Approaches to Presenting Results (Metrics)

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ISO new england

Presentation of Metrics

- **Extensive list of metrics makes presentation format critical**
  - Many metrics must be presented
  - Metrics convey important information about each scenario
  - Metrics include
    - Direct results of simulations
    - Simulation results combined with other information
    - Implications of input assumptions
  - Metrics' ability to provide useful information to stakeholders depends, in part, on having the information be clear and reasonably easy to read
- **All metrics expected to be quantified, but certain metrics may require additional time and effort**

Plenary Session Review of Metric Formats

- **There are many potential ways to present metrics.**
  - ISO has attempted to develop some approaches.
  - Stakeholders may have other good / better ideas.
  - ISO seeks input on how to present the information in subsequent meetings and in the final report
- **Following are examples of potential metric formats**
  - Focus on communication of relative merits
  - Identifying “winners” and “losers” not the objective of these metrics

Economic and Reliability Metrics

Economic
Systemwide production cost (Billion$)
LSE expense for wholesale electric energy based on hourly NE LMP (Billion$)
Avg. wholesale LSE expense for wholesale electric energy (LMP) ($/MWh)
Annually
Seasonally: Summer
Seasonally: Winter
Hourly (Key results, ranges, avg., trends)
Annual capital cost requirement (Billion$)
Net energy market revenue (Billion$)
Capital costs ($/kW)
Annual revenue requirement (Billion$)

Reliability
Operable capacity margin remaining after total loss of fuel source (MW)
Systemwide capacity provided (%/MW)
Systemwide electric energy provided (% GWh)
Nuclear (GWh)
Coal (GWh)
Gas (Except New Peakers) (GWh)
Gas (Only New Peakers) (GWh)
Residual Oil (GWh)
Distillate Oil (GWh)
'Emergency' (GWh)
Energy Efficiency (GWh)
Demand Response (GWh)
Queue Wind (GWh)
Photovoltaics (GWh)
Off-shore Wind (GWh)
On-shore Wind (GWh)
Other Renewables (GWh)

Environmental and Other Metrics

Environmental
Annual SO2 emissions (k tons)
Annual NOx emissions (k tons)
Total NOx emissions for 10 highest peak-load days (tons)
Total CO2 emissions (Million tons)
Compliance with RGGI CO2 cap (Y/N)
Total Hg emissions (lbs)
Hg emissions compared with regulation (lbs/MWh)
Increased water consumption for cooling towers (gal)
Increased land required:
for generation (acres)
for transmission (acres/MW)
Renewable energy contribution (GWh)
Comparison with RPS requirements (%)

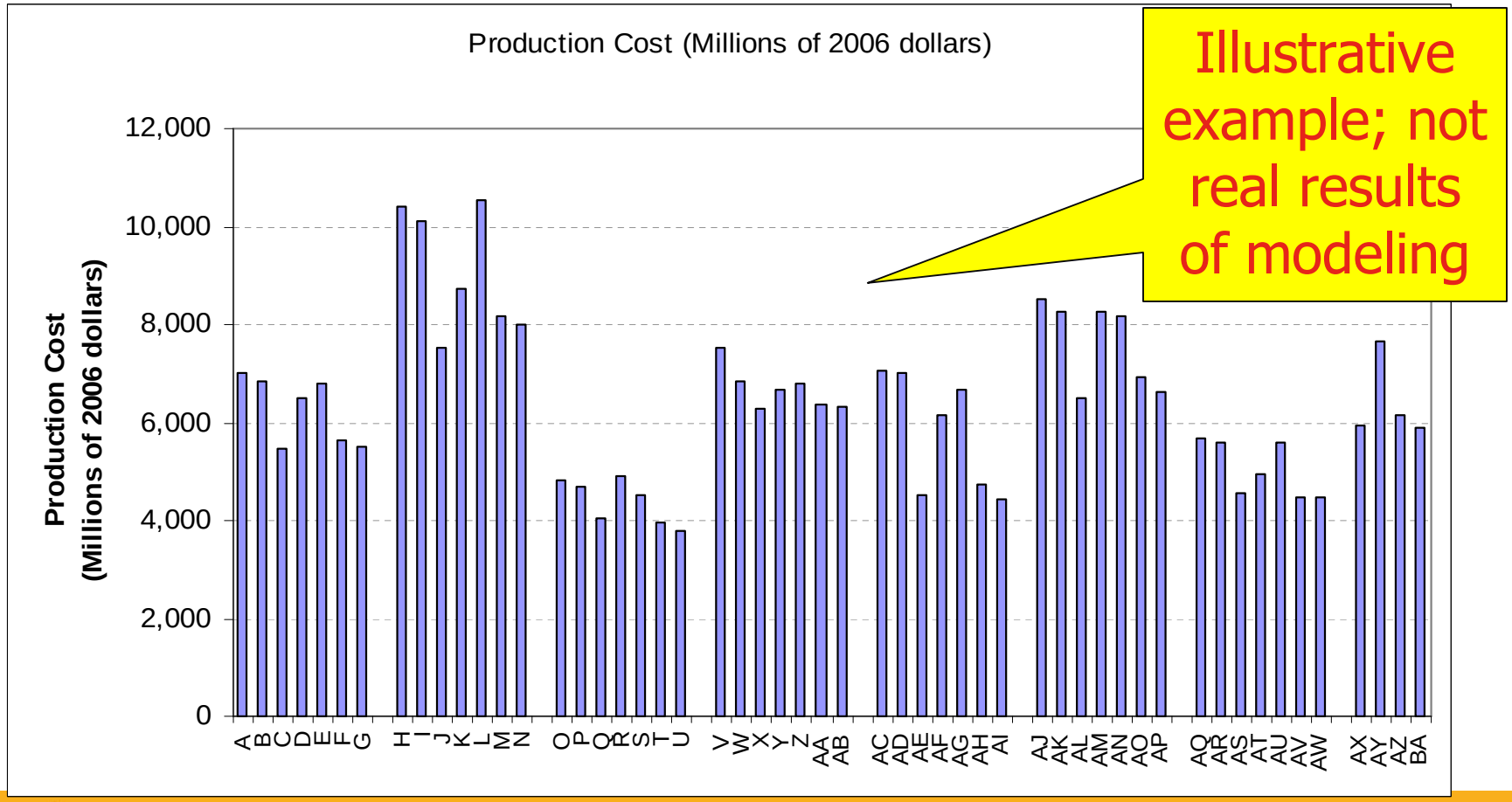
Other
Cost for generic transmission expansion ($/project)
($/MW/mile)
(¢/kWh)
Cost for generic distribution expansion ($/MW)
(¢/kWh)
Cost for generic expansion of gas-delivery system ($)
(¢/kWh)

Presentation of Metrics: Chart Format

- **Following graphs show one way (chart format) to present metrics**
  - Single metric across all cases on a single graph
  - Grouped by sensitivity cases
  - Potentially one graph for each metric
- **Tables with supporting numbers will also be provided**

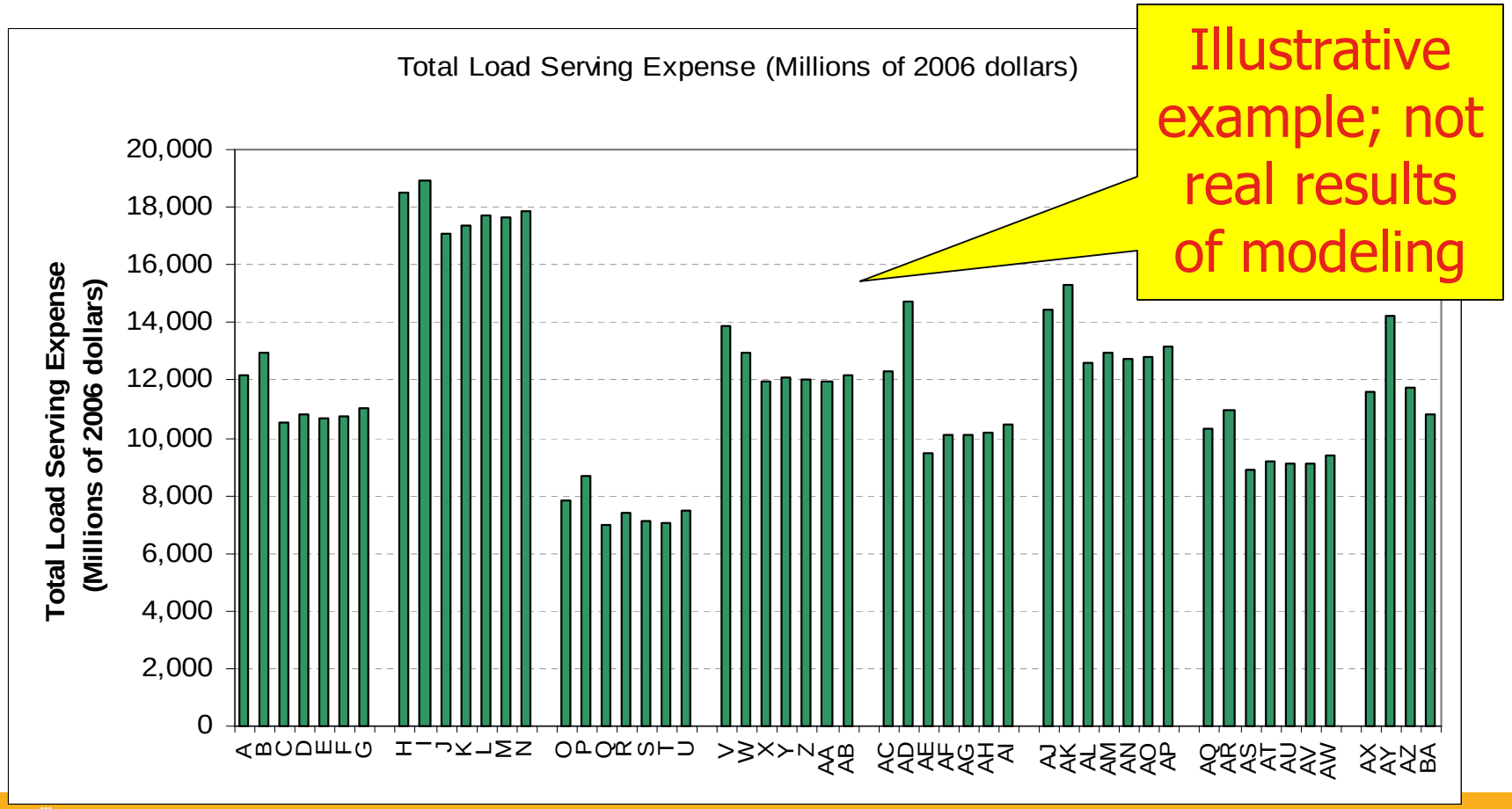
Proposed Metric Presentation: Production Cost

- **Single value reported for each scenario (A to BA)**



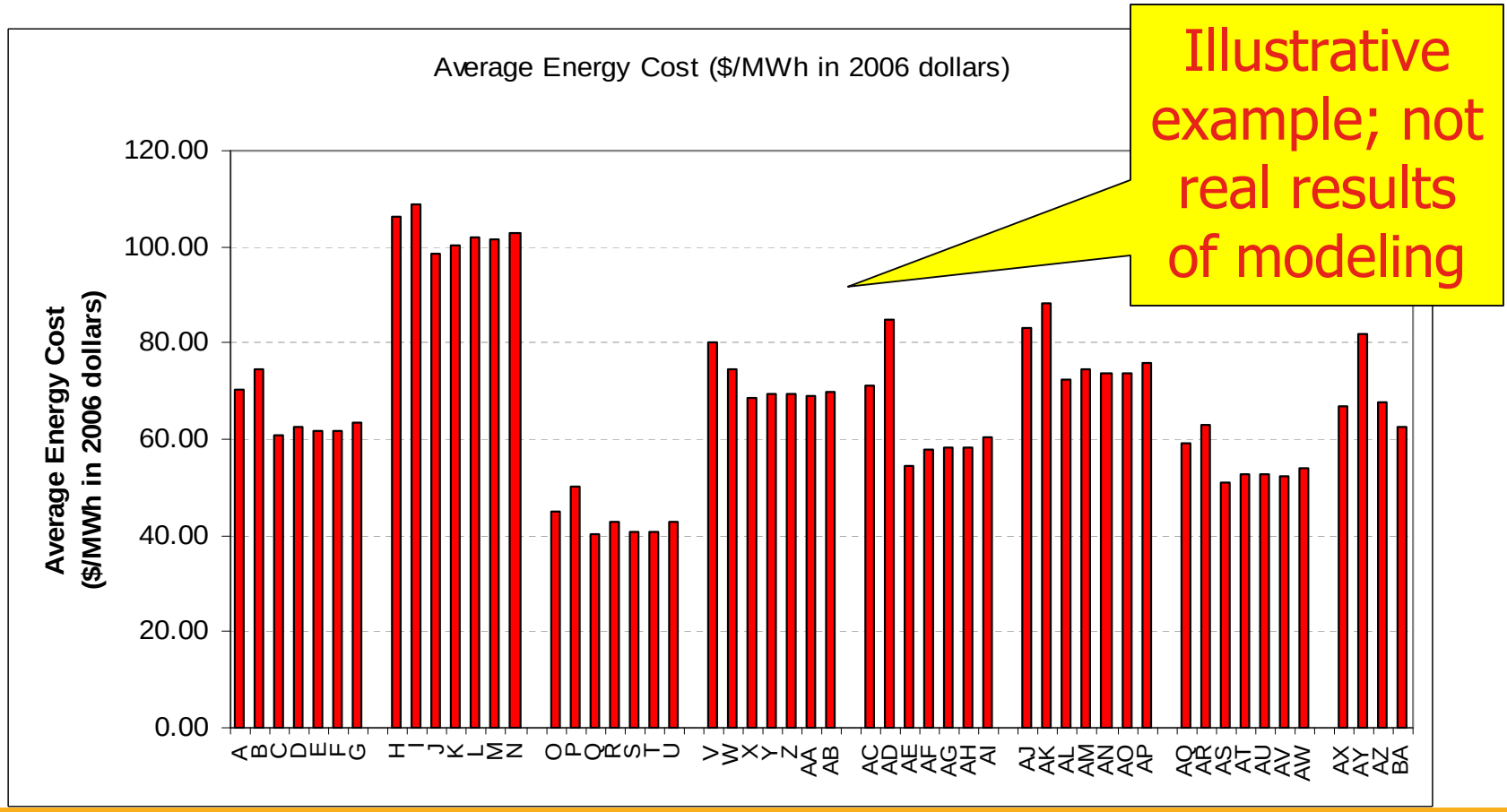
Proposed Metric Presentation: Total Load Serving Entity Expense

- **Single value reported for each scenario (A to BA)**



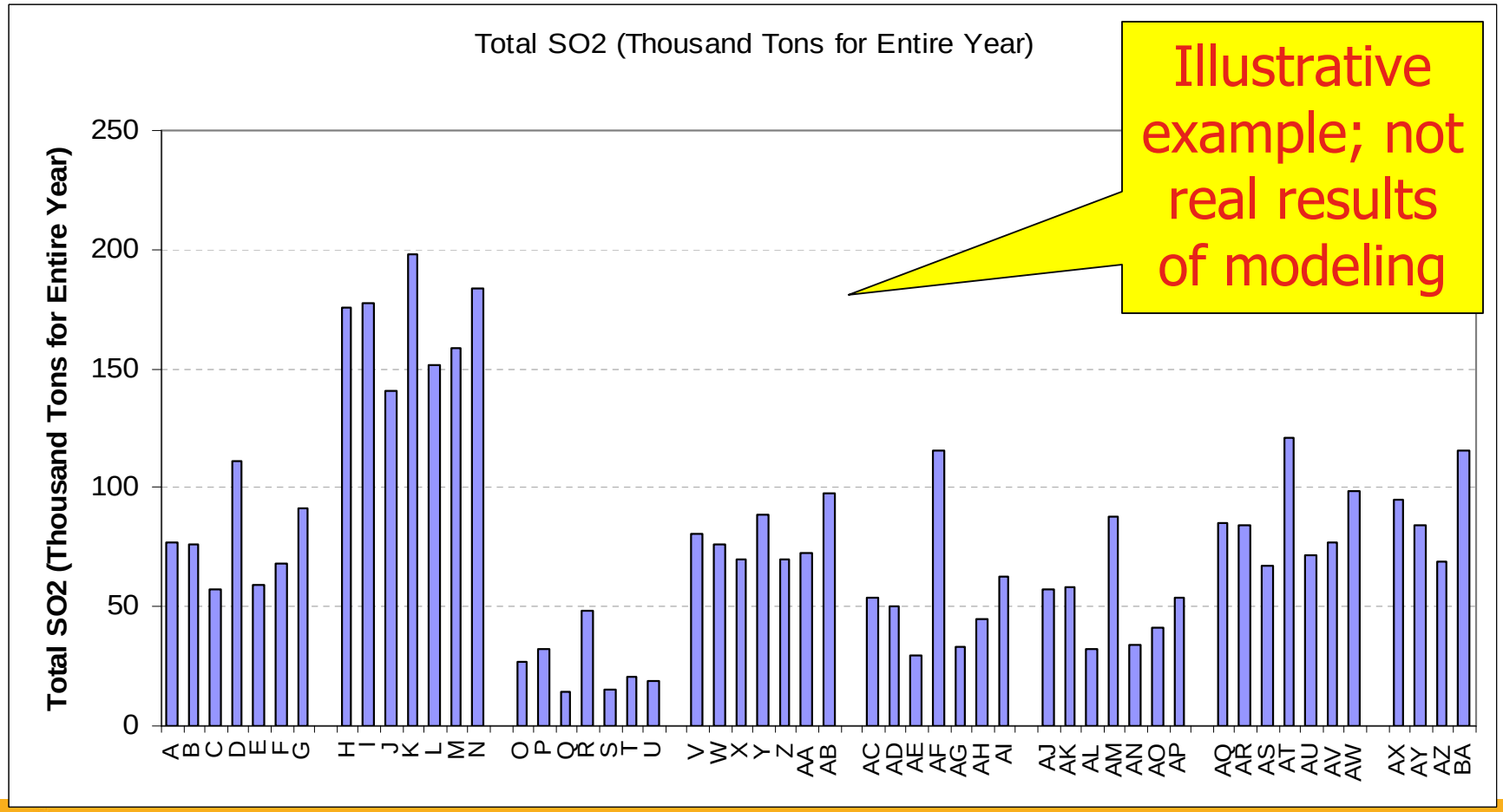
Proposed Metric Presentation: Average Marginal Energy LMP ($/MWh)

- **Single value reported for each scenario (A to BA)**



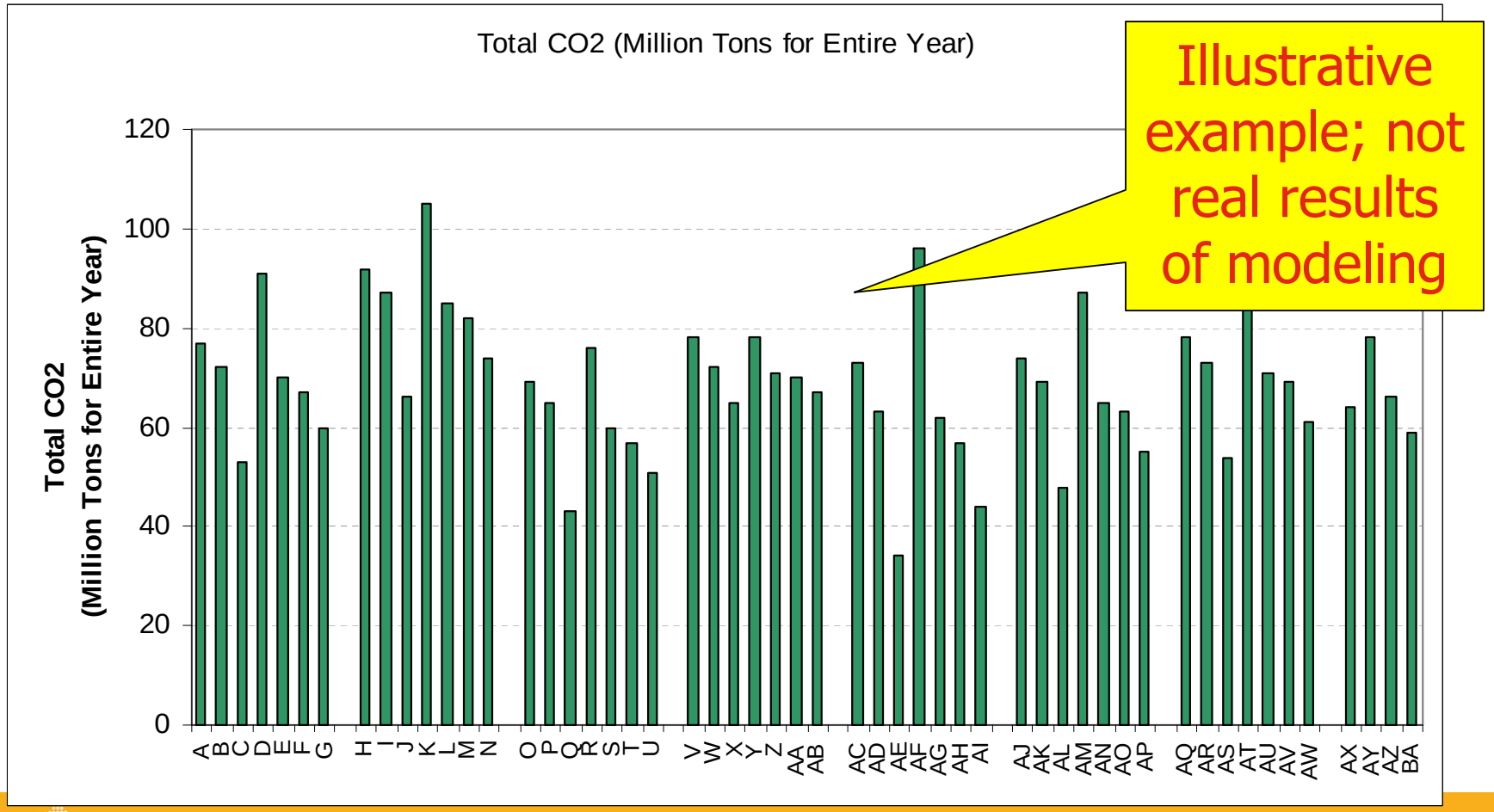
Proposed Metric Presentation: Total Annual SO2 Emissions

- **Single value reported for each scenario (A to BA)**



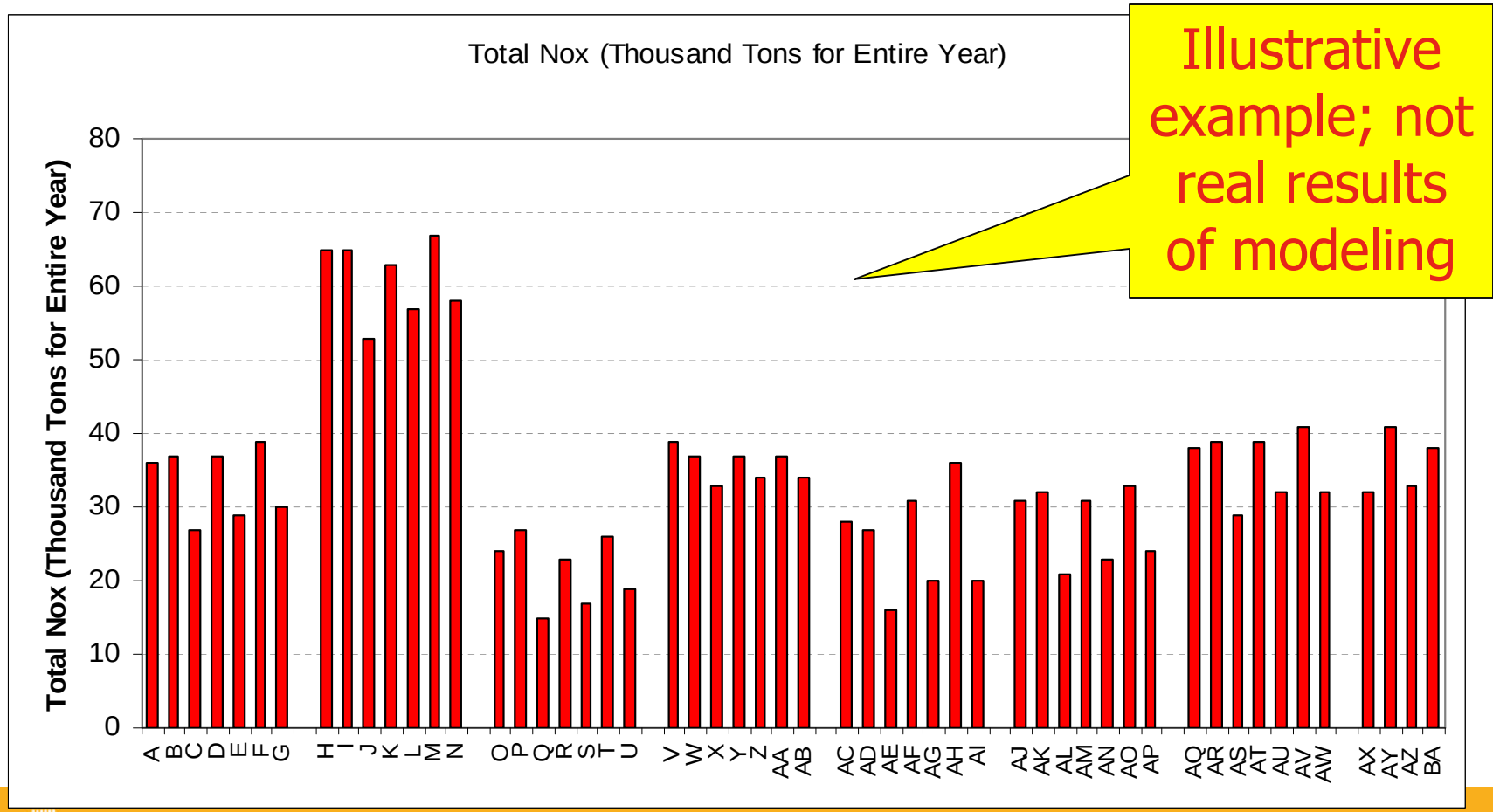
Proposed Metric Presentation: Total Annual CO2 Emissions

- **Single value reported for each scenario (A to BA)**



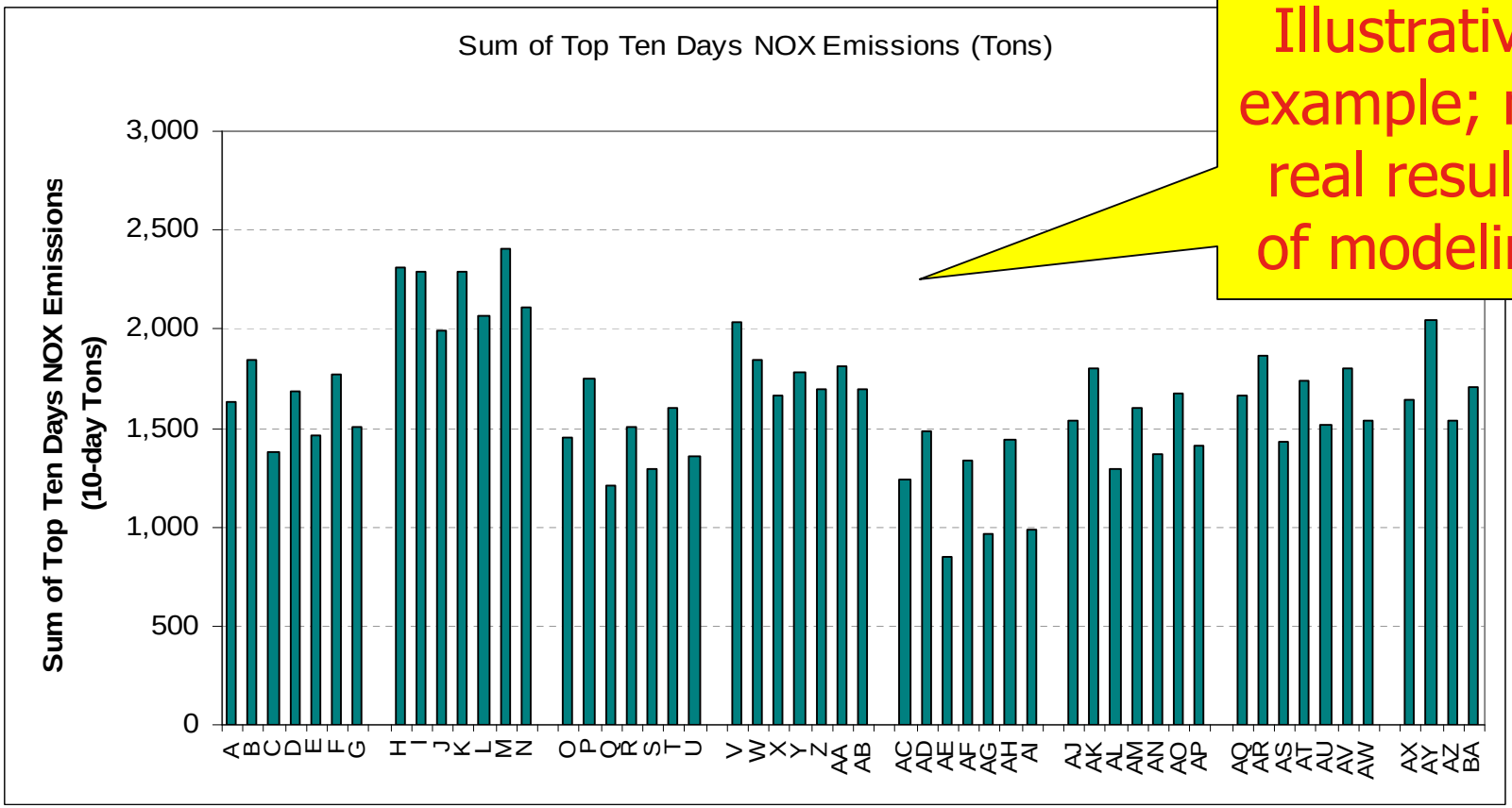
Proposed Metric Presentation: Total Annual NOx Emissions

- **Single value reported for each scenario (A to BA)**



Proposed Metric Presentation: Sum of Top Ten Days NOx Emissions

- **Single value reported for each scenario (A to BA)**



Supportable Investment for Technologies

- **Each technology included in simulations can have a supportable investment calculated**
  - Based on energy revenues above production cost
    - Used to support annual revenue requirements of capital and operations
    - Other revenue streams are possible, but not included
      - Forward Capacity Market (FCM) payments not included
      - Forward reserve market payments not included
      - Regulation market revenues
      - Other market revenues
      - Renewable Energy Credits (REC), Tax Incentives, etc.
  - Subtract production cost from LMP for each MWh produced
- **Divide by Annual Revenue Requirement factor**
- **Following shows supportable investment under each sensitivity**

Supportable Investment for Technology 'Y'