Opinion Dynamics

AESP Resilience Topic Committee

Natural Gas Energy Efficiency in the Age of Climate Goals

Q3 2023

The Key Questions:

Will removing natural gas energy efficiency incentives:

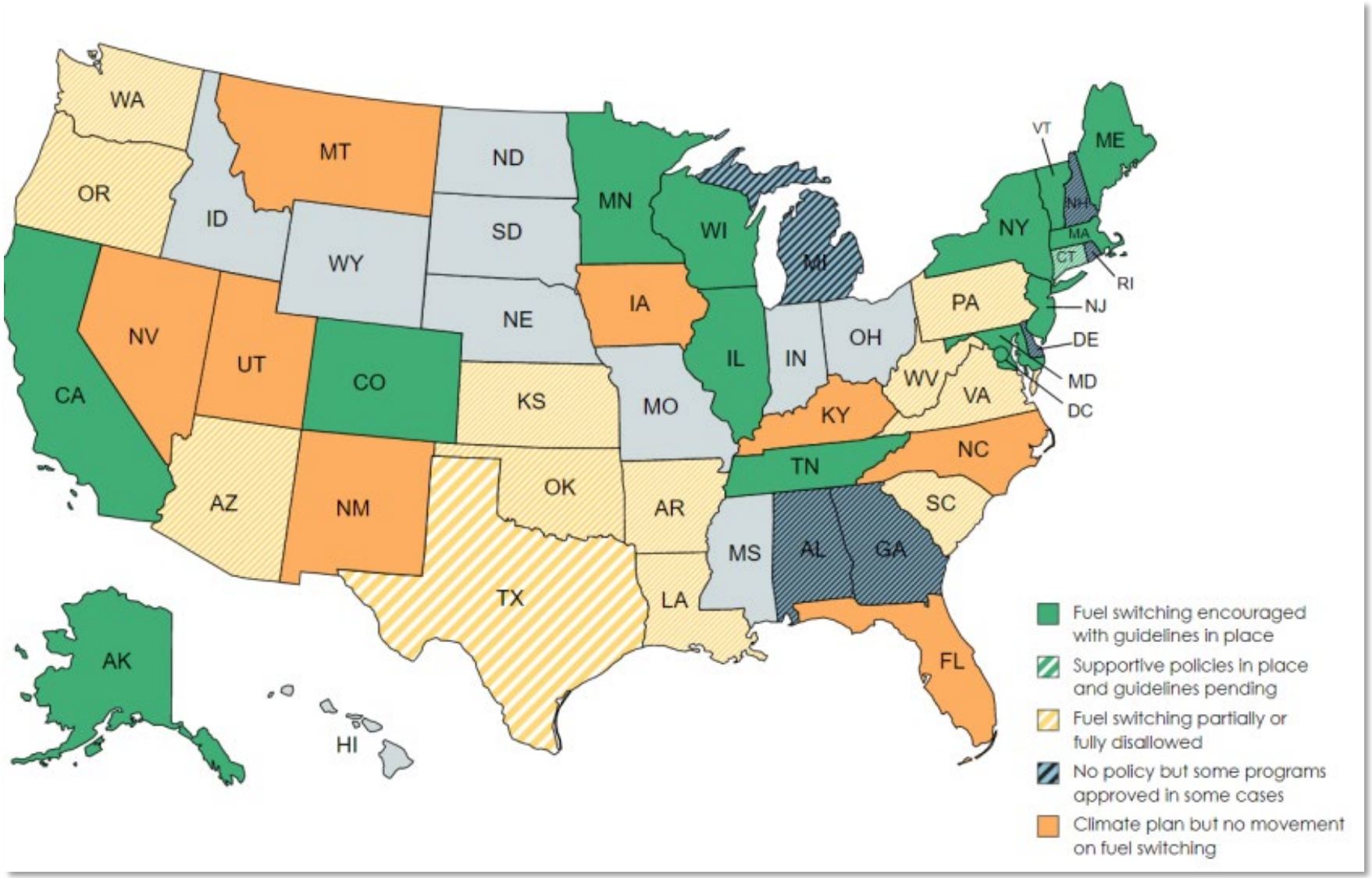
Result in customers choosing to electrify or choosing to purchase less-efficient natural gas equipment?

Result in greater inequity and/or higher energy burden?

Opinion **Dynamics**

SUPPORTING SLIDES

Fuel Switching Policy as of 2022



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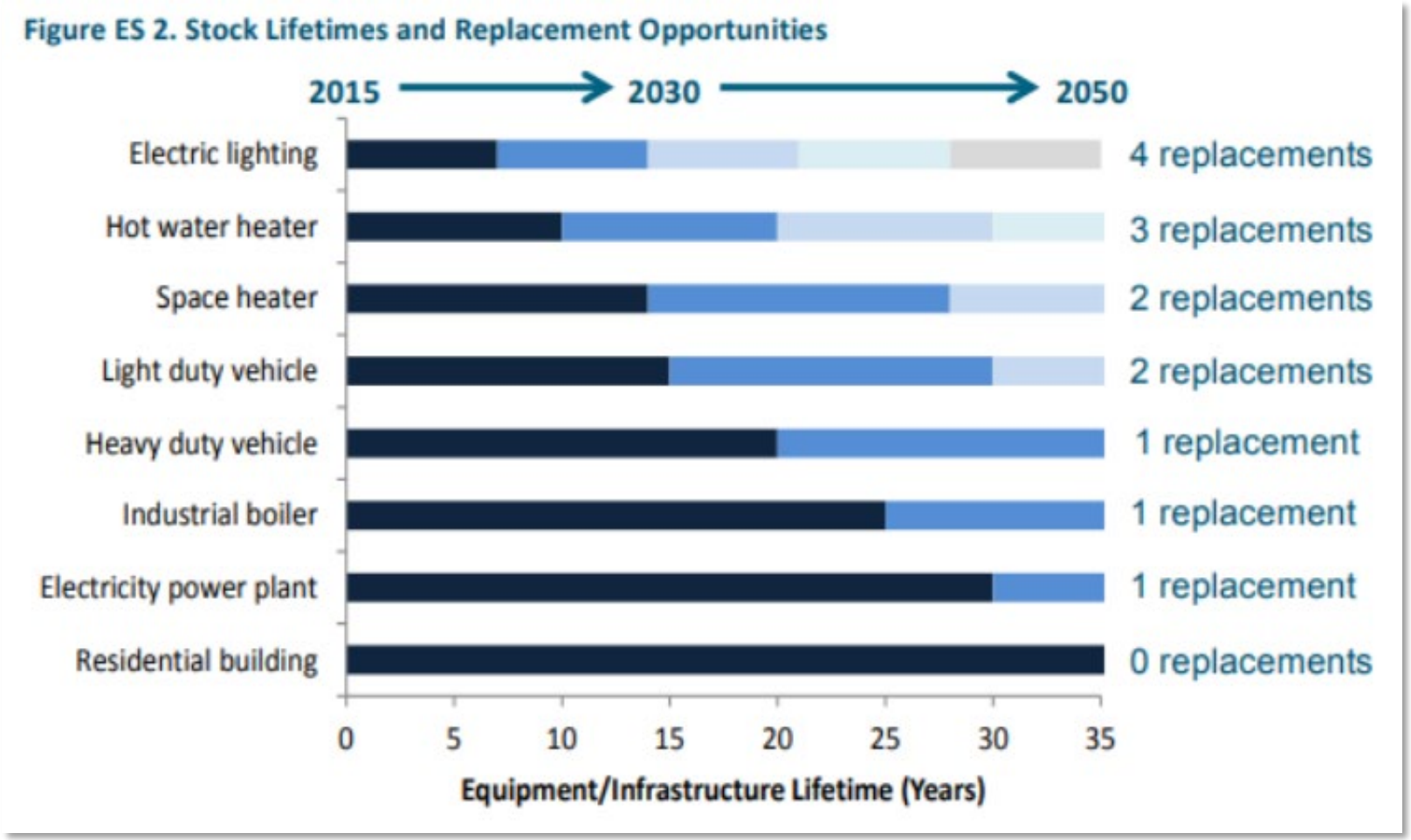
From ACEEE's draft report on fuel-switching policy (2022)

Runway to 2050



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Role of the Regulator

COMMERCE DEPARTMENT

Minnesota Energy Conservation & Optimization Act

NARUC Webinar
May 26, 2022

Efficient Fuel-Switching Criteria

A fuel-switching improvement is deemed efficient if . . . the improvement, relative to the fuel being displaced:

1. Reduces the amount of source energy consumed;
2. Reduces statewide greenhouse gas emissions over the lifetime of the improvement;
3. Is cost-effective, considering the costs and benefits from the perspective of the utility, participants, and society; and
4. Is installed and operated in a manner that improves the utility's system load factor.

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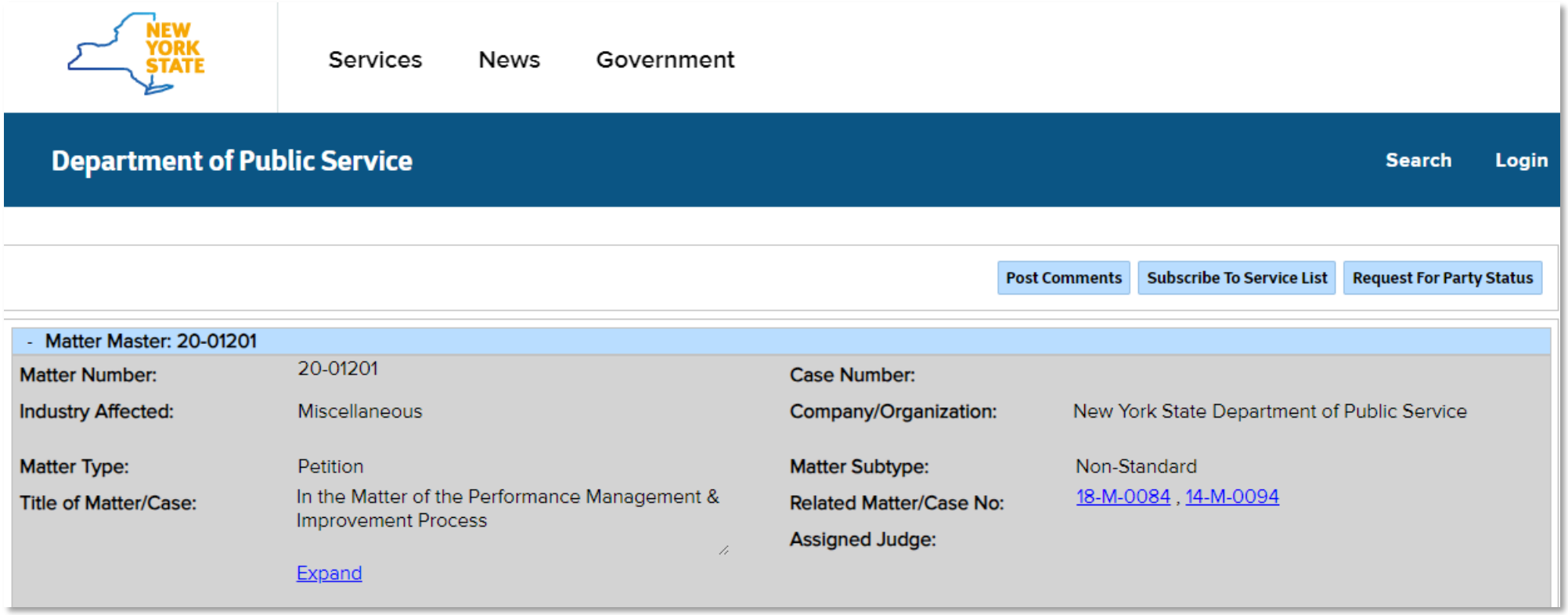
Role of the Regulator



https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=20-01201

Role of the Utility

NATURAL GAS GOAL DETAILS

Our strategy for natural gas will reduce methane and carbon dioxide emissions associated with the production, delivery and final use of natural gas in buildings.

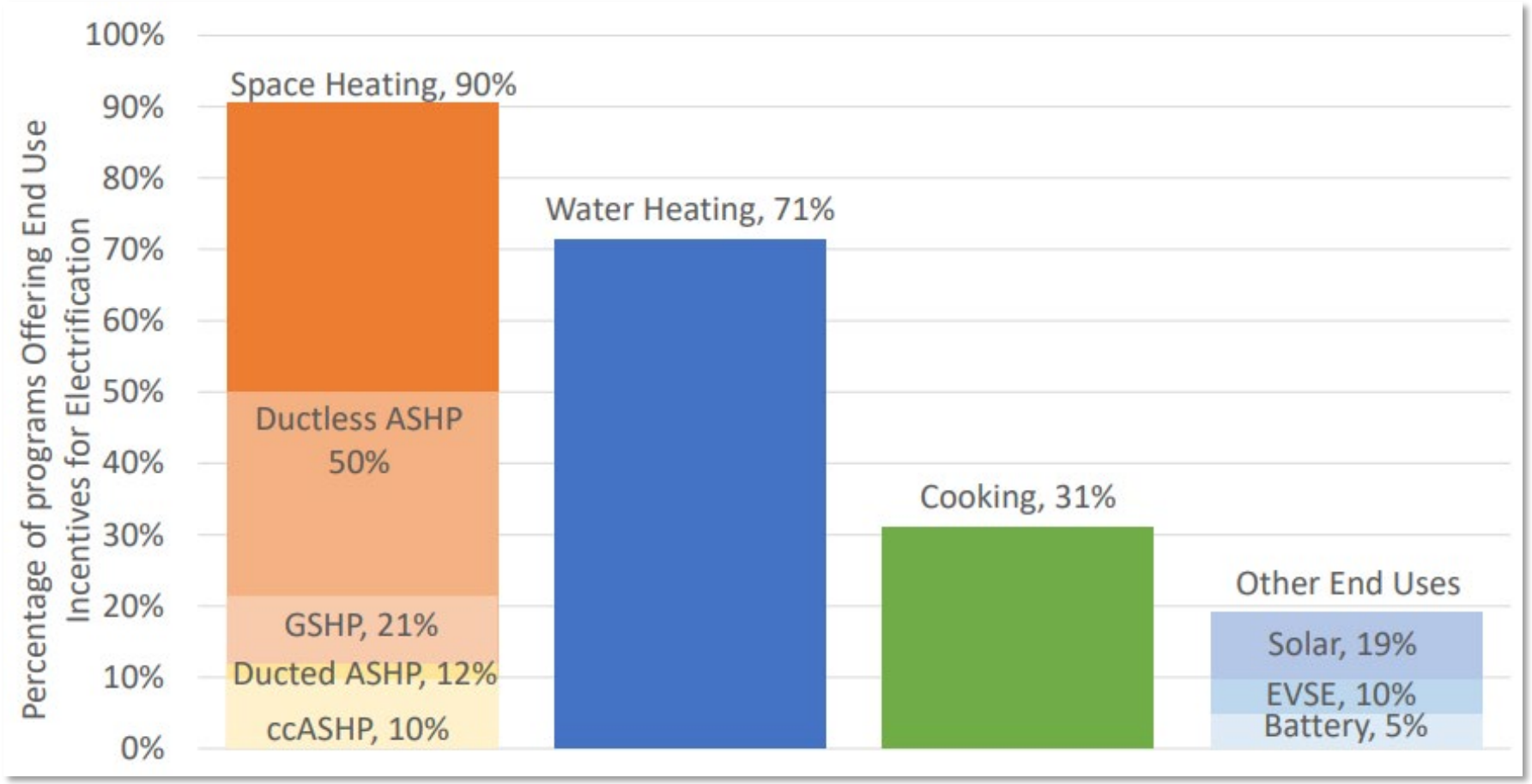
- By 2030, our goal is to reduce greenhouse gas emissions 25% below 2020 levels, achieve net-zero methane emissions and exclusively purchase certified natural gas for gas distribution and power generation.
- By 2050, our vision is to deliver gas service to customers with net-zero emissions

https://pubs.naruc.org/pub/39F566DE-1866-DAAC-99FB-4ADF774B5F54

Approach	Strategic Reduction Opportunities
Reducing Methane Emissions from Production and Delivery	Purchasing natural gas with a certified low methane emissions rate
	Operational and pipe material changes to reduce emissions on our system
	Leak detection and repair
Reducing Use	Expanding energy efficiency
Beneficial Electrification	All-electric new builds
	Grid-integrated, managed electric water heaters
	Heat pump systems with natural gas backup for cooling and heating
	District geothermal and other emerging technologies
Lower Carbon Supply	Renewable natural gas
	Hydrogen
	Power to gas
Negative Emissions	Carbon offsets
	Direct air capture

Xcel Energy®

Available Programs



https://pubs.naruc.org/pub/39F566DE-1866-DAAC-99FB-4ADF774B5F54

Citing:
Cohn, C., and N. W. Esram. 2022. Building Electrification: Programs and Best Practices. Washington, DC: American Council for an Energy-Efficient Economy. aceee.org/researchreport/b2201

Phasing by Sector

- Industry response to SAG recommendations in New York

JETRO Cash & Carry

Restaurant Depot — Where Restaurants Shop

April 21, 2022

To Whom it May Concern,

Restaurant Depot is a national wholesale cash and carry foodservice supplier based in Queens, NY that has been supplying independent food businesses with quality product[illegible] since 1990. We have participated in the Con Ed and National Grid in[illegible] equipment programs since they launched in 2017 with National Grid [illegible]

Since we first rolled out the program at 11 of our New York stores, w[illegible] our equipment sales to Energy Star products. We went from hardly ev[illegible] to selling almost exclusively Energy Star models to eligible customer[illegible] equipment such as fryers and convection ovens and electric equipmen[illegible] and ice makers. Since 2019, we have sold nearly 1,800 pieces of Ener[illegible] customers with instant rebates. We can confidently attribute this shift[illegible] programs because in our stores located in other states without these p[illegible] lower-cost, less-efficient equipment. Independent foodservice custom[illegible] conscious and so it is very challenging to sell equipment that is more[illegible] to operate.

Since we first rolled out the program at 11 of our New York stores, we have seen a dramatic shift in our equipment sales to Energy Star products. We went from hardly ever selling an Energy Star product to selling almost exclusively Energy Star models to eligible customers, including natural gas cooking equipment such as fryers and convection ovens and electric equipment such as refrigerators, freezers, and ice makers. Since 2019, we have sold nearly 1,800 pieces of Energy Star kitchen equipment to NY customers with instant rebates. We can confidently attribute this shift in sales to the instant rebate programs because in our stores located in other states without these programs, we typically only sell lower-cost, less-efficient equipment. Independent foodservice customers are extremely price-conscious and so it is very challenging to sell equipment that is more expensive up-front or over time to operate.

The COVID-19 pandemic has been extremely challenging for our cus[illegible] and we have been able to offer significant instant rebates at the cash r[illegible] also save our customers money over time through reduced energy bil[illegible] Most of our customers choose to purchase natural gas cooking equipr[illegible] costs of the equipment and the lower operating costs of gas versus ele[illegible] supplier partners do not currently offer electric cooking equipment th[illegible] gas models in up-front price, operational performance, or ongoing energy costs.

Reducing or eliminating rebates for gas kitchen equipment could lead to a majority of our customers going back to purchasing lower quality, inefficient gas equipment which costs them sometimes 30-40% more on their gas bills over time compared to the Energy Star m[illegible]

Reducing or eliminating rebates for gas kitchen equipment could lead to a majority of our customers going back to purchasing lower quality, inefficient gas equipment which costs them sometimes 30-40% more on their gas bills over time compared to the Energy Star models.

A better approach for the independent foodservice customers in New [illegible] expand the instant rebates programs for commercial natural gas and e[illegible] of New York state. The rebates should be adjusted over time as new e[illegible] mature in the market and the prices come down, but stopping gas reb[illegible] costly shift back to inefficient natural gas equipment.

Thank you for the opportunity to comment on this discussion. Please feel free to reach out to me with any questions at the contact information below.

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https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=20-01201

Phasing by Sector

- California Commercial Kitchen study undertaken by Energy Solutions as part of CalNEXT ENERGIZING CALIFORNIA'S FUTURE

Estimated Demand Cost Increase per Facility

Category	Existing Annual Peak Demand Cost	All-Electric Peak Demand Cost	Additional Annual Peak Demand Cost
Quick Service	$5,500	$10,400	$4,990
Full Service	$7,490	$14,900	$7,420
Institutional	$3,400	$6,200	$1,640

Average Cost of Electrical Upgrades

Category	Average Number of Equipment Converted	Total Cost Per Site
Quick-Service	5	$123,000
Full-Service	8.2	$160,000
Institutional	4.8	$40,000

Category	Number of Facilities	Total Market Cost (Billions)
Quick-Service	40,477	$4.99
Full-Service	29,137	$4.67
Institutional	20,002	$.81
Total	89,616	$10.46

https://www.etcc-ca.com/sites/default/files/CalNEXT_Presentation_Aug29.pdf

Equity Always

Low-Income Multifamily Housing Characteristics Study

Kevin McGrath / Project Lead
Whole Buildings, HVAC, Water Heating
Electrical Infrastructure, High-Efficiency HVAC, etc.
TSR

Field Study High Level Findings to Date

- Most buildings with multiple electric subpanels but sizeable portion with only one main electric panel
- Panel upgrades will be needed for electrification in units served by gas
- HP HVAC penetration is low in both units and common areas; common area HVAC typically different from residential units
- Common window type (sliders) may limit opportunity for some newer HP HVAC technologies
- Most DHW central or small clustered, opportunity for large electrification upgrades but potential for transformer limitations
- Stucco is common exterior wall material and likely minimal insulation material
- Common area laundry rooms are prevalent, mostly existing gas dryers – opportunity for replacement with HP dryers with infrastructure upgrades
- Potential lighting opportunities: less than half of properties with >75% LED penetration

Industrial Heat

Table ES1. Cost and performance characteristics for industrial heat pumps and three alternate technologies in 2021

	Natural Gas Steam Boiler	Natural Gas CHP	Electric Boiler	Heat Pump (80-100°C)	Heat Pump (100-180°C)
Efficiency/COP	0.95	0.85	0.99	3.7	2.2
Full load hours (hours/year)	2000	6000	2000	6000	6000
Capex ($/kW)	234	900	175	700	870
Capex ($/MWhth)	12	12	14	19	23
Non-energy opex ($/MWhth)	6	3	3	2	3
Fuel/electricity cost ($/MWhth)	18	35	75	20	34
Total cost ($/MWhth)	36	50	92	41	60

Capex = capital expenditures (excluding installation/integration costs). Non-energy opex = annual operational expenditures other than energy, such as staffing and maintenance. CHP = combined heat and power. COP = coefficient of performance, a measure of efficiency where 1.0 is complete conversion of input energy to usable heat. MWh = megawatt hours of fuel or electricity input. MWhth = megawatt hours of thermal (heat) output.

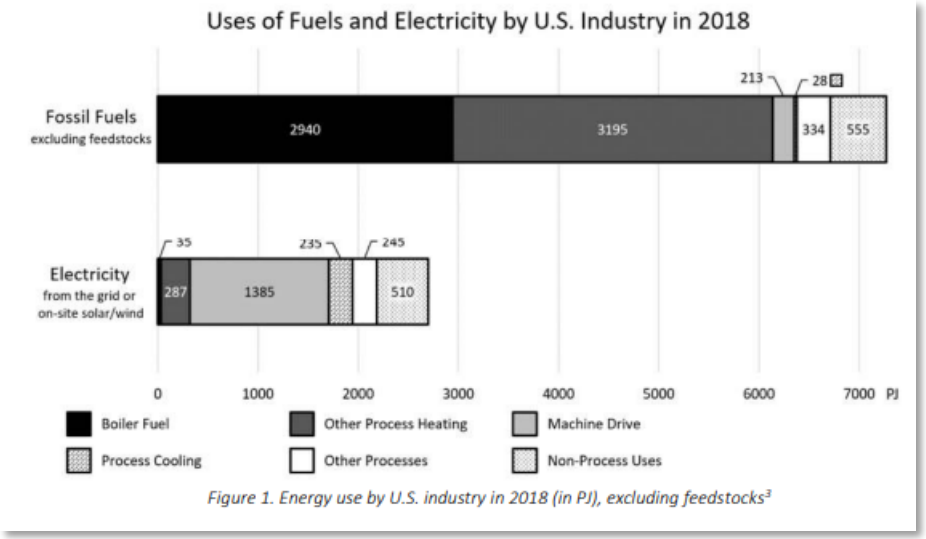

Figure 1. Energy use by U.S. industry in 2018 (in PJ), excluding feedstocks[3]

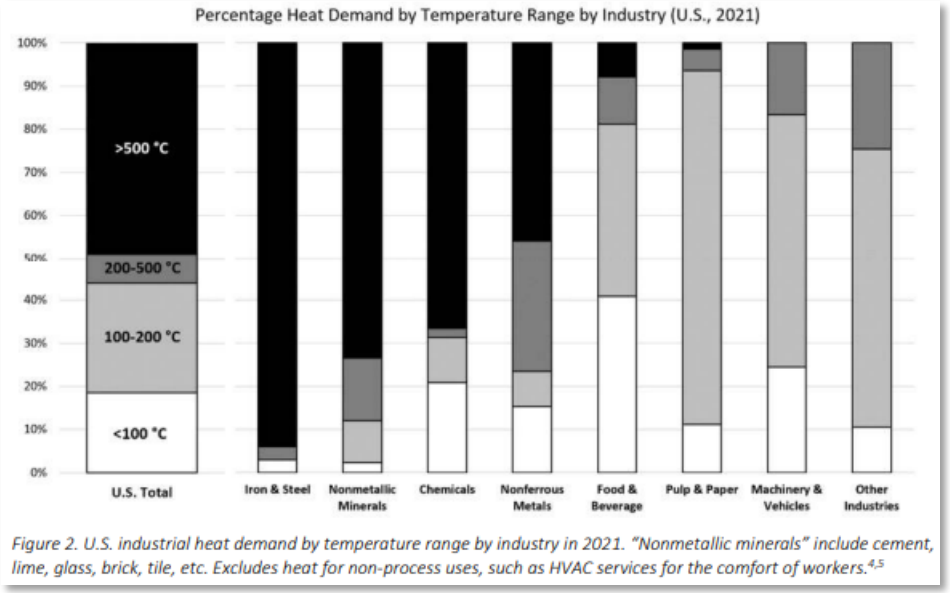

Figure 2. U.S. industrial heat demand by temperature range by industry in 2021. "Nonmetallic minerals" include cement, lime, glass, brick, tile, etc. Excludes heat for non-process uses, such as HVAC services for the comfort of workers.[4,5]

https://energyinnovation.org/wp-content/uploads/2022/10/Decarbonizing-Low-Temperature-Industrial-Heat-In-The-U.S.-Report-2.pdf

3. U.S. Energy Information Administration, "2018 Manufacturing Energy Consumption Survey," 2021, https://www.eia.gov/consumption/manufacturing/data/2018/.
4. U.S. Energy Information Administration, "Annual Energy Outlook 2022," 2022, https://www.eia.gov/outlooks/aeo/tables_ref.php.
5. Fraunhofer Institute, *Mapping and Analyses of the Current and Future (2020 - 2030) Heating/Cooling Fuel Deployment (Fossil/Renewables)*, 2016, https://ec.europa.eu/energy/sites/ener/files/documents/mapping-hc-final_report_wp1.pdf.

ACEEE Recommendations

ACEEE Recommendations for Incorporating Beneficial Electrification into Utility Programs

Recommendations for Regulators

- Remove barriers to fuel switching incentives
- Value climate/GHG impacts in cost effectiveness testing

Recommendations for State Legislators, Government Leaders

- Set concrete building electrification targets within climate plans
- Provide funding for programs for hard-to-reach sectors
- Adopt clean energy/net zero building codes
- Provide workforce training and incentivize heat pump adoption

Recommendations for Utilities

- Expand program offerings
- Phase out incentives for fossil fuel equipment

Recommendations for Contractors

- Receive education and training to install heat pumps

Recommendations for Homeowners and Property Managers

- Plan ahead for replacement of fossil fuel equipment
- Implement energy efficiency and weatherization alongside electrification

Recommendations to Support LMI Households

- Consider partnering with/ tailoring utility programs for affordable housing
- Electrification programs, measures, and incentives should be braided into existing energy efficiency programs

Source: Cohn, C., and N. W. Esram. 2022. Building Electrification: Programs and Best Practices (2022).

https://pubs.naruc.org/pub/6BA9D078-1866-DAAC-99FB-86D90B4B3DAE?_gl=1*23qvft*_ga*MTIwOTAwMzg5My4xNjkyMTM4NTY1*_ga_QLH1N3Q1NF*MTY5NTc1Mzc0NC40LjEuMTY5NTc1MzgzOS4wLjAuMA..

Opinion Dynamics

Thank you!

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