

LARA

MPSC

Michigan Energy Waste Reduction (EWR) Statewide Potential Study (2021 to 2040)

EWR Collaborative Meeting

December 21, 2021



Agenda

- **Study Overview**

- Study Objectives
- Segmentation
- Market Characterization
- Customer Survey
- Scenarios

- **Results**

- Electricity
- Electric Demand
- Natural Gas
- Sensitivities

- **Conclusions**

EWR Study Purpose and Prime Objective

Purpose

Assess technical, economic and achievable potential for reducing electricity and natural gas use, and peak electricity demand in Michigan through EWR measures.

Objective

Quantify technical, economical and achievable potential energy efficiency savings for system planning and GHG reduction.

- Differentiate Upper and Lower Peninsulas
- Sectors: Residential, Commercial, Industrial (C&I)

Segmentation

- One model encompass all segments, electricity and natural gas; calibration at sector and end use level
- Results presented by sector, segment, fuel, geographic location, and end use

Area	Metric
Location	Upper / Lower Peninsula
Fuel	Electric, Natural Gas
Sector	Residential, Commercial, Industrial
Income	Residential: Low Income / Non-Low Income
Characteristics	Multifamily, C&I Small Business

EWR Market Characterization

Data Category	Description
Segmentation	<ul style="list-style-type: none">• Territory (Upper and Lower)• Sector and Segment (Income Level)• End Use
Utility Data	<ul style="list-style-type: none">• Building Stock (# of Homes, 1000 sq. ft. building space, sector consumption)• Sales Forecast• Load Shapes• Avoided Costs• Retail Rates• Discount Rates• Line Losses
Customer Data	<ul style="list-style-type: none">• End Use Allocations (% of segment consumption)• Space Heating and Hot Water Fuel Type Distribution• Willingness to Pay and Technology Awareness
Design Framework	<ul style="list-style-type: none">• Fixed and Variable Program Administrative Costs• Historical Program Achievements• Incentive Strategy

Statewide Approach

1. Utility data request
2. Combine results, weight by utility sales where appropriate to develop state-wide model inputs
3. Fill utility data gaps with estimates based on data reported from comparable MI utilities

Customer Survey Overview

Primary Research Objectives

EWR

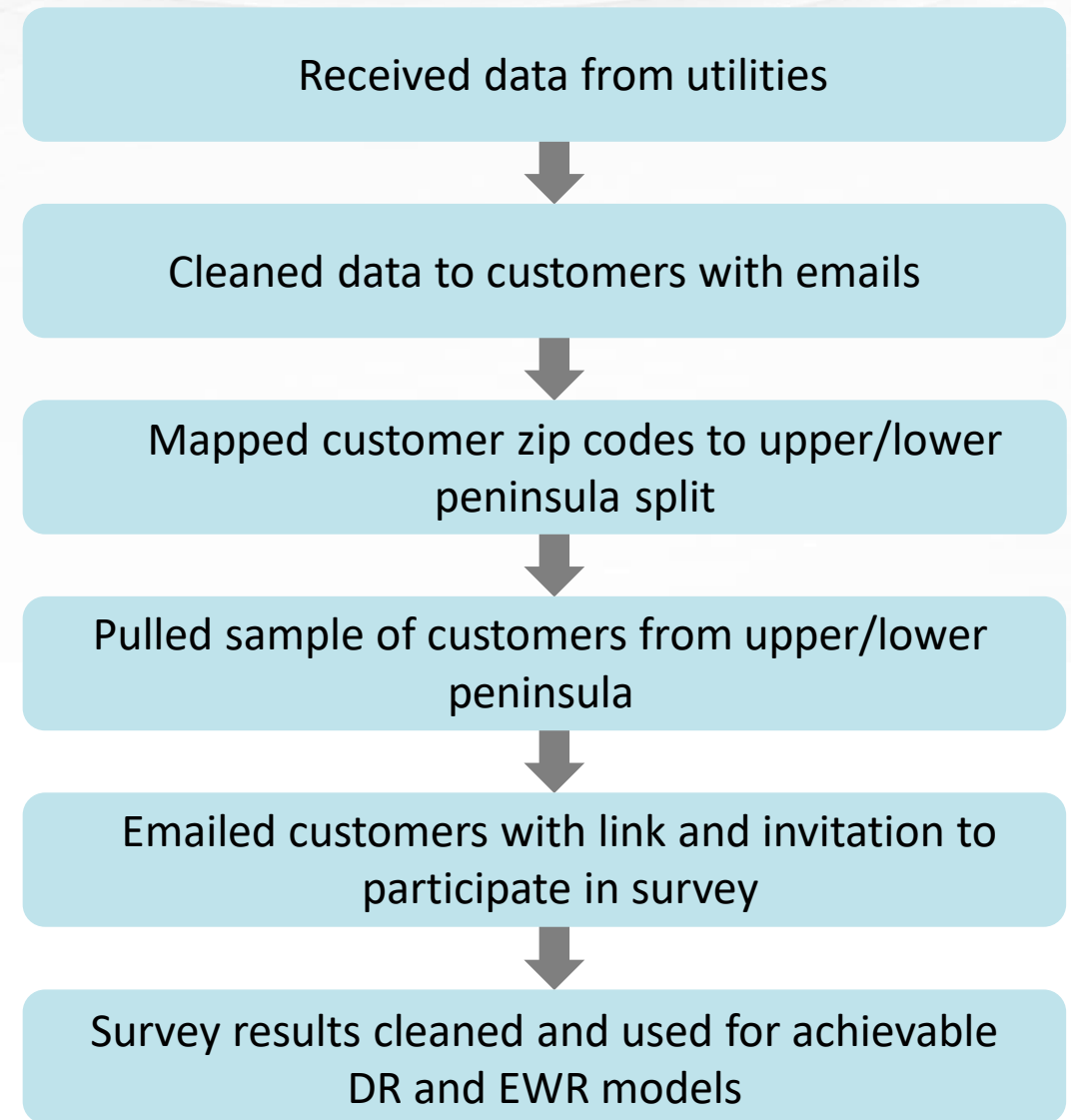
- Assess awareness of EWR measures
- Assess willingness to pay for EWR measures

DR

- Assess awareness of DR program types offered by the customer's utility
- Willingness to participate in DR programs

Secondary Research Objectives

- Effect of COVID-19 to inform modeling
- Customer barriers and recent energy use decisions to inform modeling
- Fill in any critical gaps discovered in existing baseline study results, as doable



Customer Survey Results

	Residential	C&I
Surveys Distributed	15,893	25,753
Target Responses	500	500
Received	591	470*
Percent of Target	118%	94%

** Includes 408 small businesses (self reported <\$65,000/year energy costs) and 62 large businesses.*

Results from EWR willingness to pay questions inform simple payback curves for achievable model.

EWR Potential Study Scenarios

Scenario	Definition
Reference	<p>Estimates of achievable potential calibrated to 2021 total program expectations and refined using relative savings percentages at the end use and high impact measure-level with 2019 actual achievements. Key assumptions include:</p> <ul style="list-style-type: none">• Non-low-income measure incentives of 40% of incremental cost• Low-income measure incentives low-income at 100% of incremental cost• Administrative costs represent 33% of total utility program spending
Aggressive	<p>Increased measure incentives and marketing factors and decreased program administrative costs.</p> <ul style="list-style-type: none">• Analyzed measure incentive levels to determine the 1.0 Utility Cost Test (UCT) ratio tipping point. Developed measure-level incentive estimates based on these results and adjusted where necessary to ensure program-level cost-effectiveness• Increased marketing factors above calibrated values for specific end use and sector combinations
Carbon Price	<p>Acknowledging the regulatory uncertainty around carbon price legislation, provides a high-level fuel cost adder, ramping up through time as the probability of regulatory action increases</p> <ul style="list-style-type: none">• This scenario provides insight into the sensitivity of EWR savings potential to avoided costs• Due to the uncertain nature of carbon pricing legislation, the scenario is not related to specific program or policy recommendations

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Results – Electricity

EWR Technical and Economic Potential Electricity Savings, Reference Scenario (GWh, Net at Meter)

Figure ES-1. Lower Peninsula

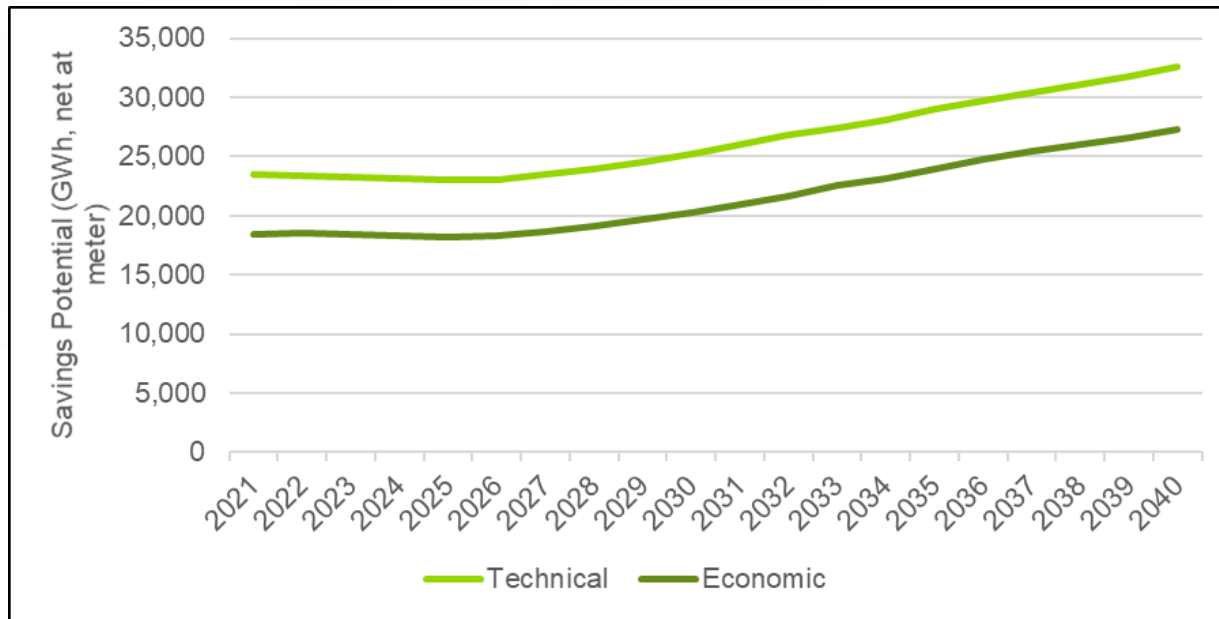
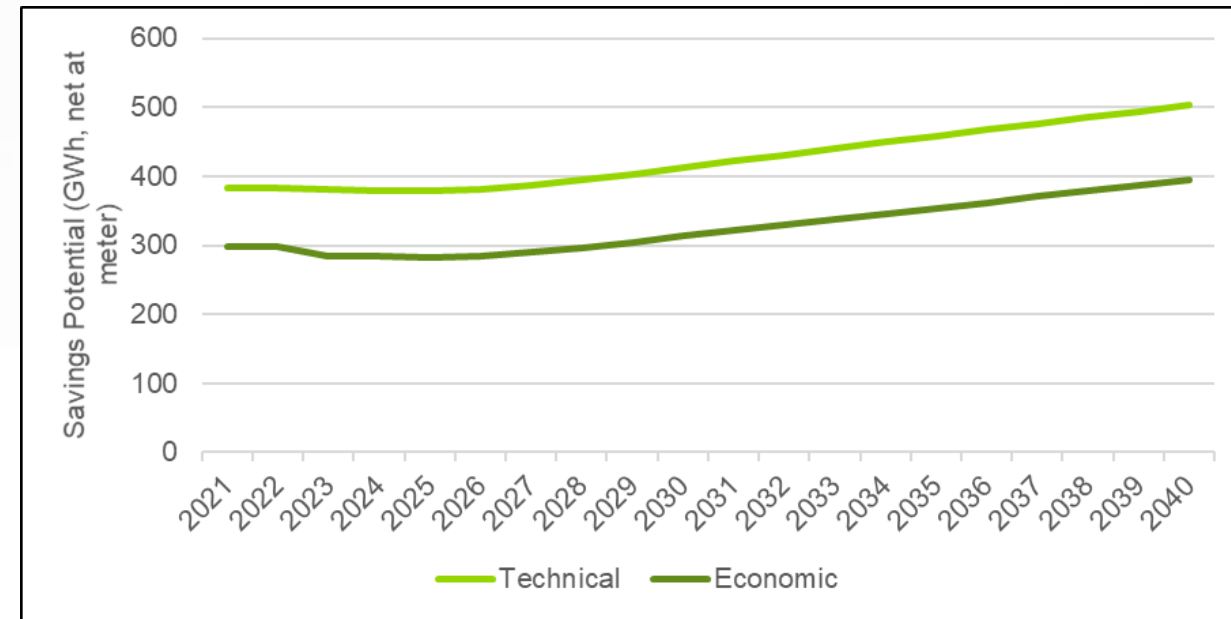


Figure ES-2. Upper Peninsula



EWR Achievable Potential Electricity Cumulative Annual Savings by Scenario (GWh, Net at Meter)

Figure ES-3. Lower Peninsula

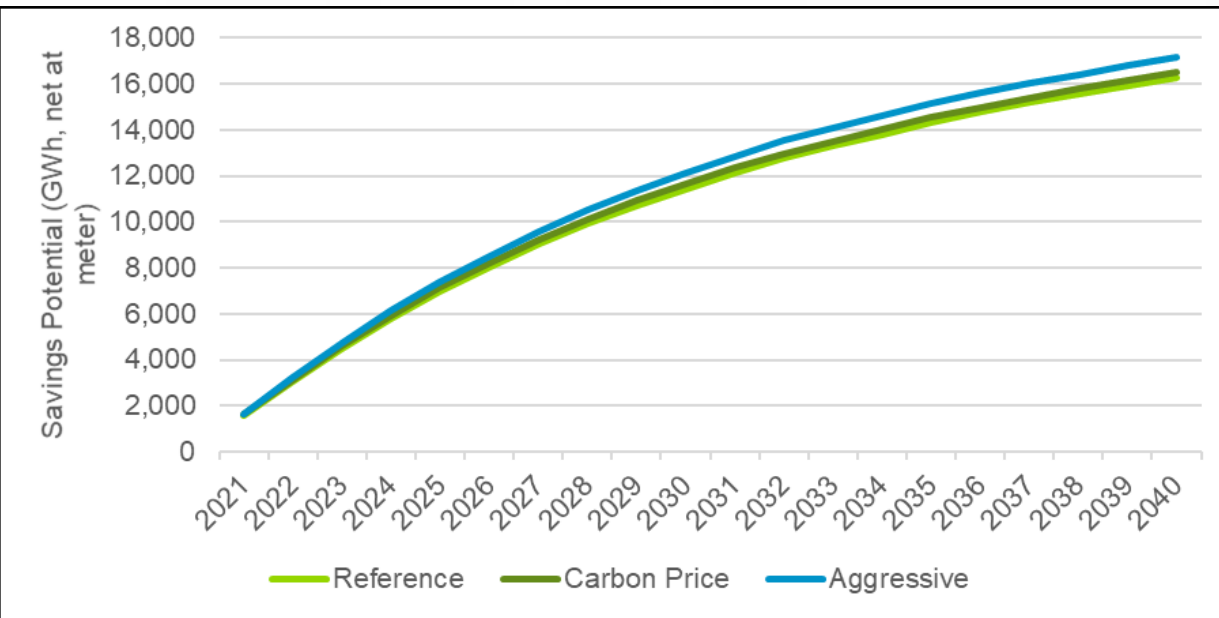
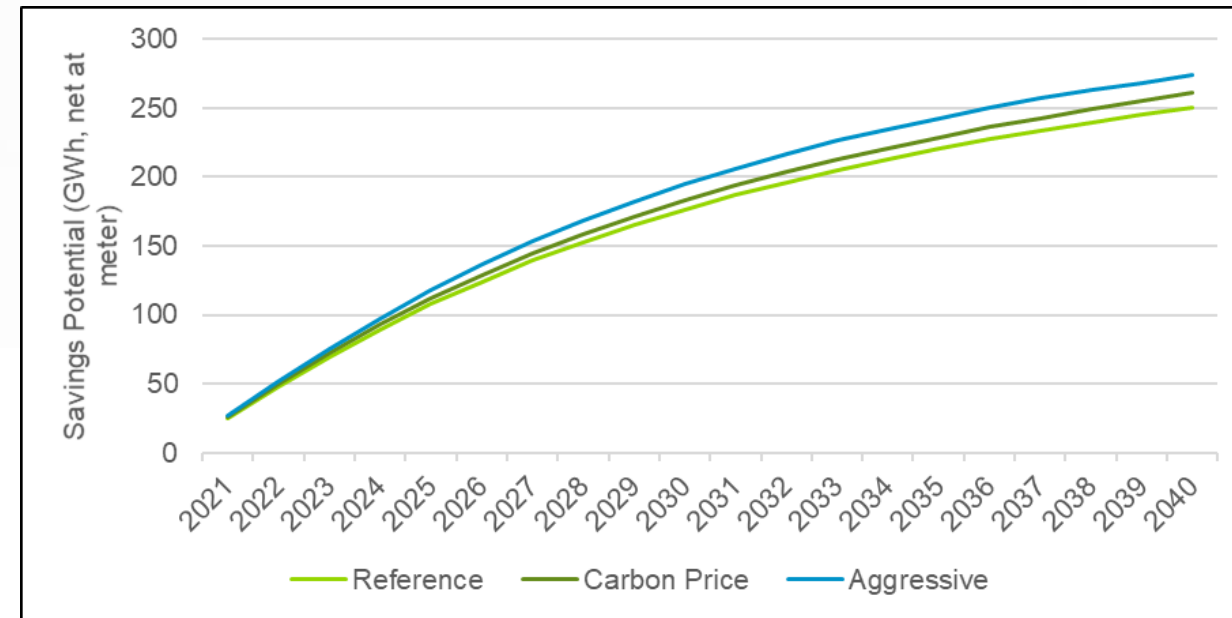


Figure ES-4. Upper Peninsula

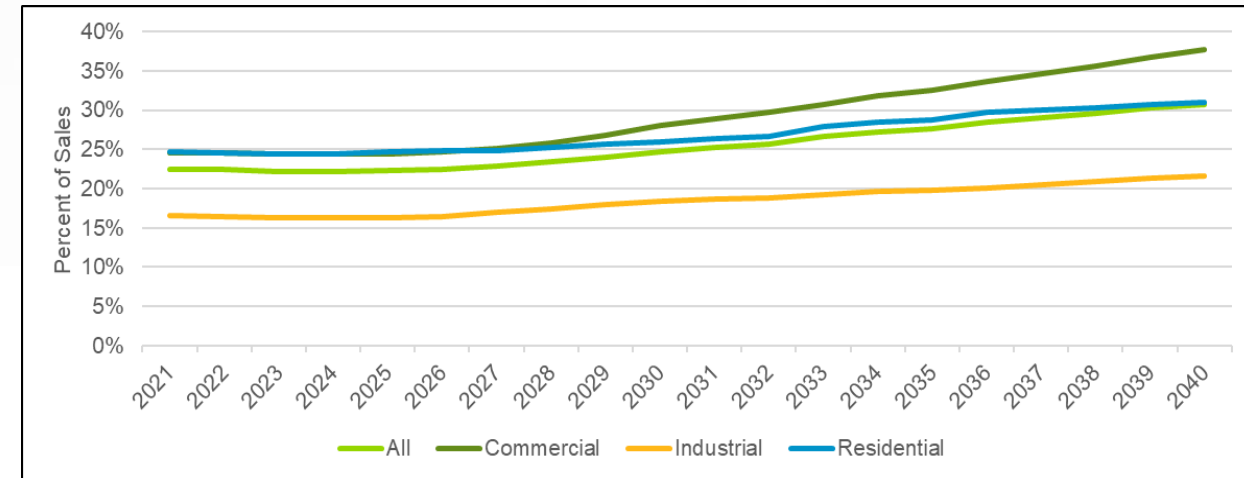
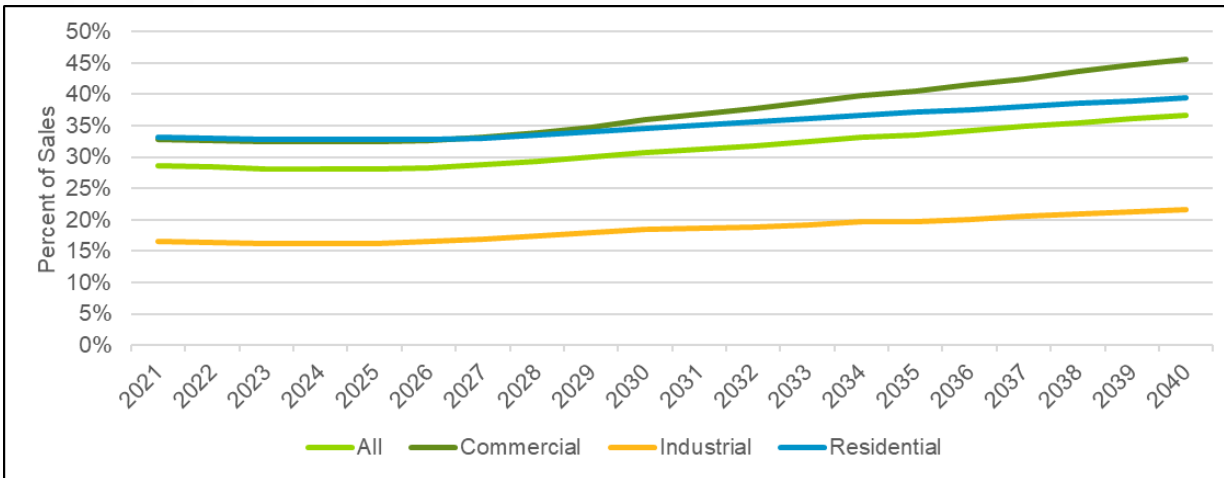


Total Electricity Cumulative Annual Potential as a Percent of Sales by Sector (%)

Appendix D-13 Ref Electricity Percent of Sales

Technical Potential

Economic Potential

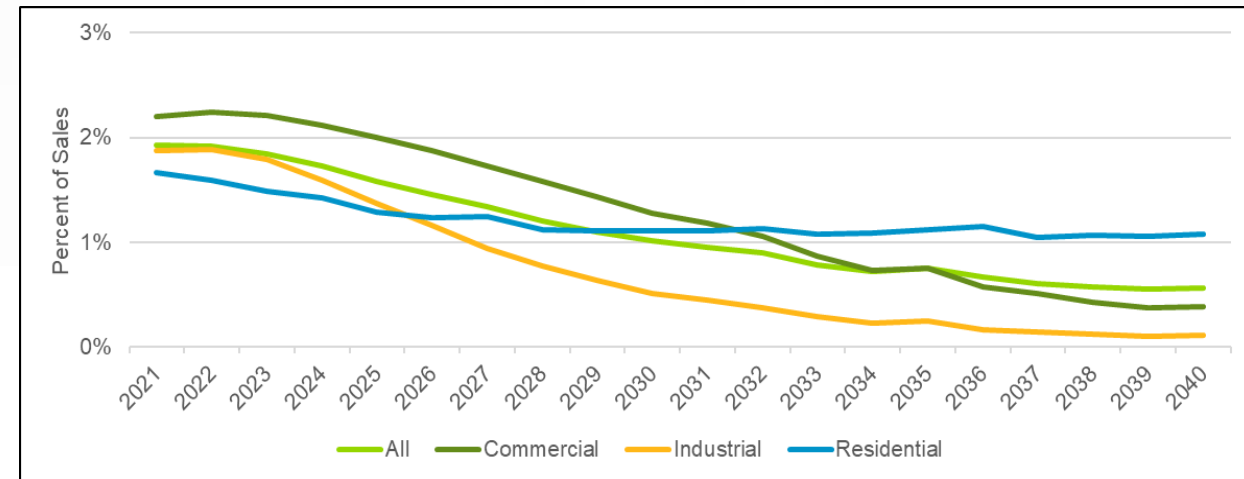
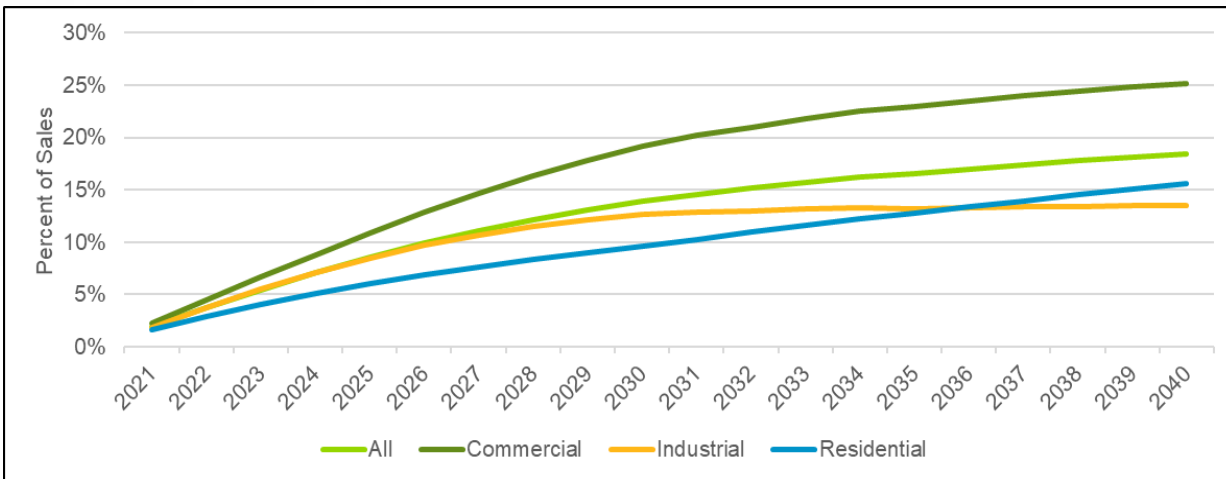


Total Electricity Cumulative Annual Potential as a Percent of Sales by Sector (%)

Appendix D-13 Ref Electricity Percent of Sales

Achievable Potential

Incremental Annual Achievable

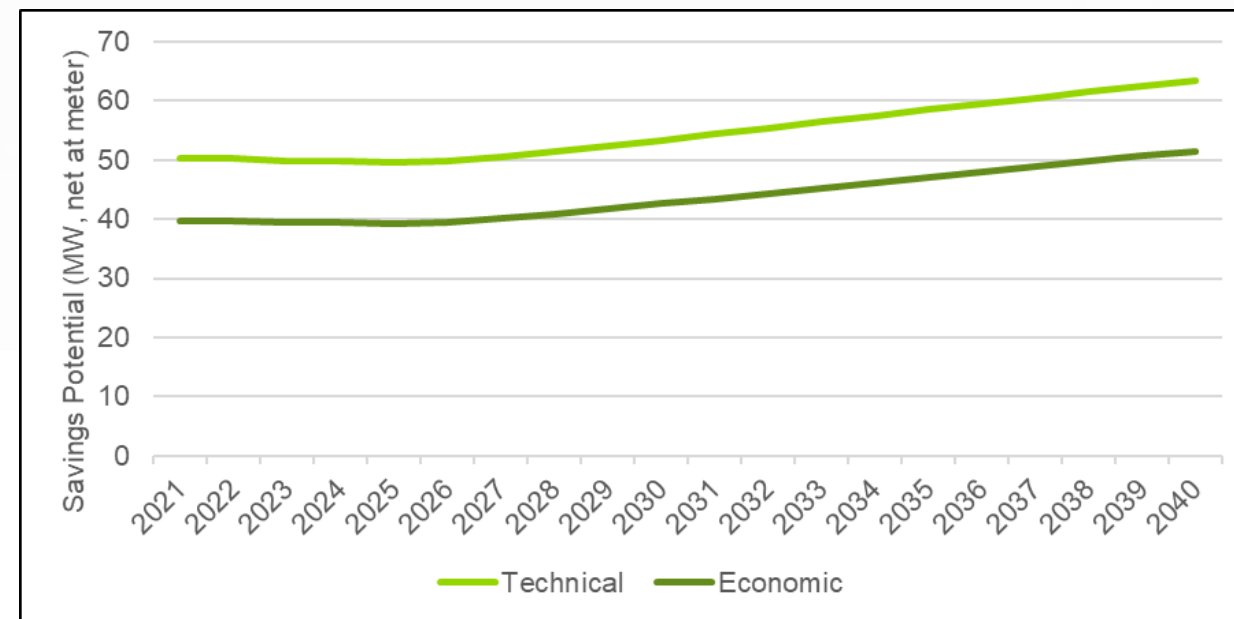
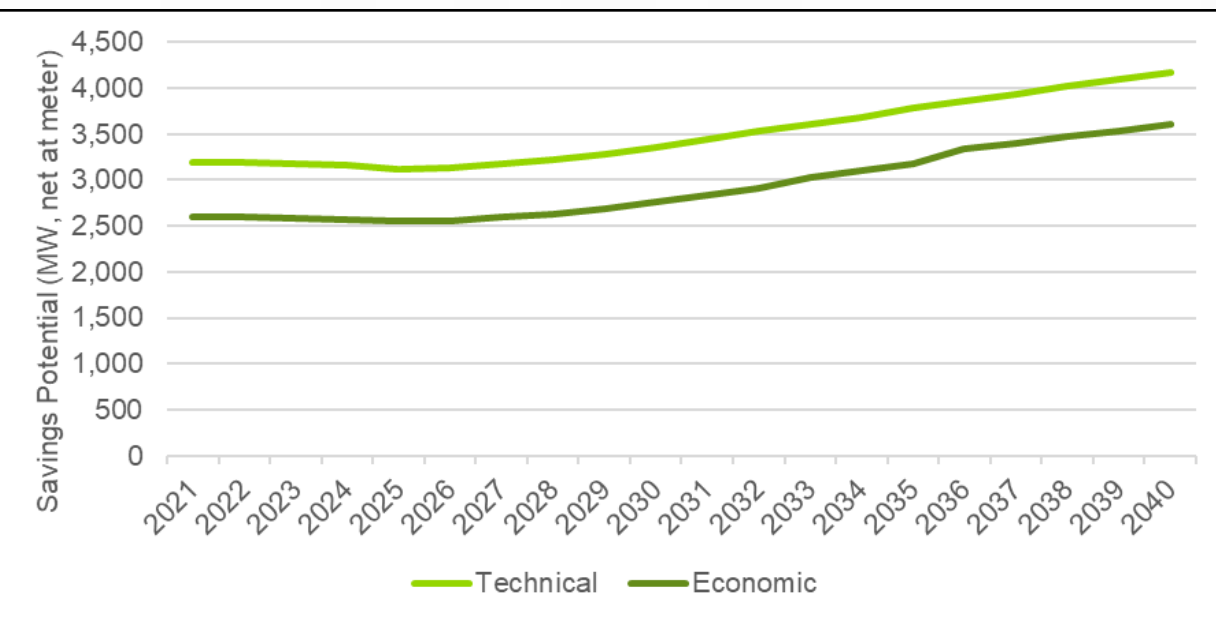


Results – Electric Peak Demand

EWR Technical and Economic Potential Summer Peak Demand Savings, Reference Scenario (MW, Net at Meter)

Figure ES-5. Lower Peninsula

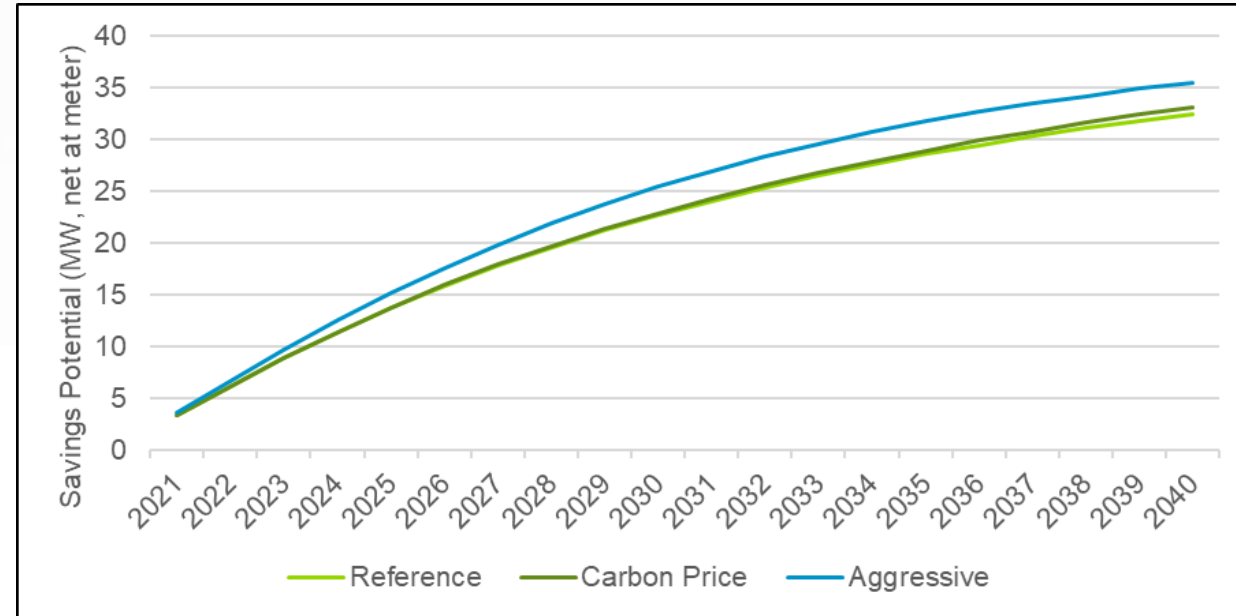
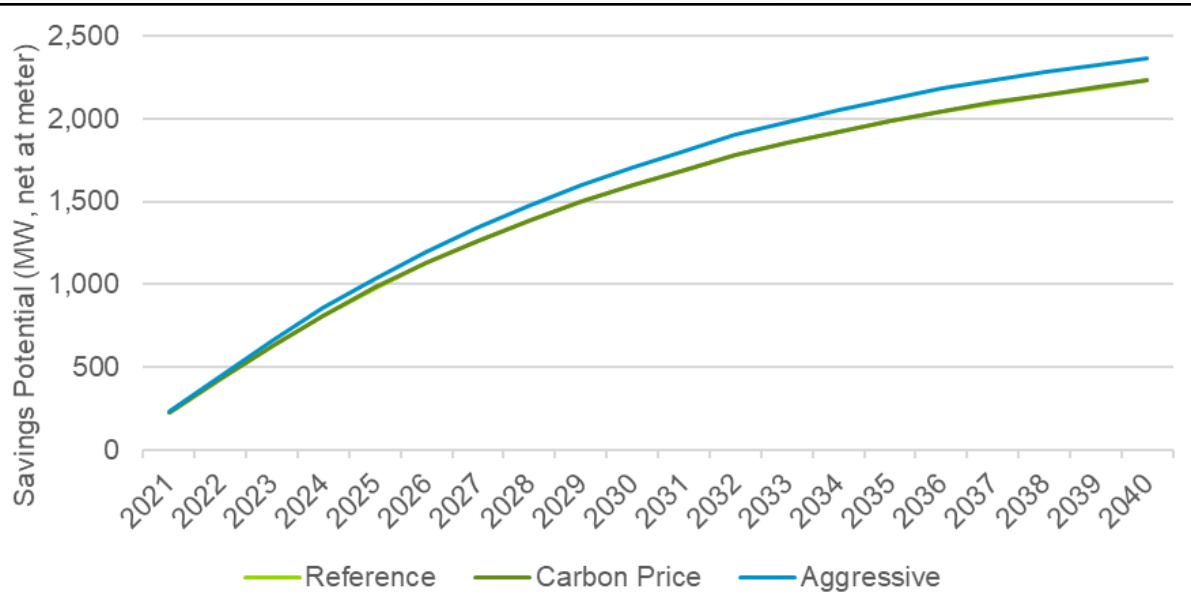
Figure ES-6. Upper Peninsula



EWR Achievable Potential Summer Peak Demand Cumulative Annual Savings by Scenario (MW, Net at Meter)

Figure ES-7. Lower Peninsula

Figure ES-8. Upper Peninsula

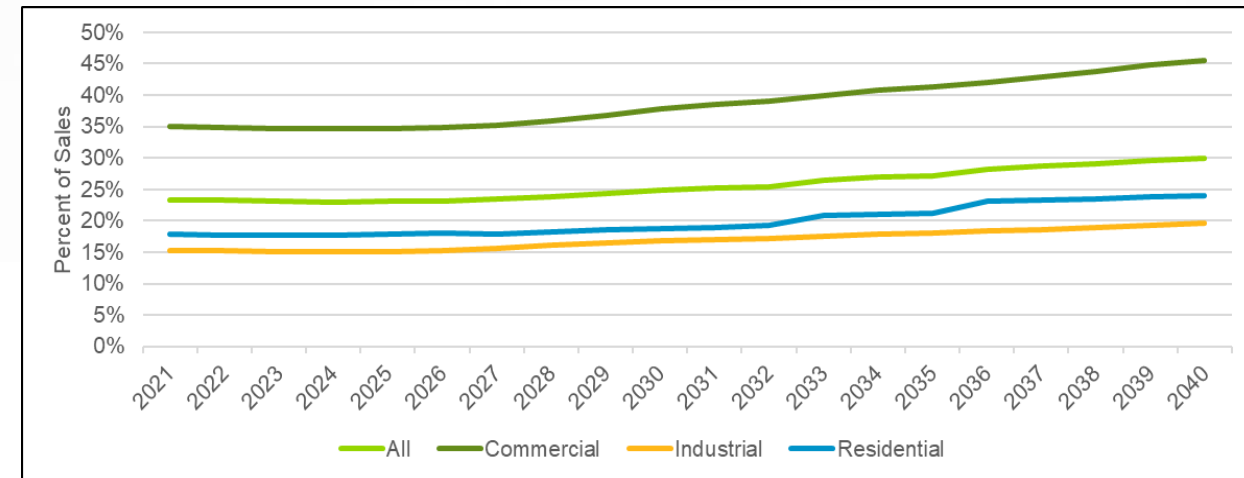
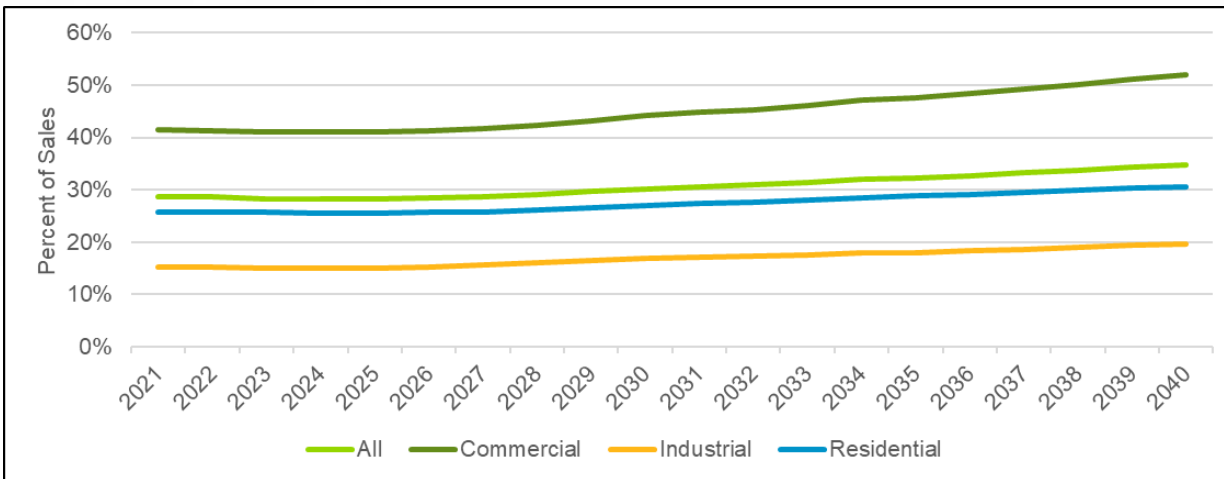


Total Electric Demand Cumulative Annual Potential as a Percent of Sales by Sector (%)

Appendix D-19 Ref ElecDemand Percent of Sales

Technical Potential

Economic Potential

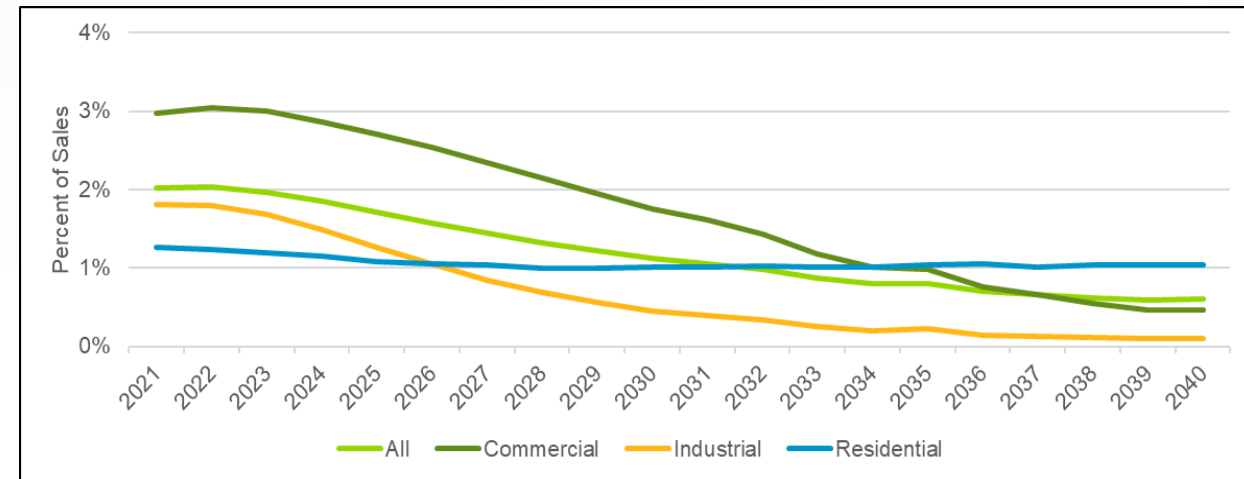
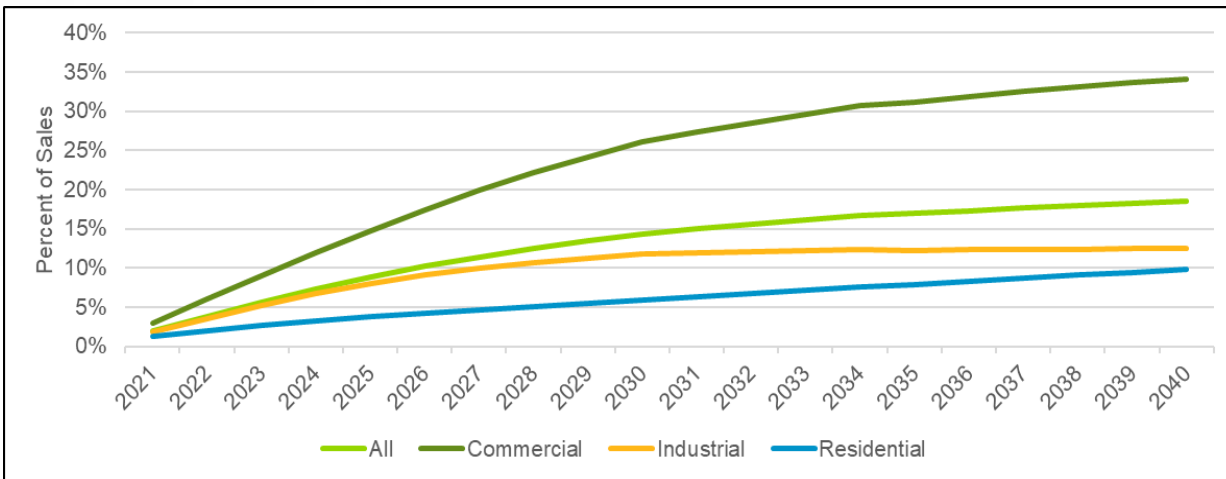


Total Electric Demand Cumulative Annual Potential as a Percent of Sales by Sector (%)

Appendix D-19 Ref ElecDemand Percent of Sales

Achievable Potential

Incremental Annual Achievable



Results – Natural Gas

EWR Technical and Economic Potential Summer Peak Natural Gas Savings, Reference Scenario (Therms, Net at Meter)

Figure ES-9. Lower Peninsula

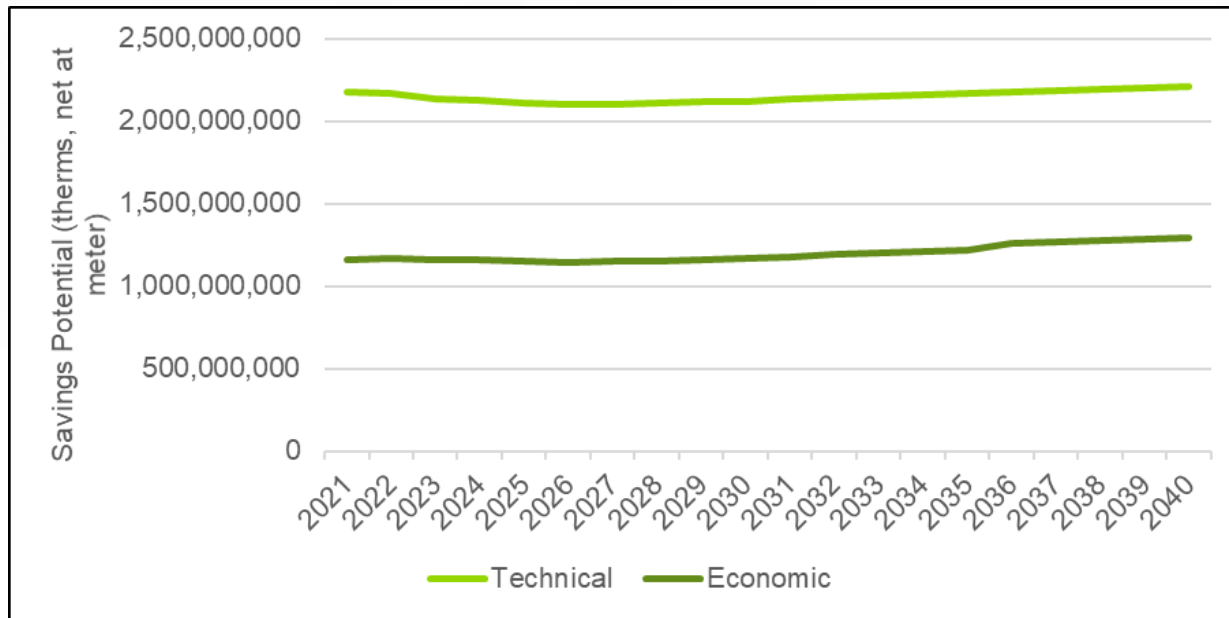
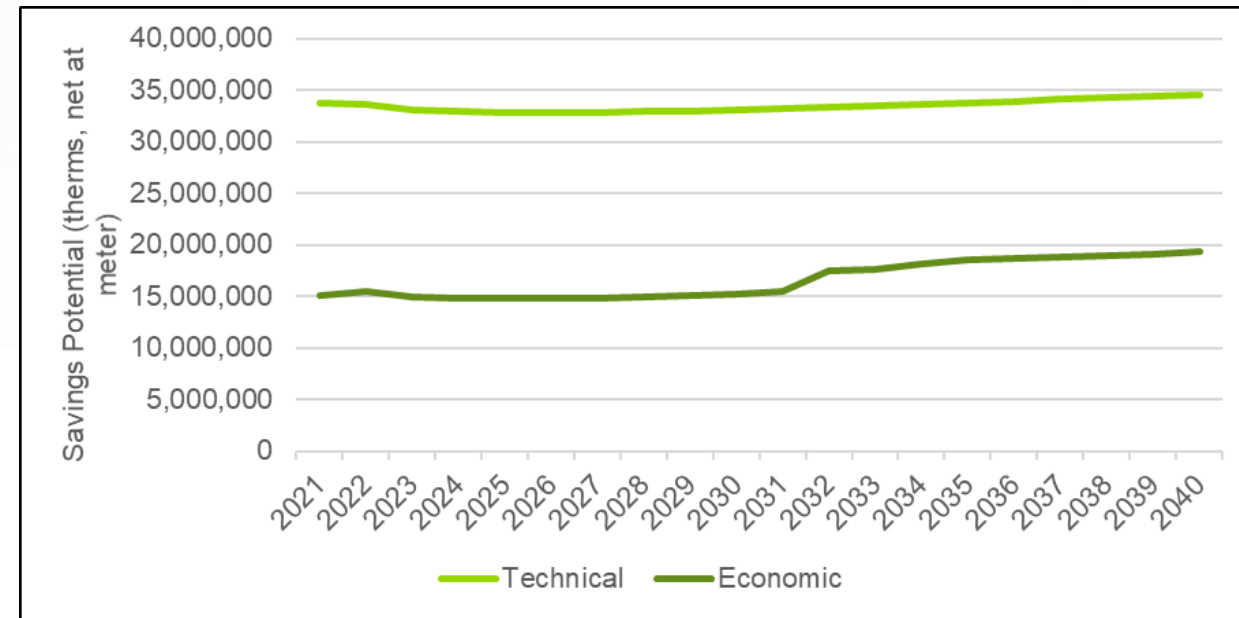


Figure ES-10. Upper Peninsula



EWR Achievable Potential Natural Gas Cumulative Annual Savings by Scenario (therms, Net at Meter)

Figure ES-11. Lower Peninsula

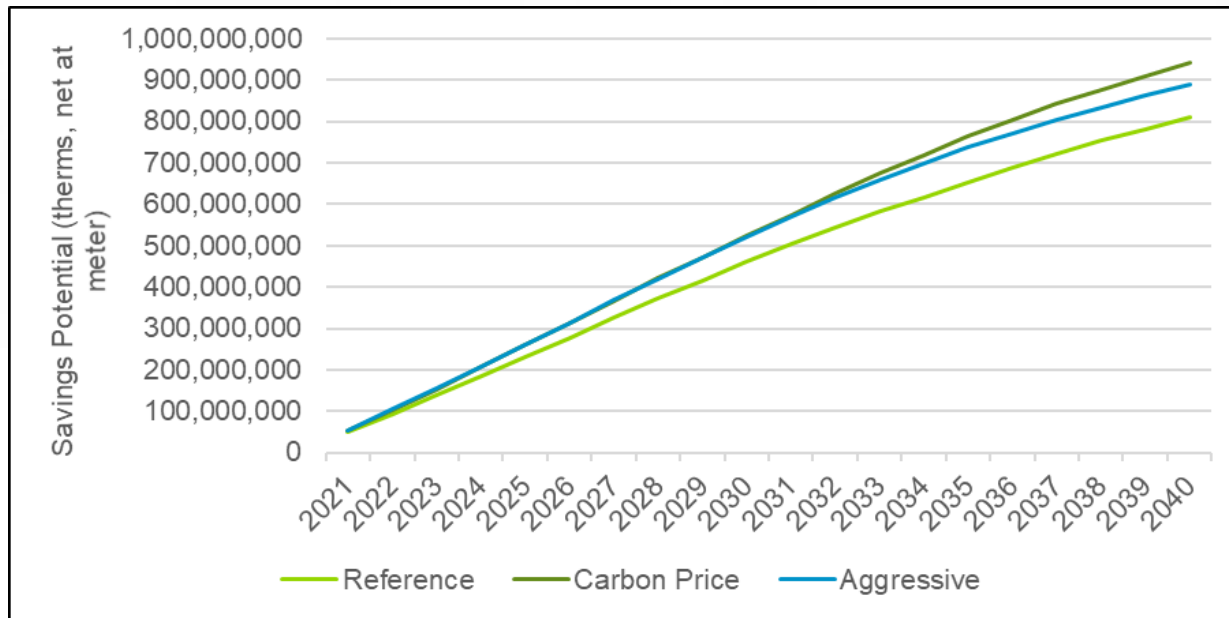
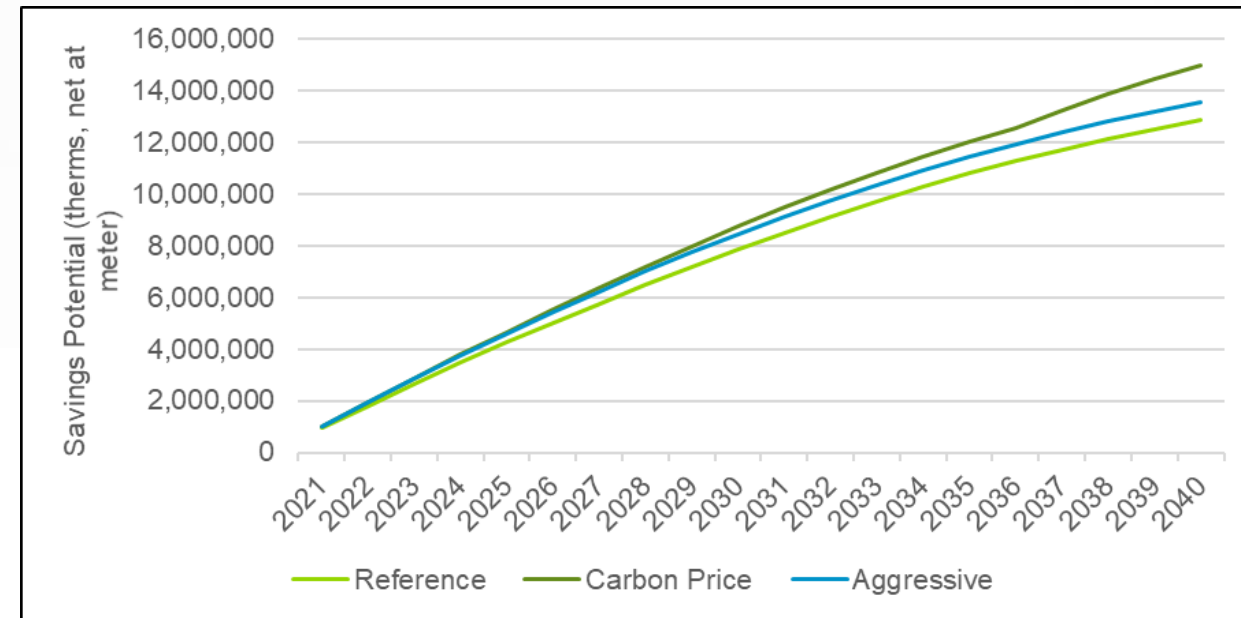


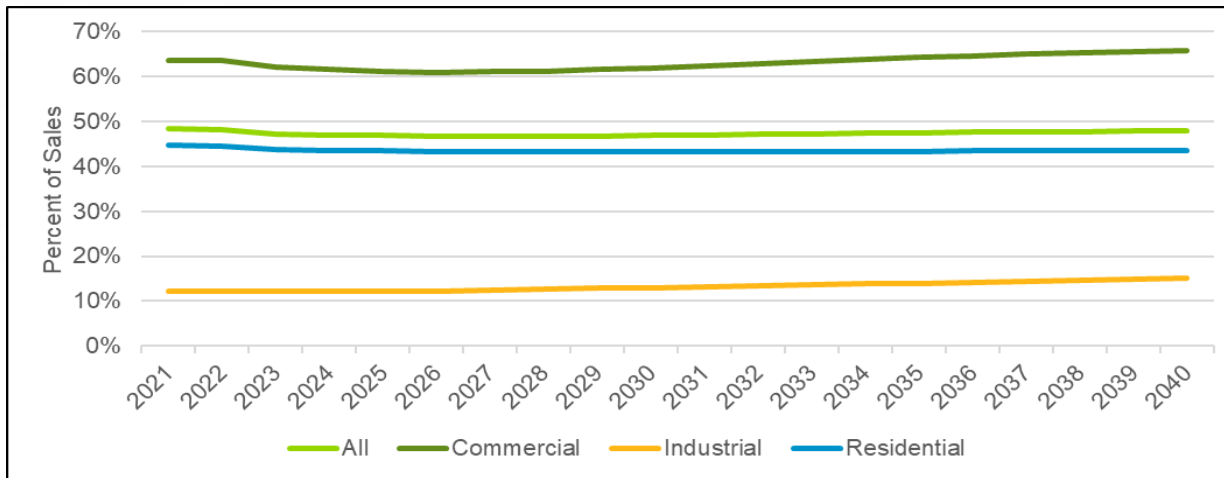
Figure ES-12. Upper Peninsula



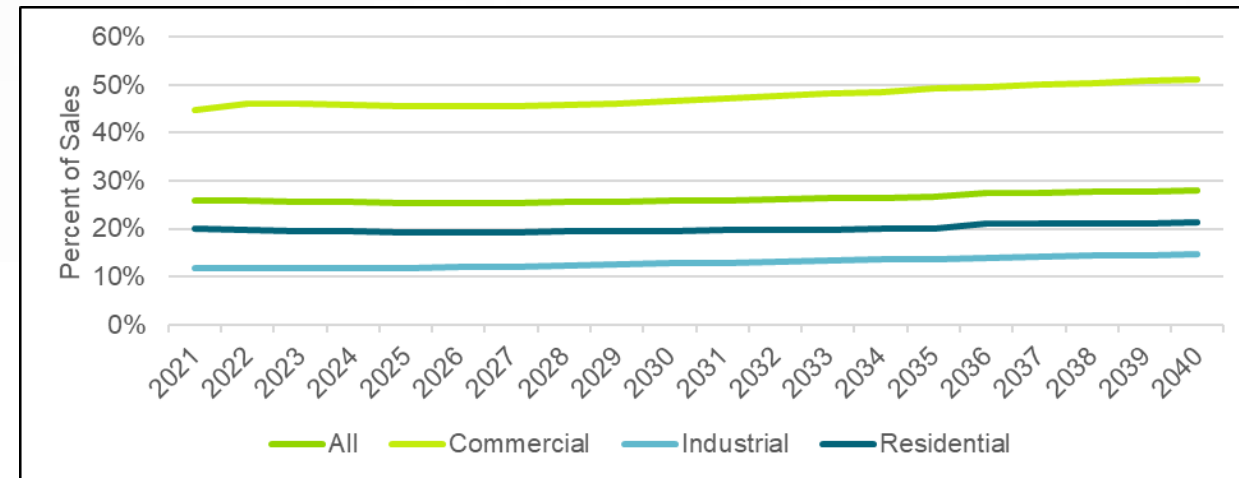
Total Natural Gas Cumulative Annual Potential as a Percent of Sales by Sector (%)

Appendix D-25 Ref Natural Gas Percent of Sales

Technical Potential



Economic Potential

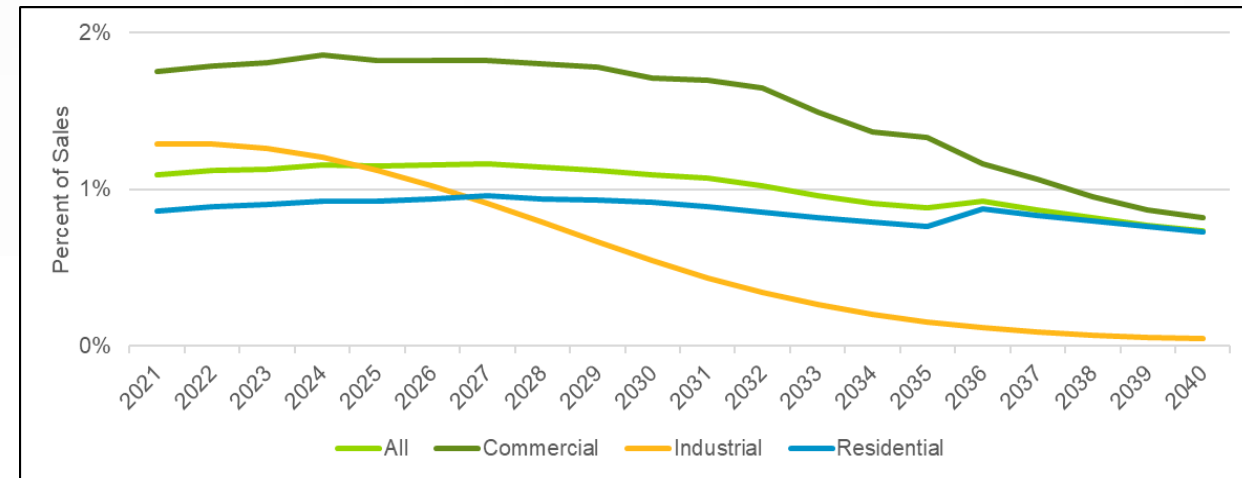
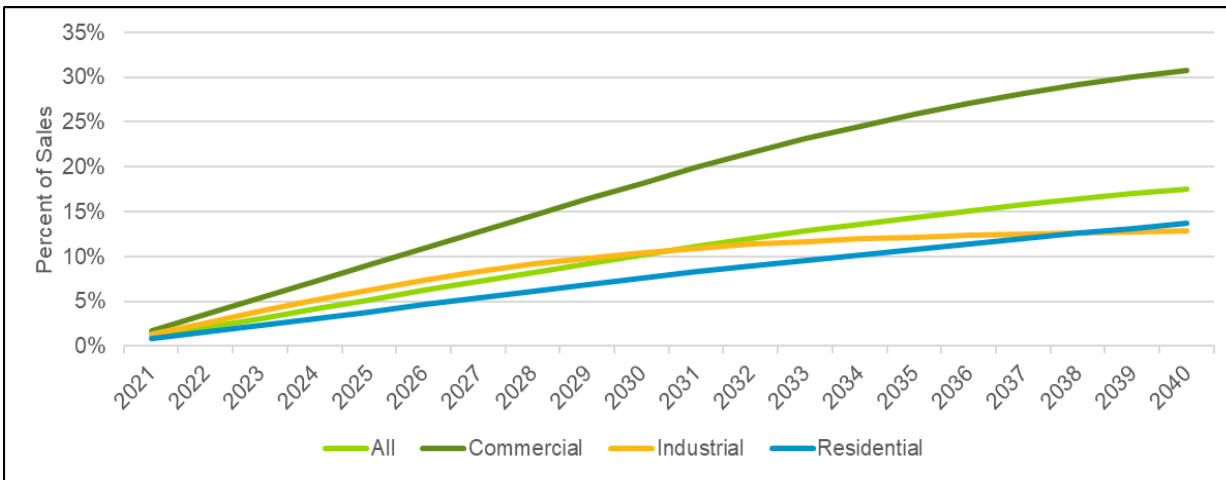


Total Natural Gas Cumulative Annual Potential as a Percent of Sales by Sector (%)

Appendix D-25 Ref Natural Gas Percent of Sales

Achievable Potential

Incremental Annual Achievable

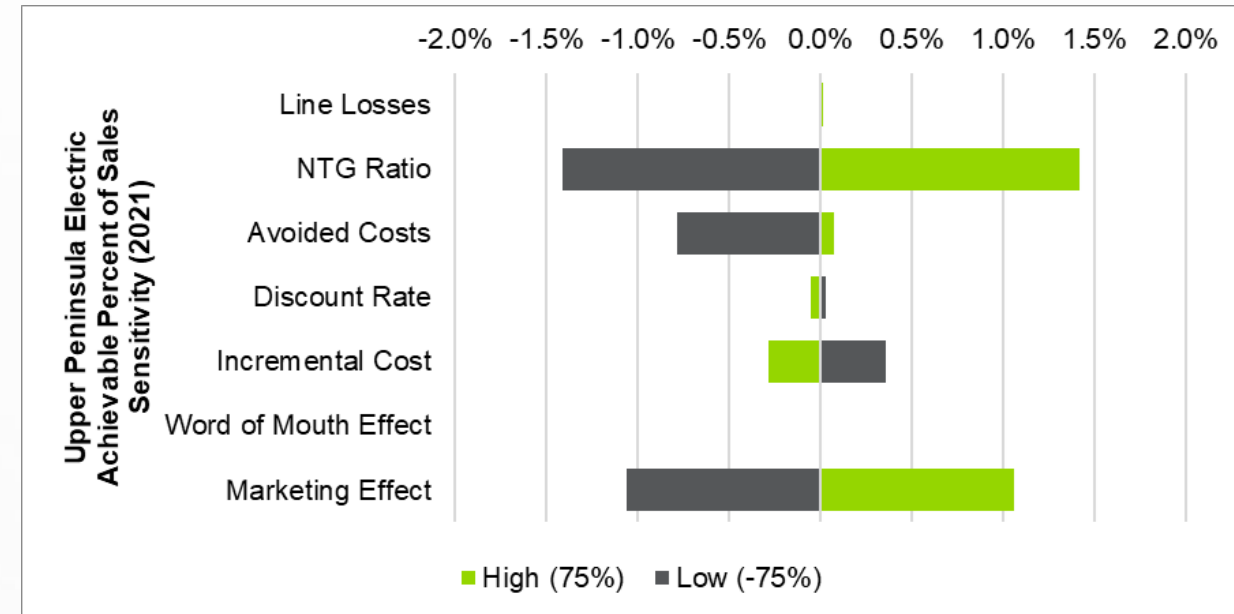
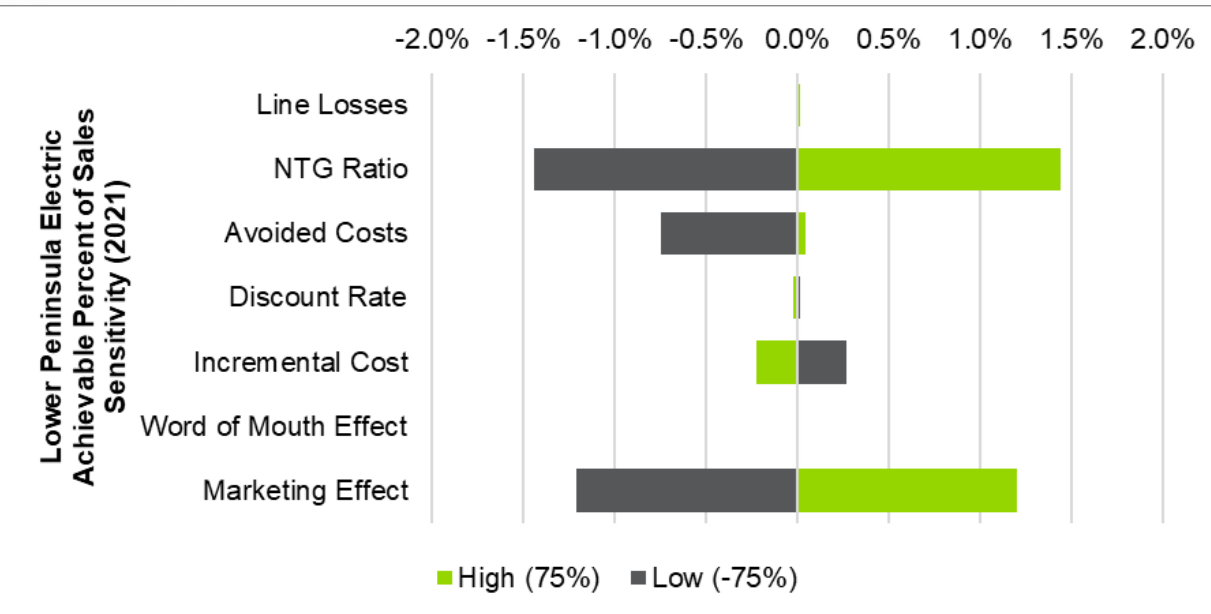


Results – Sensitivities

Electricity Achievable Percent of Sales Sensitivity, Reference Scenario (2021)

Figure 9-25. Lower Peninsula

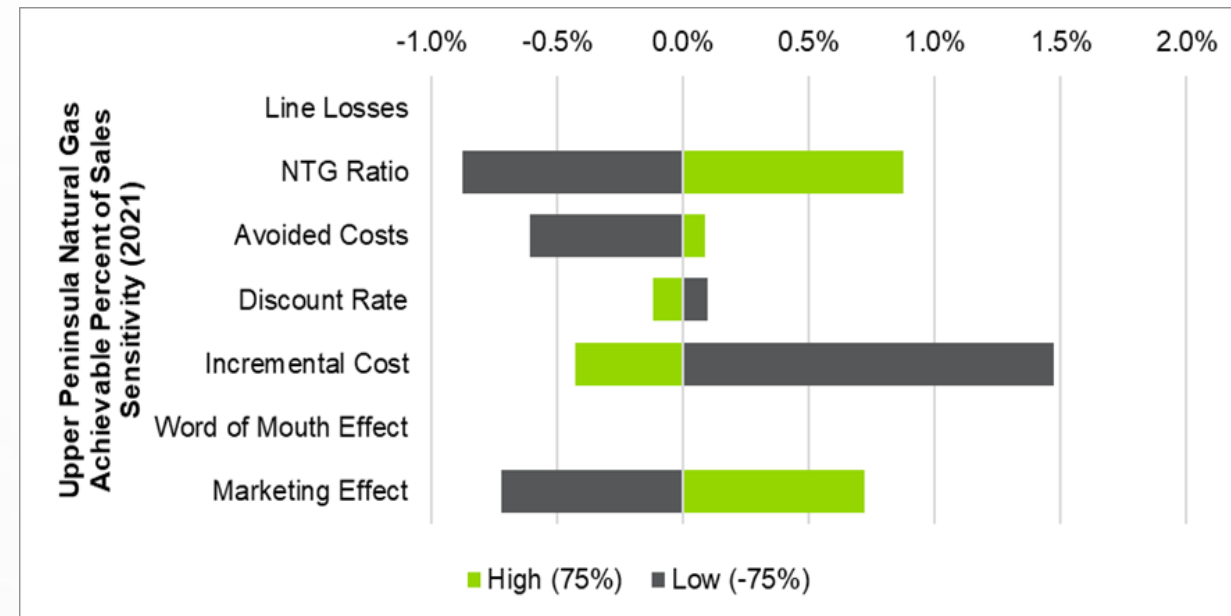
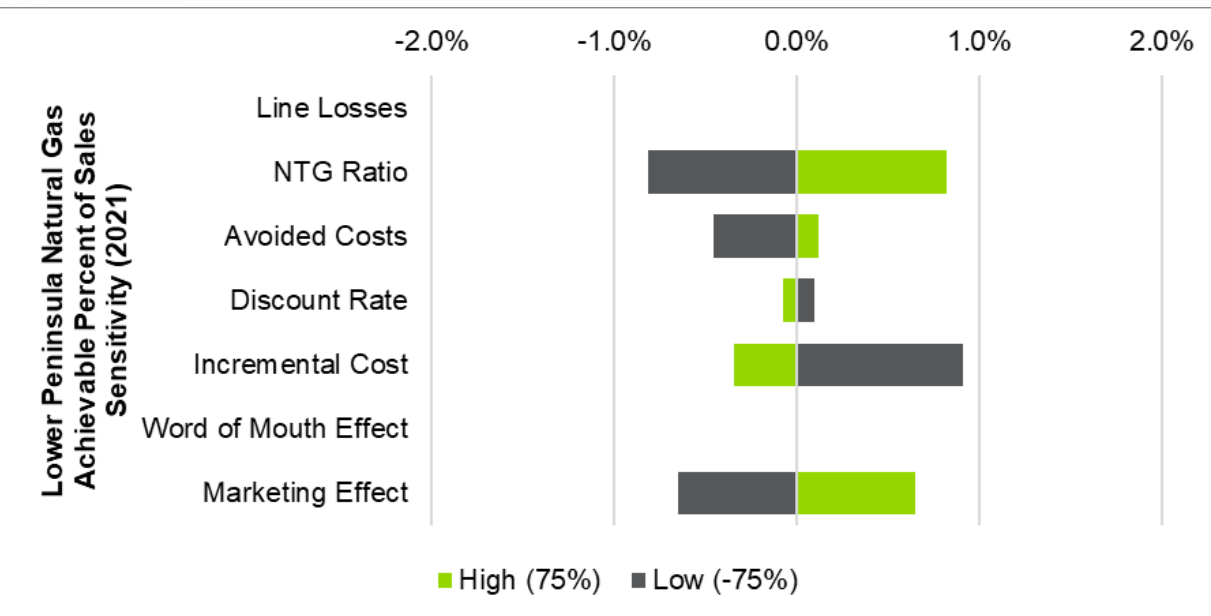
Figure 9-26. Upper Peninsula



Natural Gas Achievable Percent of Sales Sensitivity, Reference Scenario (2021)

Figure 9-27. Lower Peninsula

Figure 9-28. Upper Peninsula



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Conclusions (1/2)

- Near-term electricity and summer peak demand savings.
 - Top five electricity measures—consist of commercial and industrial custom and lighting, residential LED bulbs, and residential home energy reports
- Near-term natural gas savings.
 - Top five measures for each peninsula comprise nearly 60% of the natural gas savings. Upper Peninsula's top five measures— residential furnaces, commercial custom, residential boilers, home energy reports, and residential showerheads
- Long-term electricity and summer peak demand savings trends.
 - Incremental annual electricity potential decreases year-over-year over the 20-year study period, as some end uses, such as lighting in all sectors, begin to saturate.
- Long-term natural gas savings.
 - Natural gas savings are much steadier over the study period than electricity savings.

Conclusions (2/2)

- Cost test results.
 - All sectors achieve a UCT ratio of above 1.0 at the start of the study. However, as time progresses, the residential sector UCT drops below 1.0 for both electricity and natural gas residential program bundles.
- Scenario savings comparison.
 - There are modest differences in cumulative annual achievable potential in 2040 across the three scenarios.

Questions?



Potential Study Report Location

Michigan Public Service Commission Website

https://www.michigan.gov/mpsc/0,9535,7-395-93308_94792-552726--,00.html

REPORTS

ENERGY WASTE REDUCTION - DRAFT

- MI EWR Statewide Potential Study Final Draft Report
- Appendix A - Residential Customer Survey
- Appendix B - Commercial and Industrial Customer Survey
- Appendix C - EWR Modeling Methodology
- Appendix D - EWR Modeling Results

ENERGY WASTE REDUCTION - FINAL

- MI EWR Statewide Potential Study Report - Final
- MI EWR Statewide Potential Study Report - Redline
- MI EWR Statewide Potential Study Report Appendix A - Residential Customer Survey
- MI EWR Statewide Potential Study Report Appendix B - Commercial and Industrial Customer Survey
- MI EWR Statewide Potential Study Report Appendix C - EWR Modeling Methodology
- MI EWR Statewide Potential Study Report Appendix D - EWR Modeling Results (Excel File)
- Response to Stakeholder Feedback re: EWR Statewide Potential Study Draft Report
- MI EWR Final Global Data Summary (Excel File)

DEMAND RESPONSE - DRAFT

- MI DR Statewide Potential Study Final Draft Report
- Appendix A - Residential Customer Survey
- Appendix B - Commercial and Industrial Customer Survey
- Appendix D - Demand Response Reduction Results

DEMAND RESPONSE - FINAL

- MI DR Statewide Potential Study Report - Final
- MI DR Statewide Potential Study Report - Redline
- MI DR Statewide Potential Study Report Appendix A - Residential Customer Survey
- MI DR Statewide Potential Study Report Appendix B - Commercial and Industrial Customer Survey
- MI DR Statewide Potential Study Report Appendix D - Demand Response Reduction Results (Excel File)
- Response to Stakeholder Feedback re: DR Statewide Potential Study Draft Report
- MI DR Final Global Data Summary (Excel File)

Your Guides

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Follow Up Questions

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