Minnesota Statewide EUI Conservation Potential Study – FACT SHEET

With funding from the MN Department of Commerce, a team consisting of GDS Associates, The Cadmus Group, Center for Energy and Environment, and Demand Side Analytics conducted a potential study to quantify conservation opportunity in Electric Utility Infrastructure (EUI) assets owned and operated by utilities serving Minnesota consumers. Study findings indicate the potential for conservation is large enough that utilities should consider pursuing EUI projects as an important component of their Conservation Improvement Program (CIP) plans and policymakers should continue examining policies to lower barriers to implementation and drive utilization of EUI resources to meet CIP goals.

Overall Results

Total Statewide Conservation Potential in MWh (equivalent MWh for generation) 2020-2039

	Generation	T&D	Total
Technical Conservation Potential	1,399,850	3,248,923	4,648,773
Economic Conservation Potential	786,782	2,515,143	3,301,925
Achievable Conservation Potential	786,782	1,342,519	2,129,301

Total Statewide Conservation Potential as a Percentage of Predicted Electric Sales 2020-2039 (excluding CIP-exempt sales)

	Generation	T&D	Total
Technical Conservation Potential	0.09%	0.21%	0.29%
Economic Conservation Potential	0.05%	0.16%	0.21%
Achievable Conservation Potential	0.05%	0.09%	0.13%

Total Statewide Conservation Potential as a Percentage of CIP Electric Goals 2020-2039

	Generation	T&D	Total
Technical Conservation Potential	5.9%	13.7%	19.6%
Economic Conservation Potential	3.3%	10.7%	13.9%
Achievable Conservation Potential	3.3%	5.7%	9.0%

Percent of Total Conservation Potential by Sector and IOU/COU 2020-2039

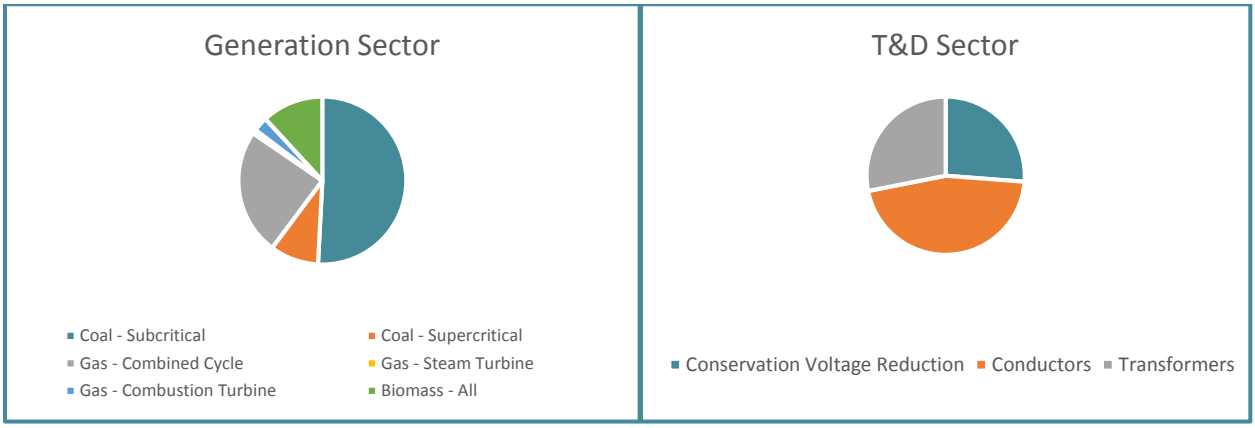
	IOU		COU	
	Generation	T&D	Generation	T&D
Technical Conservation Potential	20.8%	33.7%	9.3%	36.2%
Economic Conservation Potential	15.4%	37.1%	8.4%	39.1%
Achievable Conservation Potential	23.9%	30.8%	13.0%	32.2%

High-Level Conclusions

- EUI conservation opportunity is large enough that utilities should consider projects and programs to capture it
- Potential is not so large that EUI activities are likely to displace significant DSM initiatives on average, over time – though some individual projects may contribute to a large share of a utility's savings goal in a given year
- Coal plants not scheduled for retirement offer the most opportunity for heat rate improvements and should be targeted for evaluation, if possible

- Low-loss conductors provide more opportunity that originally anticipated
- Almost all T&D opportunity is in replace-on-fail or end of life situations, with the remainder in new expansion (direct replacement of functioning equipment did not typically result in cost-effective opportunities)
- Below are several specific recommendations for utilities to capture EUI potential
- This study will be used to inform the policy Action Plan being developed under a grant from the DOE. Parties interested in this report should look for those results as well.

Achievable Potential for Conservation by Technology



Important Methodology Notes and Interpreting Results

- Generation technical potential was estimated by comparing existing generation facilities' heat rates to top-performing facilities in the same class (fuel, technology, capacity, capacity factor, and age). A capped maximum potential percentage improvement for each class was developed through conversations with experts and applied to the model.
- Many generation facilities in the state were removed from the model. Some conservation opportunity likely exists at these sites, but is likely a relatively small share of potential.
    - Plants that do not measure performance with heat rate (renewables, hydro)
    - Nuclear facilities
    - Plants planned for retirement or decommissioning
    - Plants with low capacity factors
    - Plants serving significant load outside MN
    - Plants that are not yet operating as of 2017
- Generation achievable potential was determined by identifying a specific project that passes a TRC test that can be implemented in each class of facility. That project was scaled and applied to each facility in the class. This methodology was chosen because uniquely modeling every site in the state is far outside the scope of the potential study
- Economic potential was not calculated separately from achievable potential for the generation sector due to modeling limitations.
- T&D statewide models are extrapolated from representative sample of select utilities.
- Data was solicited from three IOUs, 32 Co-ops, and 36 municipal utilities to inform models
- Most Transmission assets were cataloged in a State HVTL database and corroborated by utilities
- Generation results presented here reflect an assumption that >50MW gas facilities are allowed to claim savings as electric utility assets despite being automatically exempted from CIP as natural gas utility customers. This assumption is not yet verified – future guidance is expected for clarification. The full report also includes results assuming these facilities are *not* eligible.

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Utility Recommendations

Process and Policy Recommendations

1- Convene periodic conversations between CIP personnel and infrastructure personnel (distribution/transmission engineers and generation plant operators). Goals should be to:

   a. Raise general awareness of opportunity to claim CIP credit from EUI projects.

   b. Discuss high-level ideas for implementing efficiency initiatives as part of ongoing infrastructure construction, operation, and maintenance.

   c. Incorporate efficiency considerations into the Integrated Distribution Planning process recently established by the MN PUC.

   d. Identify systems or facilities that are likely to offer efficiency opportunity (note, in conversations with the project team, system operators typically have good ideas where there is room for efficiency improvement, it's just not the top priority to address)

   e. Invent ideas for efficiency opportunities utilities are not even considering yet.

2- Conduct high-level assessments of possible EUI conservation projects. This does not have to take much time or effort. The point is to familiarize utilities with EUI conservation calculation methods and possibly identify conservation opportunities. As a part of this project, high-level Excel-based project screening tools were developed as possible starting point.

3- Use the Department of Commerce as a resource. If there is uncertainty about a potential project's eligibility or how to calculate conservation savings, reach out to build better understanding. Especially for utilities that have not completed EUI projects yet, reach out to begin climbing the learning curve

4- Review technology and related initiative documents to stay current on potential efficiency opportunities.*

5- Be aware of recently-issued guidance establishing a 5-year carry-forward provision for excess EUI conservation savings and clarifying 1% demand-side requirement (EUI savings are not lost if the DSM threshold is not met in a given year). Both documents reduce uncertainty surrounding EUI projects and may improve their value.*

6- Follow up with the results of the DOE stakeholder process to be published in late 2018. The project is expected to result in additional policy guidance and an overall EUI Action Plan for the state. Particularly useful may be guidance concerning how to determine the meaning of "Normal Maintenance" and guidelines to reduce uncertainty about the Department's EUI project review process.*

Generation Recommendations

7- Generation operators – examine similar plants (fuel, technology, capacity, capacity factor) to find those that operate at lower heat rates to determine what would be necessary to achieve similar conditions at a given plant. In conversations, operators are typically well-aware of opportunities for heat rate improvements and would be willing to adopt them if they were a priority and had funding.

8- Coal plants that are not planned for decommissioning offer the most opportunity for improved heat rates and energy conservation, according to our findings. These sites should be examined for heat rate improvement opportunities because there are likely to be cost-effective options.

9- Examine operating protocols. There may not be significant opportunity for improvement, but changes to protocols could inexpensive or simple to implement. It may be possible to leverage CIP credit to drive marginal improvements. As a note, most generation efficiency is likely to come from equipment replacement or upgrades. Large plants are already controlled with sophisticated software that effectively optimizes heat rate and less-optimally-operated plants are typically smaller or don't run for significant hours per year. Operations are still worth examining due to cost-effectiveness if opportunities are found.

Transmission and Distribution Recommendations

10- Consider AMI deployment or accelerating existing deployment plans. AMI enables significant efficiency opportunity (there are many drivers of AMI deployment, enabling energy efficiency opportunities makes AMI incrementally more valuable in addition to other drivers). To help understand the possible added value of CVR that can be implemented with AMI:

   a. Review CVR pilot programs to find one that applies to your situation.*

   b. Evaluate AMI functionality to ensure the ability to implement efficiency opportunity (marginal cost of features that allow CVR, dynamic rates, or load management are likely worth it. AMI deployment is often driven by operational savings, but not all meters have functionality to deliver value beyond that)

11- Conduct a system loss study and track results over time. Even a high-level estimate performed by subtracting retail sales from wholesale purchases can be instructive in terms of identifying potential opportunity and tracking improvements.

12- Update maintenance protocols to incorporate efficiency considerations. If existing plans for repairing/replacing equipment can be updated to include higher efficiency adjustments, incremental conservation can be achieved continually as already-required periodic actions are performed.

13- Remember that traditional demand-side conservation projects (HVAC, lighting, motors, etc.) at sites owned by utilities are eligible for conservation credit.

14- Examine protocols for replacing conductors on failure or end-of-life. Many specialized conductors (low sag for height restrictions or river crossings, for example) can be installed in non-specialized situations to achieve conservation goals and reduce operating costs. Our research indicates that the upfront costs of some low-loss conductors have dropped in recent years relative to standard options (Note: this assessment was made before proposed national raw metals import tariffs were announced, which may make low-loss conductors even more cost-effective relatively).

General Recommendations

15- Utilities may want to explore generation conservation opportunities in the near term as T&D opportunities will become more viable later in the planning horizon (as AMI penetration rates rise and implementation strategies are streamlined). Especially if the largest generation opportunities are targeted sooner, this will spread EUI conservation more evenly over coming years.

16- As new generation facilities or T&D system expansion are planned, consider options for increasing efficiency. Upfront decisions are typically much easier to implement than retrofits after the fact. Carefully work with the Department to verify eligibility of identified opportunity – especially the choice of baseline.

*Appendix A of the final report for this project includes a list of relevant documents utilities may find helpful.