

**STEER**

State Tool for Electricity Emissions Reduction

# STEER MODEL BRIEFING

October 2015



# BACKGROUND

---

- Model developed by 5 Lakes Energy and a University of Michigan team led by Professor Jeremiah Johnson
- Built for Advanced Energy Economy Institute
- Initially developed for Michigan
- Versions being built for Pennsylvania, Arkansas, Illinois, Virginia, North Carolina, and Georgia
- Finishing the last updates for the Final Clean Power Plan

# WHAT IS STEER?

---

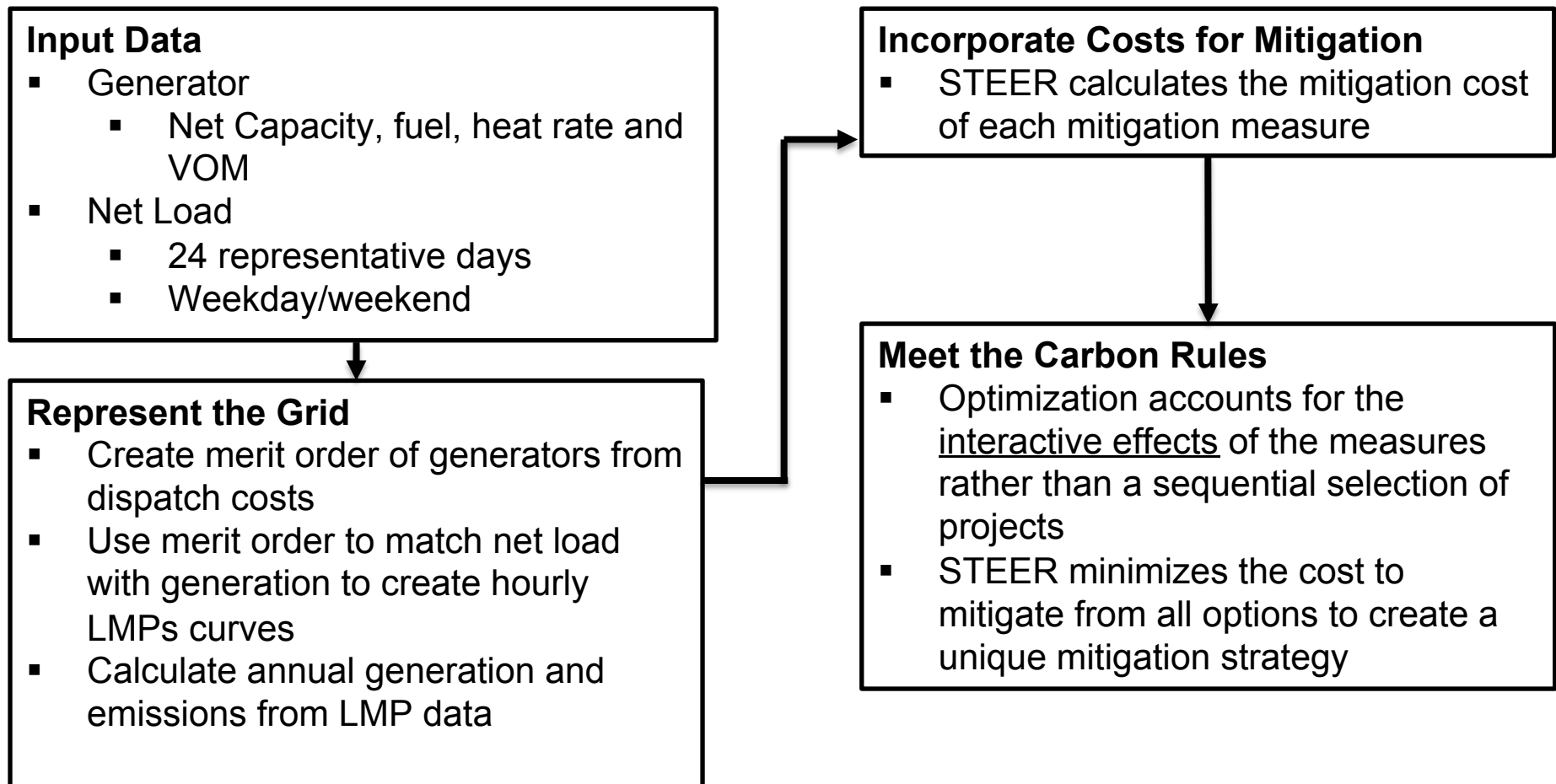
- The State Tool for Electricity Emissions Reduction (STEER) is an open-access integrated resource planning (IRP) tool
- It solves for least-cost Clean Power Plan (CPP) implementation given policy options, load and price forecasts
- All data, inputs, and formulae are visible to and changeable by the user
- STEER is Excel based and can be downloaded for free at [info.AEE.net/steer](http://info.AEE.net/steer)

# WHAT IS THE PURPOSE OF STEER?

---

- Utilities are often the only party able to model scenarios, but their proprietary models limit the sharable assumptions, etc.
  - STEER provides all stakeholders with a lighter weight but analogous and transparent IRP tool for CPP planning
  - Stakeholders can use STEER to quickly analyze options
  - Utilities will and should use their models for detailed planning
  - STEER can cross check results and identify key issues for discussion
-

# HOW DOES STEER WORK?



# KEY FEATURES OF STEER'S DESIGN

---

- It is a cost optimization model - not a potentials calculator
  - Freely accessibly to all stakeholders
  - Excel file is transparent and runs in a matter of seconds
  - Contains public default data; allows easy user modification
  - High resolution inputs/results match utility & regulator norms
    - Data for existing resources is at the generator-level
    - Full compliance range: generation to demand management
    - RE resources are site-specific with hourly resolution
    - EE is measure-by-measure from potential studies
  - Reflects interactive effects of mitigation options
  - Results include emissions and costs (e.g. rate impact by class)
-

# STEER INCORPORATES SOME IMPORTANT SIMPLIFICATIONS

---

## Simplifications

- Does not incorporate power flow and transmission constraints
- Calculates least-cost plan for user-selected single year (usually 2030); no aggregation of annual results over time
- Designed for individual states, not regions (does allow for imports/exports)

## Implications

- Designed for options analysis options and cross-checking proposals
- Utilities will and should still run their models to further analyze plan
- Some mitigation options may require policy changes to realize full benefits (e.g., DR)

# KEY EARLY FINDINGS FROM STEER MODELING OF THE PROPOSED CPP

---

- Compliance with the Clean Power Plan can **save ratepayers money** vs. business-as-usual depending on options selected
- Some compliance options are **cost-effective regardless of the Clean Power Plan**
- Long-term uncertainty and volatility of gas prices suggests **additional renewable generation should be built** even with today's low gas prices



# TWO EXAMPLE SCENARIOS RUN FOR PENNSYLVANIA UNDER PROPOSED CPP

## Key Assumptions

Natural Gas \$4.40/MMBtu  
Base Achievable EE  
8% RPS  
Current Exports  
No Interstate Carbon Allowance Purchases

1

## Key Assumptions

Natural Gas \$6.73/MMBtu  
Max Achievable EE  
8% RPS  
Reduce Exports 15%  
Purchase 20% Interstate Carbon Allowances

2

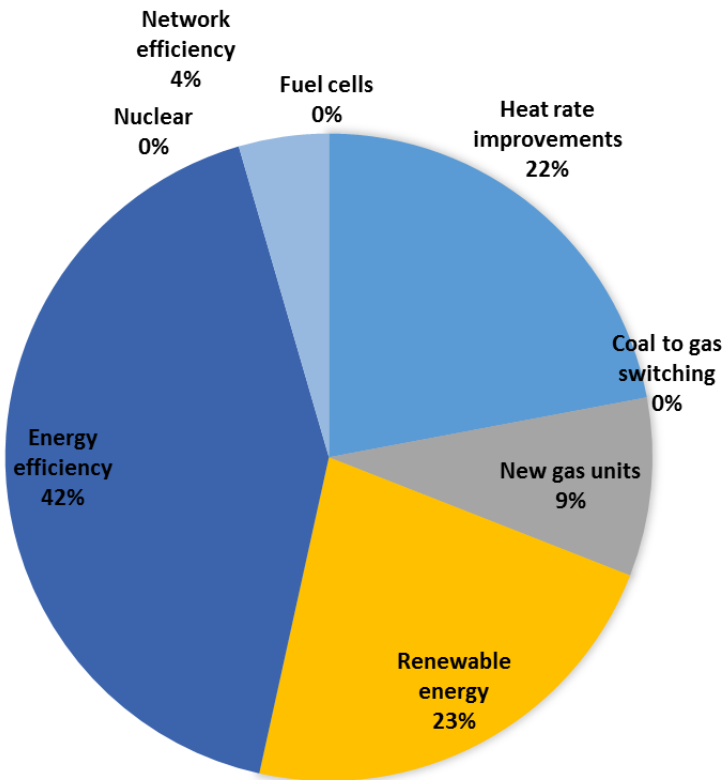
Net annual cost of mitigation:  
(\$1,141 million)  
Avg Rate Increase: (\$0.0076)

Net annual cost of mitigation:  
\$86 million  
Avg Rate Increase: \$0.0060

# MITIGATION BY MEASURE FOR BOTH SCENARIOS UNDER PROPOSED CPP

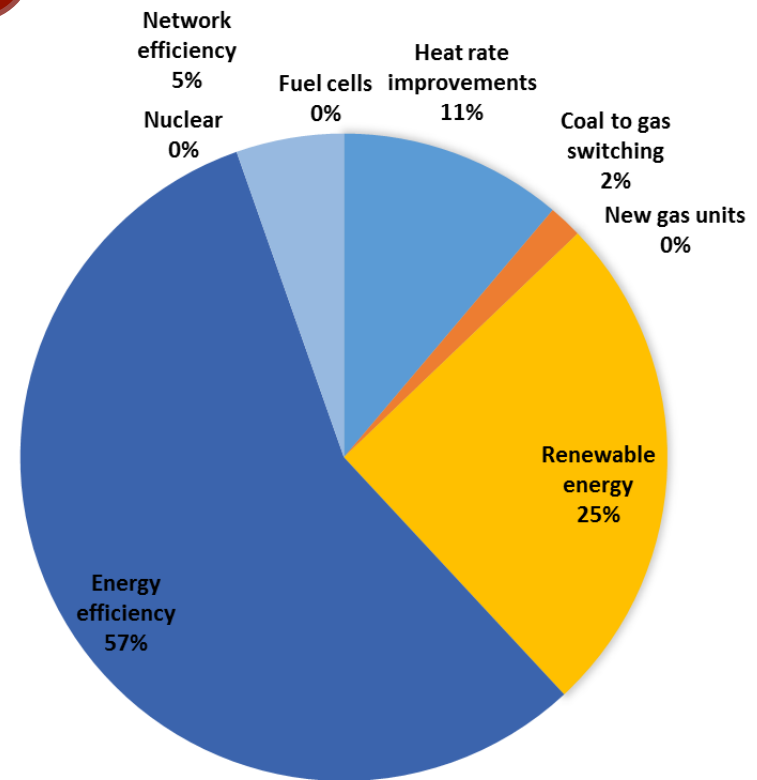
1

**PORTION OF MITIGATION BY BLOCK**



2

**PORTION OF MITIGATION BY BLOCK**



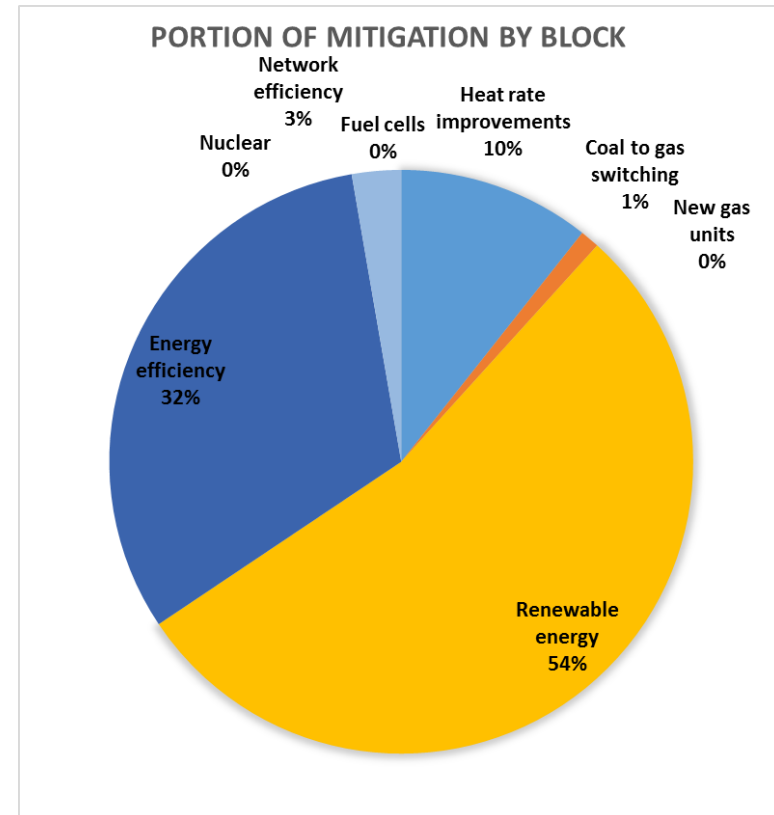
# MORE DETAIL ON NETWORK EFFICIENCY IN MICHIGAN UNDER PROPOSED CPP

## With Network Efficiency

Net cost of CPP:  
(\$96 million)

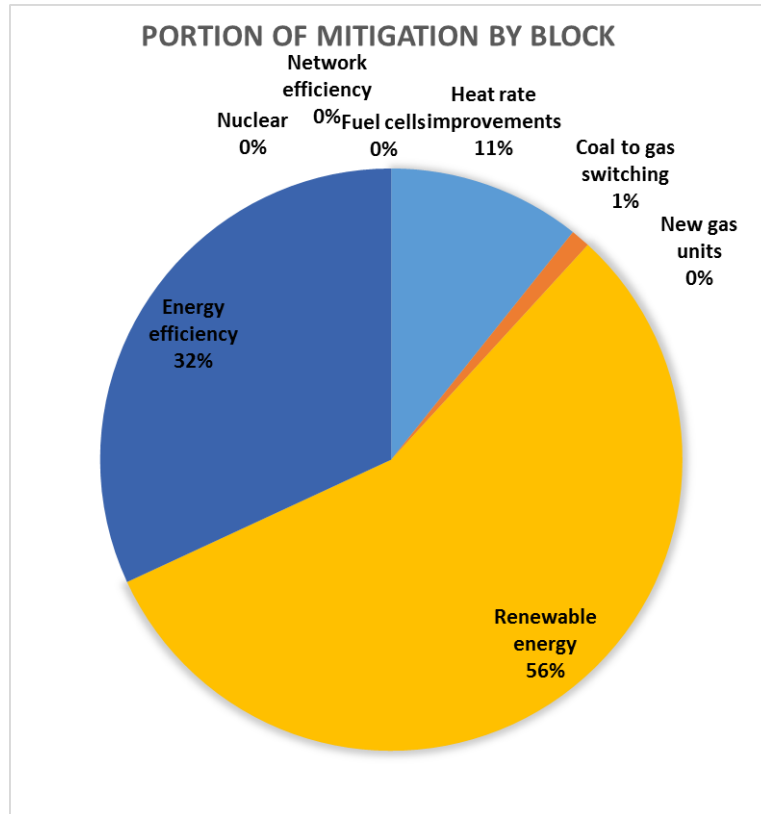
Average Rate Change:  
(\$0.0009/kWh)

Network Efficiency  
technologies include  
Dynamic Volt-VAR control and  
Conservation Voltage Reduction



# MORE DETAIL ON NETWORK EFFICIENCY IN MICHIGAN UNDER PROPOSED CPP

---



## Without Network Efficiency

Net cost of CPP:

\$14 million

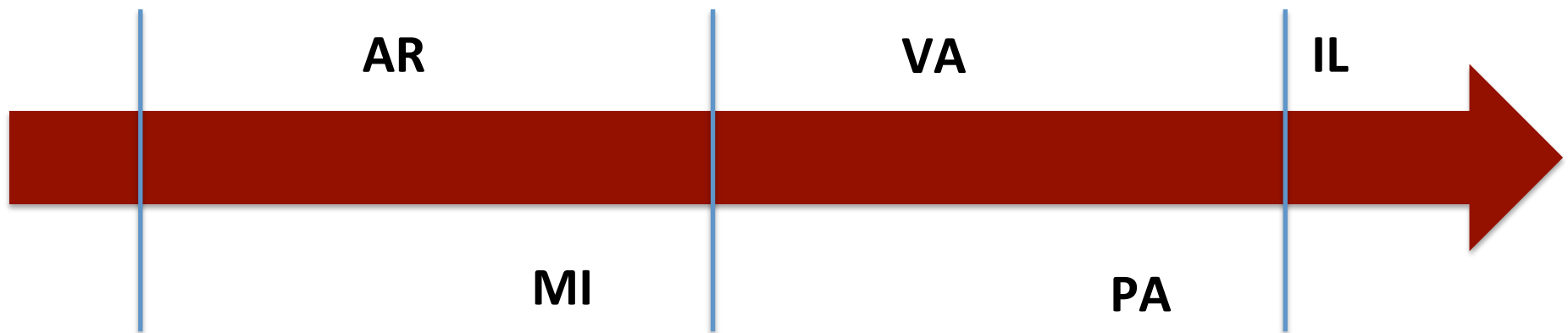
Average Rate Change:

\$0.0001/kWh

# WE WILL RELEASE STEER IN 5 STATES FOR OVER THE NEXT FEW MONTHS

---

For each state, we will produce two products: the model and an introductory paper.





**AEE**  
**INSTITUTE**

Matt Stanberry  
[mstanberry@aee.net](mailto:mstanberry@aee.net)  
(919) 423-8897