ABB Inc. , Electric System Consulting Dept.

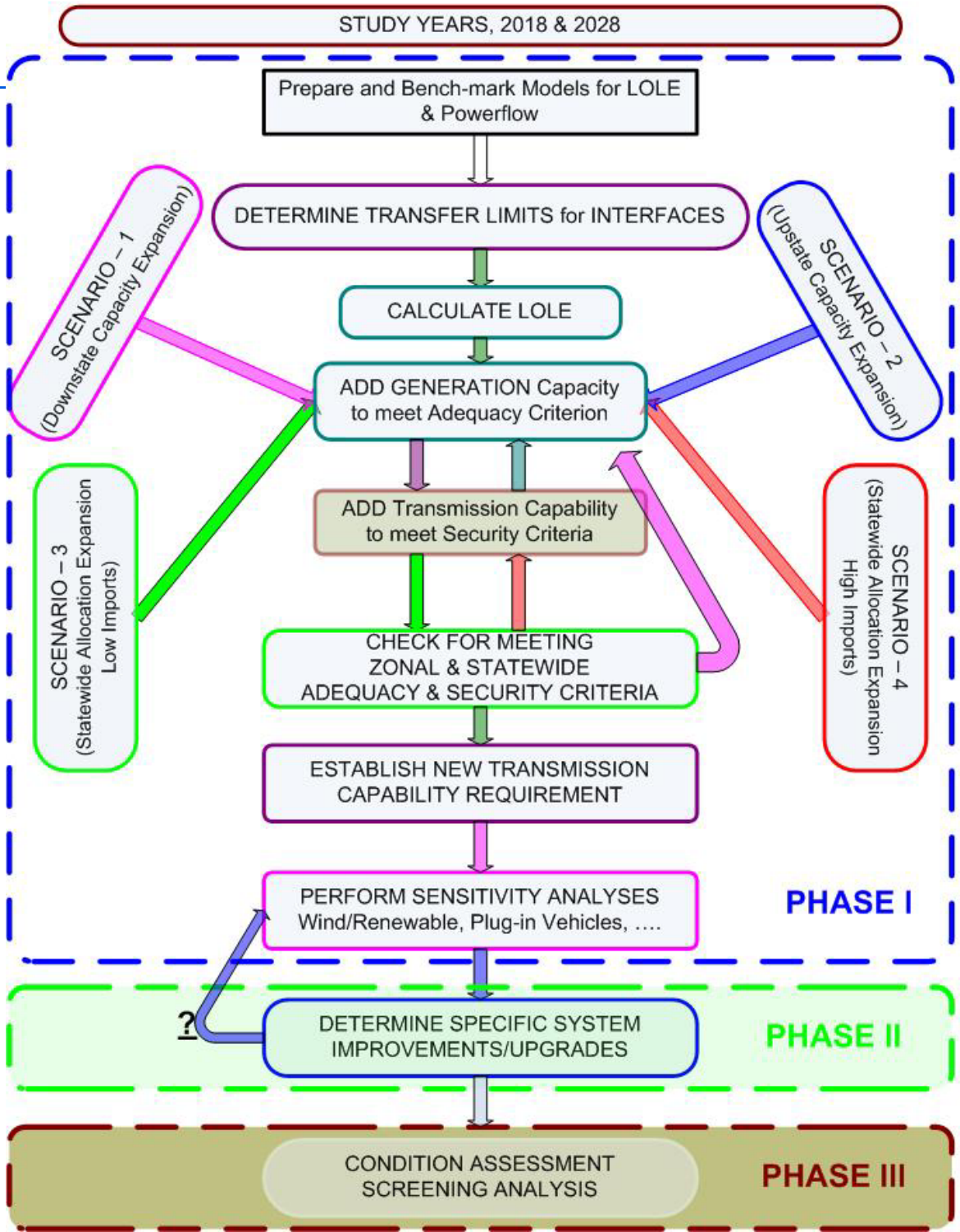
New York State Transmission Assessment and Reliability Study (STARS)

April 07 , 2009

Study Objectives

- **Determine long-term (2018-2028) reliability and economic upgrade alternatives for the transmission system considering different capacity and transmission expansion and retirement plans.**
- **Identify zones of potential “bottled” generation on the bulk power system, and identify limitations of the current transmission system to meet renewable generation development**

CONCEPTUAL VIEW OF THE STUDY



Tools and Input Data

- **Software tools**
  - **Power flow and contingency analysis: PSSE V30**
  - **LOLE calculation: GridView**
- **Input Data Sources**
  - **2009 Reliability Needs Assessment (RNA) study**
  - **2008 Gold Book**
  - **2009 Wind Study**

Market Simulation Models

Supply Curve

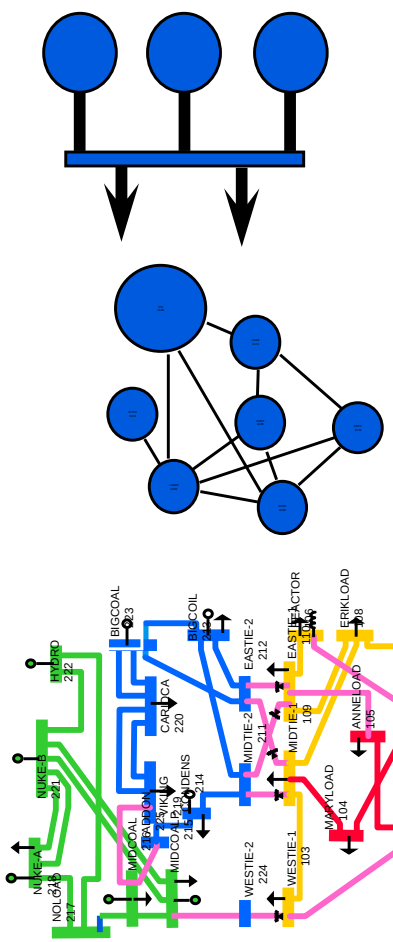
- Ignores transmission

‘Bubble’ View

- Major interconnects only

Detailed View

- Very complex



Poor

Accuracy

Good

Simple

Ease of Use

Difficult

Assumptions

i. Load level -- as given in the 2008 Gold Book, which is 37,130 MW

ii. Explicit Transmission Representation as in the power flow case, not a transportation model for NYCA system

iii. Generation capacity is as in 2009 RNA report

iv. External Areas (PJM-West, PJM-Central, PJM-East, Ontario, Quebec, SWCT, CT and Rest of NE) will be represented as single bubble for each area, with an equivalent generator for reserve capacity to give LOLE of 0.1day/yr.

v. Zonal Interface modeling: With transition rates.

vi. SCR (Special Case Resources) included in the 2009 RNA study will also be included in GridView model.

Assumptions (cont'd)

vii. **EOP (Emergency Operating Procedures) is also included in the Base Case.**

viii. **Impact of Load Uncertainty to be simulated and analyzed.**

ix. **Temperature based Derating of certain generators included.**

x. **Renewable Resources will be modeled as thermal units with given hourly capacity curve (hourly MW wind generation) and no forced outage rates**

xi. **Generation-deficient zone will not assist other zones with higher deficiency.**

Scenarios and Study Steps

- **Four major scenarios**
  - **Scenario 1 (Downstate Capacity Expansion Scenario)**
  - **Scenario 2 (Upstate Capacity Expansion Scenario)**
  - **Scenario 3 (Statewide Allocation Expansion Scenario – Low Imports)**
  - **Scenario 4 (Statewide Allocation Expansion Scenario – High Imports)**
- **Study Steps are posted on the STARS website**

Four Major Scenario Descriptions

Future Capacity Expansion Assumptions

#	Future Capacity Scenario	Internally Located Capacity (as percentage of incremental capacity requirement)	Externally Located Capacity Imports (as percentage of incremental capacity requirement)	Location of Externally Located Capacity Imports (as percentage of incremental capacity requirement)
1	Downstate Capacity	85% Zones H-K	15%	10% ISONE (Zone K) 5% PJM (Zone J)
2	Upstate Capacity	50% Zones A-F	50%	25% PJM (Zones A/C) 25% HQ (Zone D)
3	Statewide Capacity -Low Imports	90% Zones A-K	10%	3.3% ISONE (Zone F/G) 3.3% PJM (Zone J) 3.3% HQ (Zone D)
4	Statewide Capacity - High Imports	25% Zones A-K	75%	25% PJM (Zones I/J/K) 50% HQ (Zones D)

Phase I – Maintain "As Is" System TASKS

1. Develop and Benchmark NYCA Power Flow Model
2. Develop and Benchmark NYCA Resource Reliability Model
3. Update NYCA Power Flow Model for Future Study Years
4. Update NYCA Resource Reliability Model for Future Study Years
5. Calculate Transfer Limits for the study year 2018
6. Determine Adequacy for 2018 system
7. Perform Security (Contingency) Analyses for 2018 system
8. Identify zones with Wind Energy bottlenecks for 2018 system
9. Calculate Transfer Limits for the study year 2028
10. Determine Adequacy for 2028 system
11. Perform Security (Contingency) Analyses for 2028 system
12. Identify zones with Wind Energy bottlenecks for 2028 system
13. Other Sensitivity Analyses
14. Prepare Cost Estimates
15. Prepare Phase-I Draft report

Phase II – System Improvements/ Upgrades TASKS

16. Perform Contingency Analyses for 2018 system with alternatives
17. Reconfirm LOLE for 2018 system with alternatives
18. Perform Economic Comparison
19. Perform Contingency Analyses for 2028 system with alternatives
20. Reconfirm LOLE for 2028 system with alternatives
21. Estimate Costs
22. Prepare Phase-II Draft Report

Study Schedule for Phases I & II

- **Completion date : August 2009**
- **Status presentation to MPs : May TPAS Meeting (tentatively)**

Phase III – Condition Assessment Screening Analysis

The STARS WG will provide additional Sensitivity Cases on transmission scenarios to be studied.

Q & A