Initial Assessment of the Clean Power Plan
March 22, 2016
Purpose

- Describe modeling approach
- Compare rate method and mass method of compliance
Limit study to Iowa load served by Iowa generators, plus imports of generation owned by Iowa load serving entities, plus joint-owned unit shares of fossil generation exported out of Iowa
  - The Iowa “island” is representative of the Iowa compliance obligation
  - MISO studies developed through the Planning Advisory Committee provide broader regional perspectives

Hourly load developed from history and growth assumptions for MidAmerican Energy and non-MidAmerican load serving entities

Generation included in the model
  - Remove Iowa wind generation where PPAs commit those resources to serve load outside Iowa
  - Include generation outside the state committed to serve Iowa load where known long-term commitments exist
  - Include MidAmerican wind resources through Wind X
  - Include new Alliant Marshalltown combined cycle plant
  - Include generation retirements known through public announcements
Study Approach

- Iowa zone production cost models
  - Least hourly production cost simulations that include fuel and variable operations and maintenance costs, or in cases where a \( \text{CO}_2 \) dispatch adder is modeled, least production plus emissions cost
    - Capital costs of new resources are not included
  - Statistical modeling, including consideration of generator forced outages and wind availability

- The Iowa-only modeling method limits interstate exports, which limits \( \text{CO}_2 \) emissions compliance requirements

- Subcategory rate method and mass method based upon the federal implementation plan

- Carbon price varied to determine its effect

- New wind additions studied benefit the Iowa zone’s compliance under either the rate or mass method
Rate vs. Mass Compliance

- Mass compliance and rate compliance will look different as new resources are added; key drivers include:
  - The targets set by the EPA are not equal - the Eastern Interconnection was the most limiting of the three U.S. electric systems in EPA studies and was given an additional CO$_2$ allocation for the mass-based compliance target:[1]
  - The addition of Emissions Rate Credits (ERCs) in the denominator of the rate calculation[2]

- The rate and mass methods differ in their compliance targets, and with respect to the impact of new resource additions, resource fuel switching, and retirement assumptions

- Higher renewables penetration levels favor the rate-method of compliance

- Rate vs. mass benefits become more closely aligned as coal energy production decreases in the resource mix

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[1] The Eastern Interconnection, Western Interconnection, and ERCOT are the three U.S. electric systems
[2] ERCs are available by adding new renewables or energy efficiency
Model Results

- Impact of CO$_2$ dispatch adder and new wind additions – Year 2030
  - Rate method requires less wind than mass method to reduce the CO$_2$ dispatch adder, and the slope of the compliance line is steeper
  - Initial resource mix impacts the dispatch adder and wind quantity