



Market Efficiency Analysis Progress Report

Transmission Expansion Advisory Committee
March 14, 2007

- Review progress of energy market simulations/sensitivity analysis
- Review sample market simulation results summary file
- Discuss next steps
- Review market simulation metric example

- Energy market simulation sensitivity analysis using 502 Junction-Loudoun 500 kV line as prototype
- Energy market simulation analysis started for:
 - Susquehanna-Roseland 500 kV
 - Bossards-Roseland 500 kV
- Preparing simulation cases for following projects:
 - Amos-Kempton circuit
 - Kempton-Deans circuit
 - Possum Point-Calvert Cliffs-Indian River-Salem circuit
 - Kammer-Prexy-Conemaugh-TMI circuit
 - South Canton-Keystone-Sunbury circuit



Progress Report of Market Simulations for 502 Junction-Loudoun 500 kV Line

| Sensitivity | Year | | | | |
|------------------|------|------|------|------|------|
| | 2007 | 2010 | 2013 | 2016 | 2021 |
| Base Assumptions | X | X | X | X | X |
| High Fuel | X | X | X | X | X |
| Low Fuel | X | X | X | X | X |
| High Load | X | X | X | X | X |
| Low Load | X | X | X | X | X |
| High Emissions | X | X | X | X | X |
| Low Emission | X | X | X | X | X |
| High Generation | X | X | X | X | X |
| Low Generation | X | X | X | X | X |
| Others ?? | X | X | X | X | X |

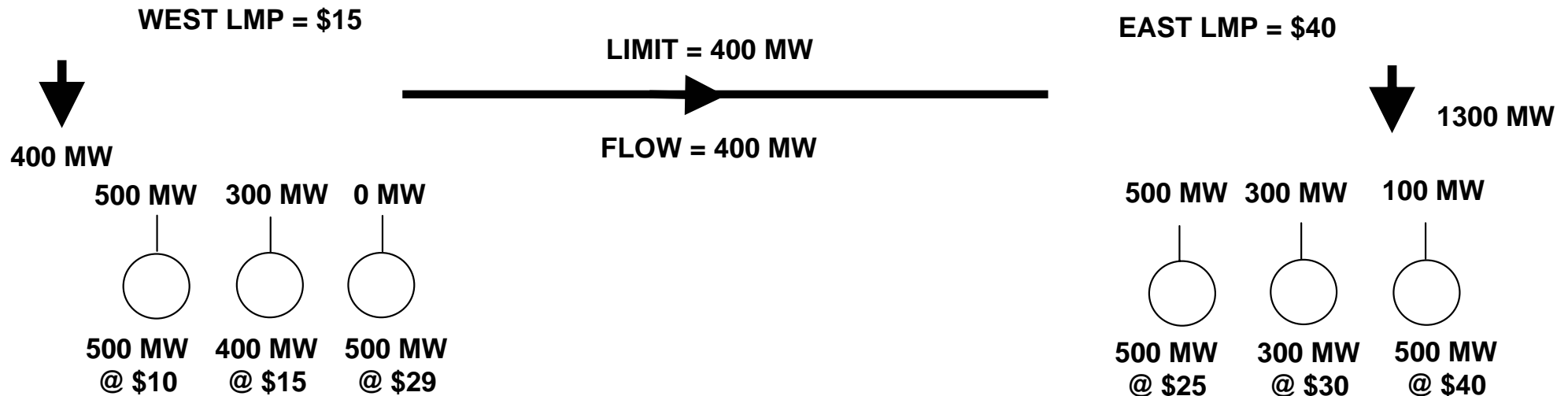


Progress Report of Market Simulations for Susq-Roseland and Bossards-Roseland 500 kV Lines

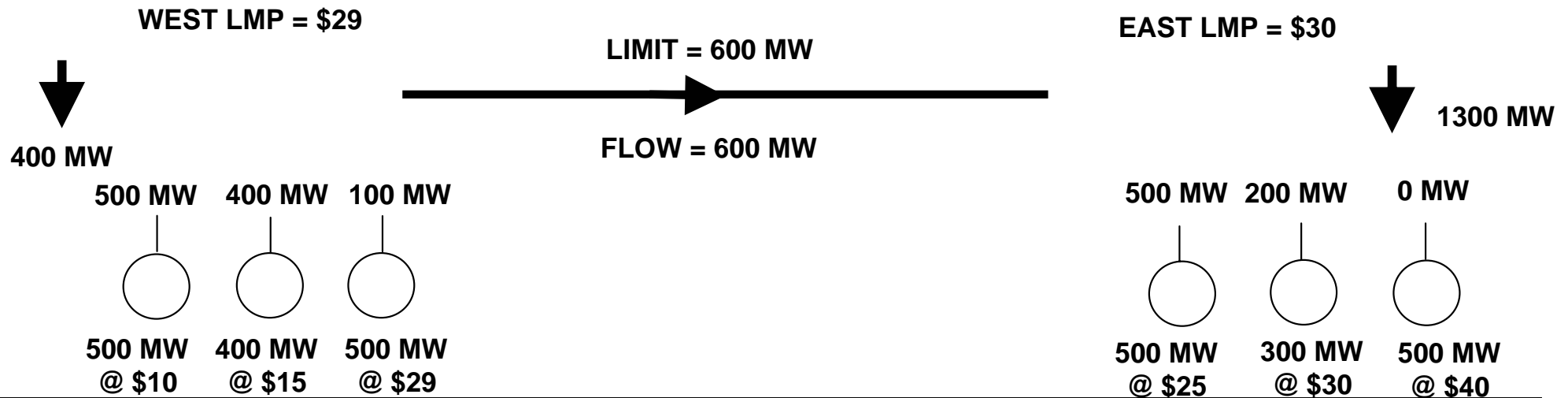
| Sensitivity | Year | | | | |
|------------------|------|------|------|------|------|
| | 2007 | 2010 | 2013 | 2016 | 2021 |
| Base Assumptions | X | X | X | X | X |
| High Fuel | X | X | X | X | X |
| Low Fuel | X | X | X | X | X |
| High Load | X | X | X | X | X |
| Low Load | X | X | X | X | X |
| High Emissions | X | X | X | X | X |
| Low Emission | X | X | X | X | X |
| High Generation | X | X | X | X | X |
| Low Generation | X | X | X | X | X |
| Others ?? | X | X | X | X | X |

- A separate excel file will be posted for each project
 - File will be updated as analysis results are processed
- A main summary tab will show for all sensitivities the change in following metrics:
 - Total system production costs
 - Total system load payments
 - Total system generation revenue
 - Total system congestion costs
 - Total system FTR credits
- A separate tab for each sensitivity will show change in following metrics:
 - Load payments by zone
 - FTR credits by zone

- Continue market simulation sensitivity analysis of 502 Junction line
 - Develop various generation scenarios for years 2013, 2016 and 2021
 - Calculate FTR values by zone for each simulation
- Complete base simulations for years 2007, 2010 and 2013 for each project
- Calculate impact of upgrades on RPM metrics
- Provide status updates as analysis progresses



| | WEST | EAST | TOTAL |
|---------------------------|----------|----------|----------|
| Gen MW | 800 MW | 900 MW | 1,700 MW |
| Gen Prod Cost | \$9,500 | \$25,500 | \$35,000 |
| Gross Gen Rev | \$12,000 | \$36,000 | \$48,000 |
| Load MW | 400 MW | 1,300 MW | 1,700 MW |
| Load Payment | \$6,000 | \$52,000 | \$58,000 |
| FTR MW | 0 MW | 400 MW | 400 MW |
| FTR Credit | \$0 | \$10,000 | \$10,000 |
| Load Payment – FTR Credit | \$6,000 | \$42,000 | \$48,000 |
| Congestion Charge | -- | -- | \$10,000 |



| | WEST | EAST | TOTAL |
|---------------------------|----------|----------|----------|
| Gen MW | 1,000 MW | 700 MW | 1,700 MW |
| Gen Prod Cost | \$13,900 | \$18,500 | \$32,400 |
| Gross Gen Rev | \$29,000 | \$21,000 | \$50,000 |
| Load MW | 400 MW | 1,300 MW | 1,700 MW |
| Load Payment | \$11,600 | \$39,000 | \$50,600 |
| FTR MW | 0 MW | 600 MW | 600 MW |
| FTR Credit | \$0 | \$600 | \$600 |
| Load Payment – FTR Credit | \$11,600 | \$38,400 | \$50,000 |
| Congestion Charge | -- | -- | \$600 |



Market Simulation Metric Example

Upgrade Impact

| | Base Case | 200 MW Upgrade Case | DELTA |
|------------------------------------|-----------|---------------------|-----------|
| Gen Prod Cost | \$35,000 | \$32,400 | -\$2,600 |
| Gross Gen Rev | \$48,000 | \$50,000 | \$2,000 |
| Load Payment (West) | \$6,000 | \$11,600 | \$5,600 |
| Load Payment (East) | \$52,000 | \$39,000 | -\$13,000 |
| Load Payment (Total) | \$58,000 | \$50,600 | -\$7,400 |
| FTR Credits (West) | \$0 | \$0 | \$0 |
| FTR Credits (East) | \$10,000 | \$600 | -\$9,400 |
| FTR Credits (Total) | \$10,000 | \$600 | -\$9,400 |
| Load Payment – FTR Credits (West) | \$6,000 | \$11,600 | \$5,600 |
| Load Payment – FTR Credits (East) | \$42,000 | \$38,400 | -\$3,600 |
| Load Payment – FTR Credits (Total) | \$48,000 | \$50,000 | \$2,000 |