Delaware

Energy Efficiency Advisory Council

Natural Gas Energy Efficiency

EEAC Meeting

July 8th, 2020

Delaware Division of ENERGY & CLIMATE

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Optimal ENERGY *Integrated Energy Resources*

Presentation Overview

- Delaware's EE programs have expanded in recent years, notably with DPL's electric programs getting up and running
- Next step is to target gas savings
- Purpose of this presentation is to:
  - Provide an overview of gas usage and savings potential in Delaware
  - Identify potential measures and program designs to achieve gas savings

DE Gas Energy Efficiency Program Background

- Regulated utilities must get approval from the Public Service Commission (PSC) to run energy efficiency (EE) programs
- Gas services are provided to Delaware by two regulated utilities:
  - Delmarva Power & Light
  - Chesapeake
- In September of 2019, Delmarva received PSC approval to provide two electric EE programs to residential customers
  - Gas programs were not included in the plan
- Chesapeake hasn't yet filed a plan to run EE programs
- Some gas savings occurring through statewide programs offered by DNREC and the SEU

Gas EE Program Overview

- Most states that run energy efficiency programs pursue natural gas efficiency in addition to electric efficiency
- Gas programs often les of a focus than electric programs
  - Savings opportunities tend to be somewhat lower
  - Gas utility revenues tend to be lower than electric, so less spending on gas EE
- However, large opportunities for cost-effective savings remain

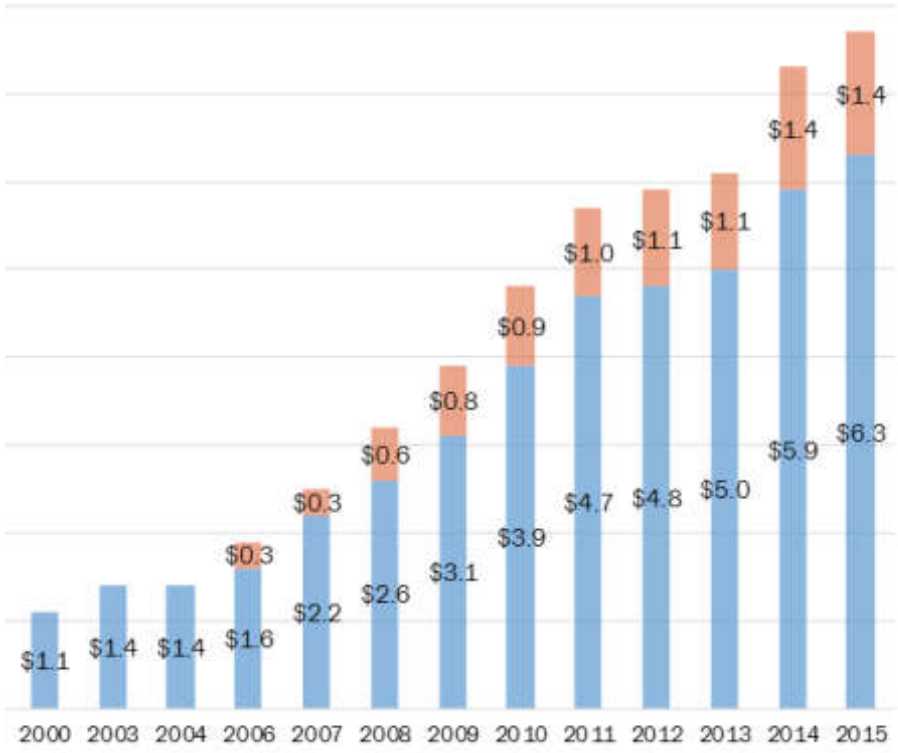


Figure 6. Utility energy efficiency spending by year ($billions) *Source:* Berg et al. 2016.

Gas Savings Levels

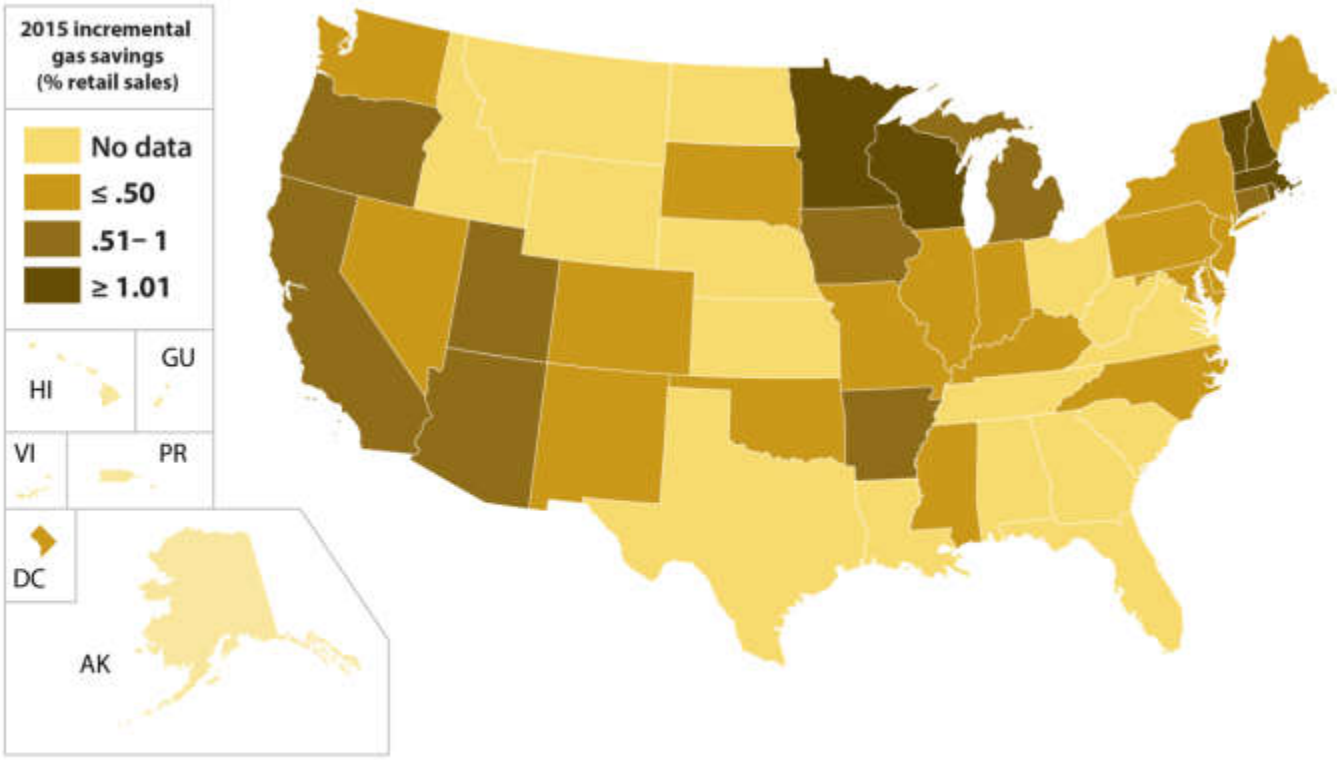
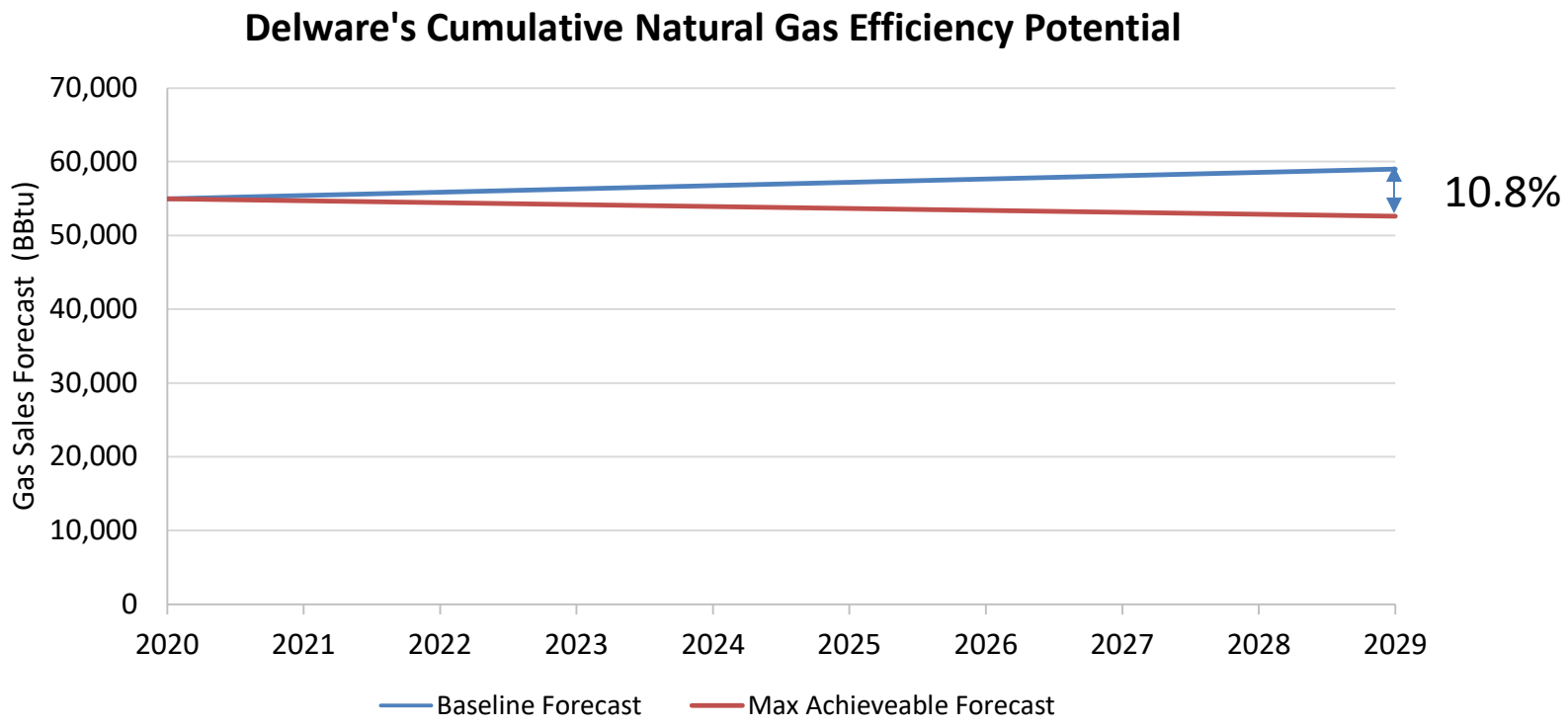


Figure 8. 2016 incremental gas savings from utility-funded programs by state. *Source:* Data from Berg et al. 2016. Data were obtained from state public utility commissions. Where data are missing, the state commission either could not or did not provide the data. States with missing data sometimes have no savings and sometimes achieved savings but did not provide data to ACEEE despite multiple requests.

Potential for Savings in DE

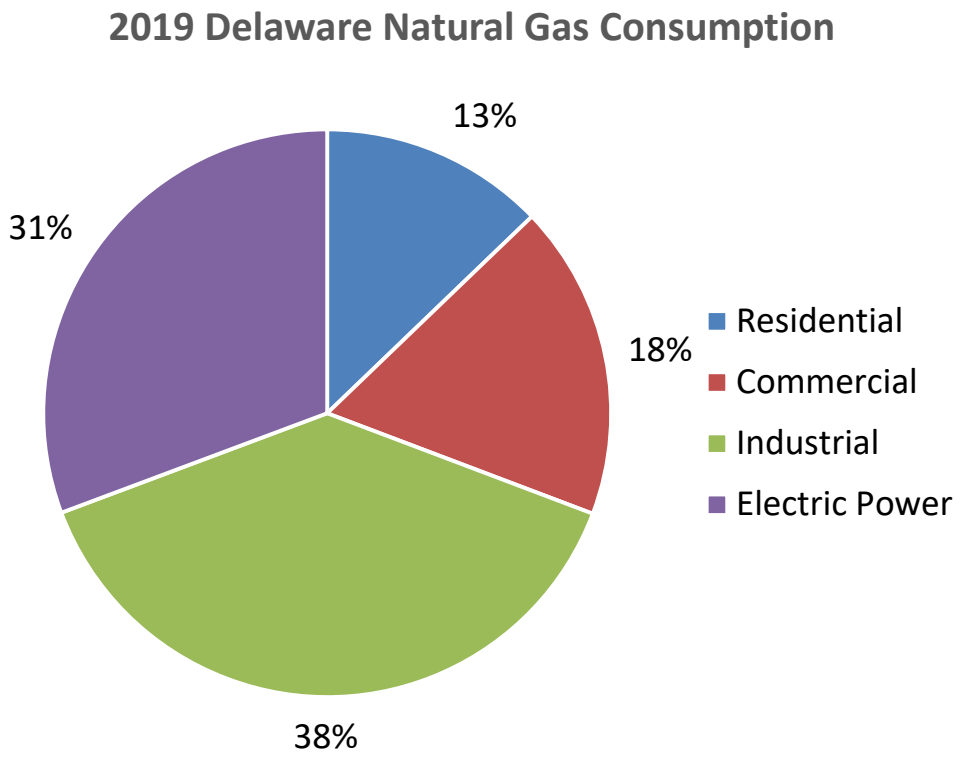
- Total current savings potential is 6,000-10,000 Billion Btu per year



Source: 2019 Optimal Potential Study

Gas Consumption in Delaware

- Most natural gas consumed in DE goes to power generation or the C&I sector



Source: 2019 EIA Natural Gas Consumption

Potential for Savings

- Much like total consumption, most of the savings can be found in the C&I sector, although also opportunities in the residential sector

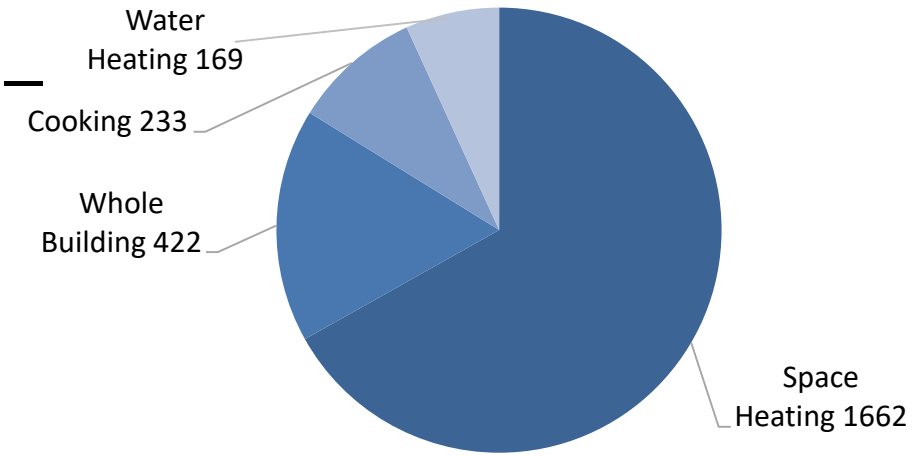
2029 Cumulative Natural Gas Energy Savings by Sector					
Residential Savings (BBtu)	**Residential Savings (% of Sales)**	**C&I Savings (BBtu)**	**C&I Savings (% of Sales)**	**Total Savings (BBtu)**	**Total Savings (% of Sales)**
916	8.2%	5,368	11.4%	6,284	10.8%

Source: 2019 Optimal Potential Study

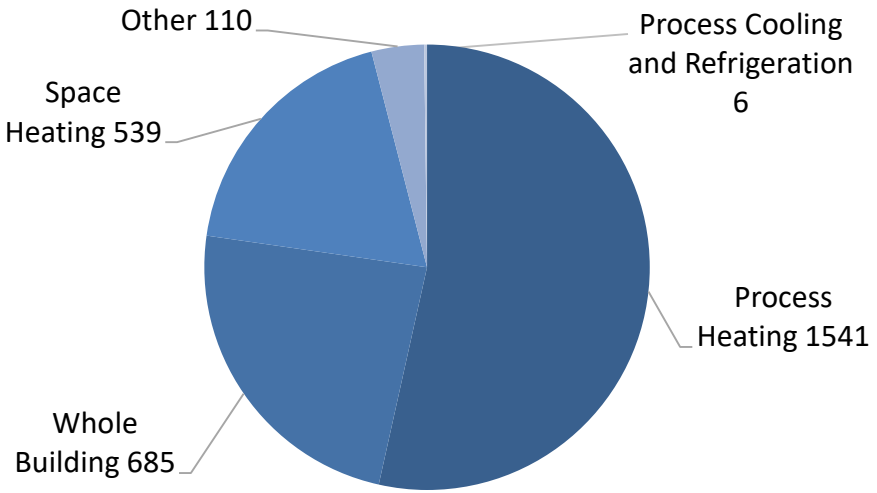
Gas Energy Efficiency Overview

Most potential for savings exists in heating end uses – space heating, water heating, and process heating

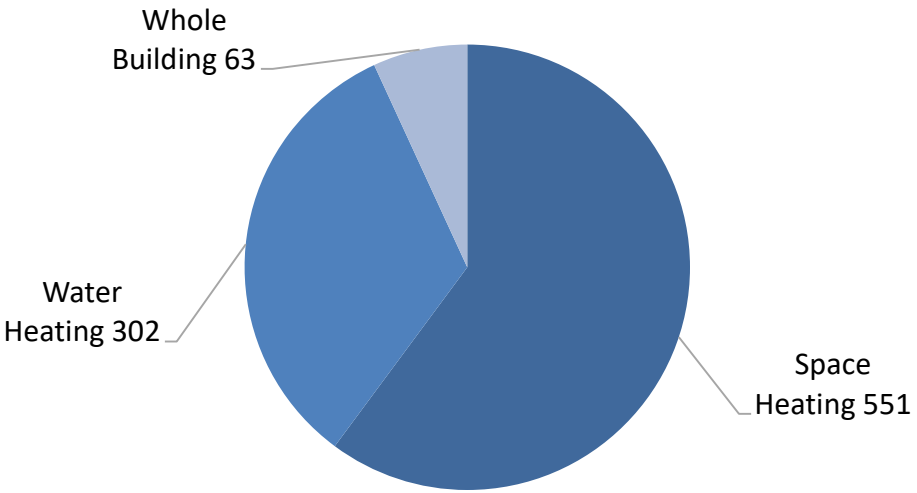
Commercial Maximum Achievable Natural Gas Potential by End Use, 2029 (BBtu)



Industrial Maximum Achievable Natural Gas Potential by End Use, 2029 (BBtu)



Residential Maximum Achievable Natural Gas Potential by End Use, 2029 (BBtu)



"Top Ten" – Residential Maximum Achievable Natural Gas Potential

Residential		
Measure Name	**Cumulative BBtu**	**% of Total**
Smart Thermostat	231.7	25.3%
High Efficiency Furnace	221.9	24.2%
Storage Gas Water Heater	158.6	17.3%
High Efficiency Boiler	82.2	9.0%
Low Flow Showerhead, Gas DHW	78.4	8.6%
Home Energy Reports	62.8	6.9%
Electronic Ignition Hearth	16.0	1.8%
ENERGY STAR Clothes Washer	14.8	1.6%
Total	**866.4**	**94.7%**

"Top Ten" – C&I Maximum Achievable Natural Gas Potential

Commercial & Industrial		
Measure Name	**Cumulative BBtu**	**% of Total**
Increase Efficiency of NG Process Heating	1,541.0	28.7%
Increase Efficiency of NG Space Heating	539.0	10.0%
Demand Control Ventilation	409.0	7.6%
High Efficiency Boiler	355.0	6.6%
Strategic Energy Management	515.0	9.6%
High Efficiency Furnace	269.0	5.0%
Energy Management System - Retrofit	212.0	3.9%
Retrocommissioning	179.0	3.3%
Smart Thermostat Retrofit	171.0	3.2%
Total	**3,870.0**	**77.9%**

Efficiency Program Best Practices

- Effective energy efficiency programs overcome the structural, informational, and financial barriers that hinder customers from investing in efficiency.

Best Practices
• Build capacity within the marketplace and awareness among consumers across several years • Bundle financial incentives with technical and/or informational services • Target market niches and customer sub-segments • Simplify processes to make participation easier for customers • Provide “one-stop-shopping” and similar approaches • Work to build relationships and partnerships • Provide financing options • Work to incorporate the latest energy-efficient technologies

Residential Programs

- Residential gas programs target energy efficiency opportunities in space heating and water heating
- Residential gas programs tend to fall into the follow-in categories
  - Existing homes
    - Sub initiatives of this program might include: multifamily and income eligible focused
  - Efficient products
  - Behavior
  - New Construction

Existing Homes Program

- **Target Market**
  - Owners of single-family homes (1-4 units) who do not meet low-income qualifications
- **Program Overview/Strategies**
  - Whole house energy audit
  - Direct installation (DI) of low/no cost measures at time of audit
  - Option to receive additional deeper measures
- **Incentive Structure**
  - DI measures at no cost to customer
  - Rebates to cover a portion of the cost of additional measures

Residential Efficient Products

- **Target Market**
  - Residential customers, though all customers are eligible
- **Program Overview/Strategies**
  - Works with manufacturers, retailers and contractors to promote the stocking, marketing and sale of efficient, DHW and HVAC equipment
  - Often offers contractor training on quality installation practices
- **Incentive Structure**
  - Mid/upstream approach for appliances, allowing for “instant” rebates for consumers at point of purchase
  - Prescriptive incentives for measures such as DHW and HVAC
  - “Bounties” payable to the homeowner for turning in old equipment to program vendor

Behavioral Program

- **Target Market**
  - Residential customers, both homeowners and renters
  - May identify target groups of customers using various criteria
- **Program Overview/Strategies**
  - Provides customers with home energy reports that compare household energy use with other similar area households
  - Likely contracted out to one of several turnkey program contractors through a competitive solicitation
- **Incentive Structure**
  - No direct financial incentives
  - Reports help customers see connection between habits and utility costs and make more economically rational decisions
  - Reports may contain coupons, special offers, etc. from time to time

Residential New Construction

- **Target Market**
  - Single-family homes (1-4 units)
  - Program available to independent builders building one home at time and developers doing multi-year build-outs
- **Program Overview/Strategies**
  - Works with builders, contractors, architects, developers, and suppliers to optimize the energy efficiency of new homes as they're designed and built
  - Two-branched approach
    - Engaging designer/developer/builder communities
    - Reaching out to customers in the market to purchase new homes
- **Incentive Structure**
  - Financial incentives to builders for constructing efficient homes
  - Incentives to raters may include builder/project recruitment and subsidized training programs

Commercial & Industrial

- C&I gas programs target energy efficiency opportunities in whole building measures, space heating and water heating
- Top C&I gas portfolios tend to have the following programs:
  - Large Business Retrofit
  - Small Business Retrofit
  - Lost Opportunity

Large Business Retrofit

- **Target Market**
  - All C&I customers and master metered multifamily accounts with energy use of a specified threshold amount
- **Program Overview/Strategies**
  - Two paths for participation: custom and prescriptive
  - All C&I customers can participate in either pathway
  - Large customers will be account managed
- **Incentive Structure**
  - Prescriptive rebates deemed for each measure
  - Custom incentives offered as a percent of the project cost
  - Account managed customers also receive a walk-through energy assessment at no cost and a portion of the cost for an engineering study

Small Business Retrofit

- **Target Market**
  - C&I customers that consume less than a specified amount of natural gas
- **Program Overview/Strategies**
  - Free onsite inspection
  - Direct install measures
  - List of additional recommended easy-to-installed measures
- **Incentive Structure**
  - Free direct install measures
  - Prescriptive rebates up to 70% of full installed measure cost for additional measures

Lost Opportunity

- **Target Market**
  - C&I customers undertaking new construction projects or needing to replace equipment
- **Program Overview/Strategies**
  - Design/technical assistance for new construction and large replace-on-failure projects
  - Custom and prescriptive measures
- **Incentive Structure**
  - Prescriptive rebates deemed for each measure
  - Custom incentives offered as a percent of the project cost

Gas Energy Efficiency Overview

- Behavior, envelope, and HVAC measures provide a bulk of gas savings
- Most of these savings from existing buildings through retrofit measures

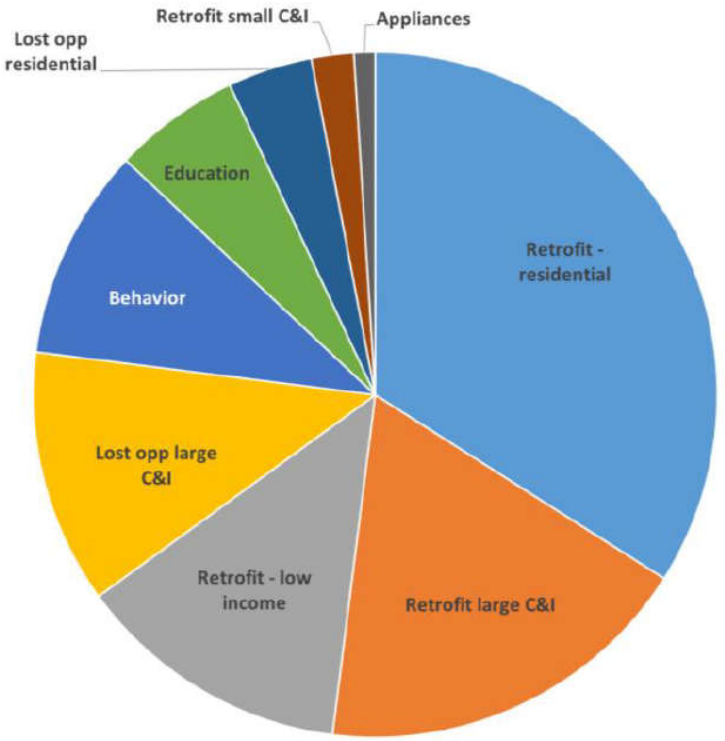
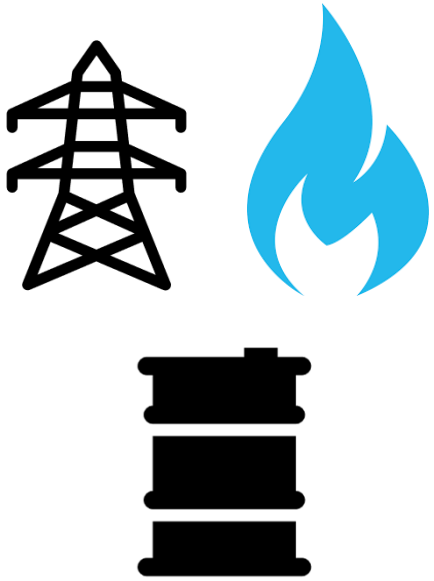


Figure 10. Natural gas savings for 2015 in energy units by measure type in the Northeast (Connecticut, District of Columbia, Delaware, Massachusetts, Maryland, New Hampshire, New York, Rhode Island, and Vermont). *Source:* NEEP REED database as contained in Caputo 2017.

Addressing All Fuels

- Best practice program designs for gas programs are also the basis for successful electric programs
- Electric and natural gas utilities often run separate programs
  - Can create challenges when customers want to undertake projects to save both electricity and gas
- Many examples of dual-fuel utilities and statewide integrated-PAs running successful combined and integrated programs



Existing Gas Efficiency Programs in Delaware

- Existing statewide programs like DNREC's EEIF, WAP and the SEU's HPwES program all achieve gas savings alongside electric savings
- Expected to save 0.2% of sales on average in 2020-2021

Table 1. 2018 DNREC Performance Metrics

Annual Electric Energy Savings (MWh)	8,558
Annual Electric Demand Savings (kW)*	3,169
Annual Natural Gas Savings (MMBtu)	10,521
Program Spending (Millions)	$3.8
Benefits (Millions)**	$10.3

Table 5. 2018 DESEU Savings by Program

	Annual Electric Energy Savings (MWh)	Annual Electric Demand Savings (kW)*	Annual Natural Gas Savings (MMBtu)
Commercial & Industrial	5,282	2,013	79,741
Energy Assessments for Non-Profits	20	7	76
Faith Efficiencies Partnership	7	3	-
Farm Program	12	72	786
Pathways to Green Schools	50	19	-
Performance Contracting	2,614	962	62,075
Revolving Loan Fund	2,579	949	16,803
Residential	2,194	559	1,758
HPwES Program	2,174	554	1,758
Lewes BPW HPwES**	20	5	-

Conclusions and Next Steps

- Plenty of cost-effective gas energy efficiency potential exists in Delaware
- Somewhat more potential in the C&I sector, but also lots of residential opportunity
- Many successful gas efficiency programs designs to draw on from across the country
- Some programs that save gas are already running in Delaware
- Opportunity for collaboration between program administrators
- Delmarva and Chesapeake will need to file program plans with the PSC to implement gas programs

Thank you! Questions?