# CARIS – BENCHMARKING RESULTS AND SOFTWARE RECOMMENDATION

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# Outline

- *Objectives*
- *Simulation Process*
- *Benchmarking Analysis*
- *Results 2007 and 2013*
- *Observations from Benchmarking*
- *Selection Criteria*
- *Selection Criteria Results*
- *Benchmark Recommendation*

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# Objectives

- Evaluate MAPS & GridView performance
  - *Benchmark Metrics*
  - *2007 and 2013 Results*
  - *Sample Study Results*

- Tool Selection Decision
  - *Meeting CARIS requirements as defined in tariff*
  - *Performance across specified metrics*
  - *Tool's Modeling Capability, Flexibility, Effectiveness and Efficiency*
  - *Etc.*

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# Simulation Process

- Load input assumptions
  - *External transactions fixed to actual*
  - *Congestion calculation referenced to Marcy 345kV*
- Perform initial simulations and compare Zonal LBMPs
- Incorrect model of SCUC contingencies found to cause spikes in Zonal LBMPs values
- Perform diagnostics for specific hours to identify cause of spikes
- Correct SCUC contingency model
- Review results and process with program vendors

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# Benchmark Analysis

- 2007 Peak Week Analysis
  - *External Transactions Fixed*

- 2007 Annual Analysis
  - *External Transactions Fixed*
  - *Sample Studies*
    - Add new Leeds-Pleasant Valley 345 kV Circuit
    - Add 580 MW generator W. 49th Street

- 2013 Annual Analysis
  - *External Transactions Fixed*
  - *Sample Studies*
    - Add new Leeds-Pleasant Valley 345 kV Circuit
    - Add 580 MW generator W. 49th Street

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# 2007 Results

**2007 Annual: Base & Sample Studies**

First Line GridView; Second Line MAPS

| Total (million $) | Base | 3rd Leeds-PV Delta | NYC CC Unit Delta |
|---|---|---|---|
| Production Cost | 4,574<br>5,691 | -13.8<br>0 | -56.8<br>-30.0 |
| LBMP Load Payment | 11,567<br>14,654 | -14.0<br>0 | -155.5<br>TBD |
| LBMP Generation Payment | 9,726<br>11,685 | -4.7<br>0 | -112.1<br>-83.0 |
| $Demand Congestion | 301.47<br>TBD | -39.9<br>TBD | -48.6<br>TBD |

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# 2013 Results

**2013 Annual: Base & Sample Studies**

First Line GridView; Second Line MAPS

| Total (million $) | Base | 3rd Leeds-PV Delta | NYC CC Unit Delta |
|---|---|---|---|
| Production Cost | TBD<br>4,680 | TBD<br>-10.0 | TBD<br>-46.0 |
| LBMP Load Payment | TBD<br>13,527 | TBD<br>-8.0 | TBD<br>-25.0 |
| LBMP Generation Payment | TBD<br>9,442 | TBD<br>+1.0 | TBD<br>-7.0 |
| $Demand Congestion | TBD<br>TBD | TBD<br>TBD | TBD<br>TBD |

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# Observations from Benchmarking

- PROBE uses a different congestion formula compared to MAPS and GridView
- Critical factors affecting the results
    - External transactions
    - Phase Angle Regulator Settings and Control
    - Analysis of Historic Market Performance on Congestion
- Results from simulation tools are different from Actuals given operational configuration conditions (transmission, outages, etc…)
- Results do not correlate with absolute magnitudes of Actuals due to intrinsic modeling differences (market bids vs. cost based bids, network operational configuration influence, virtual bidding, external proxy bus vs. actual external system representation, etc.)
- Benchmarking exercise was extremely beneficial in building the experience and skills that will be necessary to perform the CARIS studies

# Selection Criteria

| Criteria | MAPS | GridView |
|---|---|---|
| PW, 2007 & 2013 Results | | |
| NYISO Tariff Requirements<br>TCC Revenue<br>Co-Optimization Energy & Reserves | | |
| 6-digit bus number | | |
| User Friendly | | |
| Flexible Database Management | | |
| Efficient Results Reporting | | |
| Transmission Maintenance | | |
| Parallel Computing Capability | | |
| Documentation - Manuals | | |

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# Selection Criteria Results

| Criteria | MAPS | GridView |
|---|---|---|
| PW, 2007 & 2013 Results | 0 | 0 |
| NYISO Tariff Requirements | | |
| TCC Revenues | - | + |
| Co-Optimization Energy & Reserves | - | + |
| 6-digit bus number | - | + |
| User Friendly | 0 | + |
| Flexible Database Management | 0 | + |
| Efficient Results Reporting | 0 | + |
| Transmission Maintenance | - | + |
| Parallel Computing Capability | + | - |
| Documentation - Manuals | + | - |

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# Benchmark Recommendation

- Back casting and benchmarking conducted over a 7 month period
- During the first CARIS studies phase, perform CARIS with GridView and shadow the base case results and selected scenarios with MAPS
- Continue to develop GridView and MAPS data simultaneously based upon CARIS study assumptions

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