



Welcome

Minnesota Energy Efficiency Potential Study: 2020–2029

January 29, 2019

Long history of “CIP” (Conservation Improvement Programs)

1980:

PUC directed to initiate a pilot to demonstrate the “feasibility” of investments in EE.

1983:

Utilities with revenues greater than \$50 million were required to operate at least 1 conservation program. Required “significant” investment.

1989:

All Public utilities were required to operate conservation improvement programs. Oversight transferred from PUC, low-income requirements added.

1991:

A specific level of spending was required (1.5% electric, 0.5% gas) & munis and coops were included.

2007:

Next Generation Energy Act Passes.

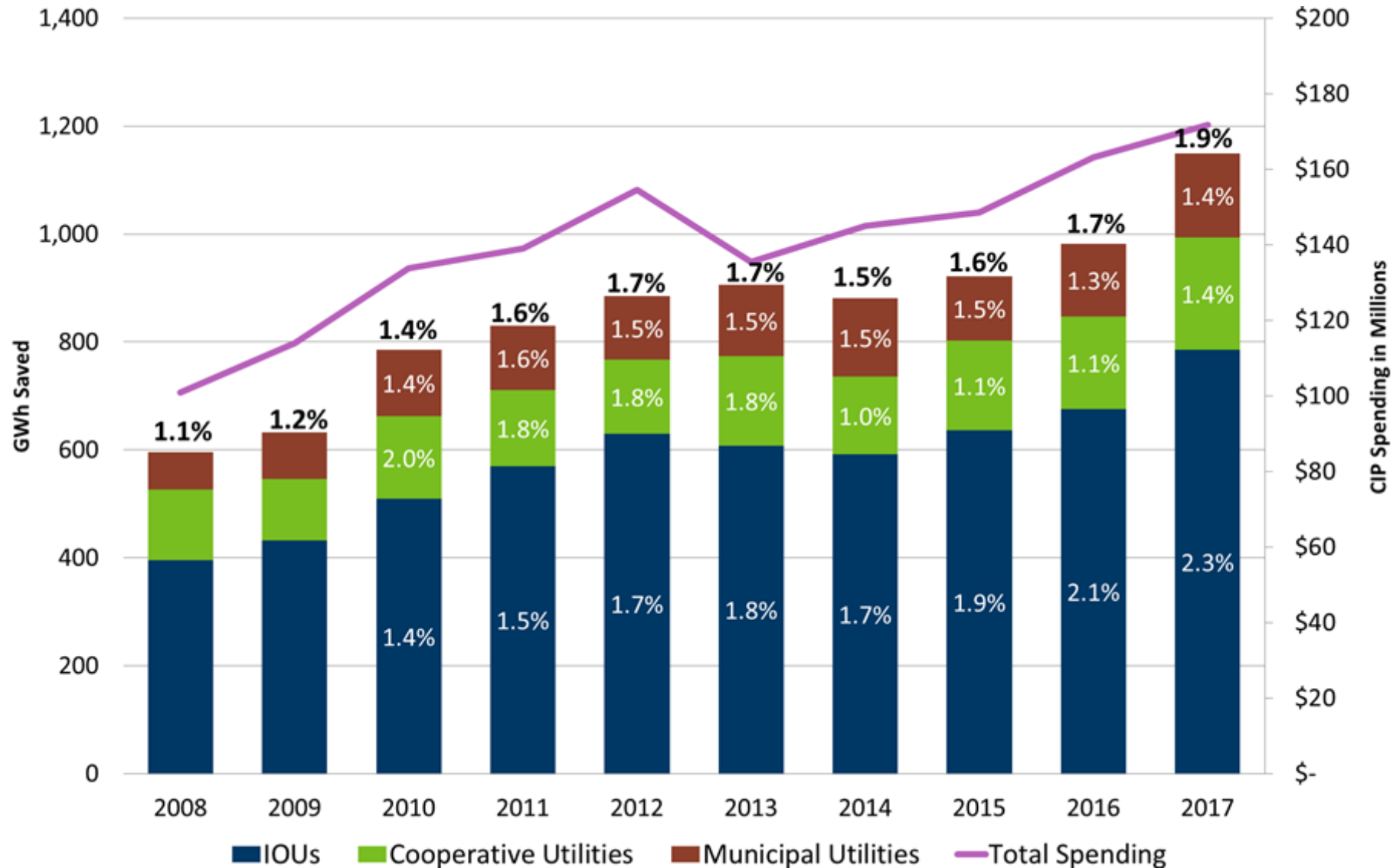
2010:

1.5% Savings Goal for Utilities takes Effect

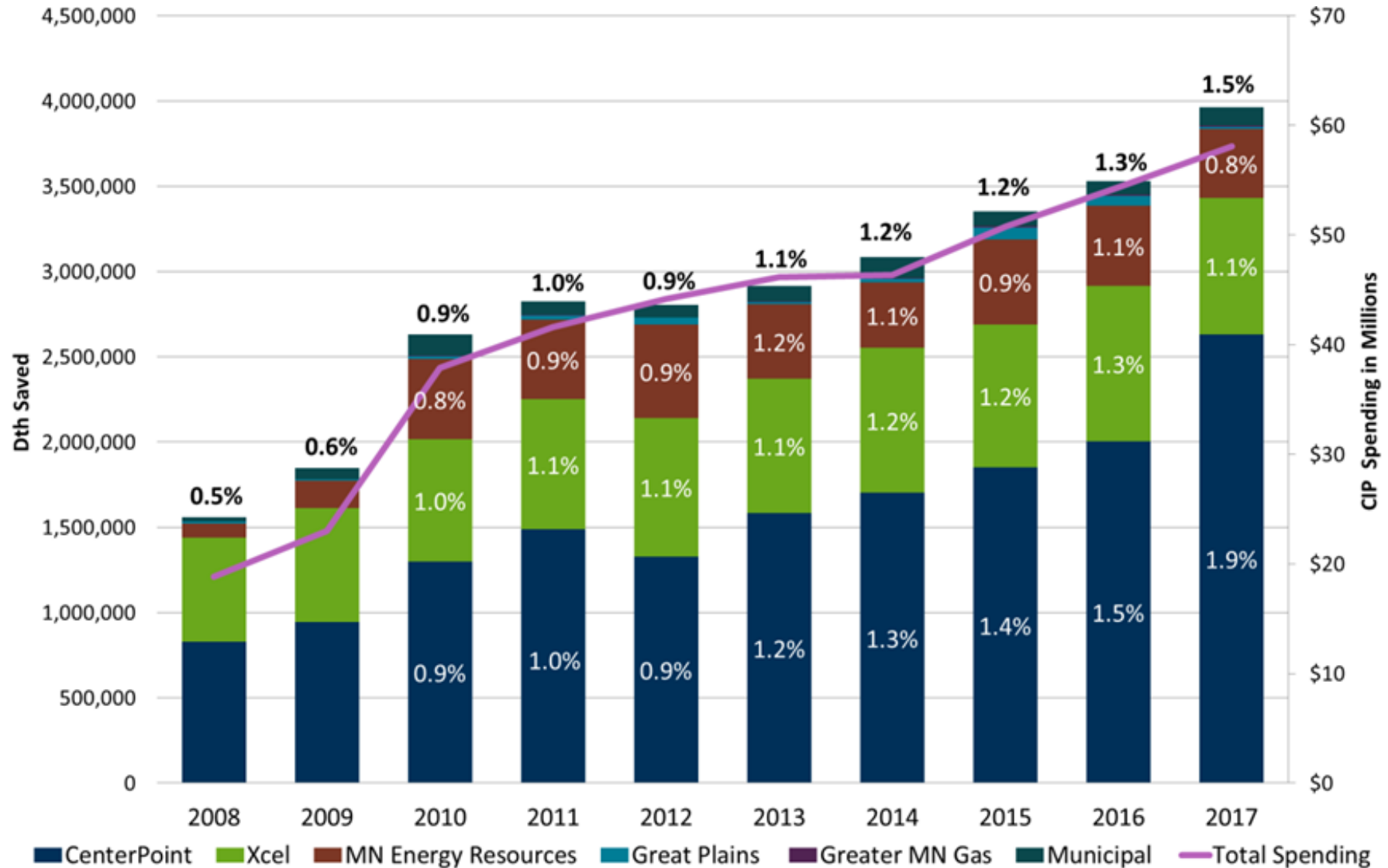
2017:

Munis and Coops meeting a specific threshold exempted from CIP.

MN EE Achievements - Electric



MN EE Achievements – Natural Gas



Goals of Study

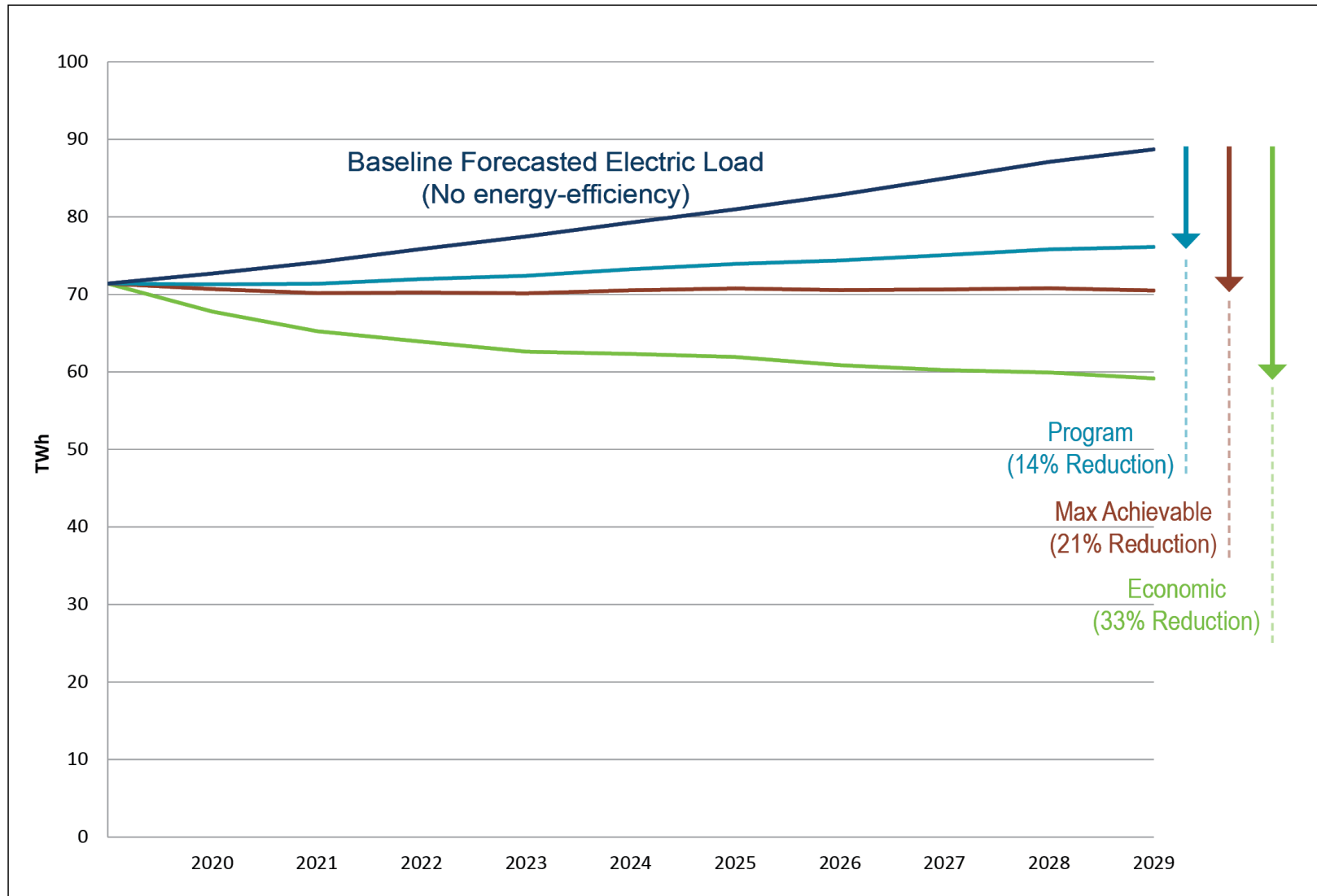
- Estimate statewide electric and natural gas energy efficiency for 2020-2029
- Produce actionable resources
- Engage stakeholders

Types of Energy Efficiency Potential

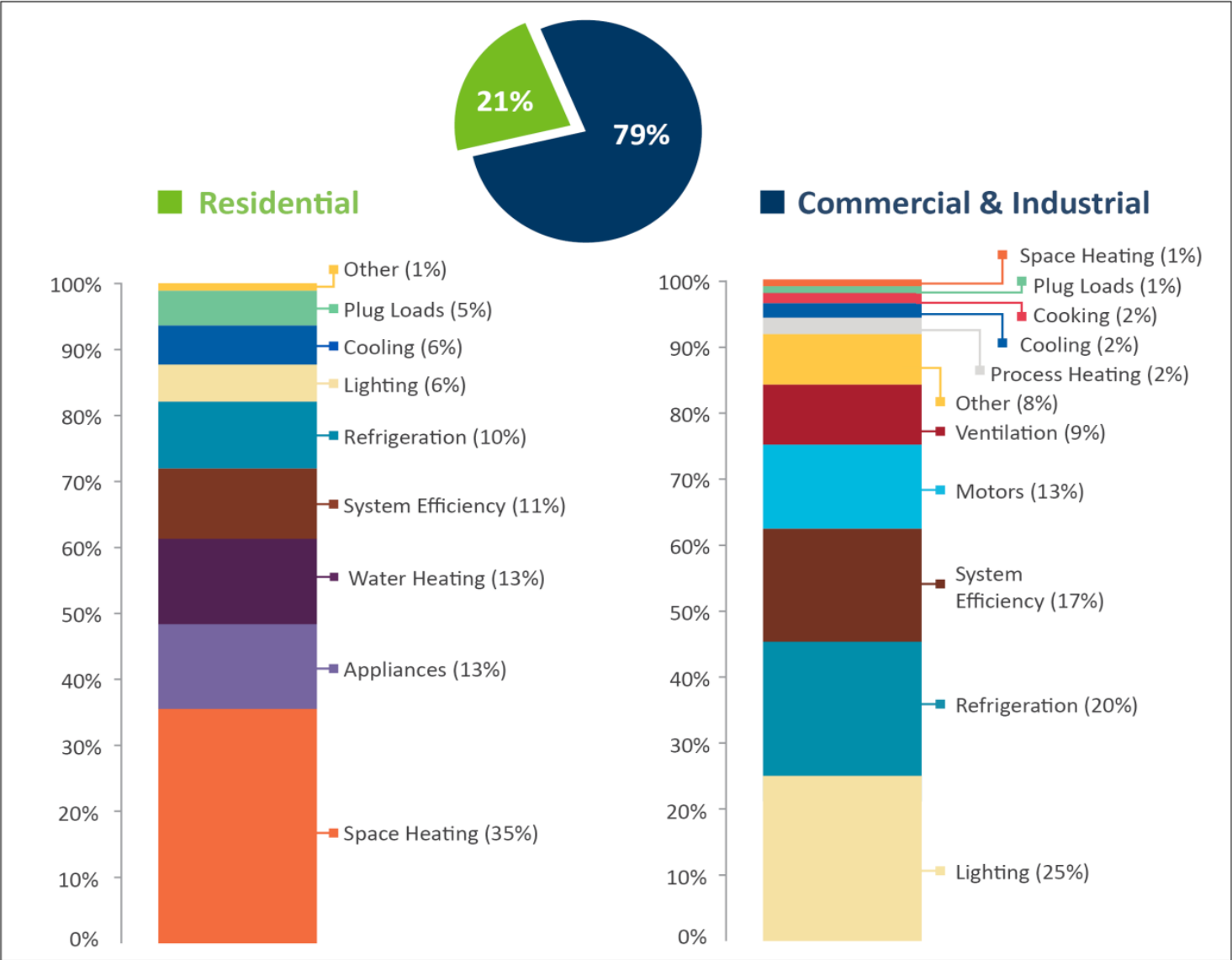


- **Maximum Achievable:** Subset that is achievable considering market barriers, given the aggressive incentives and idealized programs
 - Rebates set at 100%
 - Technology adoption at theoretical maximum
- **Program Potential:** Subset of achievable, given constrained incentives (50%) and program budgets

Results – Electric Utilities



Results – Electric Potential by End Use



Cumulative annual 2029 savings

Program potential scenario

Results – Electric Top Five Residential Measures

Cold climate ductless mini-split air source heat pump



Tier 1-3 thermostat



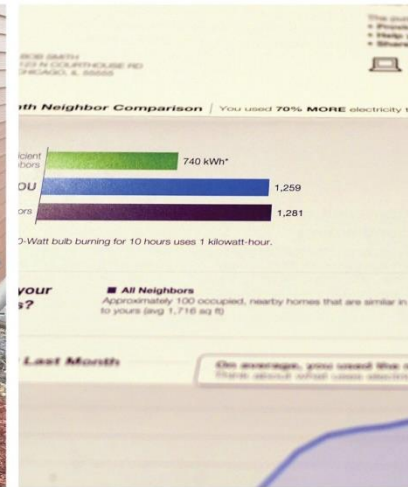
ES clothes washer



Cold climate central air-source heat pump



Home energy reports



Cumulative annual 2029 energy (MWh) savings

356,000

258,000

240,000

230,000

227,000

Percent of total residential energy savings potential

13%

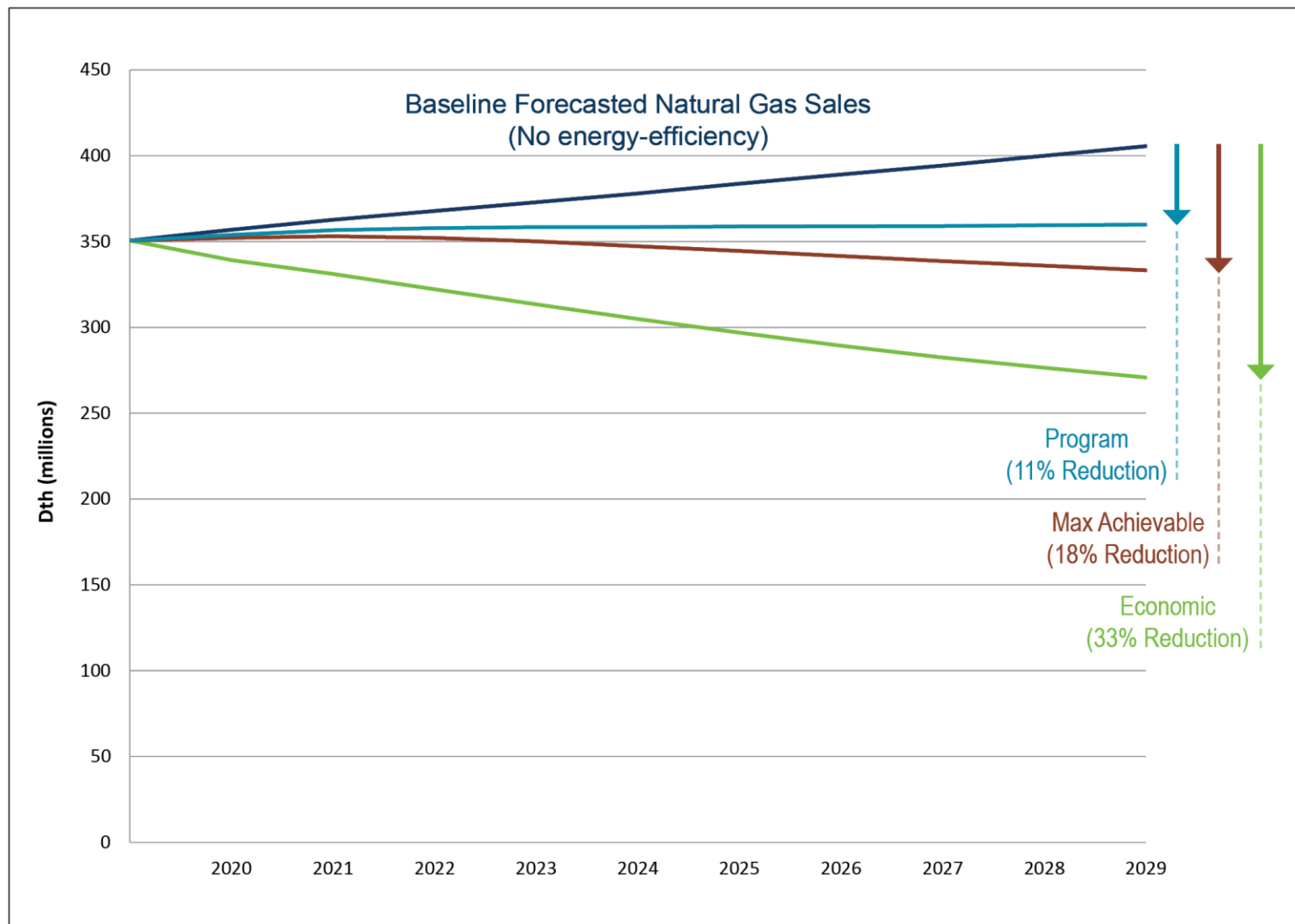
10%

9%

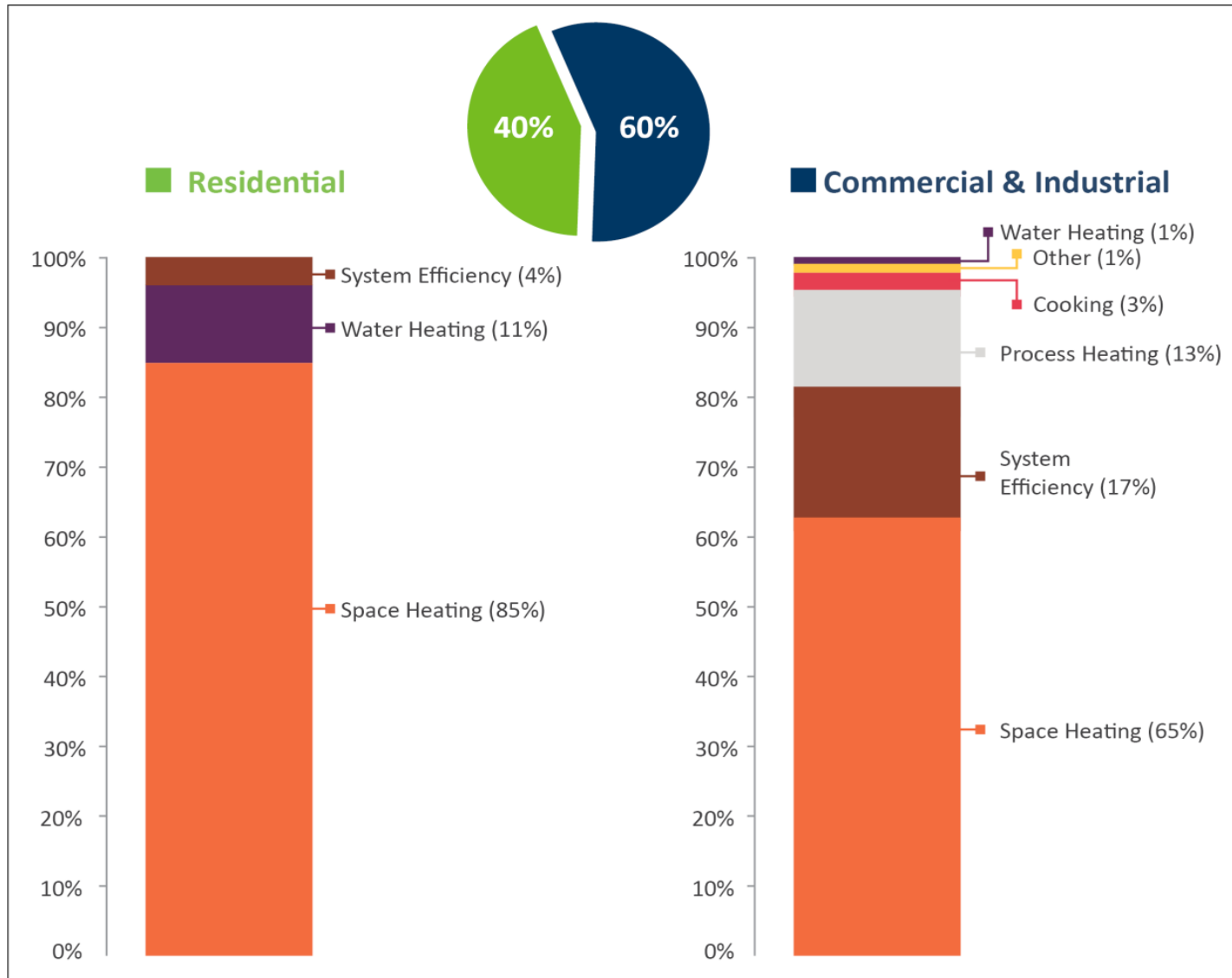
9%

9%

Results – Gas Utilities



Results – Gas Potential by End Use



*Cumulative annual
2029 savings*

*Program potential
scenario*

Results – Gas Top Five Residential Measures

Condensing furnace



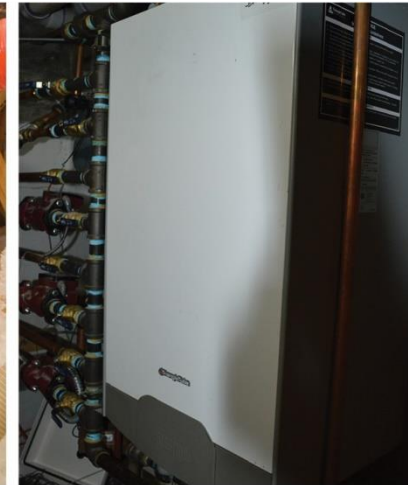
Tier 1-3 thermostat



Attic insulation & air sealing



Boiler



Aerosol envelope sealing



Cumulative 2029
energy savings (Dth,
thousands)

5,200

4,600

2,300

1,900

1,100

Percent of total
residential energy
savings potential

28%

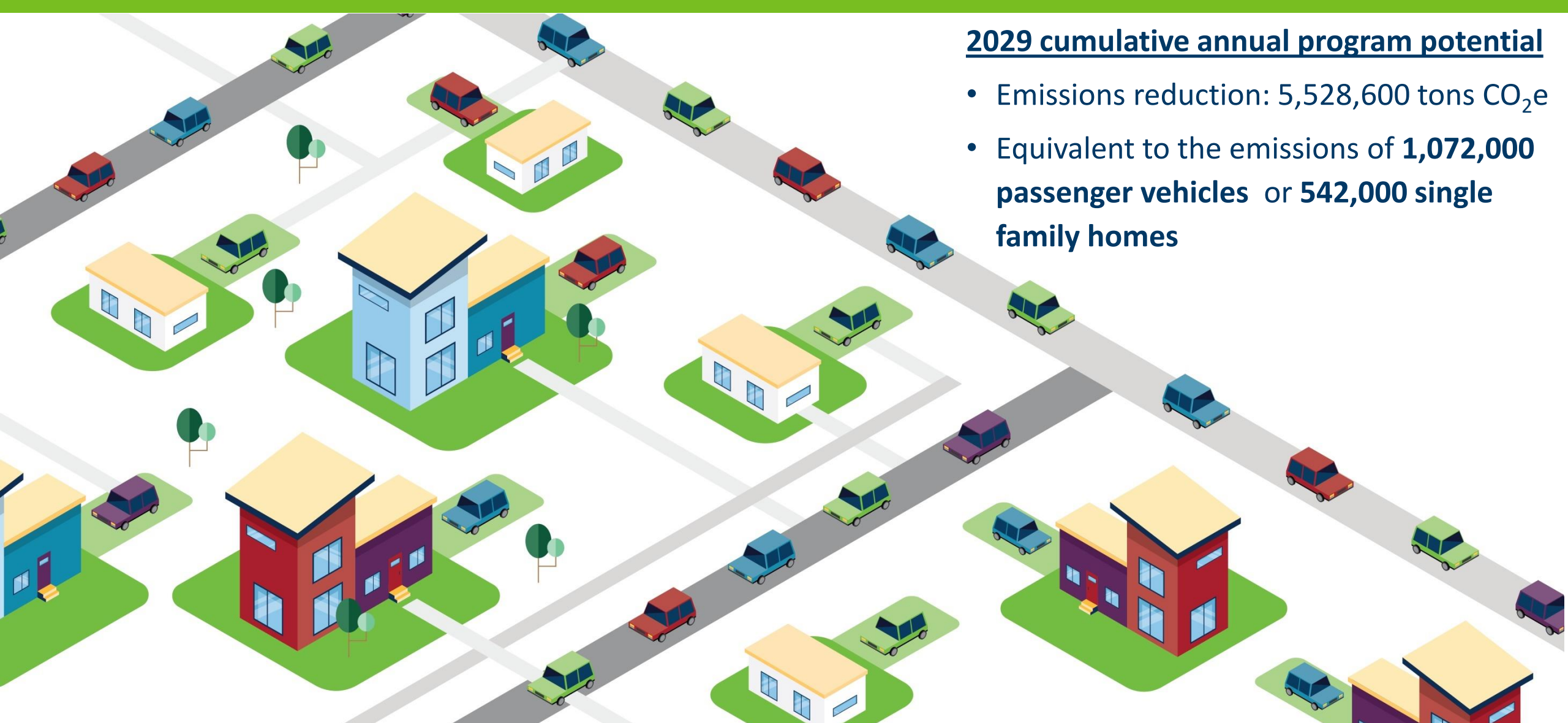
25%

12%

10%

6%

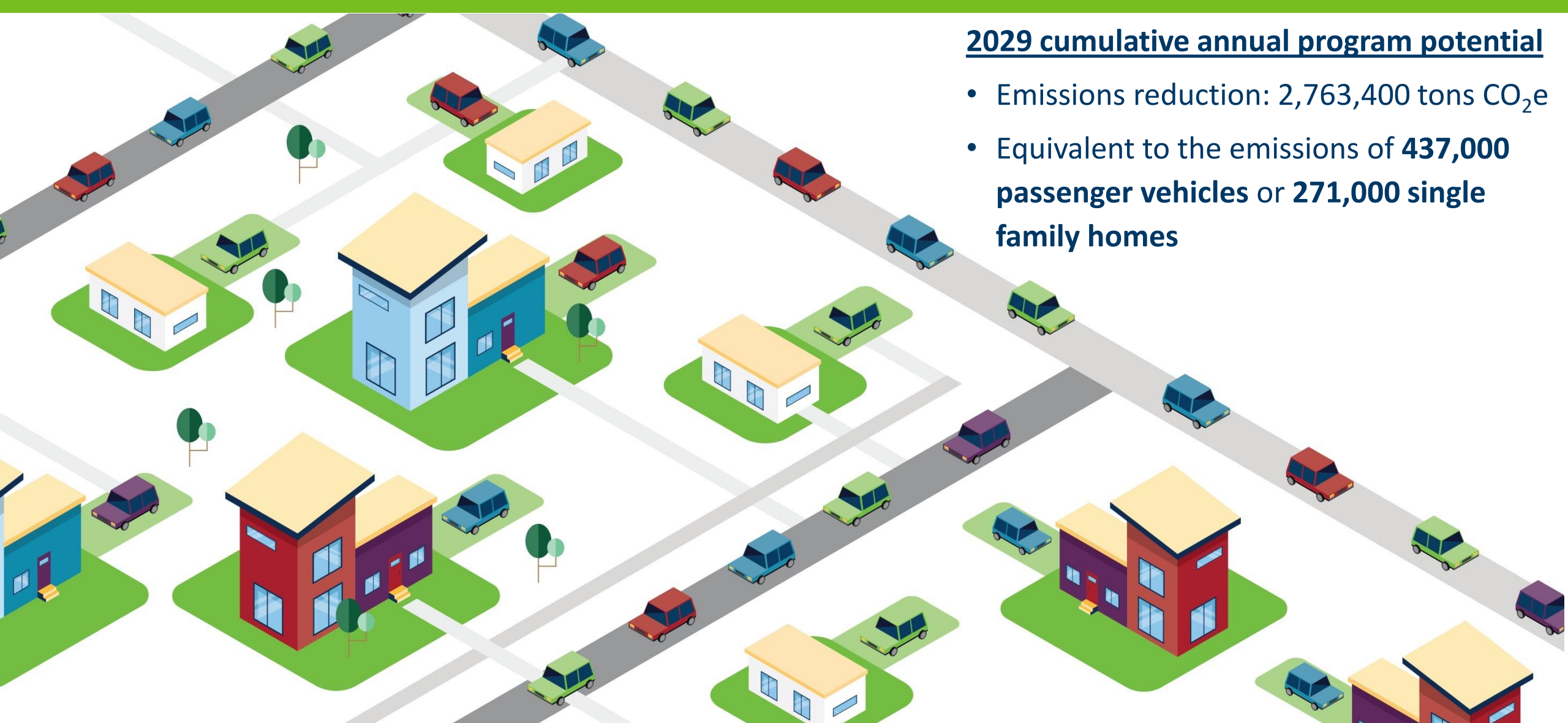
Results – Emissions Reduction from Electric Potential



2029 cumulative annual program potential

- Emissions reduction: 5,528,600 tons CO₂e
- Equivalent to the emissions of **1,072,000 passenger vehicles** or **542,000 single family homes**

Results – Emissions Reductions from Natural Gas Potential



2029 cumulative annual program potential

- Emissions reduction: 2,763,400 tons CO₂e
- Equivalent to the emissions of **437,000 passenger vehicles** or **271,000 single family homes**

Results – Program Budgets and Savings

	Electric		Natural gas	
Year	Budget (millions)	Incremental savings	Budget (millions)	Incremental savings
2020	\$205	1.70%	\$102	0.70%
2021	\$237	2.00%	\$124	0.90%
2022	\$250	1.60%	\$150	1.10%
2023	\$282	1.70%	\$177	1.20%
2024	\$315	1.80%	\$206	1.40%
2025	\$329	1.80%	\$214	1.40%
2026	\$346	1.90%	\$220	1.40%
2027	\$363	1.90%	\$225	1.40%
2028	\$380	1.90%	\$234	1.40%
2029	\$379	1.80%	\$241	1.50%

Current MN Utility Program Findings

Minnesota has a strong foundation of effective CIP programs

- Minnesota currently has some of the lowest cost and best performing programs in the country
- Utilities in Minnesota – both IOUs and COUs – have been proactive in designing and implementing comprehensive, effective, and innovative program models

Partnerships have helped increase program effectiveness

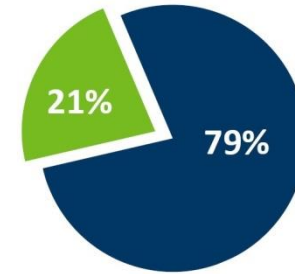
- Deep relationships with trade allies have helped utilities deliver programs
- Smaller utilities face additional challenges in implementing programs, but the most successful COU programs involve cooperation among utilities
- Some utilities have achieved enhanced performance through joint natural gas-electric programs

Electric utilities will need to increase diversity of end-uses addressed by CIP programs

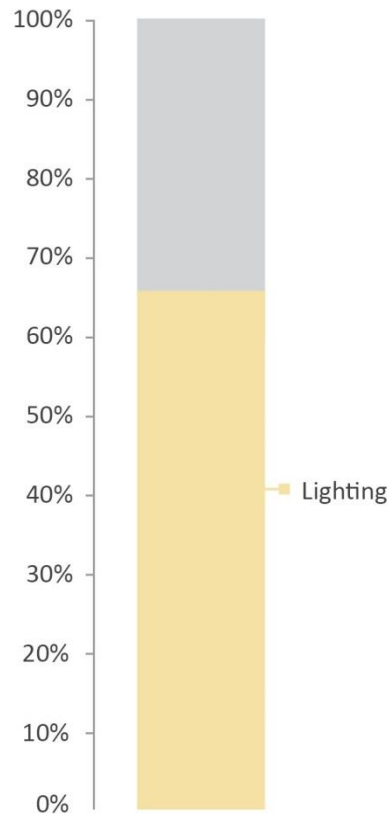
2017



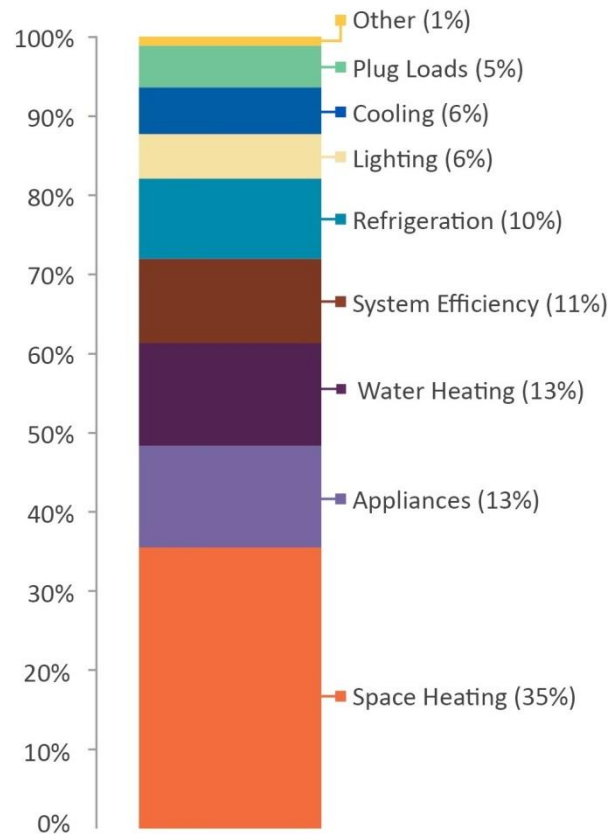
2029



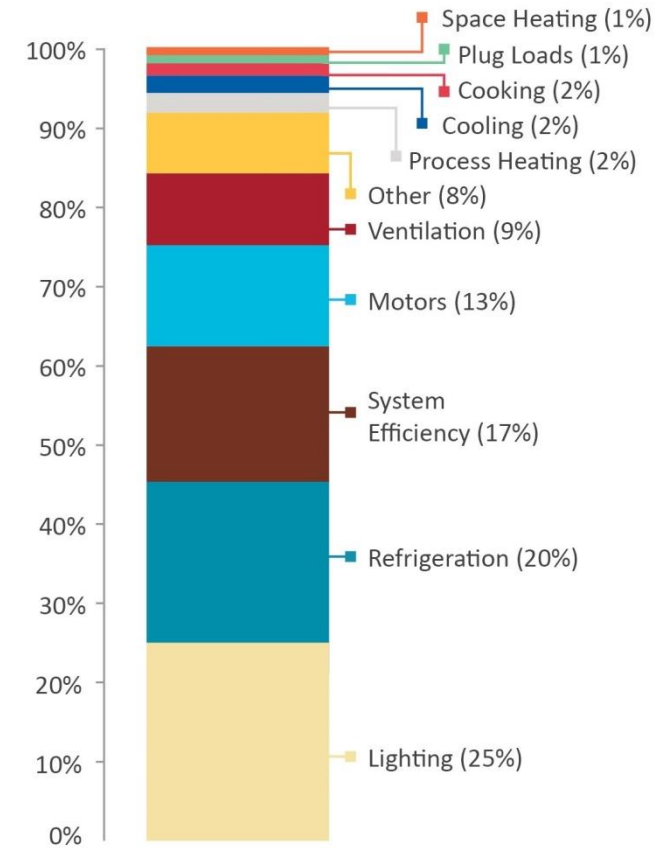
All Sectors



Residential

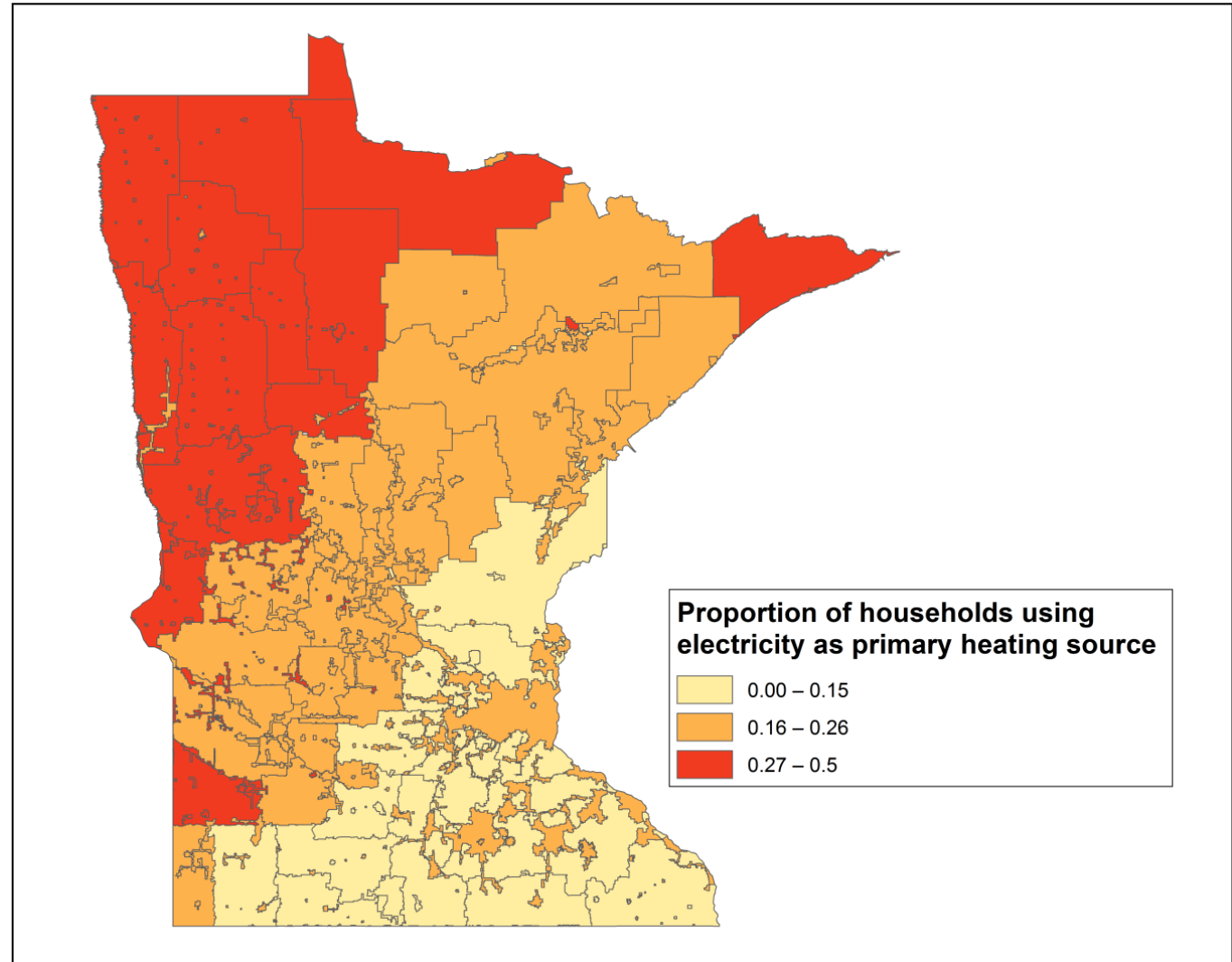
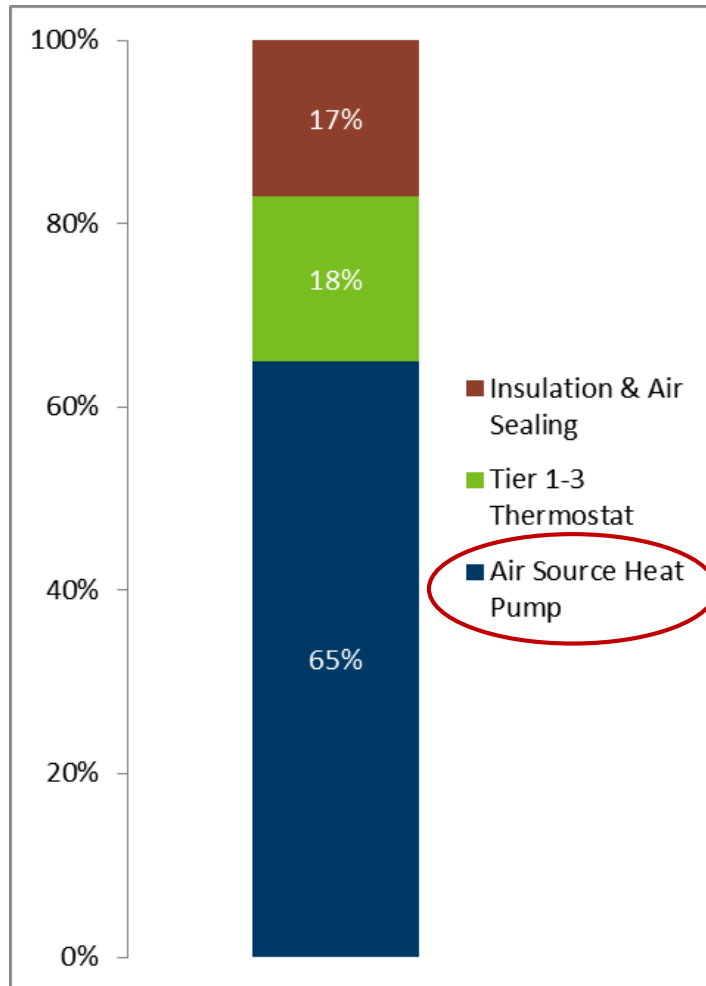


Commercial & Industrial



Air Source Heat Pumps – the new LEDs for Residential Sector?

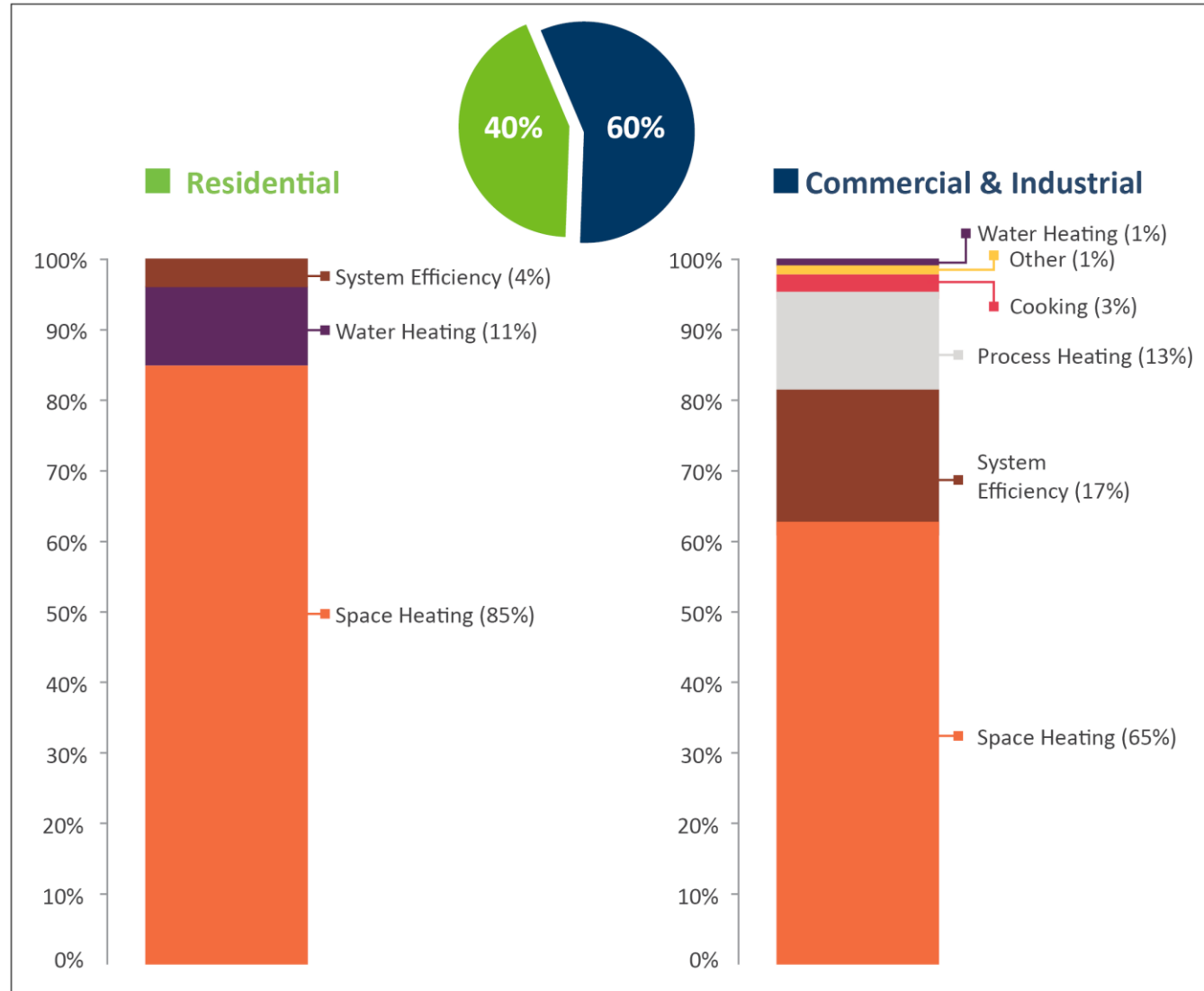
Measures within residential space heating end use



Example of Air-Source Heat Pump (“mini-split”)

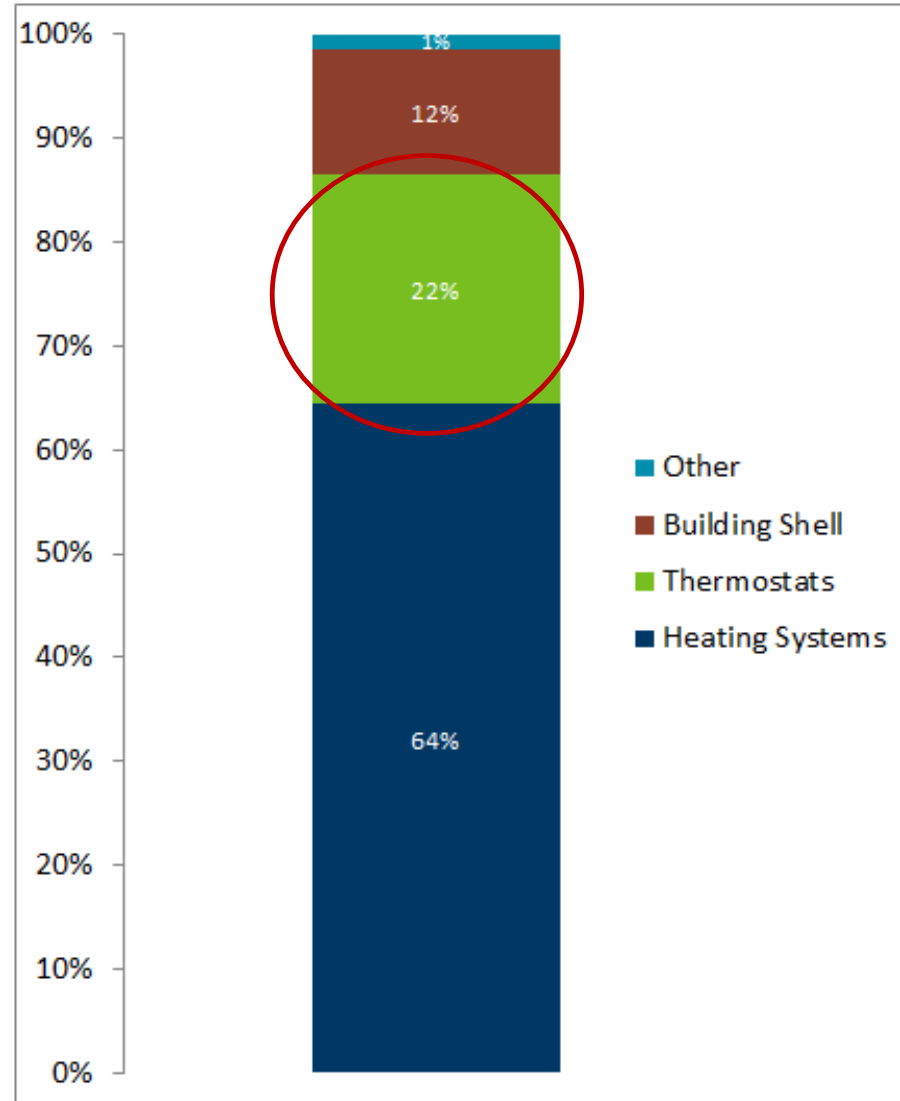


Sources of Natural Gas Potential



Smart Thermostats Grow in Importance

Measure categories within gas space heating end use



Program Recommendations

Recommendations for Utility Programs:

- Continue to test promising new approaches.
- Offer comprehensive program designs for larger and harder-to-reach customers.
- Develop upstream incentives and associated program support in selected markets.
- Incorporate operational savings into commercial and industrial programs.
- Employ segment-specific strategies to reach customers.
- Deepen trade ally engagement and training efforts.
- Incorporate AMI-enabled capabilities into programmatic strategies.
- Leverage interest by local governments in energy efficiency.

Coordination among Utilities:

- More systematically share best practices and program successes.
- Coordinate more closely on trade ally outreach and training.
- Work further towards coordinated and/or joint implementation of programs.

Questions?