



# Now More Than Ever: Natural Gas EE in a Time of Low Prices and Electrification

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Efficiency as a Resource

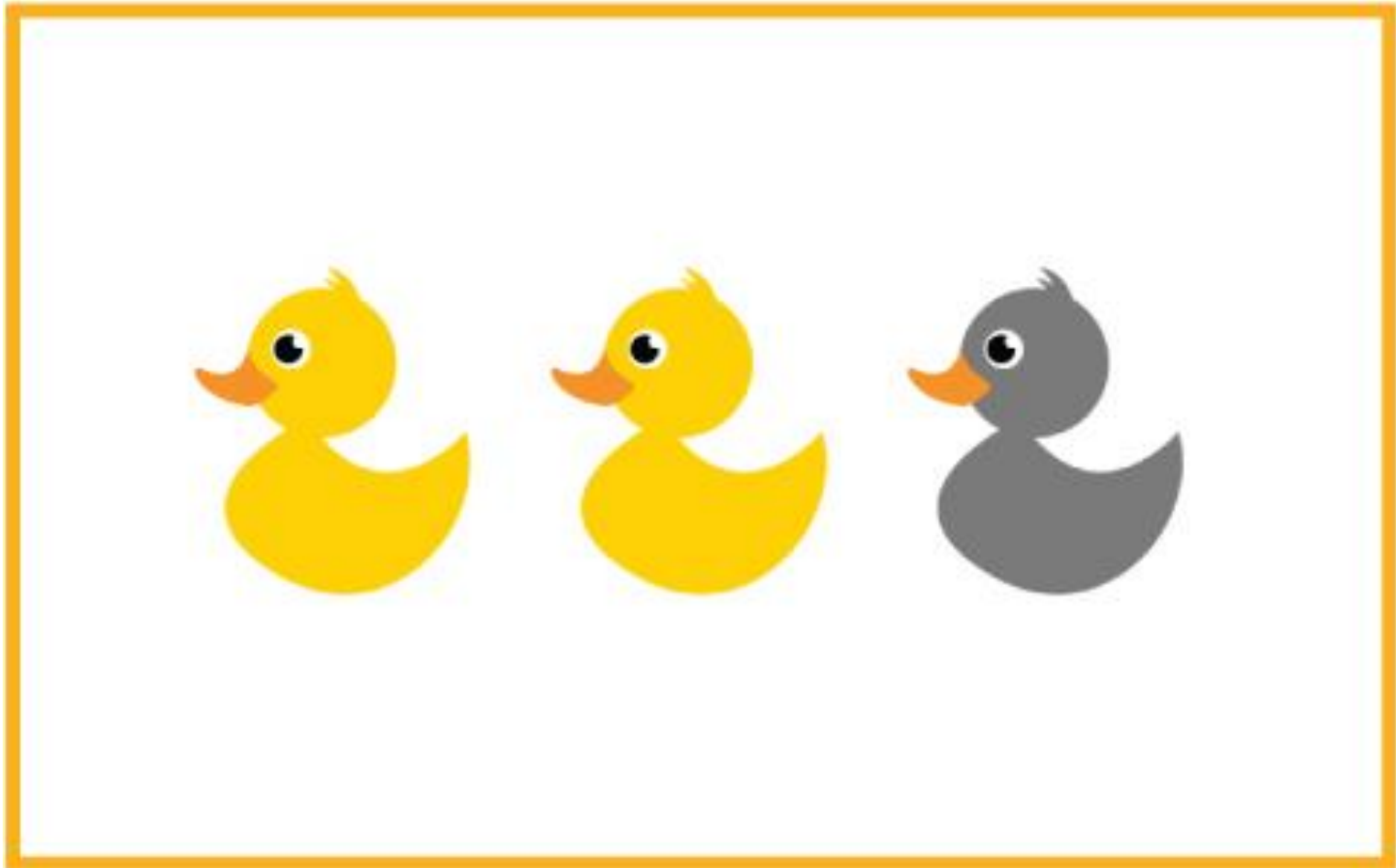
October 16, 2019

- CenterPoint Energy, Minnesota Gas:
  - Approximately 859,000 residential, commercial, and industrial customers in Minneapolis and 260 other communities in Minnesota.
  - 165 BCF in annual natural gas throughput



# Welcome to Minnesota







Welcome to Minnesota



- Northernmost State in Contiguous 48
  - Northern Angle 49° 16' N
  - Minneapolis 45° N
  - Duluth 46° 47' N
- Toronto: 43 ° N
- Boston: 42 ° N
- Seattle: 47 ° N

**MINNESOTA**  
**GETS**  
**COLD**

Source: I live here

Sources: Wikipedia, City Websites

# No, Really – It Gets Cold



- **MN Average HDD: 8,582** [NOAA Climate at a Glance, mean 1980-2018]
  - **MSP Normal: 7,580** [MN State Climatology Office, 1981-2010]
  - **Duluth Normal: 9,444** [NOAA, normals1981-2010]
- **Toronto: 6,709<sup>1</sup>**
- **Boston: 5,681** [NOAA, normals1981-2010]
- **Seattle: 4,697** [NOAA, normals1981-2010]
- **New York: 4,750**
- **Calgary: 8,944<sup>2</sup>**
- **Chicago: 6,340** [NOAA, normals1981-2010]

1: Avg HDD-65F from 1994-2018, converted from 3,727 HDD-18C. Data source: [toronto.weatherstats.ca](http://toronto.weatherstats.ca)

2: Avg HDD-65F from 1994-2018, converted from 4,969 HDD-18C. Data source: [calgary.weatherstats.ca](http://calgary.weatherstats.ca)

# What's 1,000 HDD between friends?



One thousand HDD  $\approx$

30 days of 32°F Average Daily Temp

$$(65-32) \times 30 = 990$$

November Normal HDD-65:

Minneapolis: 939

Duluth: 1,088

Source: 1981-2010 NOAA Normals via MN DNR State Climatology Office



# There are other places it gets cold...



- Fairbanks, AK: 13,669 HDD [NOAA Normal, 1981-2010]
- Minot, ND: 8,801 HDD [NOAA Normal, 1981-2010]
- Bozeman, MT: 7,700 HDD [NOAA Normal, 1981-2010]
- Gale Crater, Mars: 48,079 HDD [Curiosity Rover]

# But Nobody Lives There



- Fairbanks, AK: 13,669 HDD [NOAA Normal, 1981-2010]  
Pop: 31,516
- Minot, ND: 8,801 HDD [NOAA Normal, 1981-2010]  
Pop: 47,370
- Bozeman, MT: 7,700 HDD [NOAA Normal, 1981-2010]  
Pop: 48,532
- Gale Crater, Mars: 48,079 HDD [Curiosity Rover]  
Pop: 0 [RIP, Curiosity]

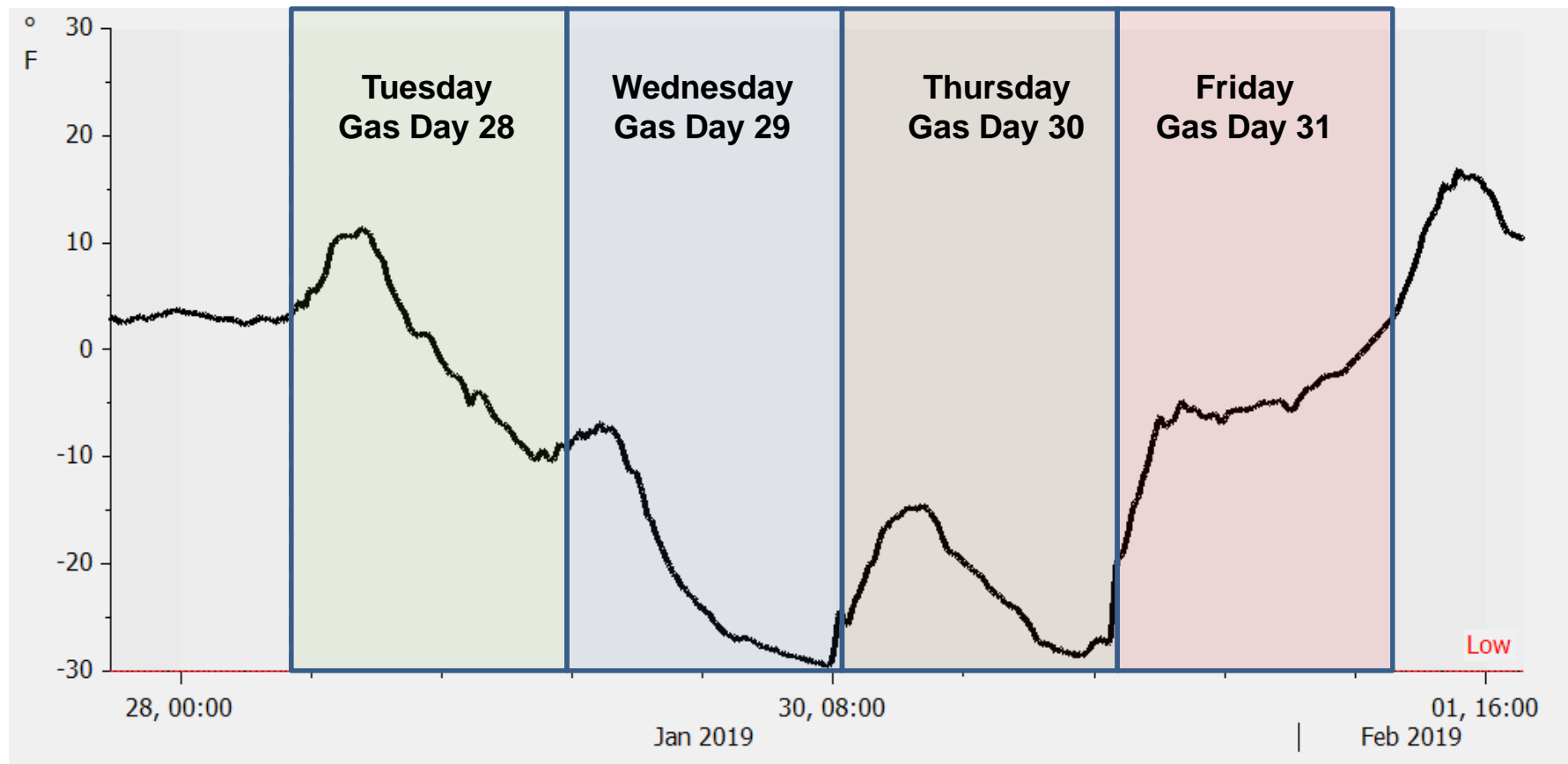
## Coldest US States

| Rank | State            | Population       |
|------|------------------|------------------|
| 1    | Alaska           | 737,438          |
| 2    | North Dakota     | 760,077          |
| 3    | Maine            | 1,338,404        |
| 4    | <b>Minnesota</b> | <b>5,611,179</b> |
| 5    | Wyoming          | 577,737          |
| 6    | Montana          | 1,062,305        |
| 7    | Vermont          | 626,299          |

Combined Population of AK, ND, ME, WY, MT, & VT:

**5,102,260**

## Actual Temperature



Source: CenterPoint Energy Data

## All Time Record Gas Deliveries

- **1,495,000 DT** on January 29<sup>th</sup> 2019 @ average temperature of -18.5F  
= 438,000 MWh  
≈ 2.38 days of statewide electric consumption
- 1,448,000 DT on January 30<sup>th</sup> 2019 @ average temperature of -19.9F
- At peak, delivering over **20,000 MW**  
MN installed nameplate generation capacity: 18,636 MW
- Wind adjusted daily average temperature was -25F.
- Coldest hour -30F @ 6:00 am January 30<sup>th</sup> 2019.
- Coldest weather on system since February 1<sup>st</sup> 1996.

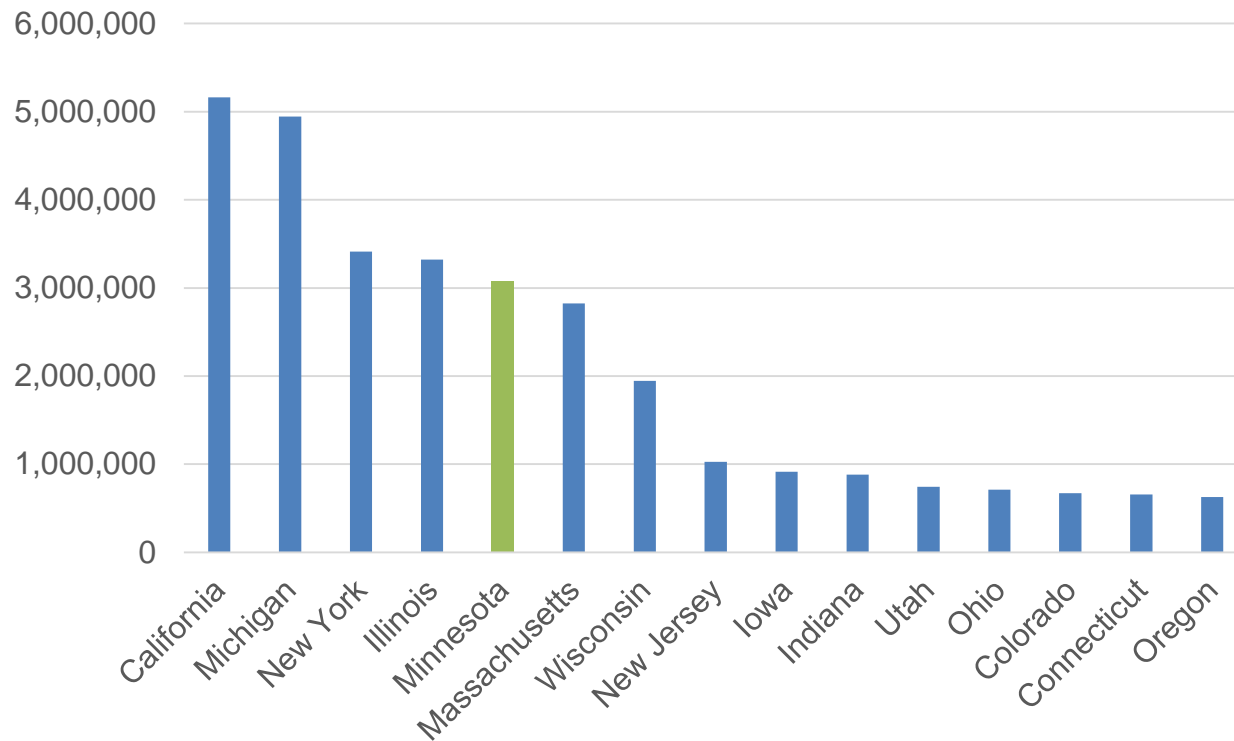
Sources: CenterPoint Energy data, EIA; avg statewide electric consumption based on EIA total retail electric sales of 67,152,580 MWh (2017) divided by 365 days

- Leaky homes increase capacity needs
- Wasted energy sends dollars out of the state
- Energy waste can put lives in danger
- MN has been investing in gas efficiency for decades
- MN is better at it than you



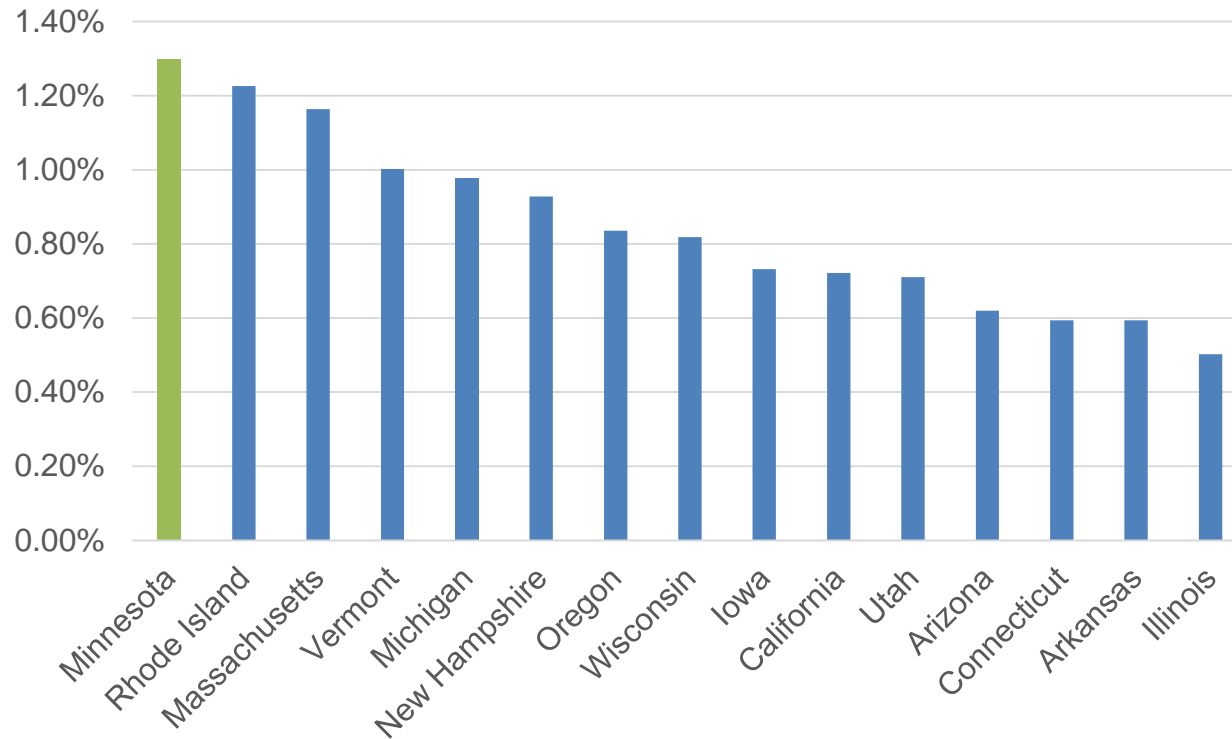
- Total Energy Saved
  - Energy Saved as % of Sales
  - Program Cost per Dth Saved
- 
- All savings data taken from ACEEE Scorecard reporting
    - (Includes NTG adjustment for comparison)

## Average Total Energy Savings 2013-2017



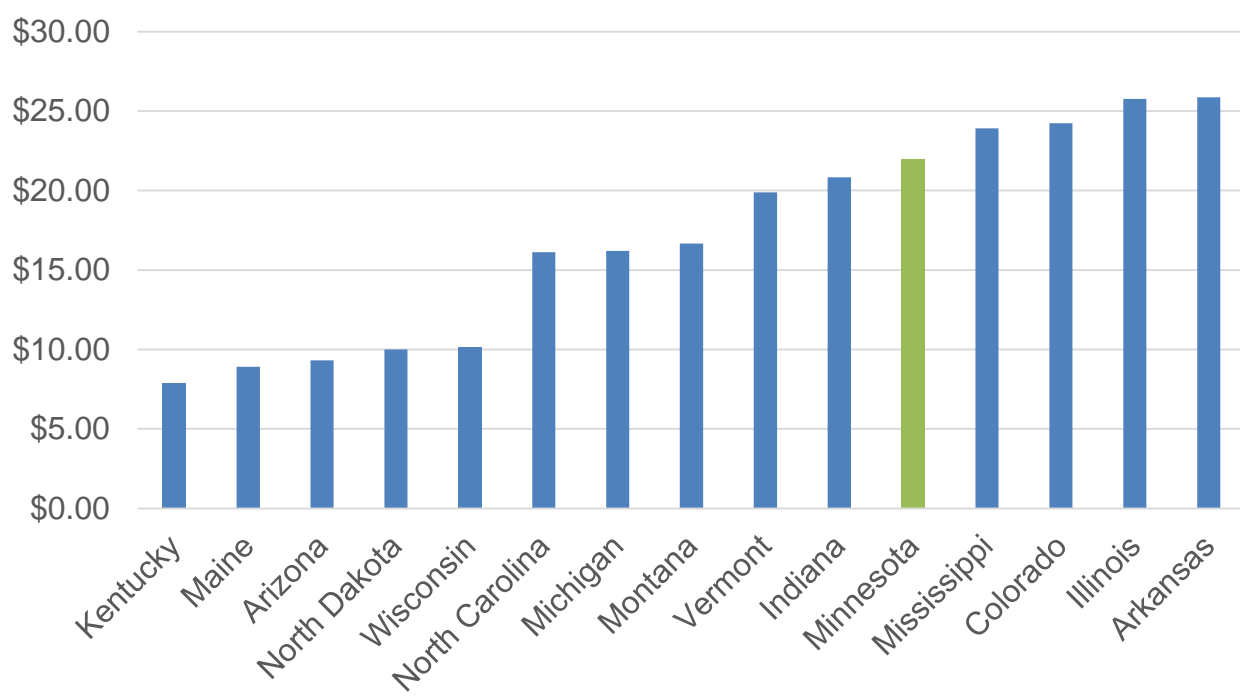
Source: ACEEE State Scorecard Reports

### Average Savings as % of Sales, 2013-2017



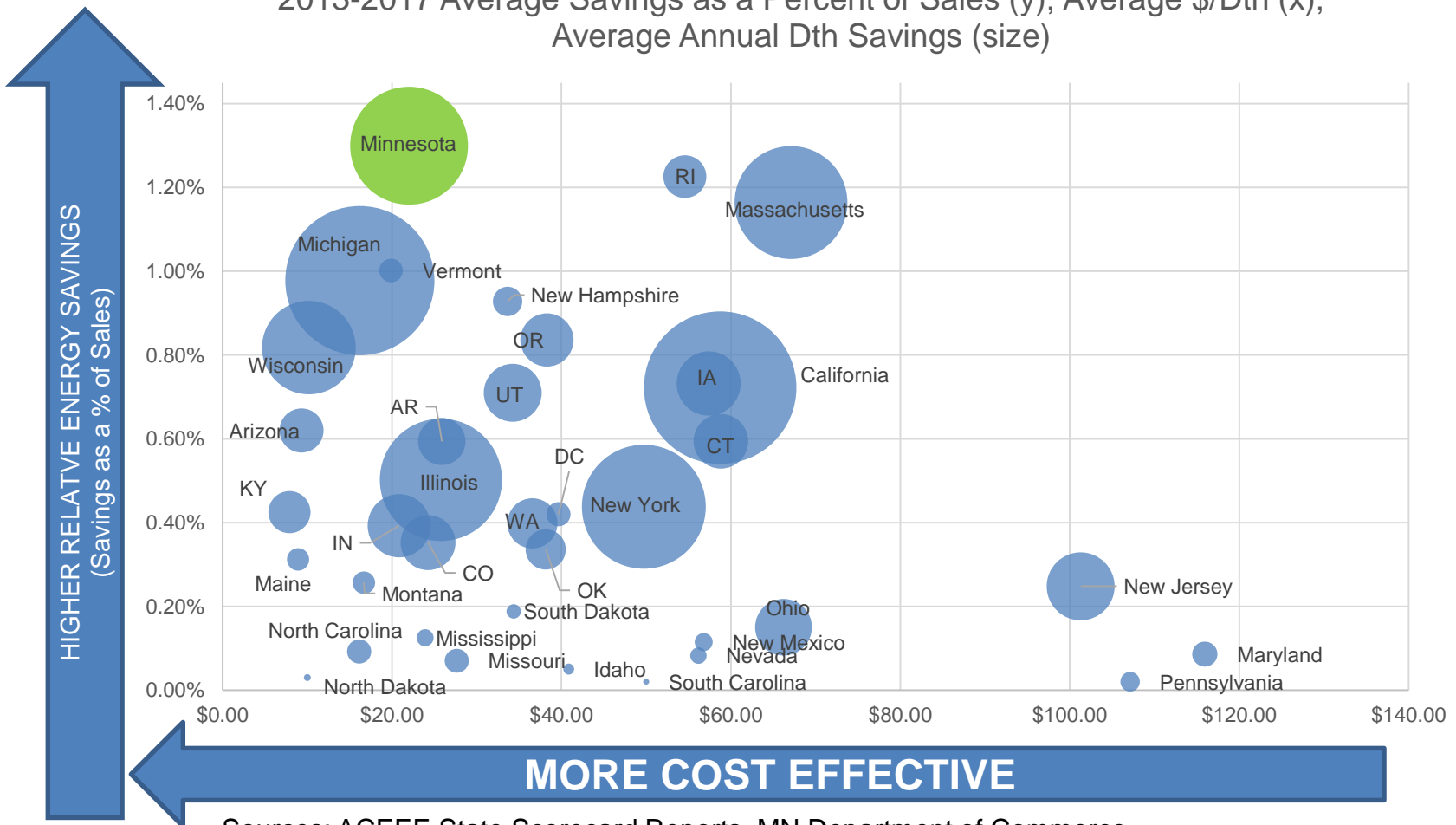
Source: ACEEE State Scorecard Reports

## Average Program Cost per Dth Saved, 2013-2017



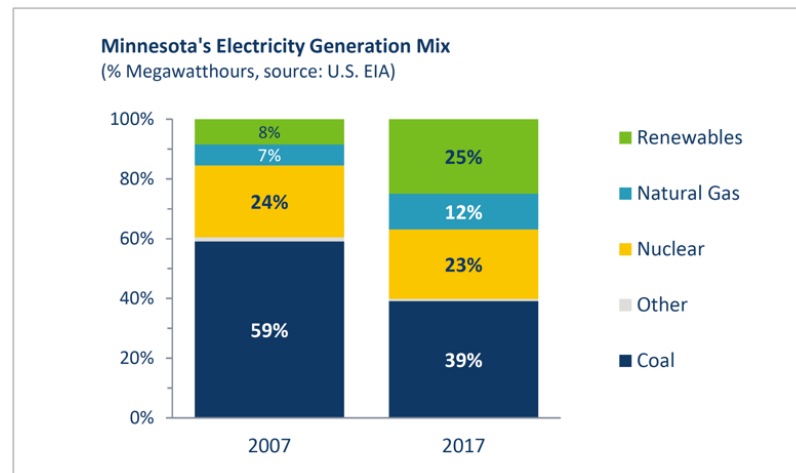
Source: ACEEE State Scorecard Reports

2013-2017 Average Savings as a Percent of Sales (y); Average \$/Dth (x);  
Average Annual Dth Savings (size)



# Do we really need gas EE?

- Gas is cheap
  - Maybe the economics say you should just use it!
- Electricity keeps getting cleaner
  - So forget EE; maybe it's better to just get rid of gas?



Graphic source: MN Department of Commerce



- Current residential prices:
  - \$3.04/Dth (commodity plus demand) <sup>1</sup>
  - \$5.02/Dth with delivery charge<sup>1</sup>
  - $\approx$  \$0.0171/kWh
- Energy Efficiency is Cheaper:
  - MN Gas IOUs spent less than \$500 million on EE from 2007-2018<sup>2</sup>
  - Gas IOU lifetime savings achieved 2007-2018: 409 BCF<sup>2</sup>
  - Resource cost: \$1.19/Dth

<sup>1</sup> Source: CenterPoint Energy Minnesota Gas October Rates, 9/29/19

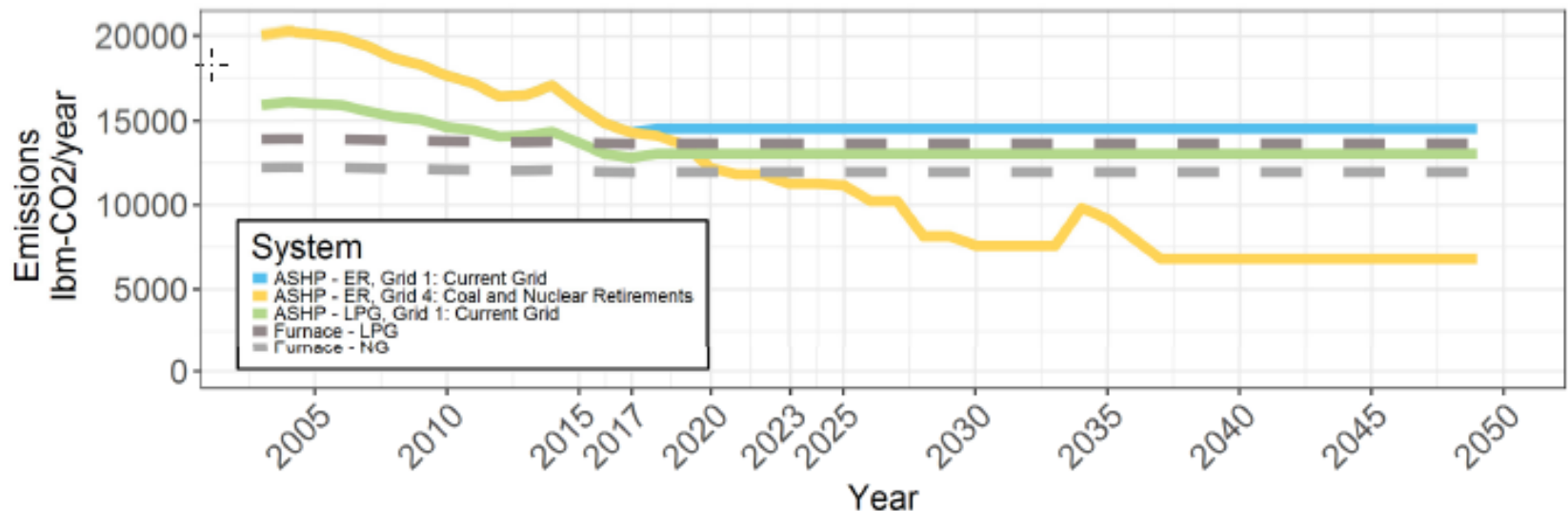
<sup>2</sup> Source: MN Department of Commerce *Report on the Impacts of the 2010-2018 Shared Savings Demand-Side Management Financial Incentive Mechanism on Investor-Owned Utility Conservation Achievements and Customer Costs*, 7/1/19, Docket E,G999/CI-08-133. Total Gas IOU Expenditures \$285,922,543; Total Gas Utility Lifetime Savings: 408,962,125 Dth

- New England ISO Operational Fuel-Security Analysis
  - “While the use of natural gas for both heating and power generation is growing, the natural gas supply infrastructure is not expanding at the same pace, resulting in natural gas supply constraints in winter.”
  - “[L]imitations on the region’s natural gas delivery infrastructure are the most significant component of New England’s fuel-security risk.”
- ConEd and National Grid both facing moratorium on new gas customers in NYC, possibly others

- “New York households consume an average of 103 million Btu per year, 15% more than the U.S. average.”<sup>1</sup>
  - “Electricity consumption in New York homes is much lower than the U.S. average”<sup>1</sup>
  - ConEd’s residential use per customer is 120 Dth/year, 33% higher than CNP MN.<sup>2</sup>
  - NYC has 4,777 HDD vs 7,580 in MSP.<sup>3</sup>
- 
- 1 EIA State Energy Brief, [https://www.eia.gov/consumption/residential/reports/2009/state\\_briefs/pdf/NY.pdf](https://www.eia.gov/consumption/residential/reports/2009/state_briefs/pdf/NY.pdf)
  - 2 ConEd “Smart Solutions for Natural Gas Customers Program” Petition, p. 13
  - 3 NOAA

- “A natural gas furnace is still consistently cheaper to operate than heat pumps, for all regions of the state [...] On average the operating costs of an all-electric heat pump heating system are about twice those of a natural gas furnace.” (J. Edwards et. al., 2018, CEE, presented at ACEEE Summer Study)
- “Currently, natural gas fired condensing furnaces yield the lowest annual emissions, and all-electric ASHP heating system produces the highest annual emissions, based on statewide averages.” (*ibid*)
- BUT! This emissions picture is changing fast!

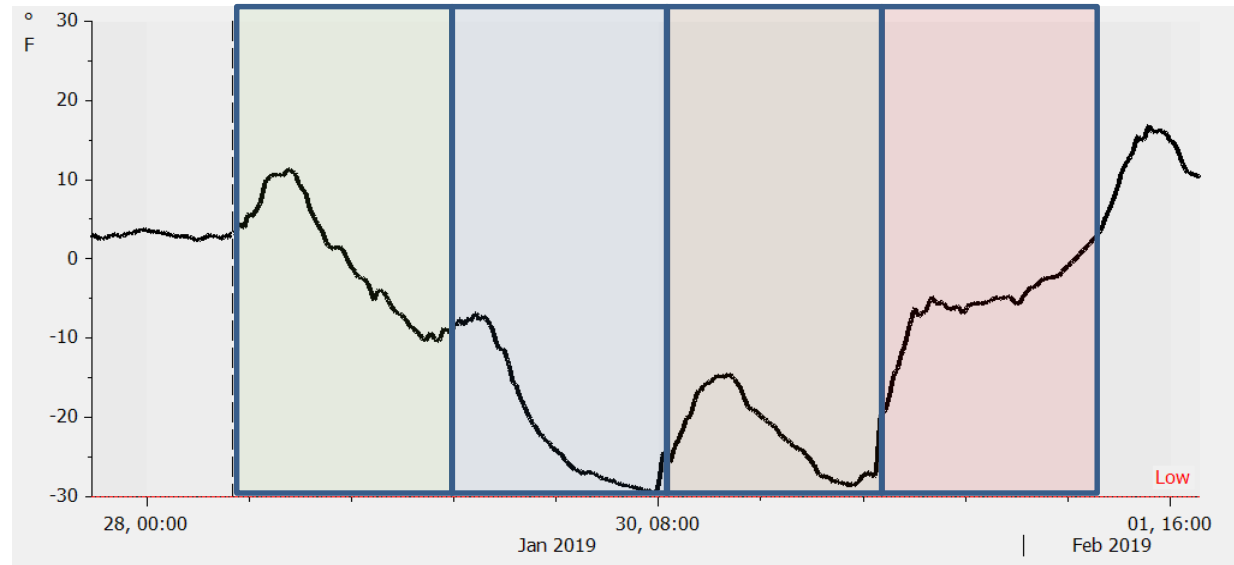
- By 2023 under *current* electric IRPs, “an all-electric ASHP will yield lower annual emissions than a high efficiency condensing furnace. In the case where the state retires its coal and nuclear fleet, even when natural gas is the dominant replacement fuel, the system will result in 40% lower emissions.” *(still ibid)*



Graphic source: *ibid, ibid, ibid!*

# Getting Rid of Gas?

- Minnesota gets cold.
- Really cold.



- 20,000 MW is a lot of capacity.<sup>1</sup>
- Lowest Recorded Temperature, Berkeley CA: 25°F
- Normal Daily High in January, MSP: 23.7°F
- Combination of low temps and all-electric operating cost means a combustion-backup system is likely

<sup>1</sup> 20,000 MW / 1.21 GW = enough to send 16.5 DeLoreans to 1985



- But let's assume the “beneficial” criteria were met<sup>1</sup>
- Why is electrification an *electric* EE measure?
- EE Business Model is built to encourage a utility to reduce its sales; no electric savings are achieved with heat pumps!
- Heat pumps with gas backup should be a gas DSM measure.

1 Criteria vary, but for now let's pretend heat pumps are cheaper to operate, reduce emissions, and use less source energy than gas furnaces.

- To discourage load-building:
  - Utilities promoting fuel-switching should be decoupled
- Careful analysis to establish when and where fuel-switching is permitted through EE
- Careful consideration of shifted cost burden for customers who don't switch
  
- Consider system benefit of retaining gas as winter peaking resource – natural gas utility as electric demand response!

# Robust, Comprehensive Gas EE Programs Can:

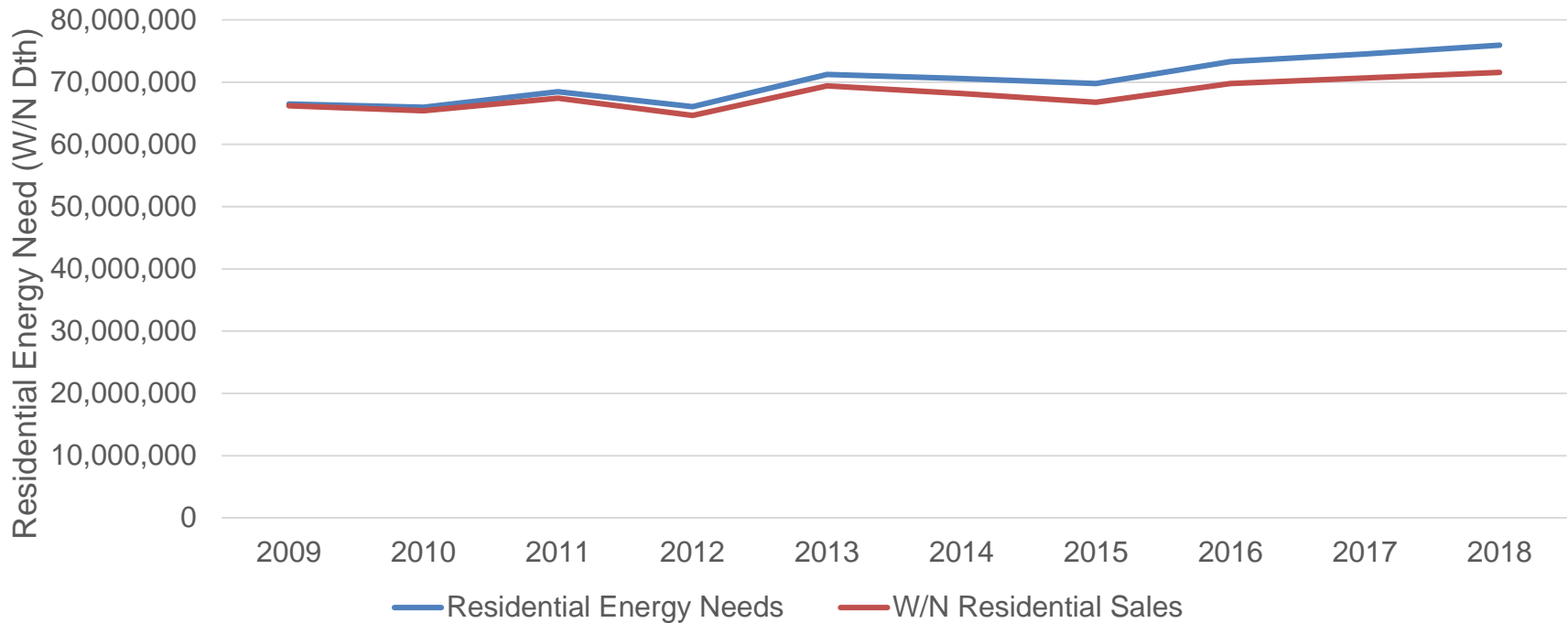


- Reduce pressure on gas capacity, potentially at key peaks
  - This benefits both direct use and electric generation!
- Enable electric and gas demand-response (leaky homes don't work for DR)
- Reduce customer exposure to price volatility
- Create downward price pressure

# Energy Efficiency Is Keeping Customers Warm



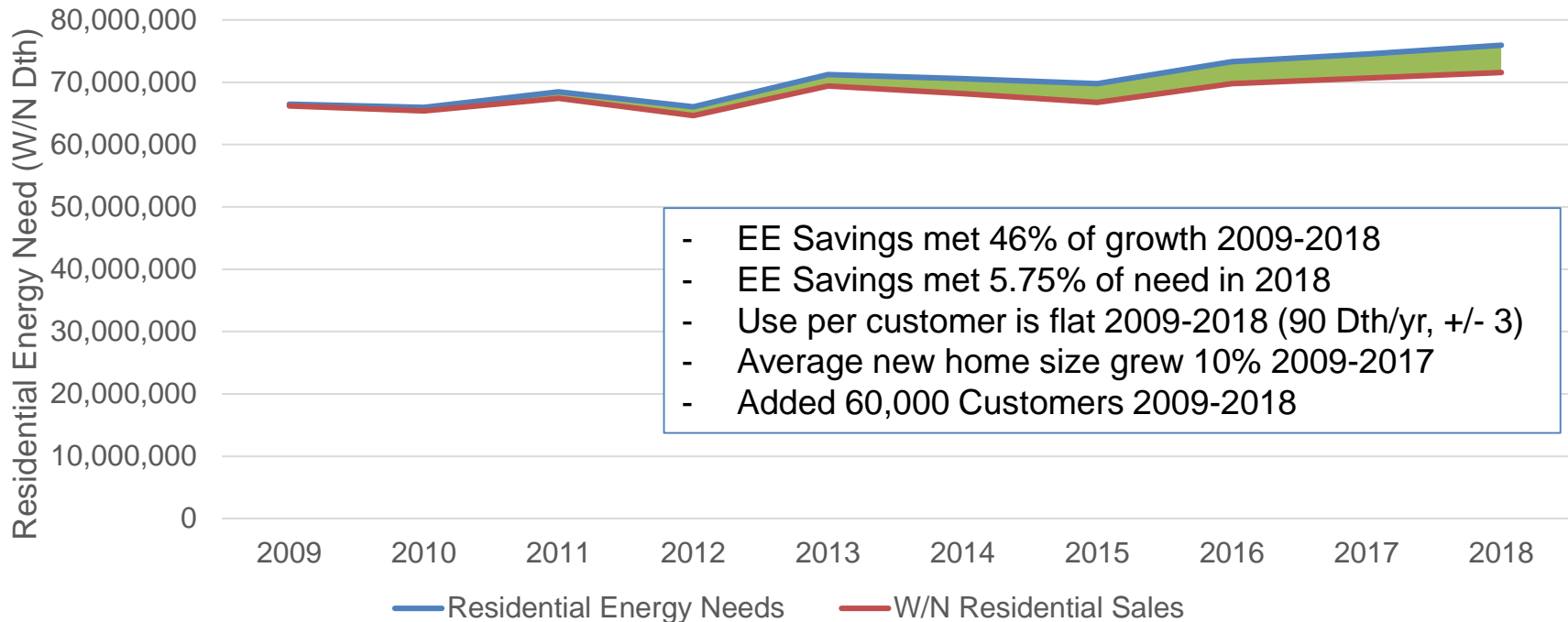
## Resources Used to Meet MN Residential Needs, 2009-2018 (Weather Normalized)



# Energy Efficiency Is Keeping Customers Warm



## Resources Used to Meet MN Residential Needs, 2009-2018 (Weather Normalized)



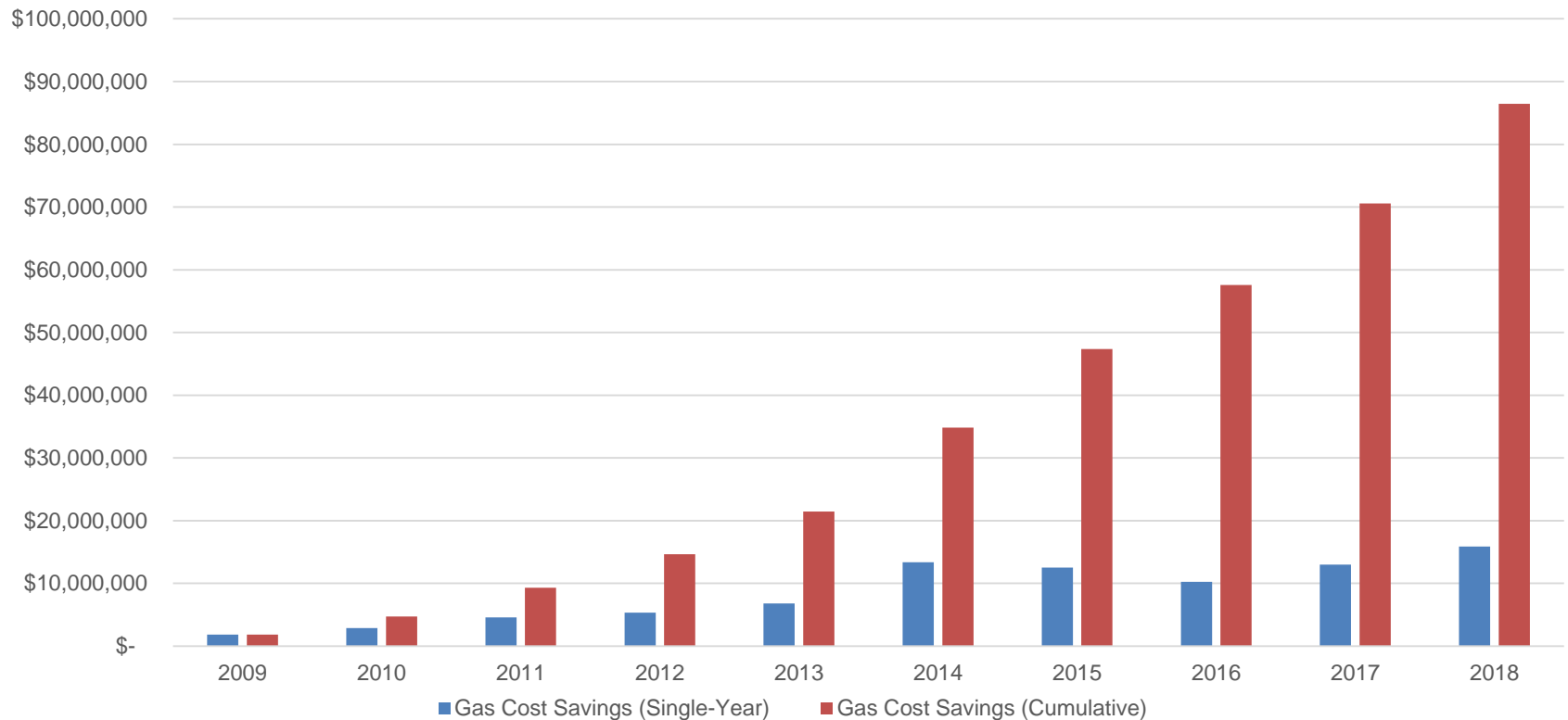
Sources: CenterPoint Energy annual EE program reporting and annual jurisdictional report filings

# EE is Saving Customers Money



## Minnesota Residential Customer Gas Cost Savings due to EE, 2009-2018

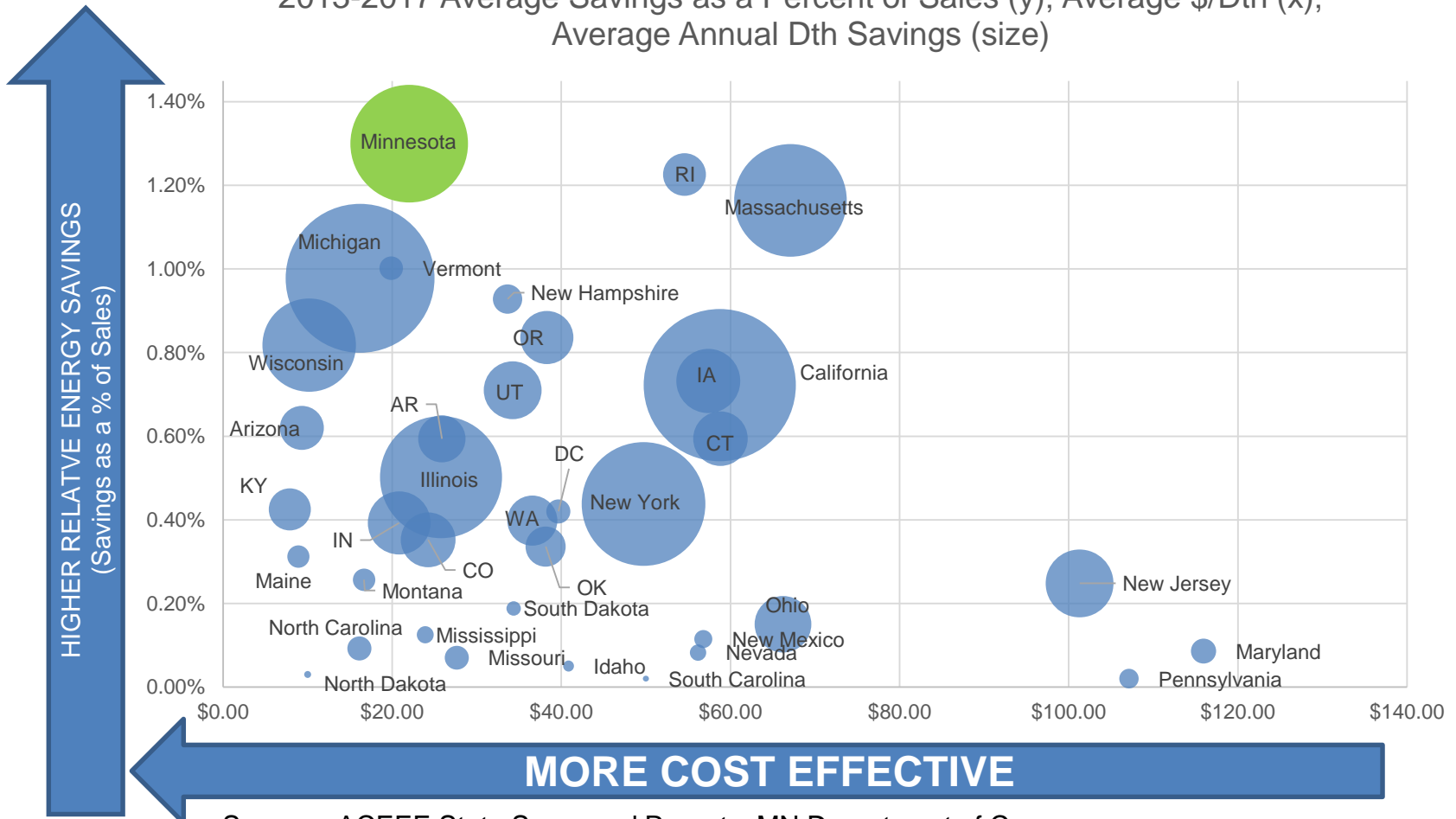
Based on cumulative persisting CIP savings and weighted-average residential cost of gas in each year



Sources: CenterPoint Energy annual EE program reporting and annual PGA filings



2013-2017 Average Savings as a Percent of Sales (y); Average \$/Dth (x);  
Average Annual Dth Savings (size)



Sources: ACEEE State Scorecard Reports, MN Department of Commerce

- “[C]ost-effective energy savings are preferred over all other energy resources. ... [C]ost-effective energy savings should be procured systematically and aggressively” MN Stat §216B.2401
- “To the maximum reasonable extent, the commission shall set rates to encourage energy conservation” MN Stat §216B.03
- “The commission may [...] adopt any mechanism [...] such that implementation of cost-effective conservation is a preferred resource choice for the public utility” MN Stat §216B.16

# Translating to Strong Utility Business Case for EE



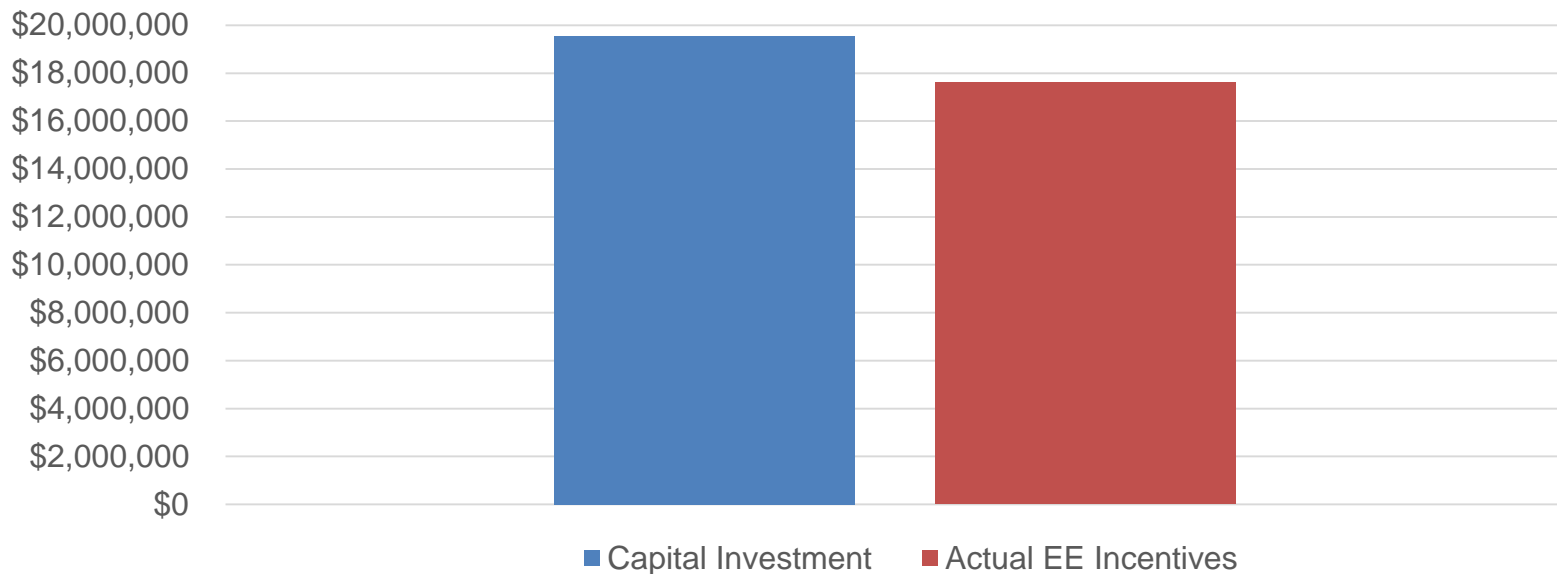
- Program Cost Recovery
- Full Revenue Decoupling
- Robust Shareholder Incentive
  - Rewards performance, not merely compliance
  - Based on savings results and cost-effectiveness
  - ~\$0.40 per lifetime Dth Saved<sup>1</sup>
  - Total EE program cost: \$1.59 per lifetime Dth Saved (incentives plus program costs)

<sup>1</sup> 2018 Gas IOU incentives per lifetime Dth Saved, MN Department of Commerce *Report on the Impacts of the 2010-2018 Shared Savings Demand-Side Management Financial Incentive Mechanism on Investor-Owned Utility Conservation Achievements and Customer Costs*, 7/1/19, Docket E,G999/CI-08-133.



## MN Gas IOUs spent \$62,364,943 on EE in 2018

### Return on Capital Investment vs EE Incentives



Capital Investment: NPV of return on hypothetical investment of \$62,264,943 with ten-year life and ROR of 7.5% = \$19.56 million

Actual 2018 EE Incentives \$17.6 million from MN Department of Commerce *Report on the Impacts of the 2010-2018 Shared Savings Demand-Side Management Financial Incentive Mechanism on Investor-Owned Utility Conservation Achievements and Customer Costs*, 7/1/19, Docket E,G999/CI-08-133.

- Minnesota does gas EE better
- We need more gas EE than ever – not just in MN
  - Climate
  - Capacity
  - Cost
- Doubling down on EE will require new ways of thinking – about programs, measures, policy, and business models

Thanks!

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