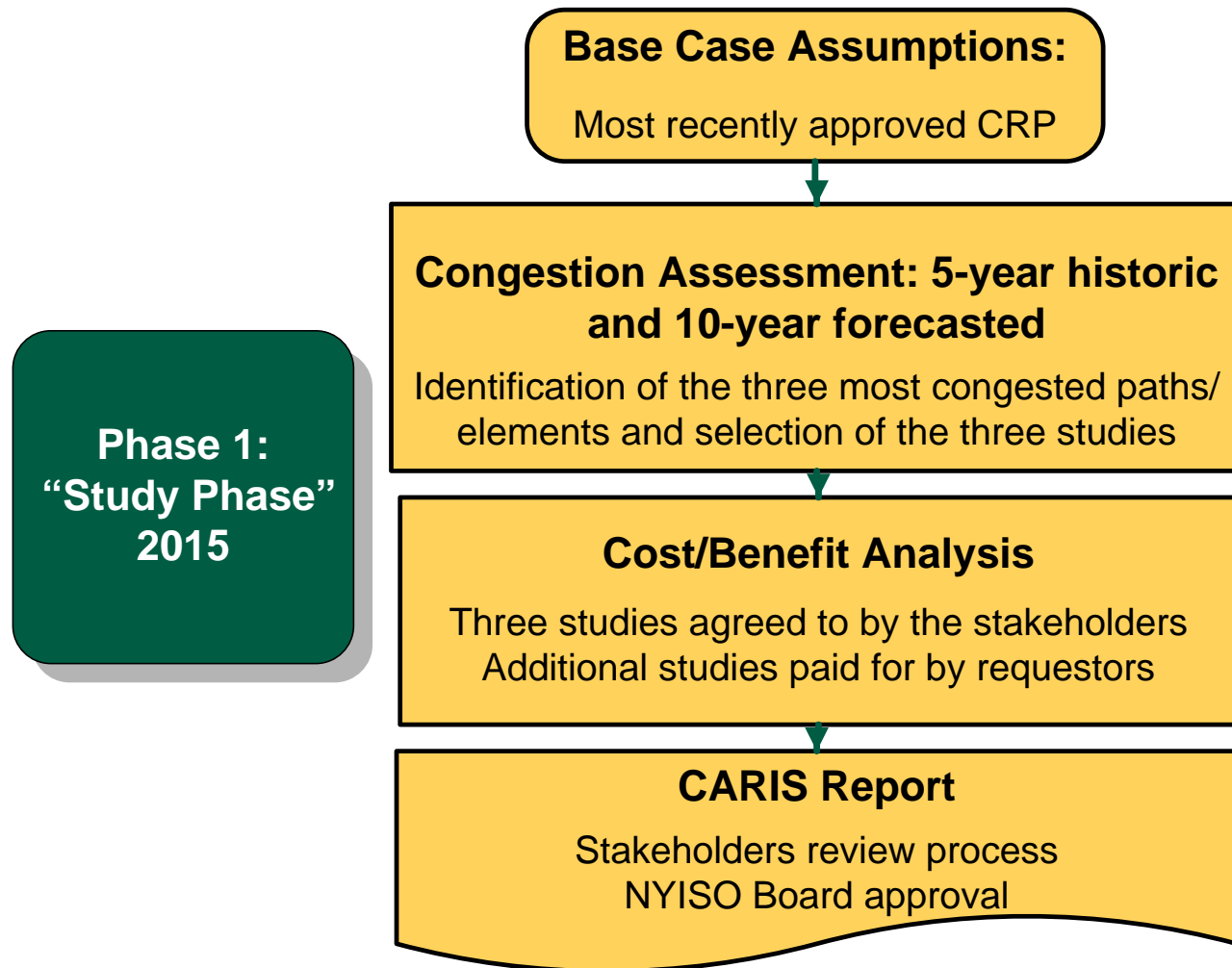
What does the CARIS do?

- ◆ **A congestion mitigation process to improve transmission system efficiency with cost allocation/recovery through the NYISO Tariff**
 - ◆ **Congestion cost is the cost of being unable to dispatch lower priced generation**
- ◆ **Identifies congestion on the New York State bulk power system**
- ◆ **Demonstrates benefit/cost calculations of congestion mitigation solutions to congested corridors using generic solutions: transmission, generation, demand response, or energy efficiency**
- ◆ **Provides studies to developers of specific transmission projects to relieve congestion and identify beneficiaries**
- ◆ **Allows beneficiaries vote to approve the transmission projects.**

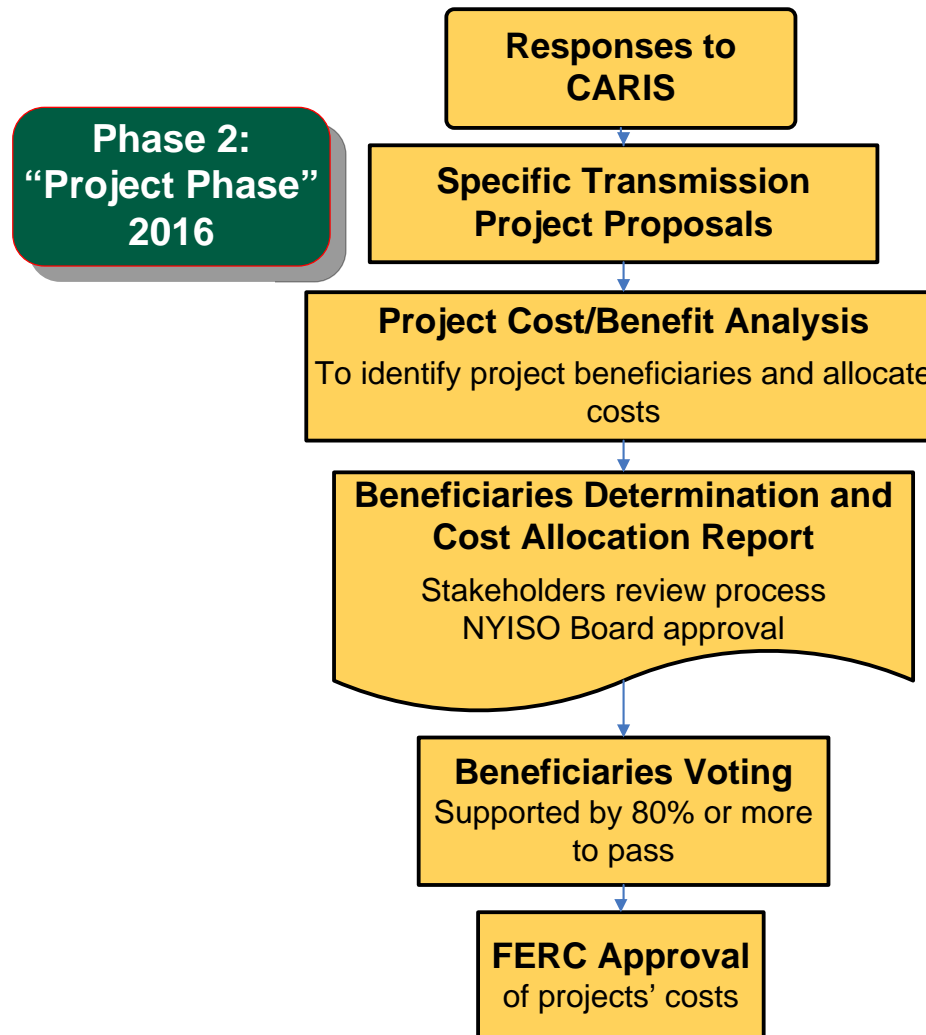
Limitations on CARIS Process

- ◆ **Benefits utilized in benefit/cost analysis are restricted to Production Cost Saving**
- ◆ **Other benefits such as reduced energy/capacity payments, reduced emission, reduced transmission losses, etc., are calculated/reported but not included as the benefits.**
- ◆ **Other quantifiable benefits such as avoided transmission refurbishment costs, increased tax revenues and employment impacts not considered**
- ◆ **Other non-quantifiable benefits such as enhanced system operability and flexibility not considered.**

CARIS Process Phase 1



CARIS Process Phase 2



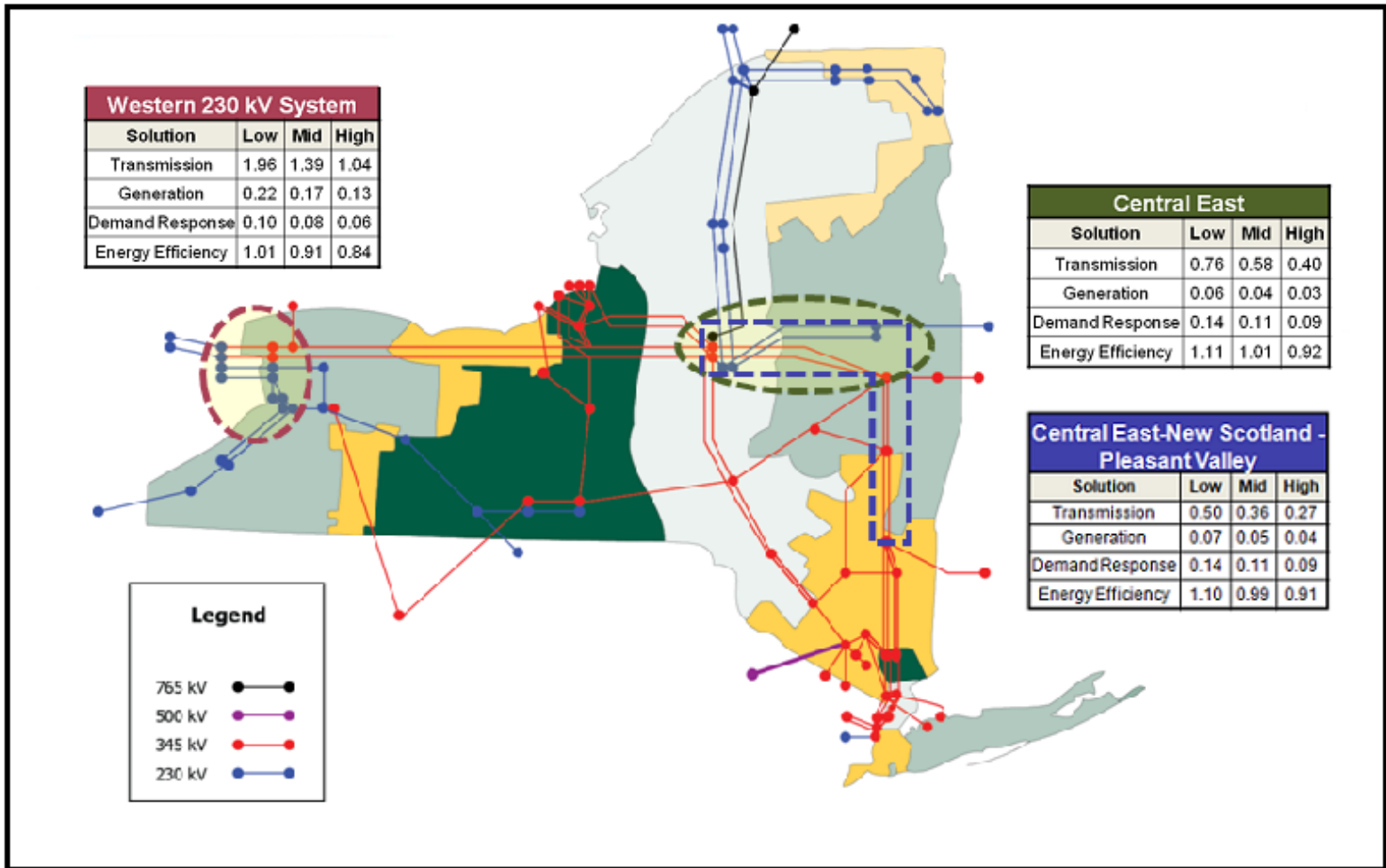
2015 CARIS Phase 1 Report

- ◆ **Identification of the most congested elements and selection of the three CARIS studies**
 - *5-year historic and 10-year projected*
 - *Projected congestion dependent on modeling assumptions*
- ◆ **Application of Generic Solutions**
 - *Transmission, generation, demand response and energy efficiency for each of the three studies*
- ◆ **CARIS metrics**
 - *Production cost savings as the primary metric and 6 additional metrics*
- ◆ **Benefit/Cost analysis**
 - *High, Medium, and Low cost estimates for each solution*
- ◆ **Scenarios**
 - *Nine scenarios analyzed*

Congested Elements Studied

- ◆ **Selection based on largest potential reduction in production costs**
- ◆ **Study 1: Central East – New Scotland – Pleasant Valley**
- ◆ **Study 2: Central East**
- ◆ **Study 3: Western NY 230 kV System**

Three Congestion Studies: Ratios of Production Cost Savings to Solution Costs (B/C Ratios)



Benefit/Cost Analysis

- ◆ **Measured by projected production cost savings divided by the estimated costs of a solution**
 - *The NYISO's tariff requires that New York system-wide production cost savings is the sole metric for the evaluation of the economic benefit of projects in the CARIS process.*
- ◆ **Evaluated generic transmission, generation, demand response and energy efficiency solutions**
- ◆ **Utilizing the prescribed benefit metric and assumptions, the CARIS analysis indicates the cost-effectiveness of a Western 230kV transmission project.**
- ◆ **Study results are comparable with those reported in the NYPSC's AC Transmission proceeding**
 - *CARIS study utilized cost data submitted in AC Proceeding*
 - *Estimated Production Cost Savings are consistent*

Additional Metrics and Benefits

- ◆ **Other benefits are provided for informational purposes -- but are not included in the B/C ratio**
 - *Reduced ICAP costs, lower emissions, value of TCCs created, reduced system losses, generator payments, and load payments*
- ◆ **Some other metrics that are not considered in the CARIS process due to the nature of the study may include impacts to system reliability, grid operations, economic development, property taxes and employment**
- ◆ **Incorporating additional metrics in the evaluation of specific projects may materially improve the benefit-cost ratio.**

Next Steps

- ◆ **Prepare model and database for specific project evaluations and studies**
 - *Perform Additional CARIS Studies upon request*
 - *Perform Project-Specific CARIS Phase 2 studies for NYISO tariff-based cost recovery*

Appendix: Management Committee Presentation on 2015 CARIS Phase 1 Report

*Timothy Duffy
Manager, Economic Planning
New York Independent System Operator*

Management Committee
October 28, 2015
KCC



NYISO Economic Planning

- ◆ **Primary activity is the Congestion Assessment and Resource Integration Study (CARIS)**
- ◆ **Provides information to stakeholders, developers & other interested parties on System Congestion (Phase 1)**
 - *historic and projected values*
 - *key drivers*
 - *top congested elements or groupings*
 - *Cost effectiveness of generic solutions to relieve congestion (using production cost savings as primary metric)*
 - *Additional benefits of implementing generic solutions*
- ◆ **Evaluates specific transmission projects proposed by developers seeking cost-recovery through the NYISO's Tariff (Phase 2)**

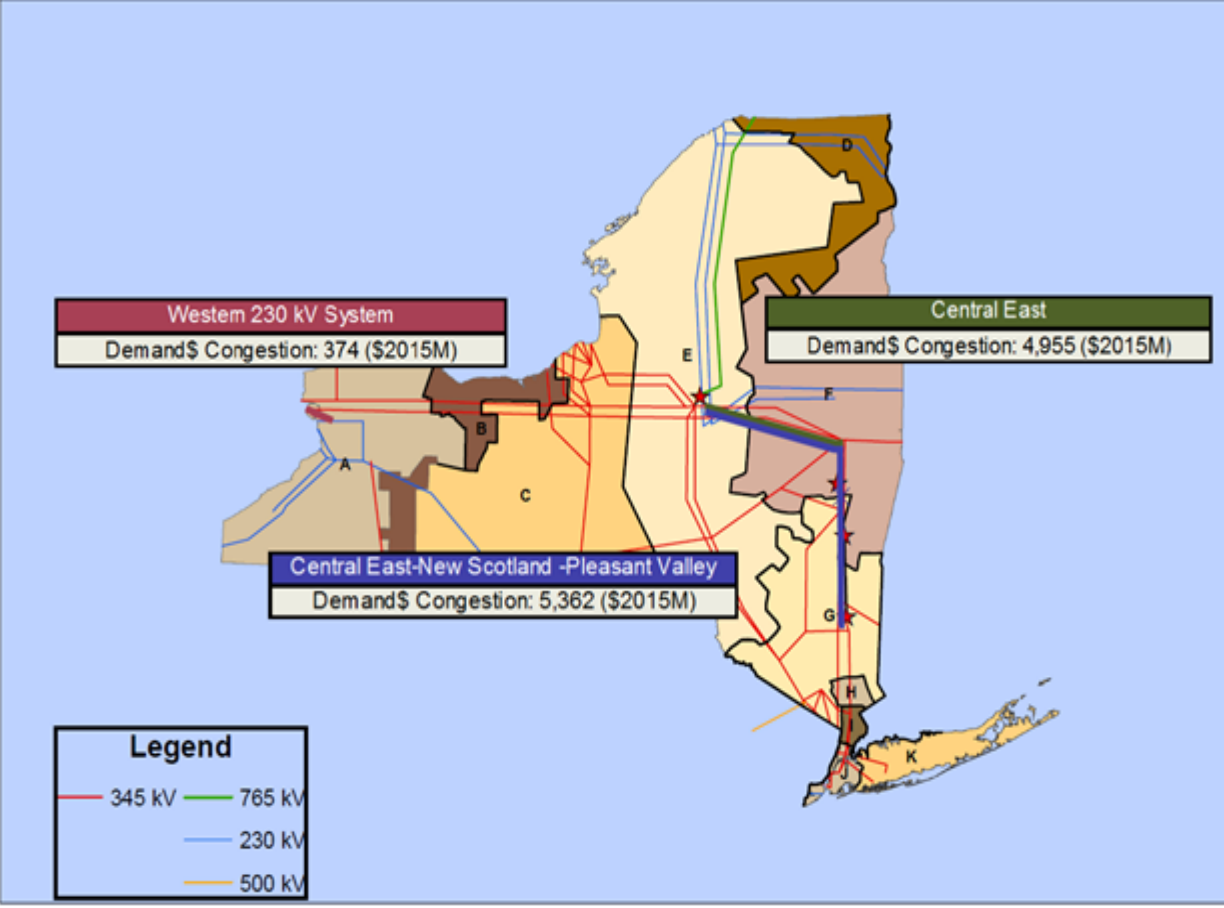
System Congestion (2015 CARIS)

- ◆ **Top congested corridors selected based upon largest change in production costs (with constraints relieved) over study period (2015-2024)**

Most Congested Corridors

- **Central East – New Scotland – Pleasant Valley**
 - **Central East**
- **Western 230 kV System**

Three Congestion Studies: Demand\$ Congestion

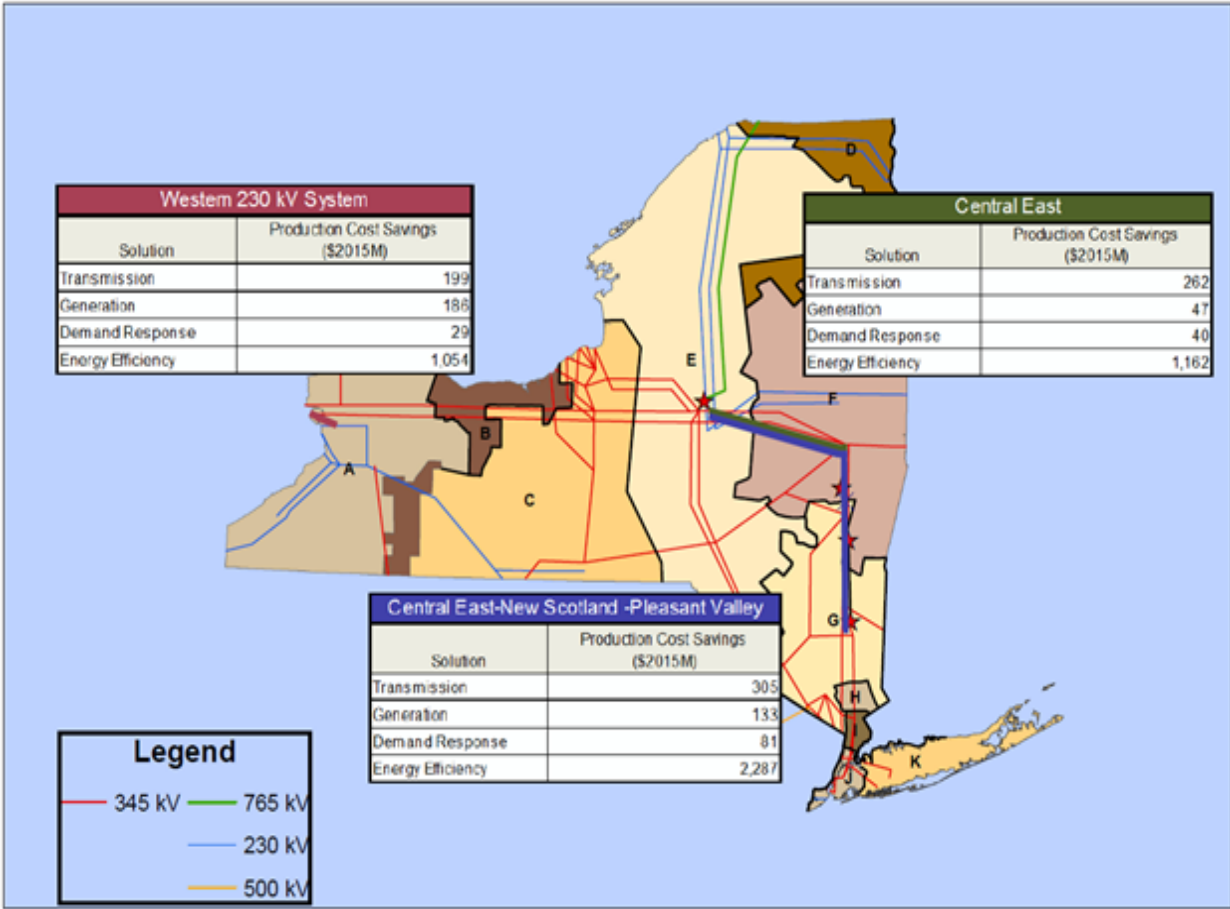


Ten-Year Demand\$ Congestion for the Three CARIS Studies (Base Case, 2015 \$M)

Generic Solutions

- ◆ **Transmission, generation and demand response, and energy efficiency generic solutions modelled for all three studies**
- ◆ **Potential benefits (*i.e.*, NYCA-wide production costs savings) projected for each solution type**

Three Congestion Studies: Production Cost Savings

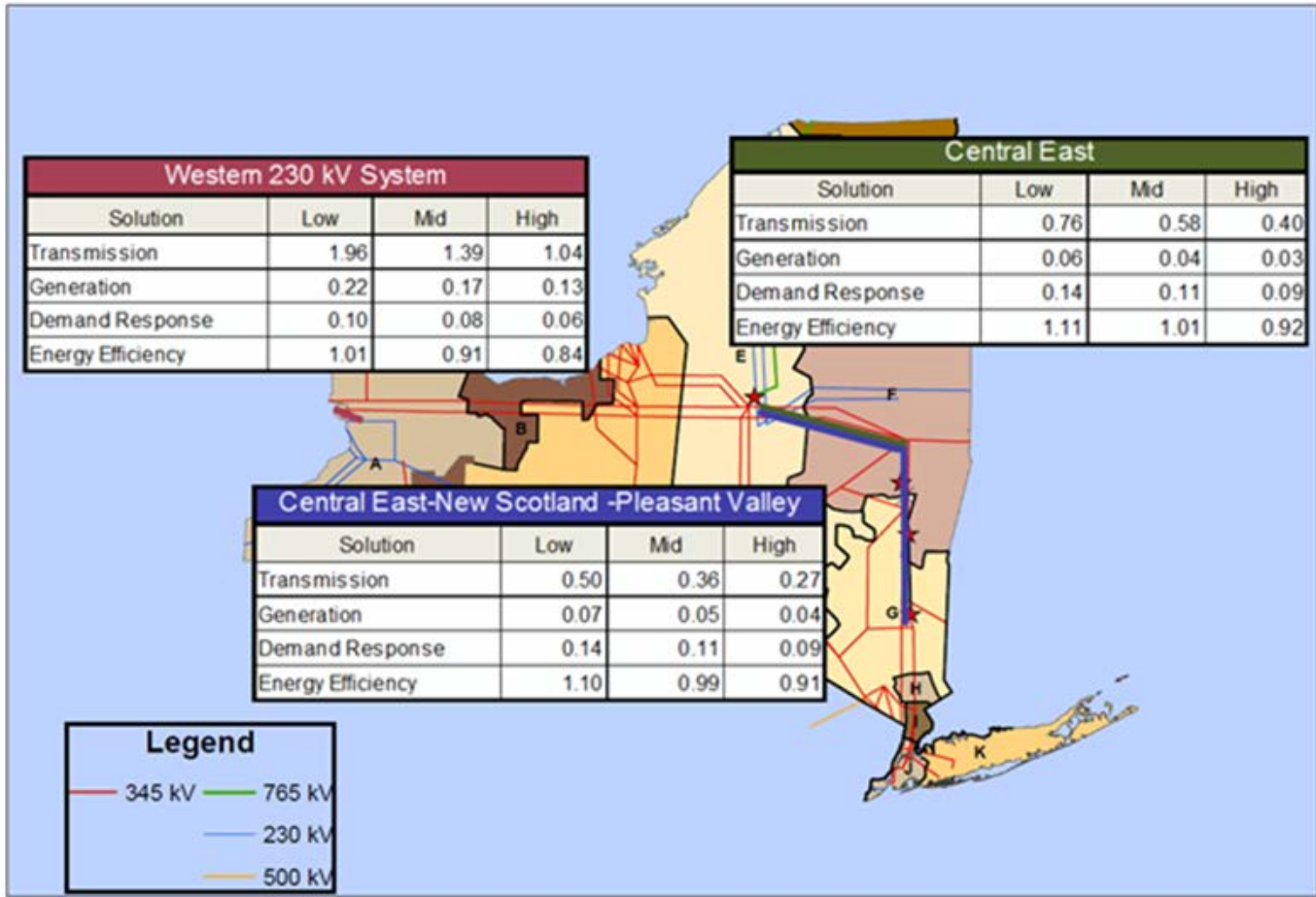


Ten-Year Production Cost Savings for the Three CARIS Studies (2015 \$M)

Benefit/Cost Analysis

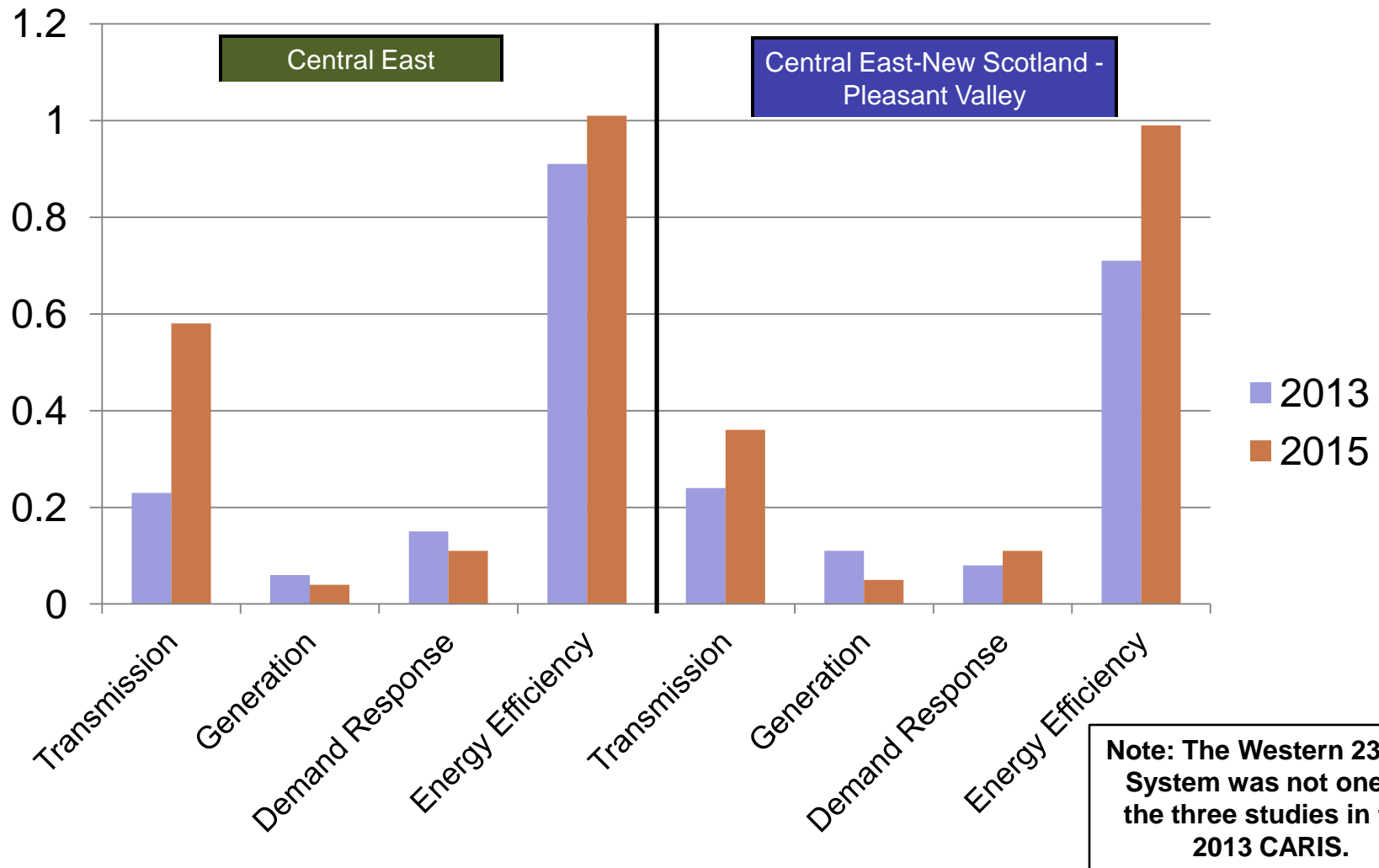
- ◆ **Generic Solution Costs are simplified estimates developed using low, mid and high unit cost estimates for each solution type**
- ◆ **The ratio of production cost savings to project costs calculated based upon the first ten years of operation**
- ◆ **Feasibility of the solutions is not evaluated**

Three Congestion Studies: Ratios of Production Cost Savings to Solution Costs (B/C Ratios)



Generic Solutions Benefit/Cost Ratios (Low, Mid and High Cost Estimates)

Comparison of 2013 and 2015 CARIS B/C Ratios (Mid-Range Costs) by Solution Type



Supplemental Analyses

- ◆ **Additional benefits were estimated for informational purposes for each solution type (e.g., generator payments, load payments, TCC payments, losses costs, ICAP costs, and emissions)**
- ◆ **Scenarios were run to estimate the impact of key drivers on Demand\$ Congestion (e.g., high/low natural gas price forecasts; high/low load forecasts)**

Next Steps

- ◆ **Present Final 2015 CARIS Phase 1 Report to NYISO Board for Approval**
- ◆ **Post Board-approved Report on NYISO Website**
- ◆ **Conduct public information session**
- ◆ **Initiate 2015 CARIS Phase 2 by working with ESPWG to update and expand database**
- ◆ **Analyze specific transmission projects in Phase 2 (as requested)**

The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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