# IMM Proposals

MEPETF

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Monitoring Analytics

# Proposal 1: Eliminate The Process

- **Current approach favors non-market solutions over market solutions to market signals**
  - **Markets shift risk to those that can best internalize the risk**
  - **Fundamental premise of PJM markets not represented in efficiency project approach**
  - **Rate of return assets vs. competitive market responses to prices**

# Proposal 1: Eliminate The Process

- **Uncertain benefits streams highly sensitive to assumptions regarding fuel mix and fuel prices**
  - **Dramatic changes in projected benefits and costs possible**
  - **Risk of incorrect answer forced on customers in the form of a regulated rate of return asset**
  - **Market would be able to correct of for a bad investment, same is not true of regulated assets**
- **LMPs are correct, not a sign of market inefficiency**
  - **Congestion the result of least cost security constrained optimization**
  - **LMP provide the marginal price of energy by location**

# Overview: Proposals 2 and 3

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# Benefit/Cost Analysis: Basic Concepts

- **Sum Identified Benefits (positive and negative)**
  - **Inclusive list of benefits and costs**
  - **Cost/Benefit analysis is intended to measure the positive or negative consequences of a project.**
  - **To evaluate benefits:**
    - **List all parties/categories of parties affected by the project**
      - Add the positive or negative value of the project to each party
      - Benefit = the net benefits

# Benefit/Cost Analysis: Basic Concepts

- **Risk associated with project outcomes is usually handled with probability theory.**
  - **Can be factored into the discount rate**
  - **Can/should be considered separately**
  - **Risk can be used to weight results**

- **Uncertainty in assumptions/parameters should be evaluated with sensitivity analysis**
  - **Monte Carlo**
  - **Both Benefits and Costs subject to uncertainty**

# PJM Benefit Cost Analysis

- **Market Efficiency Projects intended to address:**
  - **Energy market constraints**
    - **Compare Benefits to Costs**
  - **Capacity market constraints**
    - **Compare Benefits to Costs**
- **Total Benefits = Energy Benefits + Capacity Benefits**

# PJM Regional Energy Benefit Analysis

- **Regional Projects: 50 percent Change in Total Energy Production Cost + 50 percent Change in Load Energy Payment**
- **Change in Total Energy Production Cost**
  - **Calculated for the whole PJM Region**
  - **Total change in energy production cost**
- **Change in Load Energy Payments**
  - **Calculated for each transmission zone**
  - **Includes only zones that show a reduction in load energy payments**
  - **Total change in load energy costs not considered.**

# PJM Low Voltage Energy Benefit Analysis

- **Regional Projects: 100% of change in Load Energy Payments**
- **Change in Load Energy Payments**
  - **Calculated for each transmission zone**
  - **Includes only zones that show a reduction in load energy payments**
  - **Total change in load energy costs not considered.**

# PJM Capacity Benefit Analysis

- **Mirrors Energy Benefit Analysis**
- **Regional Projects: 50% Change in System Capacity Cost + 50% Change in Load Capacity Payment**
  - **Total system capacity cost**
  - **Load capacity payments included if lowers cost**
- **•Lower Voltage Projects: 100% change in Load Capacity Payment**
  - **Load capacity payments included if lowers cost**

# Issues with Benefit Analysis

- **Current B/C Analysis only lists energy benefit to those zones that would benefit from the project**
  - **Ignores zones that would be hurt by project.**
- **To evaluate benefits, need to list all parties/categories affected by the project**
  - **Add the positive or negative value of the project to each party**
  - **Benefit = the net benefits**

# Need to account for Risk in Benefit/Cost Analysis

- **Uncertainty in assumptions/parameters can be evaluated with a sensitivity analysis**
  - **Monte Carlo**
  - **Both Benefits and Costs subject to uncertainty**

# Need to account for Risk in Benefit/Cost Analysis

- **Benefit assumptions in B/C analysis are not subject to rigorous sensitivity analysis**
  - **One benefit estimate used in ratio**
  - **Does not explicitly account for different probabilities (generation build, changes in fuel costs, load change) in ratio**

- **Uncertainty in assumptions/parameters can be evaluated with a sensitivity analysis**
  - **Monte Carlo**
  - **Both Benefits and Costs subject to uncertainty**

# Proposal 2 and 3

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# Proposal 2: Benefit measured as changes in system wide load costs, net of modeled congestion allocation

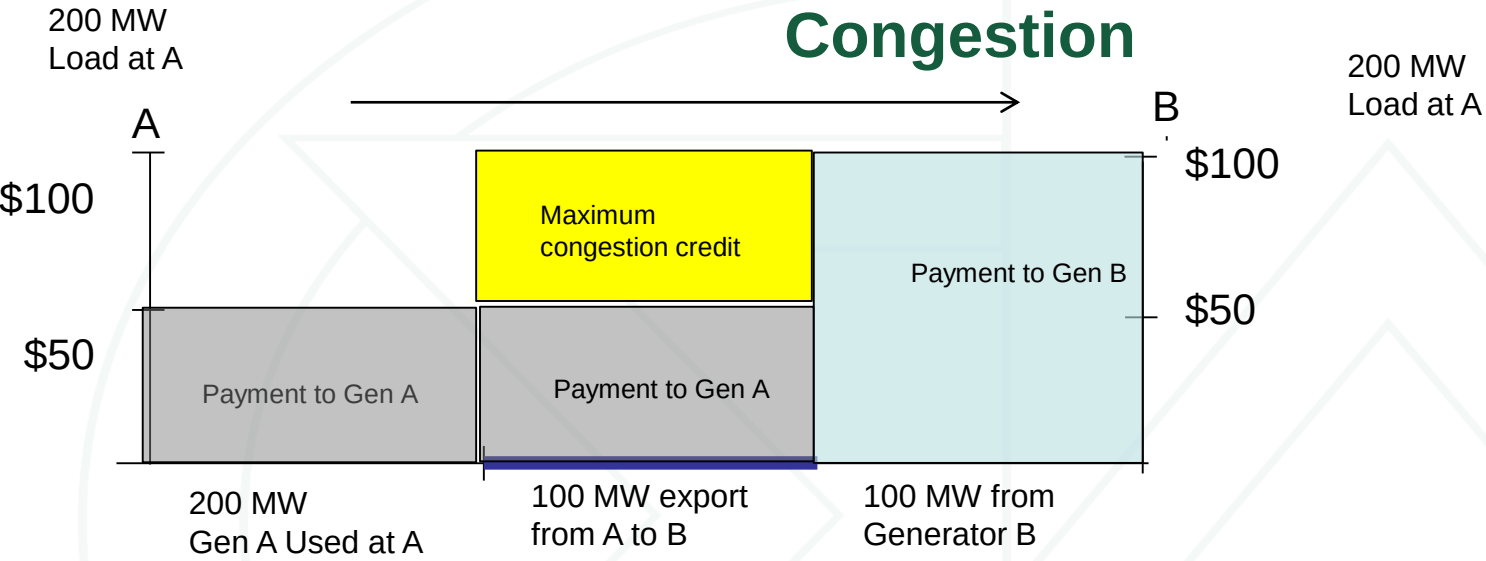
- **Proposal is to correct the calculation of benefits in the B/C analysis**
  - **Difference in total load costs before and after proposed project**
    - **Positive and negative benefits (load costs)**
    - **Accounting for changes in ARR related offsets**
      - Methodology would update with any changes in the ARR/FTR market construct
    - **Use the average of the forecasted benefits**
  - **Same metric for benefit calculation used for regional and local projects**

# Proposal 3: Benefit measured as changes in system wide production costs

- **Proposal is to correct the calculation of benefits in the B/C analysis**
  - **Difference in total system-wide production costs before and after proposed project**
    - **Positive and negative benefits (production costs)**
    - **Method assumes perfect allocation of congestion to those that pay (no difference between generation payments and load payments)**
      - Methodology matches IMM proposed revisions to ARR/FTR market
    - **Use the average of the forecasted benefits (changes in production costs)**
  - **Same metric for benefit calculation used for regional and local projects**

# Example 1

# Congestion




| Day Ahead | Bus A | Transfer A to B | Bus B |
|---|---|---|---|
| Price | $50 | | $100 |
| Load | 200 | → | 200 |
| Generation | 300 | 100 MW | 100 |

| Day Ahead | Bus A | Bus B | System Total |
|---|---|---|---|
| Load | $10,000.00 | $20,000.00 | $30,000.00 |
| Generation | $15,000.00 | $10,000.00 | $25,000.00 |
| Total | -$5,000.00 | $10,000.00 | $5,000.00 |
| (Load charges - congestion allocation)/(Total Load) | $50.00 | $75.00 | $62.50 |
| (Generation credits/Total Load) | | | $62.50 |

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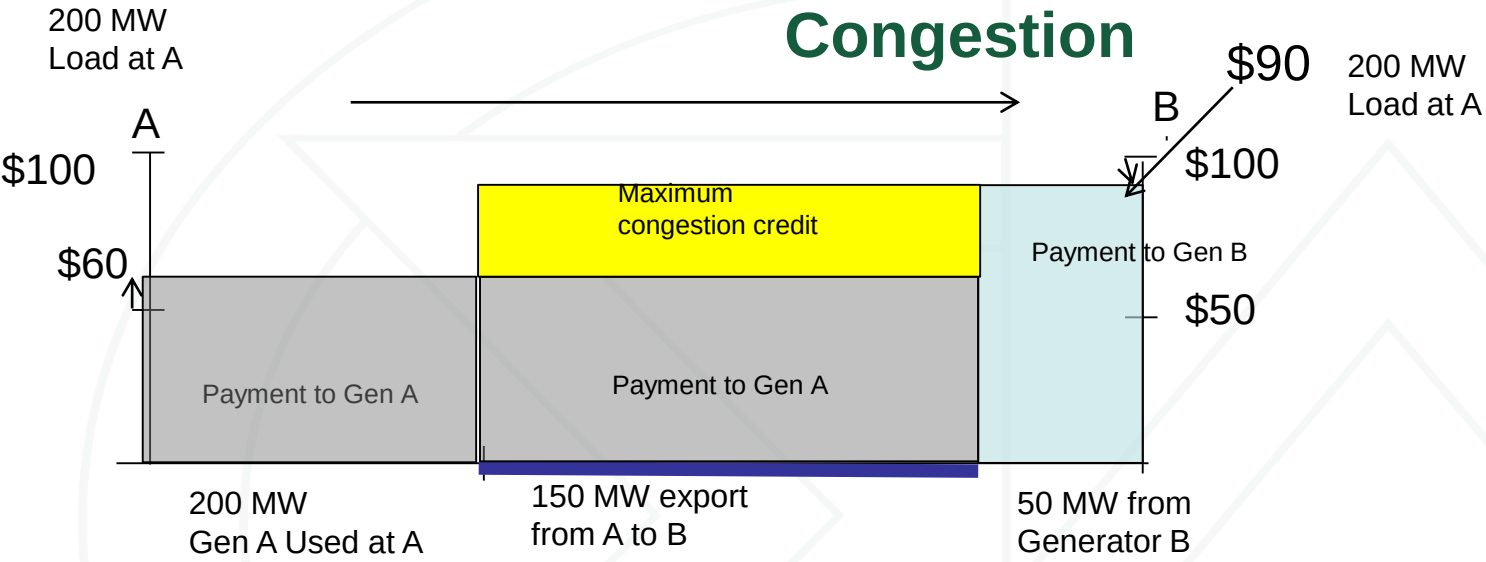
# Congestion




| Day Ahead | Bus A | Transfer A to B | Bus B |
|---|---|---|---|
| Price | $60 | | $90 |
| Load | 200 | → | 200 |
| Generation | 350 | 150 MW | 50 |

| Day Ahead | Bus A | Bus B | System Total |
|---|---|---|---|
| Load | $12,000.00 | $18,000.00 | $30,000.00 |
| Generation | $21,000.00 | $4,500.00 | $25,500.00 |
| Total | -$9,000.00 | $13,500.00 | $4,500.00 |
| (Load charges - congestion allocation)/(Total Load) | $60.00 | $67.50 | $63.75 |
| (Generation credits/Total Load) | | | $63.75 |

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# Comparing Approachs to Benefit Calculation

| Day Ahead | Bus A | Transfer A to B | Bus B | |
|---|---|---|---|---|
| Price | $50 | | $100 | |
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| **Day Ahead** | **Bus A** | | **Bus B** | **System Total** |
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| Day Ahead | Bus A | Transfer A to B | Bus B | |
|---|---|---|---|---|
| Price | $60 | | $90 | |
| Load | 200 | → | 200 | |
| Generation | 350 | 150 MW | 50 | |
| **Day Ahead** | **Bus A** | | **Bus B** | **System Total** |
| Load | $12,000.00 | | $18,000.00 | $30,000.00 |
| Generation | $21,000.00 | | $4,500.00 | $25,500.00 |
| Total | -$9,000.00 | | $13,500.00 | $4,500.00 |
| (Load charges - congestion allocation)/(Total Load) | $60.00 | | $67.50 | $63.75 |
| (Generation credits/Total Load) | | | | $63.75 |

| Changes in costs (+ Higher Cost) | A | B | Total |
|---|---|---|---|
| Upgrade Change in Load Costs | $2,000 | -$2,000 | $0 |
| Change in Congestion Offset | NA | -$500 | -$500 |
| Change in Total Load Costs | $2,000 | -$1,500 | $500 |
| Change in Generation Costs | $6,000 | -$5,500 | $500 |

| | Benefit |
|---|---|
| PJM Method Regional (50 +50), Positive Load Only | $500.00 |
| PJM Method Local (local load only) | $1,500.00 |
| IMM Proposal 2 | -$500.00 |
| IMM Proposal 3 | -$500.00 |

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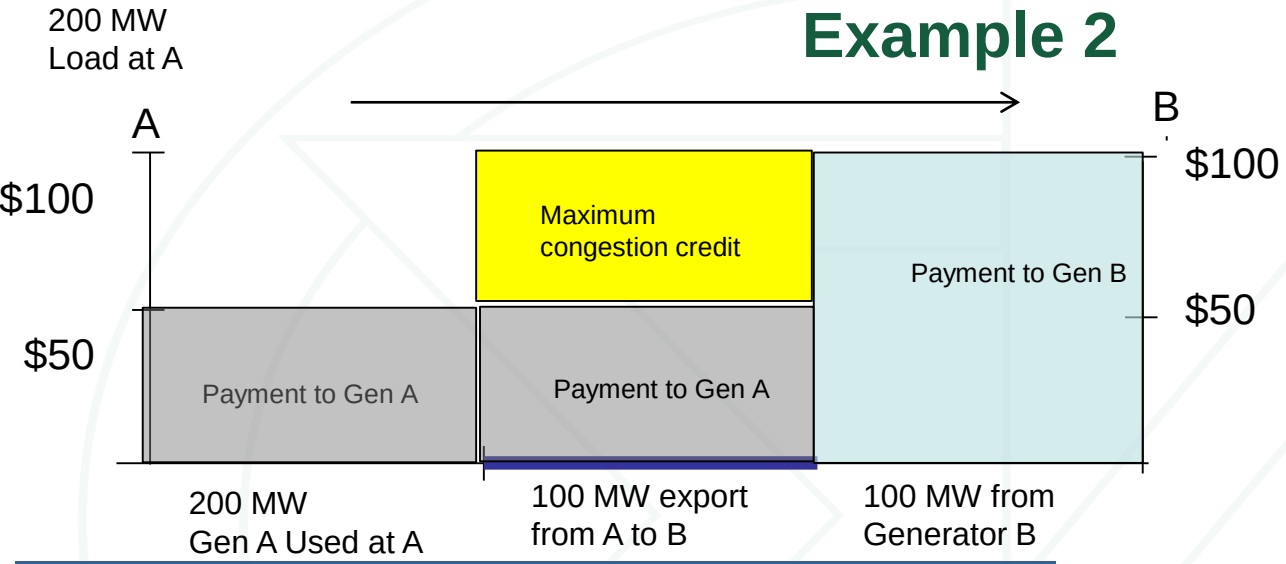
# Example 2

# Example 2

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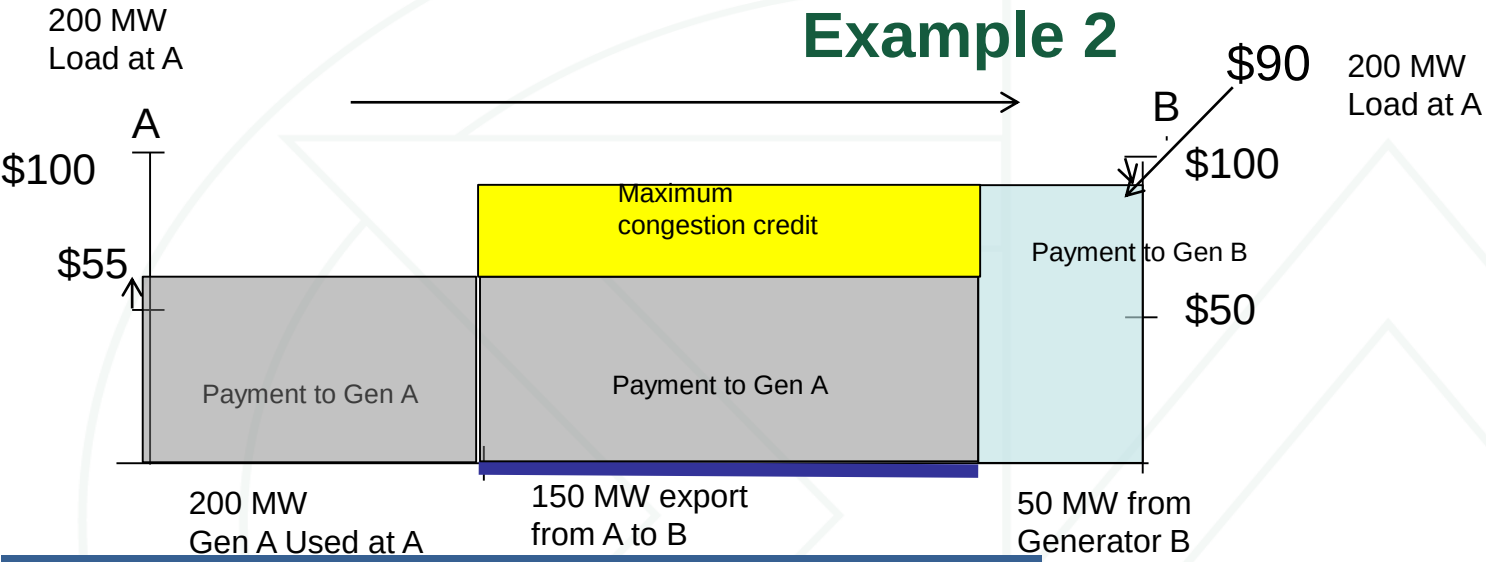


| Day Ahead | Bus A | Transfer A to B | Bus B |
|---|---|---|---|
| Price | $55 | | $90 |
| Load | 200 | → | 200 |
| Generation | 350 | 150 MW | 50 |

| Day Ahead | Bus A | Bus B | System Total |
|---|---|---|---|
| Load | $11,000.00 | $18,000.00 | $29,000.00 |
| Generation | $19,250.00 | $4,500.00 | $23,750.00 |
| Total | -$8,250.00 | $13,500.00 | $5,250.00 |
| (Load charges - congestion allocation)/(Total Load) | $55.00 | $63.75 | $59.38 |
| (Generation credits/Total Load) | | | $59.38 |

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# Comparing Approaches to Benefit Calculation

| Day Ahead | Bus A | Transfer A to B | Bus B | |
|---|---|---|---|---|
| Price | $50 | | $100 | |
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| **Day Ahead** | **Bus A** | | **Bus B** | **System Total** |
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| Total | -$8,250.00 | | $13,500.00 | $5,250.00 |
| (Load charges - congestion allocation)/(Total Load) | $55.00 | | $63.75 | $59.38 |
| (Generation credits/Total Load) | | | | $59.38 |

| Changes in costs (+ Higher Cost) | A | B | Total |
|---|---|---|---|
| Upgrade Change in Load Costs | $1,000 | -$2,000 | -$1,000 |
| Change in Congestion Offset | NA | $250 | |
| Change in Total Load Costs | $1,000 | -$2,250 | -$1,250 |
| Change in Generation Costs | $4,250 | -$5,500 | -$1,250 |

| | Benefit |
|---|---|
| PJM Method Regional (50 +50), Positive Load Only | $1,750.00 |
| PJM Method Local (local load only) | $2,250.00 |
| IMM Proposal 2 | $1,250.00 |
| IMM Proposal 3 | $1,250.00 |

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