## Today’s Agenda

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Advisory Committee Purpose

- Provide input on key potential study parameters and policy recommendations
- Act as liaison for their organizations; consult with other internal stakeholders and subject-matter experts within their organizations, and keep them informed as needed
MEETING OBJECTIVES:

- Understand the overall study goals, main tasks involved, and timeline
- Understand the technical approach that will be used, and provide feedback on that approach
- Provide feedback on three key areas:
  - Proposed primary data collection plan – specific contacts to reach out to
  - Possible improvements to modeling methodology
  - Ranking policy barriers and begin thinking about potential solutions
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EUI Potential Study Overview

- Study Goals
- Project Team
- Review Main Study Tasks
- Stakeholder Involvement
- Project Schedule
EUI Potential Study Goals

Estimate the potential for improving efficiency and reducing carbon emissions related to Electric Utility Infrastructure in Minnesota

- Develop appropriate models based on TRM measures to estimate Generation and Transmission and Distribution potential
- Collect all data required to populate the models
- Present findings in terms of technological, economic, and achievable potential with recommendations to effectively prioritize implementation of EUI efficiency projects
An estimated 12-15% of the nation’s electricity production is consumed by generation auxiliary loads, transmission and distribution losses, and substation consumption.
EUI Potential Study Team

Study lead
Data collection and modeling

Stakeholder engagement
Coordination across all projects

Potential Study expertise
Data collection and modeling

Data analysis
Statistical modeling
PROJECT TEAM (CONT.)

GDS Associates

- Travis Hinck: Project Manager
- Josh Duckwall: Project Manager
- Rich Polich: Managing Director
- Joe Danes: Principal

Demand Side Analytics

- Jesse Smith: Principal Consultant

Cadmus

- Jane Colby: Principal
- Mark Osborn: Senior Associate
- Lakin Garth: Associate

Center for Energy and Environment

- Carl Nelson: Director
- Mike Bull: Director
- Jon Blaufuss: Project Associate
Using Cadmus’ Excel Potential Model
Model is similar to a Demand-Side study
Top-down approach starts with load forecasts
Potential based on MN TRM measures
Develop a baseline energy forecast using existing technology
Apply efficiency measures to forecast impacts of each
Characterize costs of measures to separate technical, economic, and achievable potential
Example of EUI Measures Technical Workbooks
Start with high level data about all generation sites in MN (gross and net capacity, gross and net heat rate, operating hours, load factor, etc.)

For auxiliary loads – compare each site to top-performing similar size/age facilities across the country to approximate potential for improvement

Collect data about operations at each site to verify identified auxiliary efficiency opportunity and to identify possible core technology improvements – targets for these data requests will be prioritized by estimated opportunity
MODELING APPROACH – GENERATION (CONT)

- Collect data concerning planned future operation at each site to build base case model
- Identify specific opportunities for net heat rate improvement at each site
- Aggregate findings by utility type and region (removing identifying information).
- Separately aggregate findings by fuel and generation technology
- Similar (but different) methodology used in a 2015 EIA study for comparison
- Unique process – open to recommendations for improvement
Chart uses placeholder “dummy” data that does not represent actual measured values.
Potential for energy conservation from infrastructure improvements broken down by:

- Technical, Economic, and Achievable
- IOUs vs. COUs
- Geographic region
- Generation, Transmission, and Distribution
- Technology
- Surveyed individual utilities (if desired)
## EUI Potential Study Schedule

<table>
<thead>
<tr>
<th>Month</th>
<th>Activity</th>
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<tr>
<td>April</td>
<td>Begin collection of existing data from available sources – define preliminary potential models (underway)</td>
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<tr>
<td>June</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Advisory Committee meeting (today)</td>
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<tr>
<td>Summer</td>
<td>Primary data collection begins</td>
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<tr>
<td></td>
<td>Surveys, specific data requests, and interviews</td>
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<tr>
<td>July</td>
<td>Coordinate with Policy Project about technology issues</td>
</tr>
<tr>
<td></td>
<td>(Policy project stakeholder meeting on technologies)</td>
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<tr>
<td>Fall</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Advisory Committee meeting</td>
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<td></td>
<td>Preliminary findings and final course corrections</td>
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<tr>
<td>November</td>
<td>Final report completed</td>
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MAJOR DATA NEEDS

- Existing infrastructure specifications
- System design and planning processes
- Load forecasts
- AMI deployment plans
- Maintenance protocols
- Handout provided with preliminary list of specific data needs
Inventory / Nameplate data
capacity, quantity, age, manufacturer

Qualitative data
Maintenance protocols, operating conditions, unique circumstances
Data Collection Strategy

- Start with sources we already have access to. Ex. - FERC filings, SNL database, etc. provide high-level values for generation facilities. Collect as much data as possible before contacting stakeholders.
- Identify data gaps – Iterative process throughout project.
- Work internally and with advisory committee members to determine possible sources of data.
- Contact utilities, manufacturers, and industry experts to collect data required to complete models.
- Data collected by conducting interviews and submitting direct data requests to stakeholders. Every effort will be made to consolidate data requests into as few contacts as possible.
Process will be open-ended at first – part of our data collection process will be to determine what data is available.

Large and unique utilities will likely all be contacted for data collection.

A statistically representative sample of smaller utilities will be surveyed.

Handling of sensitive data – NDAs if necessary.

This is open to discussion and your feedback is immensely helpful.
## Sample Generation Data Collected

<table>
<thead>
<tr>
<th>Power Plant</th>
<th>Black Dog</th>
<th>Cambridge</th>
<th>Elk River</th>
<th>Sherburne Count</th>
<th>Owatonna CT</th>
<th>St. Bonifacius</th>
<th>SMMPA Meth Solway CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner Name</td>
<td>Northern States</td>
<td>Great River Energy</td>
<td>Great River Energy</td>
<td>Northern States</td>
<td>Owatonna City</td>
<td>Great River Energy</td>
<td>Southern Mini Otter Tail Power Co.</td>
</tr>
<tr>
<td>Technology Type</td>
<td>Combined Cycle</td>
<td>Combustion Turbine</td>
<td>Steam Turbine</td>
<td>Steam Turbine</td>
<td>Combustion Turbine</td>
<td>Combustion Turbine</td>
<td>Combustion Turbine</td>
</tr>
<tr>
<td>Fuel Type</td>
<td>Natural Gas</td>
<td>Natural Gas</td>
<td>Biomass</td>
<td>Coal</td>
<td>Natural Gas</td>
<td>Petroleum Products</td>
<td>Biomass</td>
</tr>
<tr>
<td>Operating Status</td>
<td>Operating</td>
<td>Operating</td>
<td>Operating</td>
<td>Operating</td>
<td>Operating</td>
<td>Operating</td>
<td>Operating</td>
</tr>
<tr>
<td>Output Assigned to Region (%)</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
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GENERATOR EFFICIENCY IMPROVEMENT MODEL
PLANT DATA REQUEST
QUESTIONNAIRE PART 1

Name of Plant: ________________________________________________  Unit: __________

1. Steam Turbine:
   a. Please provide the efficiency for each turbine stage:
      High Pressure ____%  Intermediate Pressure ____%  Low Pressure ____%
   b. Have any of the steam turbine stages been upgraded? If so, please provide modification
Feedback on modeling approach

Comments on data needs
- Who to contact?
- Best way to ensure responses?
- Will the data we’re looking for be available?

Anything else in general
- Something missing or you would like to see included?
- Thoughts about how to make the study results more useful to you?
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OVERVIEW OF EUI POLICY REVIEW PROJECT

- Project Goals:
  - Understand existing policies concerning EUI
  - Examine (dis)incentives to improve EUI efficiency
  - Recommend policy changes or clarifications to leverage EUI efficiency to meet MN goals
- Conduct 4 public stakeholder meetings
  - First meeting scheduled for July 28th focused on Infrastructure Technologies
- Develop roadmap to increase supply-side efficiency
- Funding from DOE grant
- Minnesota is leading the country
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Today’s Goal - Discuss Policy Barriers

- Early deliverable from the project is a Literature Review document, which identified several possible policy barriers to implementation of EUI efficiency projects.
- Consider barriers – are they accurate?
- Any barriers missing?
- Rate barriers in terms of difficulty to overcome.
- Think about possible solutions to barriers, but hard solutions not necessary today.
The business case for improving EUI efficiency may not be strong enough.

- Fuel is often a pass-through cost to customers (regulated utilities)
- Efficiency savings don’t all accrue to the utility’s bottom line
Significant EUI efficiency projects may trigger a New Source Review permitting process.

- NSR otherwise unnecessary
- According to several stakeholders, the desire to avoid a New Source Review may be the single greatest impediment to considering major generation facility efficiency projects.
Recovering costs of EUI efficiency projects may require additional effort or justification on the part of the utility.

- IOUs - Rider already does exist, but some utilities may not be interested in expending the additional effort required to file.

- COUs - utility board may have to be convinced to raise rates in the short term to pay for a project.
Utilities may simply not be aware of infrastructure efficiency opportunities or have the time to consider them.
Utilities cannot claim infrastructure costs toward their CIP 1.5% mandated spending goals.

- Not likely a deal-breaking problem for most utilities.
- May change value proposition compared to demand side efficiency options.
Reliability and security are always more important than efficiency; an obvious barrier to efficiency implementation is that there are simply higher priorities.

- Staffing a performance engineer or allocating design resources to efficiency redirects from other focuses
- Look for ways to leverage lessons learned across utilities or statewide
Many large gas generation facilities are exempt from CIP. If the primary incentive for completing efficiency projects is CIP credit, facilities that are exempted from CIP will not be willing or able to participate.

- Have been some inconclusive discussions about this issue
- Possible that EUI CIP credit may encourage opting back into CIP if it’s an option (may be unlikely)
- Allocating CIP credit to downstream users likely too complicated to overcome barrier
For some utilities, part of the goal of demand-side efficiency programs is to engage customers and visibly provide a service, which infrastructure projects do not accomplish.
The CIP electric conservation metric is kWh, which does not capture the efficiency gains achieved by some infrastructure improvements

- Reactive power conservation is valuable, but uncounted by CIP
- Demand reduction a valuable component of efficiency to utilities, but not to CIP directly
- Note: Partial solution already devised to count equivalent kWh for generation fuel input reduction
Easier options are available. There is no urgent need to invest in infrastructure efficiency while demand-side efficiency programs are still meeting conservation goals today.

- This study may help lay groundwork to develop infrastructure as an efficiency tool as the “low-hanging fruit” of demand-side programs begins to dry up in coming years.
Lack of standardized calculation methodology introduces uncertainty to planning EUI efficiency projects.

- Some measures are now defined in the TRM
- There is still room for improving the defined measures and more could be added in the future
- EUI projects are still very likely to require custom calculations
The conservation statute requires that eligible infrastructure projects must be more energy efficient than would otherwise be implemented in the course of “normal maintenance activity,” which is not clearly defined by the statute.

- TRM measures addressed as well as possible
- Clean Air Act provision that established the New Source Review has a similar “normal maintenance activity” clause, which is similarly uncertain
- May request a pre-install review by DOC to verify eligibility
Consider barriers – are they accurate
Are any important barriers missing?
Rate barriers in terms of difficulty to overcome
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Large Stakeholder Meeting

- Scheduled for July 28th
- Expert Speaker from EPRI – Ron Schoff
- Focus on infrastructure technologies and experiences using them across the country
- Draft agenda - Handout
Final Comments – Next Steps

- Open for questions, discussion, comments
- Next Advisory Committee Meeting on October 3rd
  - Discuss progress of data collection and preliminary potential study modeling results
  - Push for final potential study data collection
  - Update and feedback on Policy Review project status
  - Input on final deliverables to ensure value
Contact Information

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