

**Q.** WHAT AMAZING ENERGY-SAVING DEVICE...

1435 BROADRIPPLE TERRACE!

... CHEAP, LOW-TECH, EASY TO INSTALL ...

COPY THAT!

... IS BANNED BY NEARLY ALL OF CALIFORNIA'S 35,000 HOMEOWNERS ASSOCIATIONS?

THERE THEY ARE!

Andrews McMeel Syndication ©2001 G.B. Trudeau

www.doonesbury.com

**A. THE CLOTHESLINE.**

SIR! STEP AWAY FROM THE LAUNDRY!

DAMN... BUSTED!

www.doonesbury.com



# **BUILDINGENERGY BOSTON**

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## **Efficiency is Decarbonization**

**Heather Nolen (AEA)  
Andrew Padian (PadianNYC)**

**Curated by Tristan Grant (MaGrann Associates)**

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**Northeast Sustainable Energy Association (NESEA) | March 20, 2024**

# EFFICIENCY IS DECARBONIZATION

A DISCUSSION OF CARBON, FINANCING, AND OWNERS

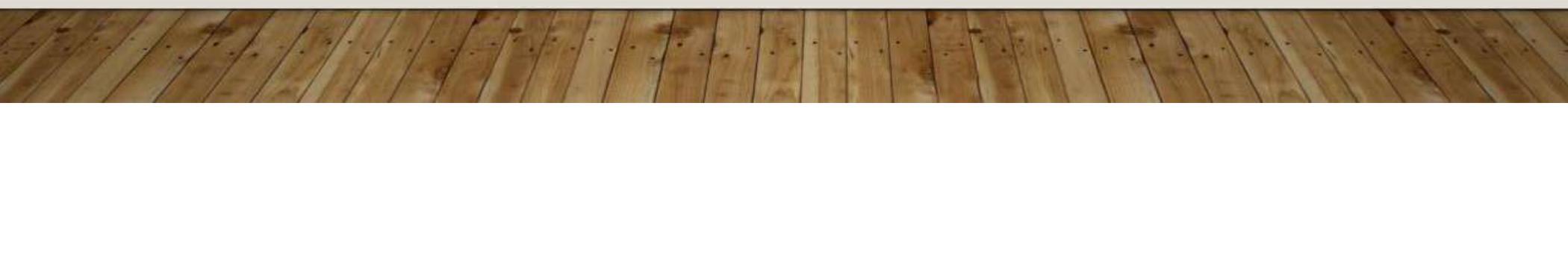
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**Heather Nolen, Association for Energy Affordability, Bronx, NY**

**[hnolen@aeacleanenergy.org](mailto:hnolen@aeacleanenergy.org), 603 738-1541**

**Andy Padian, PadianNYC, NYC, NY**

**[apadian@gmail.com](mailto:apadian@gmail.com), 212 586-2940**



## A FEW THINGS TO COVER TODAY, WE WILL BOUNCE AROUND A BIT

---

- **Introductions of us + you**
- **Some definitions, history, and case studies**
- **Lessons on environmentalism and psychology**
- **The intersection of Building Science, Financing, and decisions**
- **Lessons learned, lessons to learn, hopefully some levity**

# SURVEY/CALISTHENICS

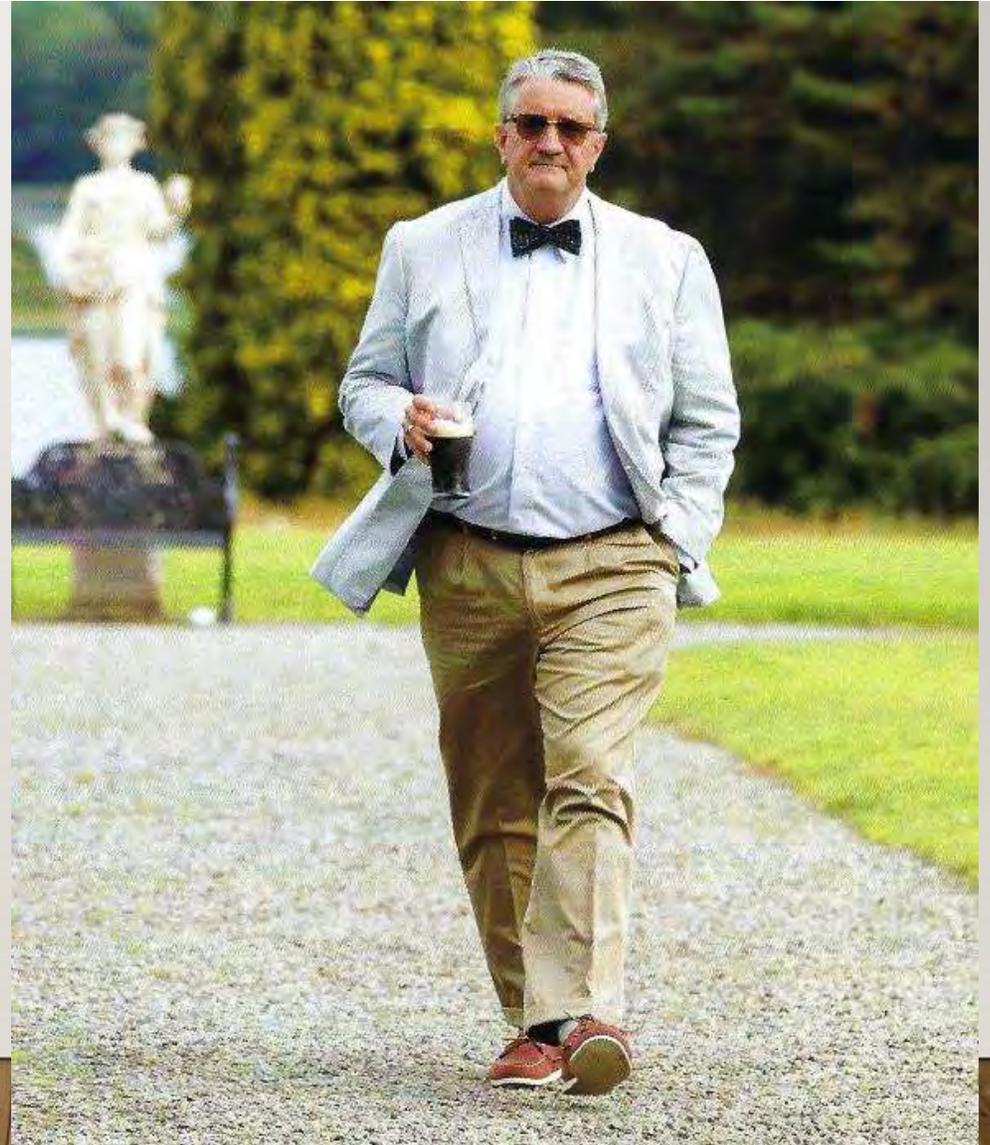
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- EE Program Managers/Staff?
- Builders/Contractors?
- Field Personnel??
- Gubment?
- Utility?
- Non-Profit?
- Product Rep/Supplier?
- Engineer/Architect?
- Student? University?
- Army/Navy/Air Force/Marines?
- Other?

- Benchmarking
- Audits – ASHREA, Resiliency, health
- Consultant
- Developed and delivered operations and maintenance training program



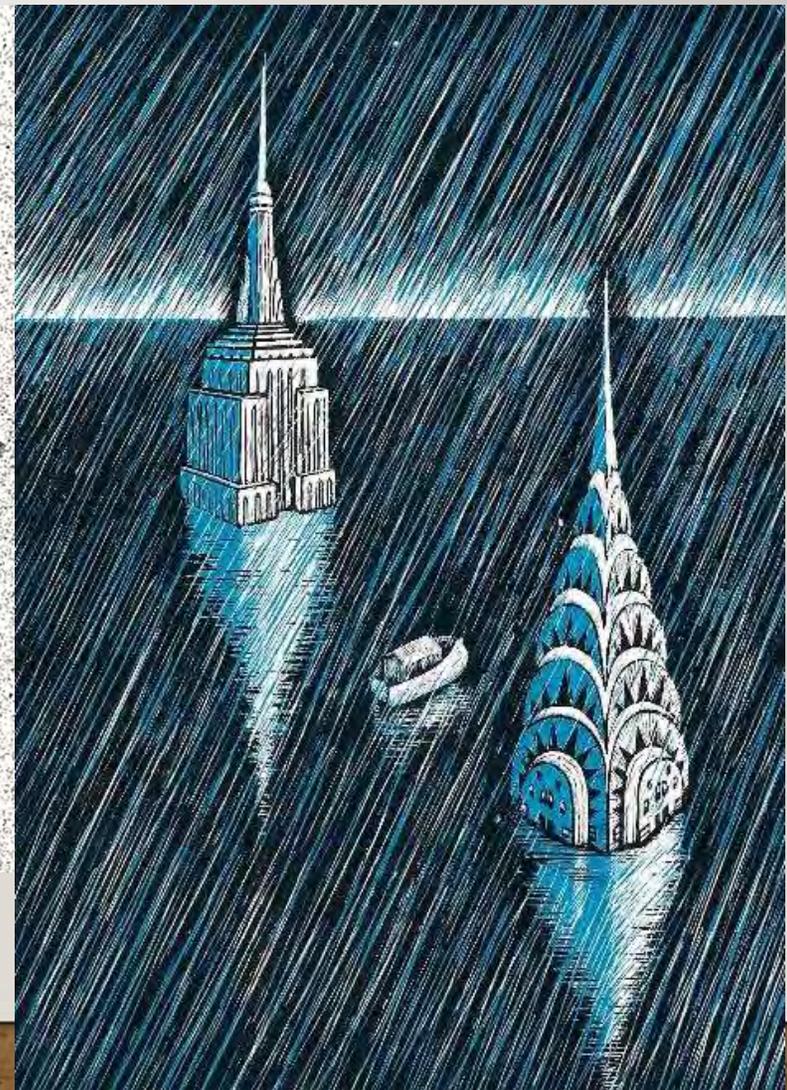
- Over 2000 ASHRAE II
- Sandy + Resilience
- Banking & Finance
- Private + NP Engineering
- Gubment
- Insultant, Primarily LI MF



# SEA LEVEL

BY

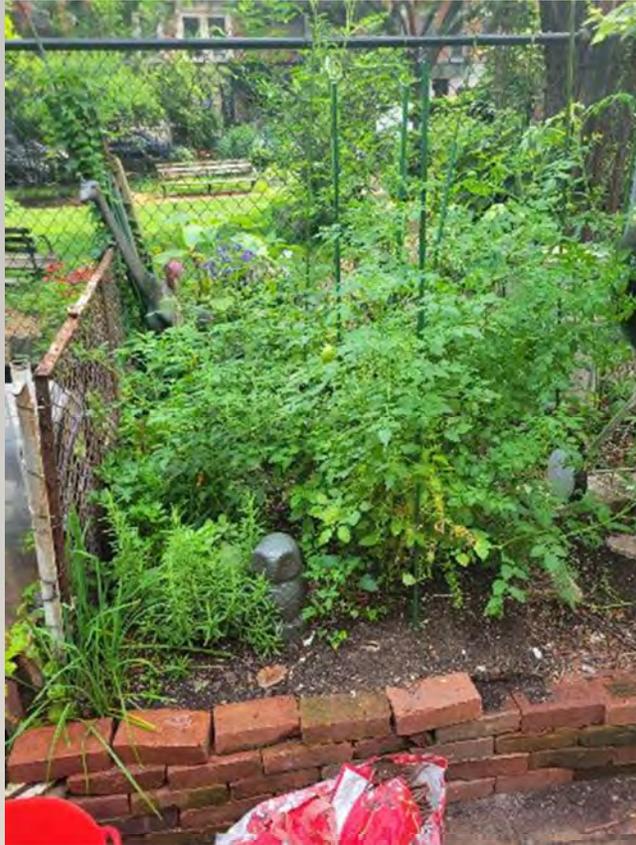
50



**SOME WAYS  
FOR SOME OF US TO  
DECARBONIZE**

HOW MANY ENVIRONMENTALISTS IN THE ROOM?

HOW MANY OF YOU COMPOST FOOD WASTE?



"If it were a country, food waste would be the third highest emitter of greenhouse gases on Earth, behind only China and the United States."

-Oliver Franklin-Wallis

Wasteland: The Dirty Truth About What we Throw Away



# NOW OPEN!

## COMPOST

### DROP-OFF SITE

IN BLOOMFIELD

Welcome Heather,

We're so excited to have you join our Drop-off Pilot Subscription Program! Please read through these VERY IMPORTANT directions. These details will always be available through your [account portal](#) under Service & Support.



**FREE FOR RESIDENTS**  
SIGN-UP TODAY! ➔

[www.javascompost.com/drop-off](http://www.javascompost.com/drop-off)



POWERED BY JAVA'S COMPOST

**7.25.19-  
7.24.20**

**Totals (Lbs.)**

**365 Days**

**Paper**

**Metal-glass-**

**Compost**

**Garbage**

**TOTALS**



53.4

790.7

40%

2.16 lb/day

% of

waste

oto

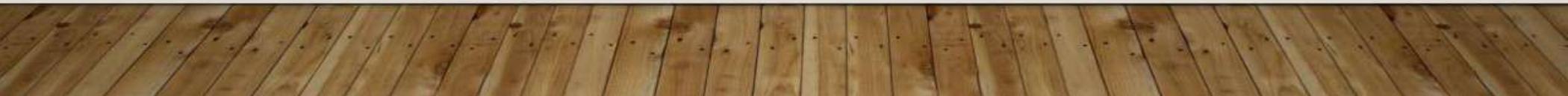
age



# WHO SAID THIS?

“Now we need efficiency and ingenuity more than ever. Each American uses the energy equivalent of 60 barrels of oil per person each year. Ours is the most wasteful nation on Earth. We waste more energy than we import.”

(Hint: Very Famous Nuclear Engineer)





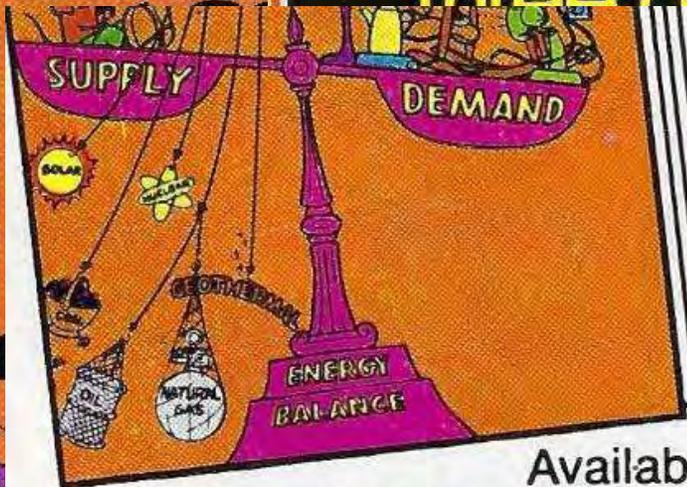
**“Moral Equivalent of War” (MEOW) speech  
April 18, 1977**

# WHY EFFICIENCY?

---

- Over half of it is DIY
- Simple, Safe, Inexpensive
- Taking Manufacturers & Contactors w/ +/-
- RESEARCH Good Sources with Results
- “No one sells something ahead of their product”
- Efficiency helps question authority

# MICK



Now you can use these  
**three proven resources** in your

experts:



energy—and a chart depicting energy consumption for America's first 200 years.

Available in limited quantities without charge:  
 Public Affairs Department: *EXXON, U.S.A., P.O. Box 2180, Houston, Texas 77001*

## 3. The Wide World of Energy Multimedia Kit

If you're looking for a learning lab that explores

Available in limited quantities without charge:  
 Public Affairs Department: *EXXON, U.S.A., P.O. Box 2180, Houston, Texas 77001*

**Efficiency  
Curbs  
Catastrophic  
Waste!**





1982



# The Cold-Air Cops

by Roger Rawlings



Two Canadians make a business of arresting heat leaks. Their advice could retrieve your lost cash.

**S**ebastian Moffatt and Brendan Reid are experts at cutting fuel bills. Co-owners of Retrospectors, a Canadian company devoted to helping people improve the energy efficiency of their homes, they helped design inspection methods for Canada's national home energy auditing program. They've written several publications for the Canadian government, including a manual that tells homeowners about practical home weatherization techniques. Sebastian and Brendan have their offices at 176 Edmonson Avenue in Ottawa, a city where midwinter temperatures often fall as low as -40°F. The experience they've gained fighting that kind of climate makes their opinions worth listening to, even if you live in a balmy part of the world.

Recently I visited the Retrospectors.

"Every house is full of holes," Sebastian said. "The art of home weatherization can be reduced to two simple steps: 1) Find the holes, and 2) Plug them."

"What people see about improving their homes' energy efficiency," he continued, "they automatically think of insulation. That's fine. But there's something else they should think about that would be much more effective: fixing caulk and weatherstripping to seal the leaks in their houses."

Up to half the heat loss in a typical home is caused by openings that permit heated indoor air to seep and cold outdoor air to enter the house. Accord-

ing to Sebastian, sealing these openings is the first priority. "You definitely should do it before you insulate," he said. "For one thing, caulk and weatherstripping are considerably cheaper than insulation. For another, insulation your home does very little good if the indoor air can simply bypass the insulation and escape to the outdoors. I've been in insulated cities that were actually dusty because so much warm air was seeping there from the rooms below. The owners of those houses were getting very little benefit from the insulation they had installed."

Brendan named a couple of other reasons to seal your house before insu-

lating. "It's far easier to find the leaks and plug them before you bury them under insulation," he said. "If household air is leaking into your attic and you proceed to spread insulation up there, you may actually have to pull up some of the insulation again—a very unpleasant job—to get at the leaks."

They then see a potential problem with moisture. Imagine the situation if you insulate a wall without taking care of any cracks in the wall first. Moist air from the house would be able to enter the wall and become the insulation but, however, the temperature inside the wall condensation could accumulate there. At the best, condensed water vapor

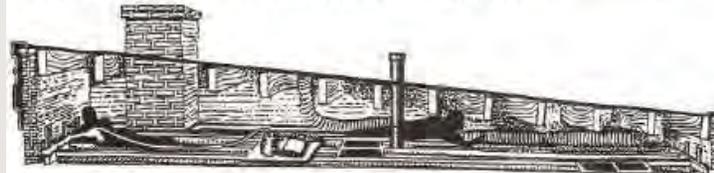
PHOTOGRAPHS BY ROGER RAWLINGS

PHOTOGRAPHS BY ROGER RAWLINGS

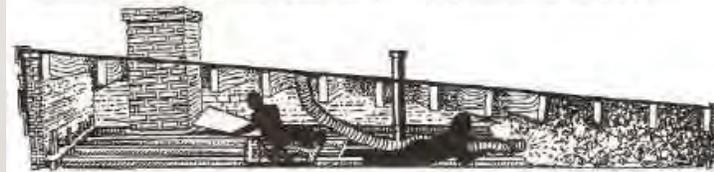
1992



Inspect for roof leaks and weak ceilings. Note bypass locations from below (duct chases, closets, ceiling height changes, etc.). Cut an access hole big enough for a person but small enough for a foot vent.



Crawl to rear as far as possible and seal accessible bypasses. Dense-pack rear wall perimeter and unreachable bypasses up to roof deck. Other crawler can directly seal bypasses in front section such as framing space shown.



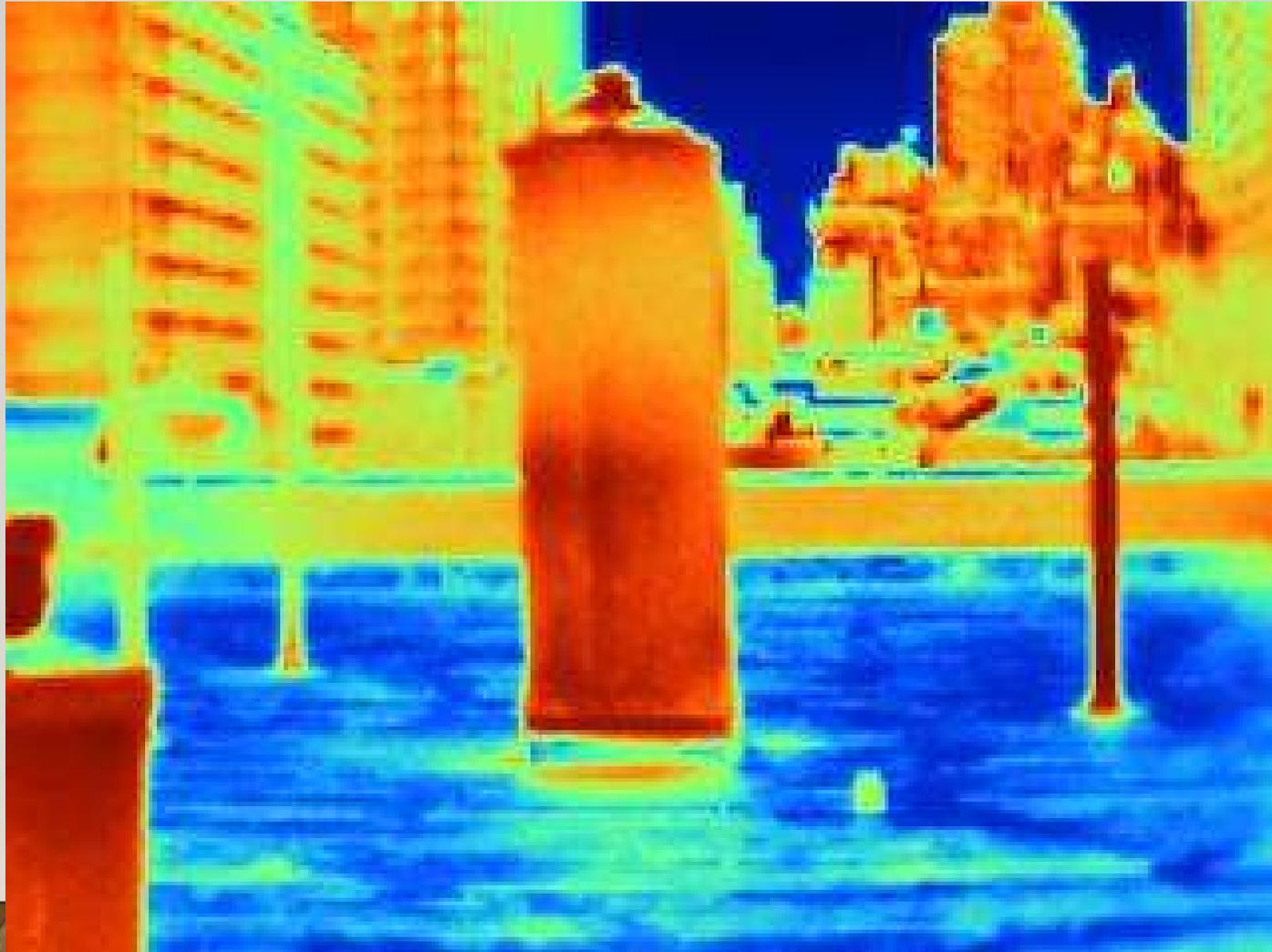
Rear crawler continues to dense-pack while the front crawler directly seals more bypasses. Here, the chimney pipe has been sealed and the adjacent duct chase is being capped and sealed.



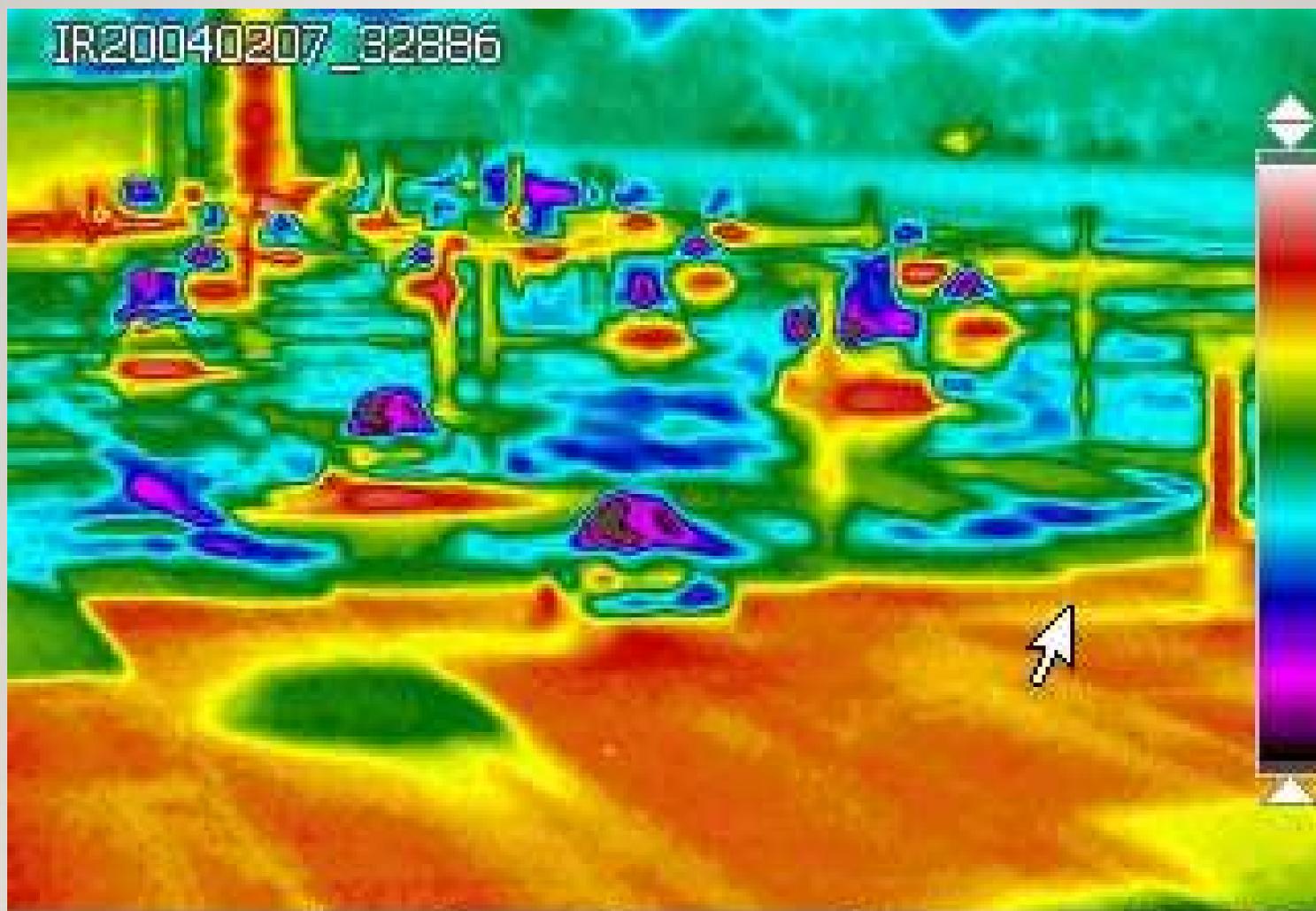
After dense packing is done, both crawlers continue to seal bypasses. Here, front crawler is installing drop-ceiling pipe while rear crawler is forming plumbing stack bypass.



After all bypasses have been sealed, insulation blowing can be completed by one crawler. Be sure to allow for settling—read the bag and check your work with a bag course.







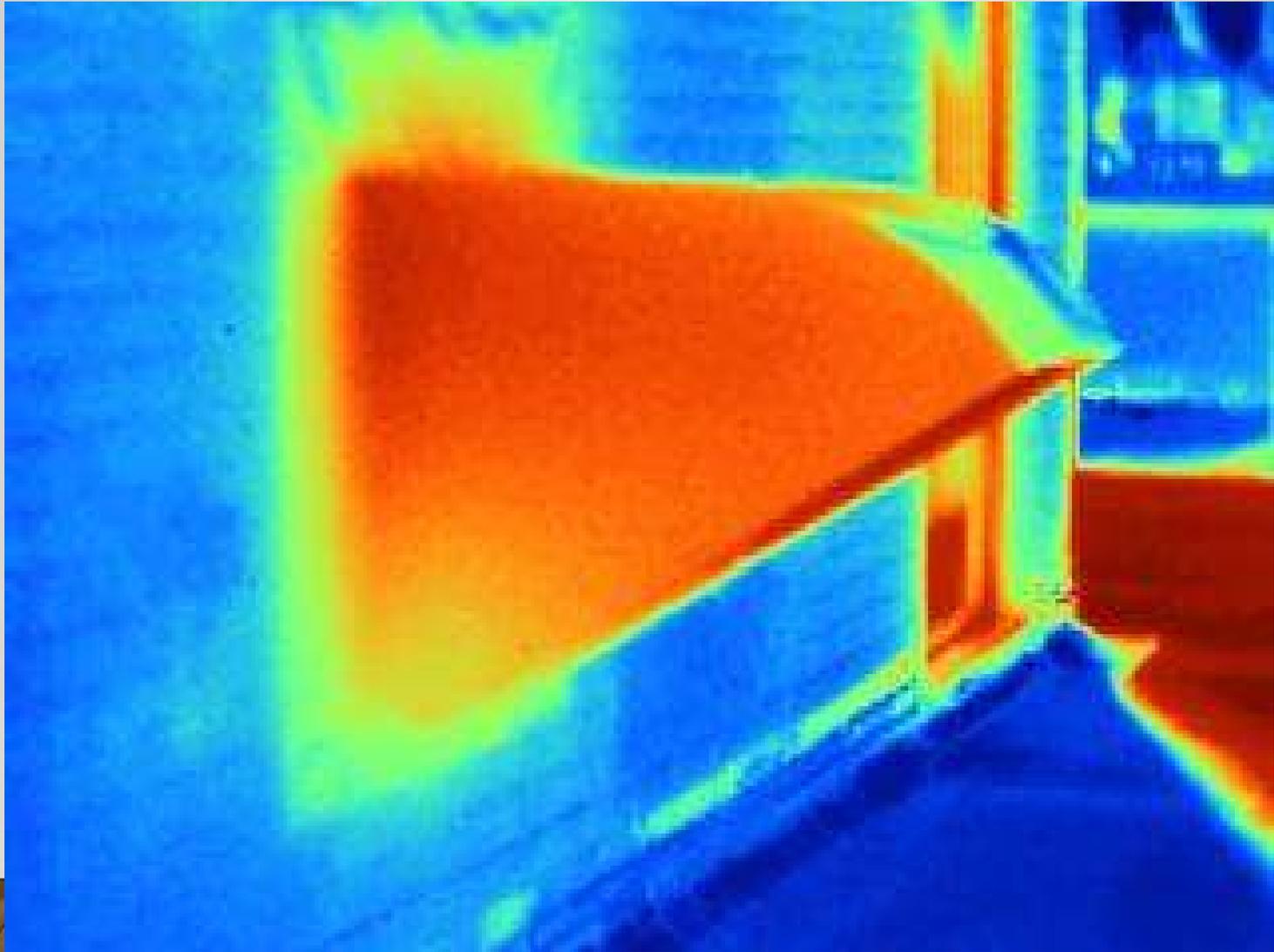
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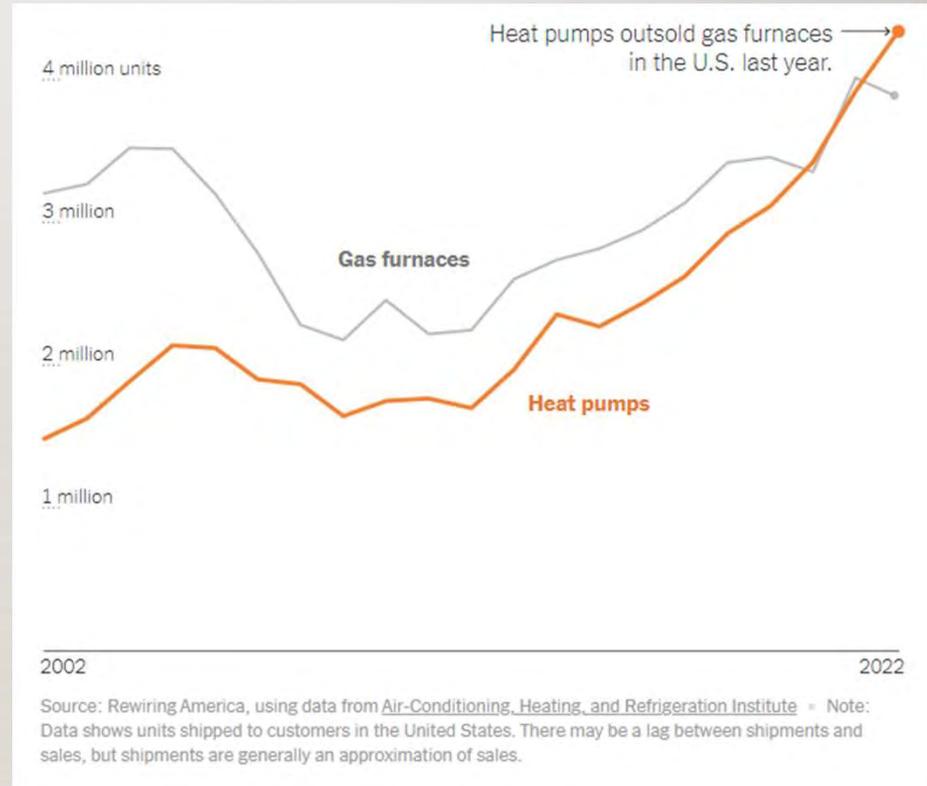
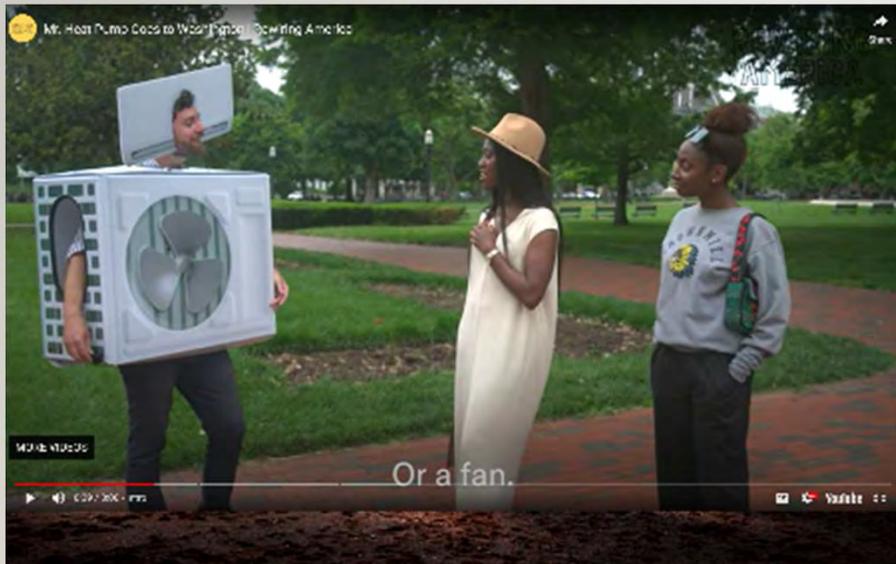




What have we not  
talked about?



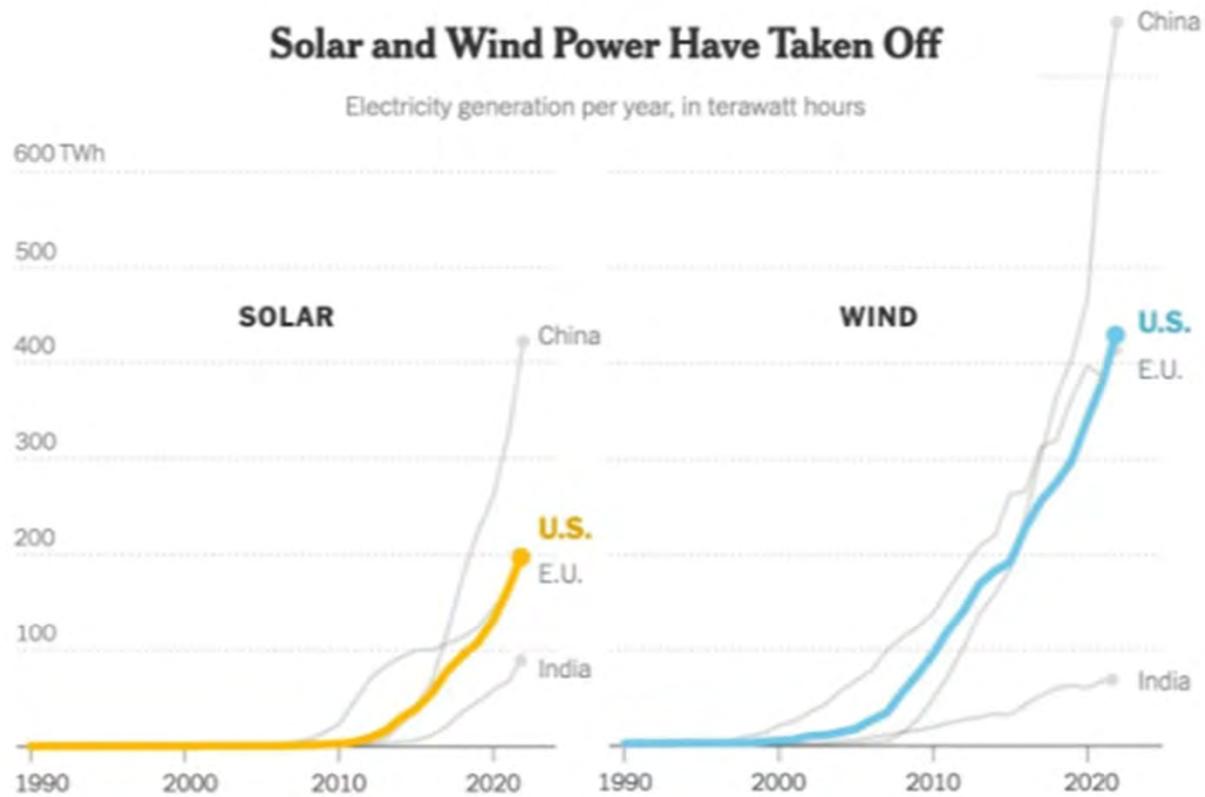
# Heat Pumps Go Mainstream



Source: New York Times

## Solar and Wind Power Have Taken Off

Electricity generation per year, in terawatt hours



Source: The Energy Institute's 2023 Statistical Review of World Energy - Note: Data reflects generation within country borders. - By The New York Times

Source: New York Times

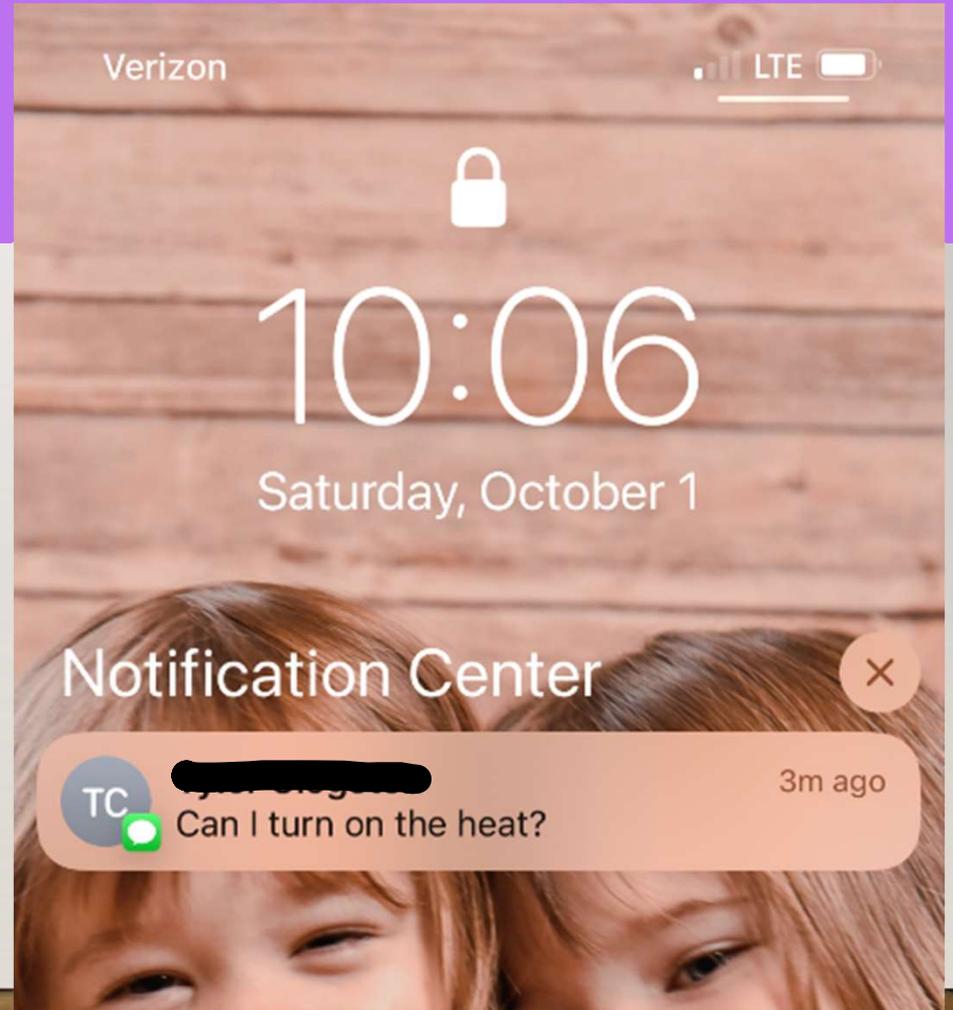
# ELECTRIC COOKING

## Bronx property

- Oil boiler, 1 pipe steam
- Gas for cooking
  - Issues with gas lines  
→ switched to electric cooking, 10 years ago
  - Now upgraded to induction
- Piloting heat pumps

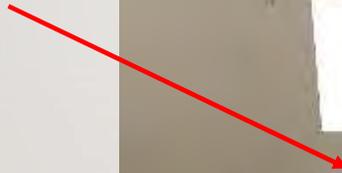


# HUMAN BEHAVIOR





Owner!



# WAP CASE STUDY

## Scope of work:

- Pipe insulation
- Windows – in-unit and common area
- Lighting – in-unit and common area
- Low flow water fixtures
- Refrigerators
- Ventilation added
- Roof and re-pointing





68

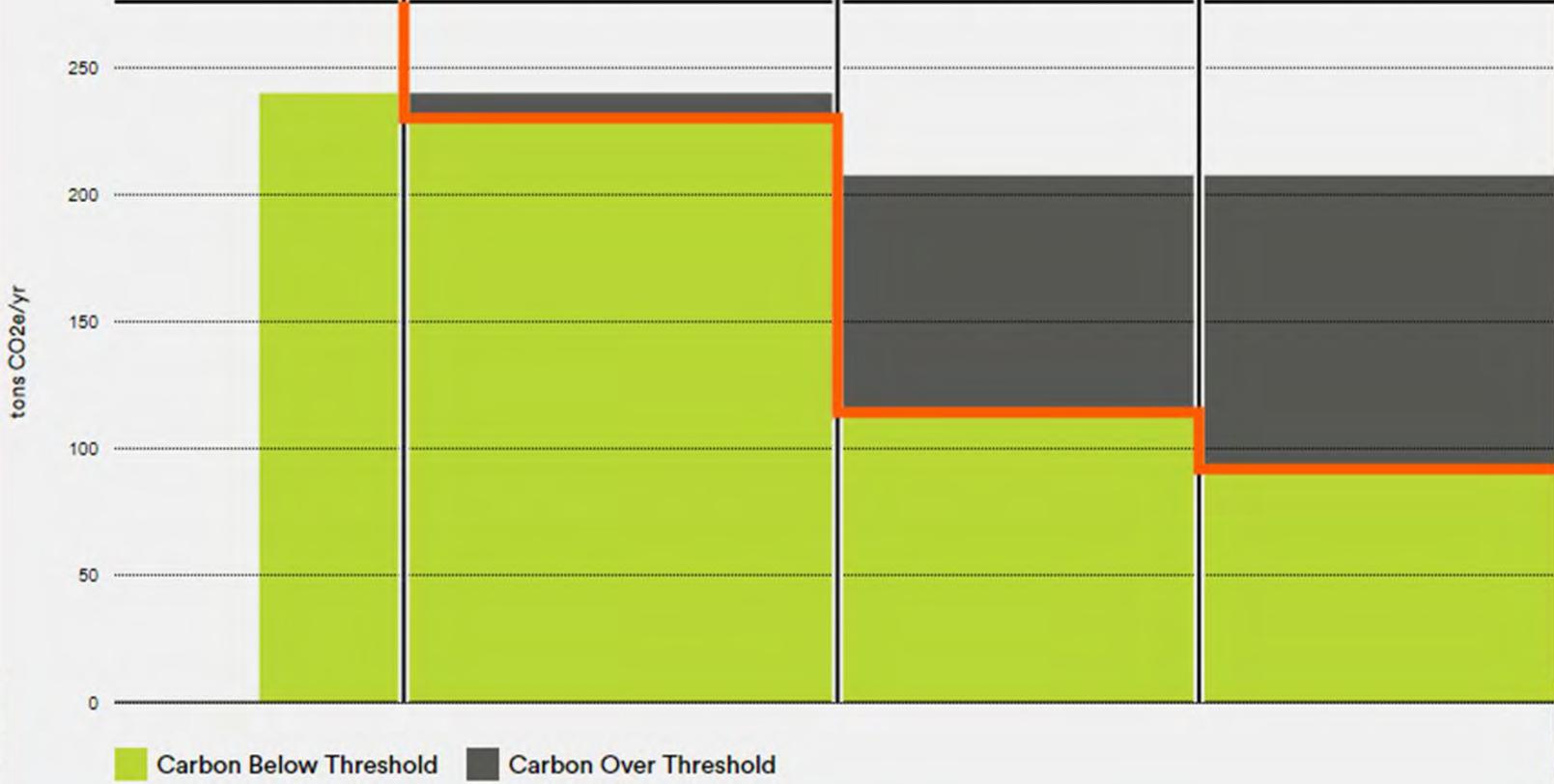
FOR RENT

FOR RENT

FOR RENT  
718-857-2544

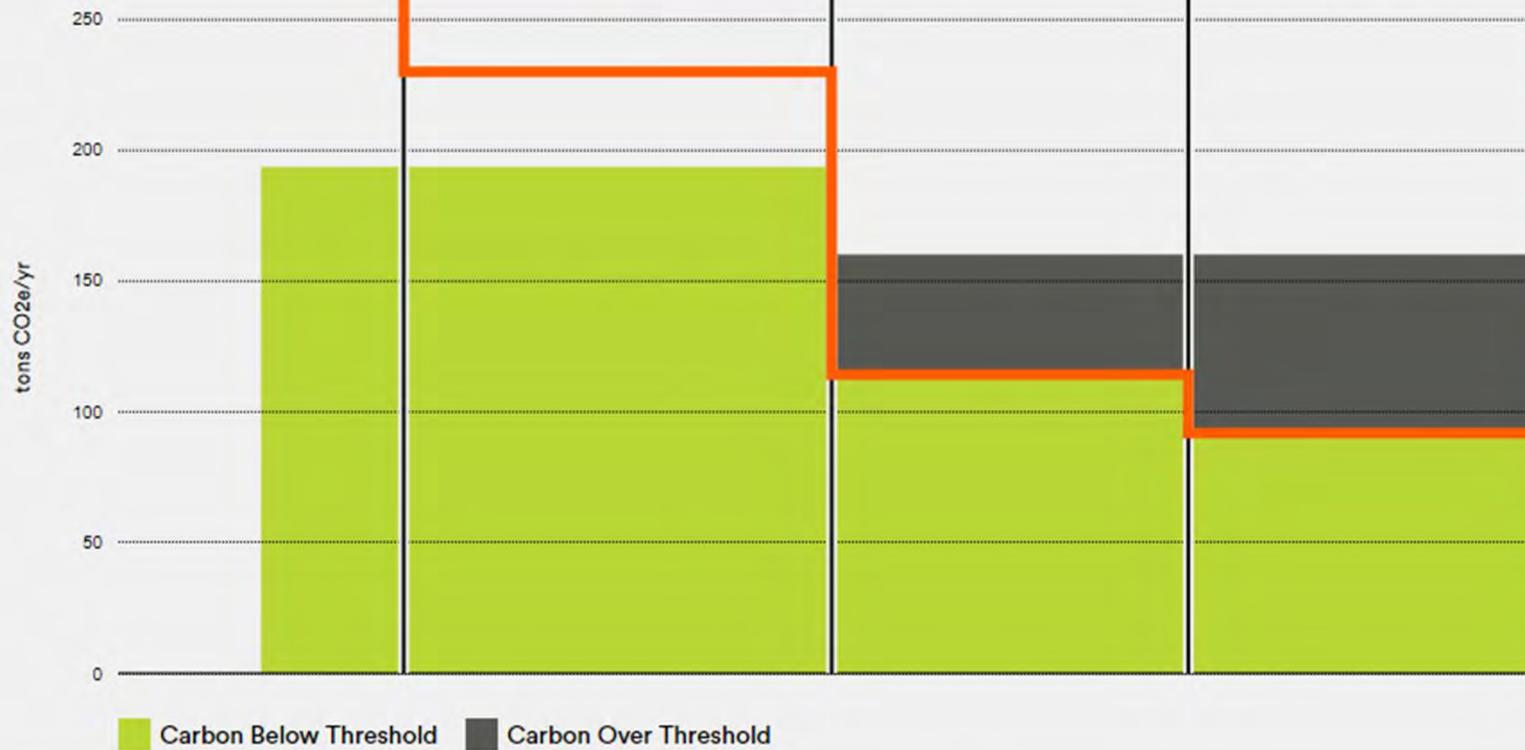
# Annual Carbon Threshold Summary

	2024-2029	2030-2034	2035-2039
<b>Emissions</b> (tCO <sub>2e</sub> /yr)	240	207	207
<b>Threshold</b> (tCO <sub>2e</sub> /yr)	230	114	92
<b>Est Penalty</b> (\$/yr)	\$2,679	\$25,029	\$30,996



## Annual Carbon Threshold Summary

	2024-2029	2030-2034	2035-2039
<b>Emissions</b> (tCO <sub>2</sub> e/yr)	193	160	160
<b>Threshold</b> (tCO <sub>2</sub> e/yr)	230	114	92
<b>Est Penalty</b> (\$/yr)	\$0	\$12,323	\$18,290



# HOW ARE YOU DECARBONIZING?

Evaluate energy efficiency options including

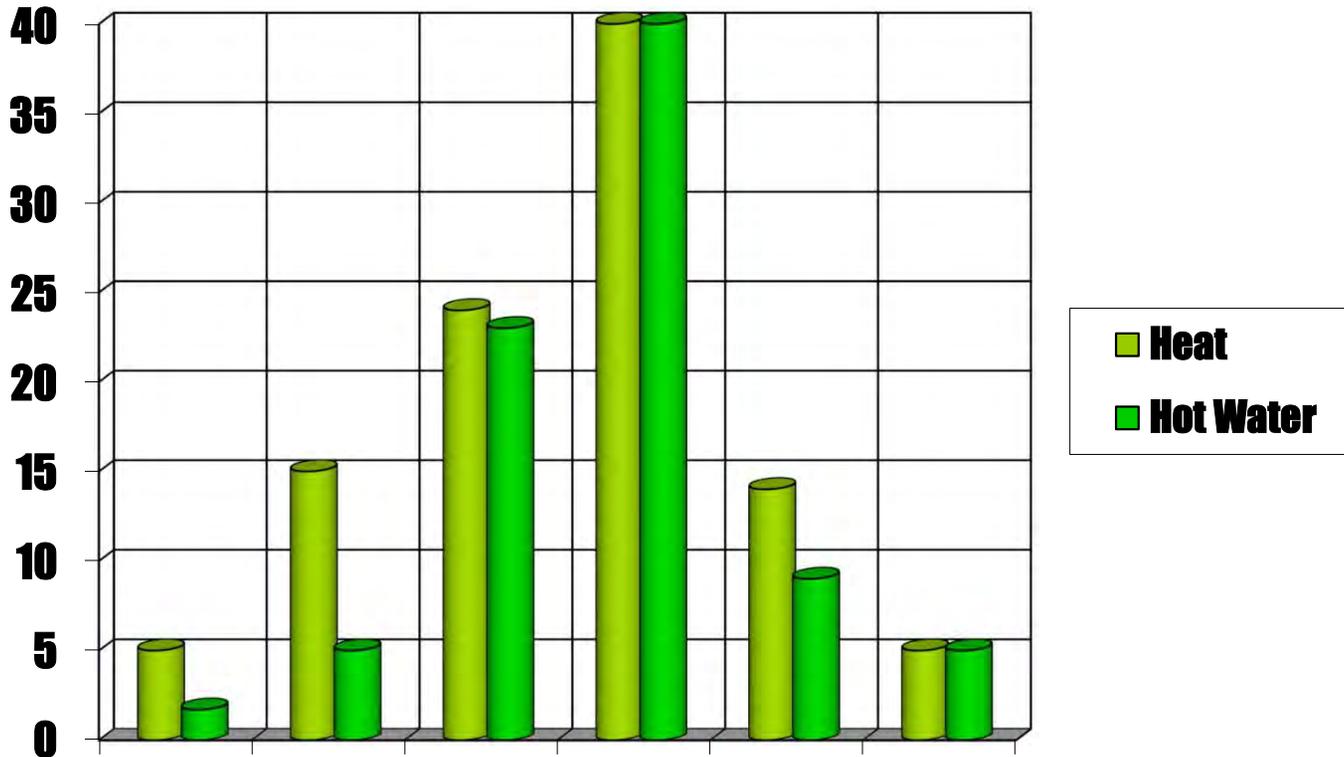
- Training
- Ventilation

Take local laws into account – NYC focus for carbon targets (LL97)

- Including LL97 prescriptive list in the WAP scope of work where possible

**THE NEXT PART:  
BEING PAID TO  
LEARN STUFF**

# RANGE OF ENERGY USAGE IN BUILDINGS



All listed in  
Btu/ft²/HDD

Single  
Family  
USA

Low  
Income  
Single  
Family  
NYS

Middle  
Income  
Multi-  
Family  
NYS

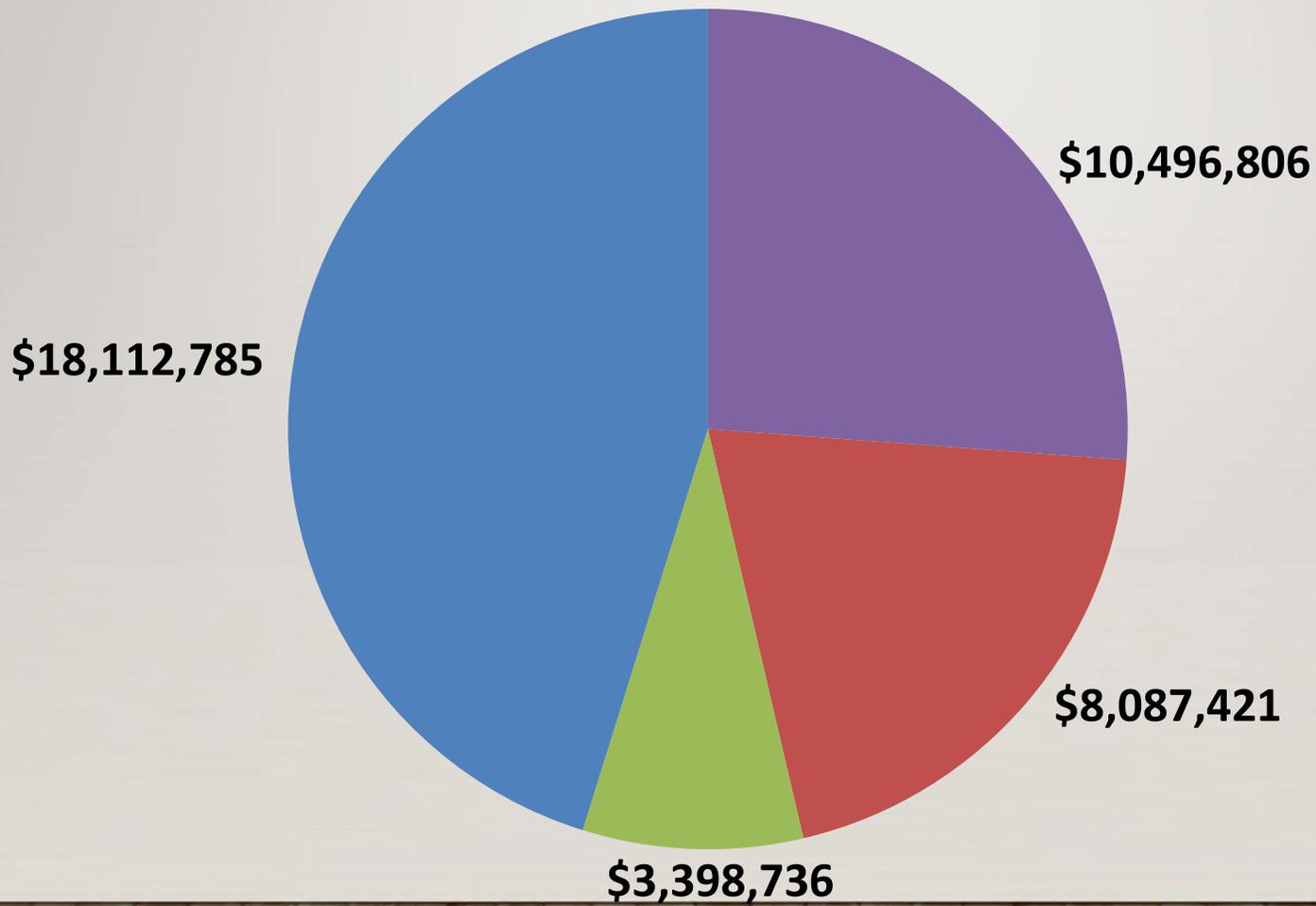
Selected  
New  
Afford.  
Rehabs  
NYC

Low  
Income  
Multi-  
Family  
NYS

Melrose  
Commons

**MF M&O Data  
Total Dollars  
750 BLDGS**

- Oil
- Gas
- Electricity
- Water





**This former 1873 engineering school converted to senior housing got attic air sealing and insulation. With heating and DHW replacement without raising historic preservation flags south of Albany NY.**

**22% Gas Savings**





The Auburn Housing Authority replaced every 1950's furnace and hot water maker in every unit, and replaced 19 roofs using HA funds. Lighting and refrigerators were also done in every apartment. Master metered for gas and electric, the building documented savings of 26.2% reduction in heating gas usage and 54.8% reduction in hot water and stove usage. All this considering since the retrofit, vacancy has gone from 20% to 3%.



This 131 unit electric heated, individually metered building had apartment airsealing performed and saw an average CFM 50pa reduction of 24%. New gas hot water makers were installed to replace older models. Common area and apartment lighting, refrigerators, and low flow showerheads and aerators were also installed. In less than one month, the building saw recorded 46% reduction in gas usage and 21% reduction in water usage. Apartment electric bills reduced by 25%.. North Street Apartments Canandagua, NY



**James Geddes Houses, a two block complex of the Syracuse Housing Authority that includes both low rise and towers, was retrofitted with sealed combustion furnaces, hot water makers, wall insulation in the low rise, and lighting, refrigerators, showerheads and aerators in all apartments. Another master metered building for gas heat and tenant electric, and another building where local private crews were kept employed. Buildings showed 26 to 41% reduction in base usage, and up to 23% reduction of heating usage.**



---

**DO AS I SAY, NOT AS I DO.....**



Switching to CFLs is a great idea. They can use 75% less energy than regular bulbs and last 10 times longer.



**conEdison**  
ON IT. THE POWER OF GREEN.

CFLs use 75% less energy than regular incandescent bulbs and last 10 times longer. CFLs are not recommended for use in enclosed spaces.

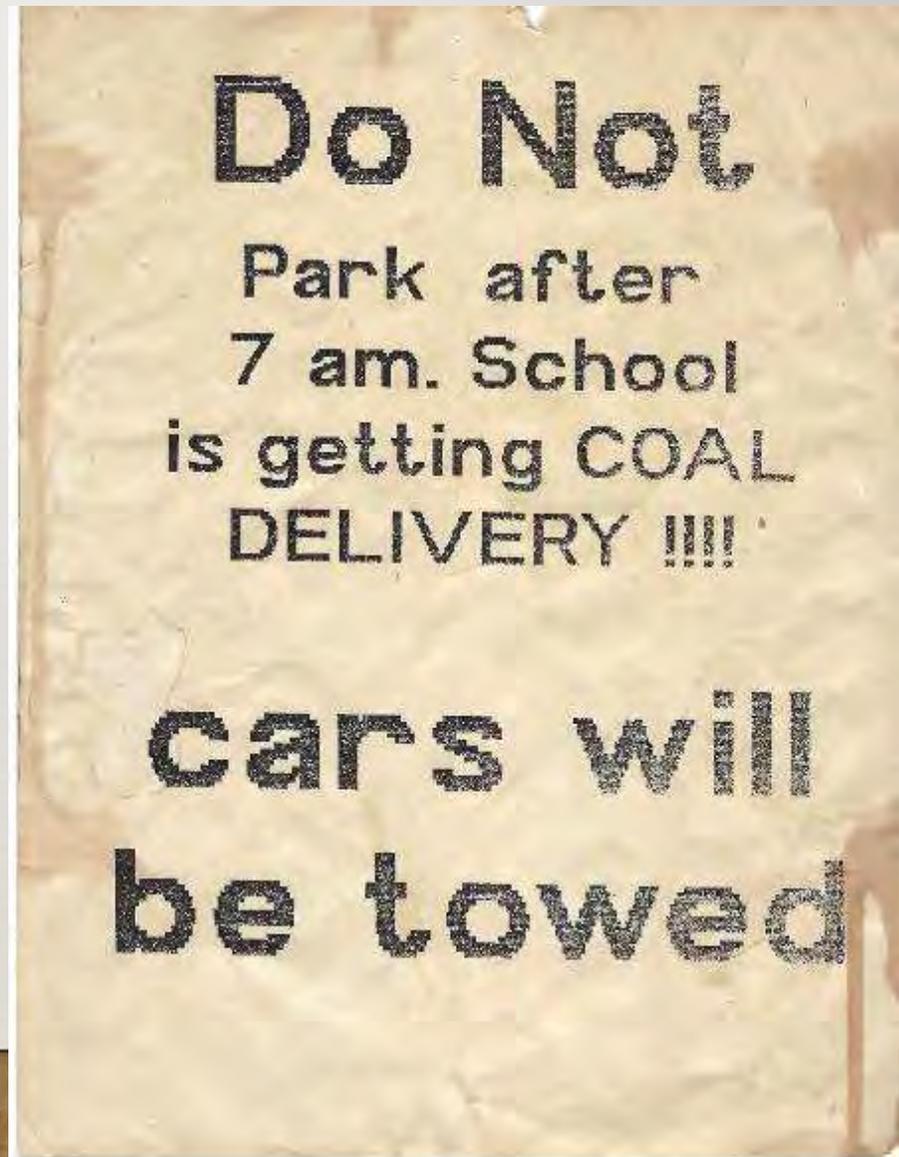
ON IT WITH BIO-DIESEL POWER

72480

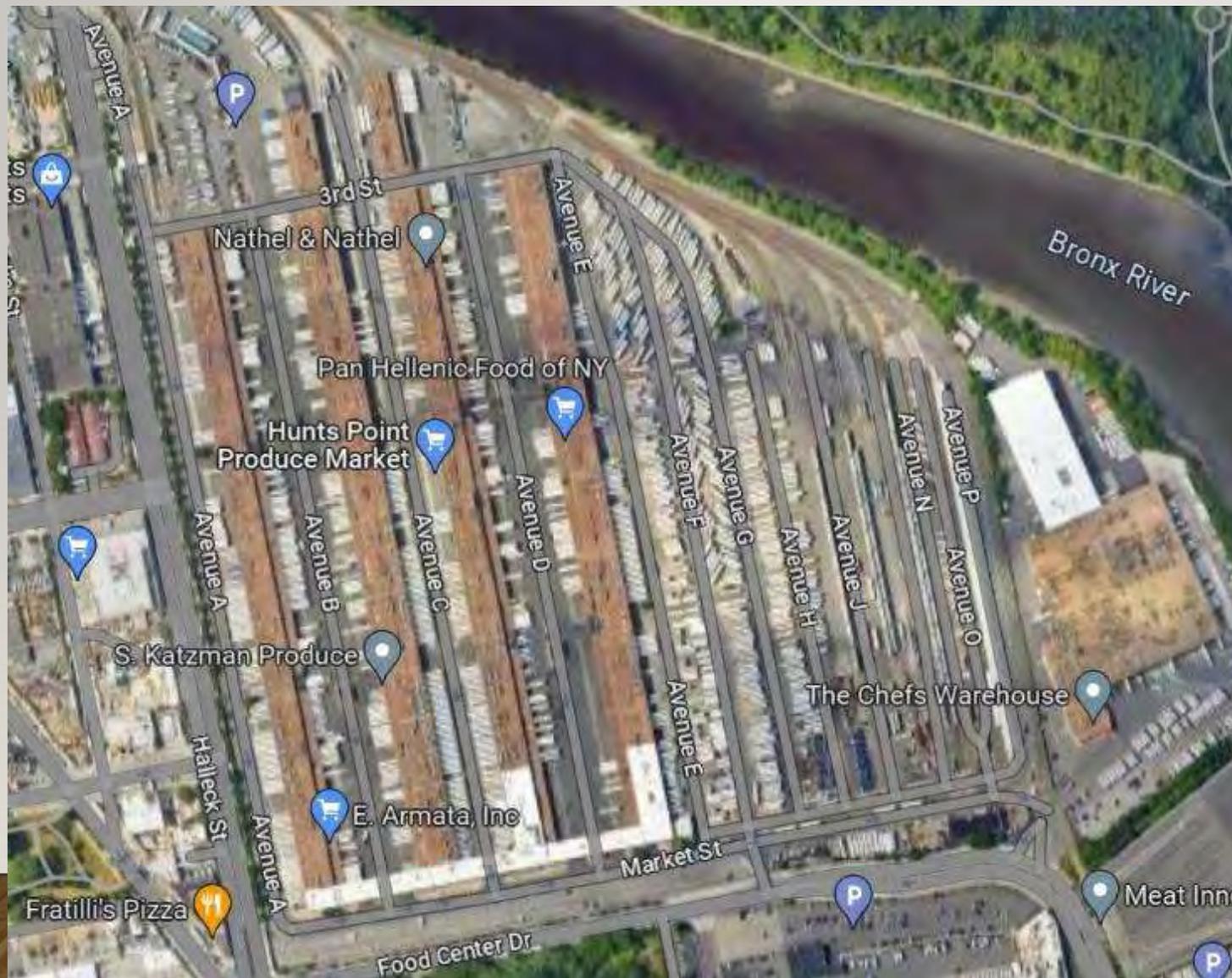
USDOT#106673



“When you see all the ashcans outside, you know it’s our school,” says a project manager for the New York City School Construction Authority (2.9.2000 Education Week)





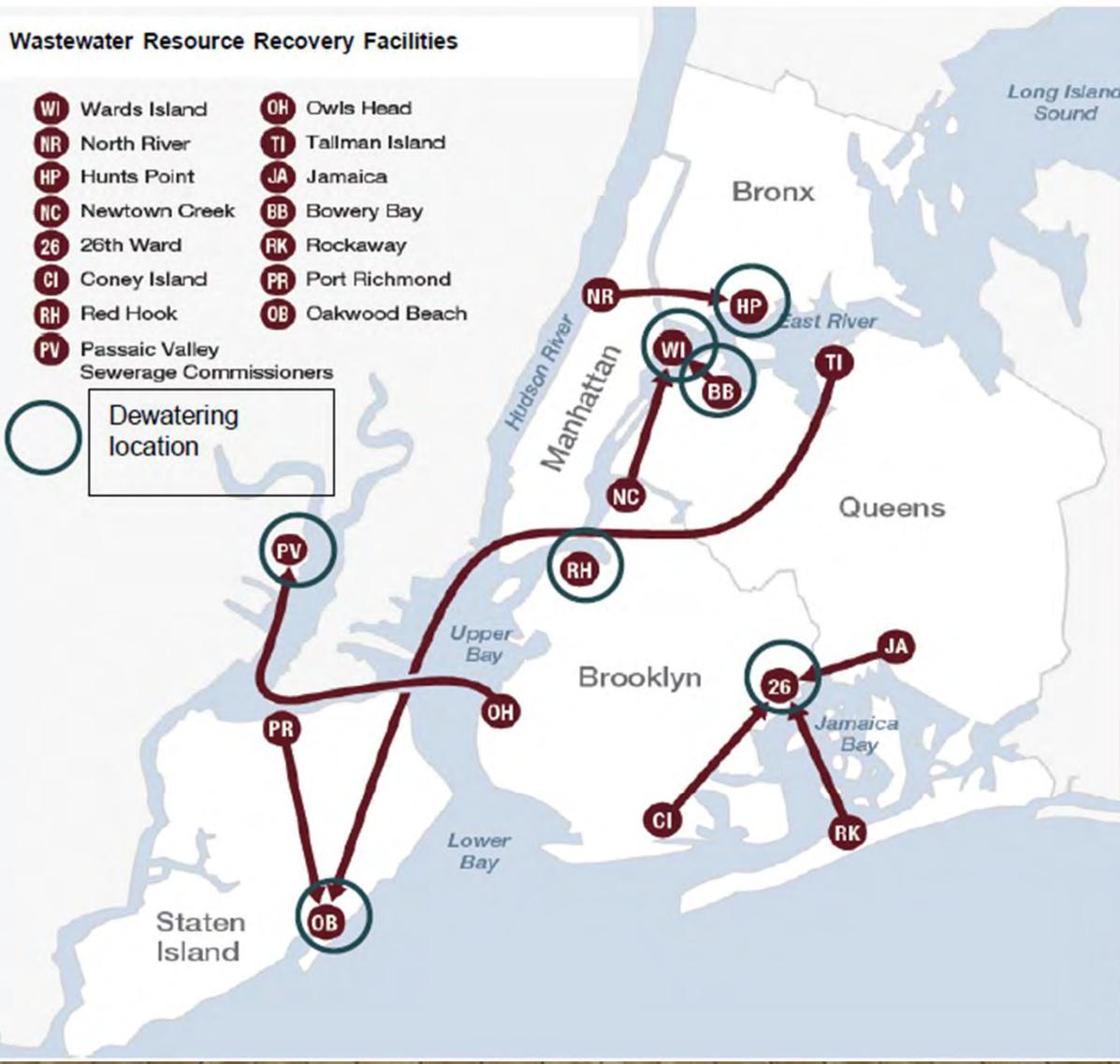


1000  
Idling  
Trucks?

### Wastewater Resource Recovery Facilities

- |                          |                          |
|--------------------------|--------------------------|
| <b>WI</b> Wards Island   | <b>OH</b> Owls Head      |
| <b>NR</b> North River    | <b>TI</b> Tailman Island |
| <b>HP</b> Hunts Point    | <b>JA</b> Jamaica        |
| <b>NC</b> Newtown Creek  | <b>BB</b> Bowery Bay     |
| <b>26</b> 26th Ward      | <b>RK</b> Rockaway       |
| <b>CI</b> Coney Island   | <b>PR</b> Port Richmond  |
| <b>RH</b> Red Hook       | <b>OB</b> Oakwood Beach  |
| <b>PV</b> Passaic Valley |                          |
- Sewerage Commissioners

 Dewatering location



## **MOST IMPORTANT RESIDENTIAL BUILDING LOCAL LAWS?**

**LOCAL LAW 152: GAS INSPECTION** COVERS THE REQUIREMENTS FOR GAS PIPELINE INSPECTION AND REPORTING, AND WHERE THE BUILDING'S RESPONSIBILITIES LIE.

**LOCAL LAW 11: FISP** COVERS THE FAÇADE INSPECTION AND SAFETY PROGRAM, AS WELL AS THE REPORTING DUTIES OF BUILDING OWNERS.

**LOCAL LAW 147: SMOKING POLICY** COVERS THE LAWS ON BUILDING-WIDE SMOKING POLICIES AND THE DISCLOSURE OF REGULATIONS AROUND SMOKING.

**LOCAL LAW 195: FIRE PROTECTION/EVACUATION PLAN** COVERS FIRE ALARMS AND FIRE PROTECTION PLANS, AS WELL AS THE REPORTING OF THOSE MATTERS.

**LOCAL LAW 55: INDOOR HEALTH HAZARDS** COVERS THE PROCEDURE FOR TREATING VERMIN, ROACHES, AND OTHER INDOOR ALLERGEN HAZARDS IN RESIDENTIAL BUILDINGS.

**LOCAL LAW 97: BUILDINGS EMISSIONS LAW** COVERS REQUIREMENTS FOR ENERGY EFFICIENCY AND GREENHOUSE GAS EMISSIONS.

**LOCAL LAW 154: CONSTRUCTION ON A RESIDENTIAL BUILDING** COVERS REQUIREMENTS WHEN CONSTRUCTION OR REPAIRS ARE BEING CARRIED OUT IN A BUILDING WHERE PEOPLE ARE LIVING.

**LOCAL LAW 87: ENERGY AUDITS AND RETROFITTING** COVERS REQUIREMENTS FOR REPORTING ON, AND ADDRESSING, ENERGY EFFICIENCY IN RESIDENTIAL BUILDINGS.

**LOCAL LAWS 92 AND 94: SUSTAINABLE ROOF ZONES** COVERS THE REQUIREMENTS FOR CREATING A SUSTAINABLE ROOF ZONE AND THE CONDITIONS THAT WOULD MANDATE SUCH A ZONE.

**BLC 727: PREVENTING CONFLICT OF INTEREST** COVERS THE REPORTING REQUIREMENTS FOR CO-OP BOARD MEMBERS TO PROVE THAT THEY HAVE NO CONFLICT OF INTEREST.





Please  
hold  
flush button  
down for  
10 seconds.



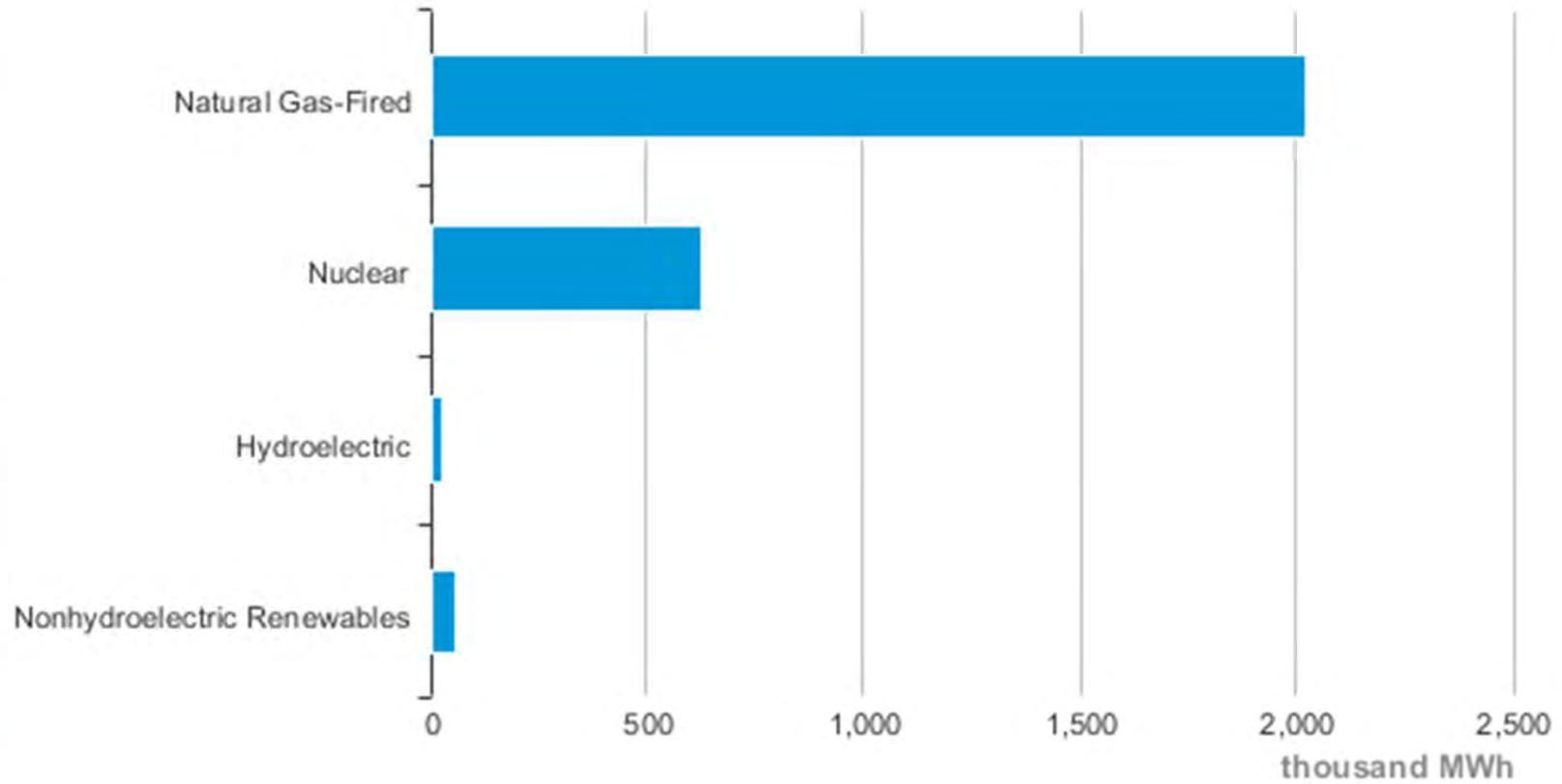
Please  
hold  
flush button  
down for  
10 seconds.

**NYC rules crack down on coal-, wood-fired pizzerias — must cut carbon emissions up to 75%**



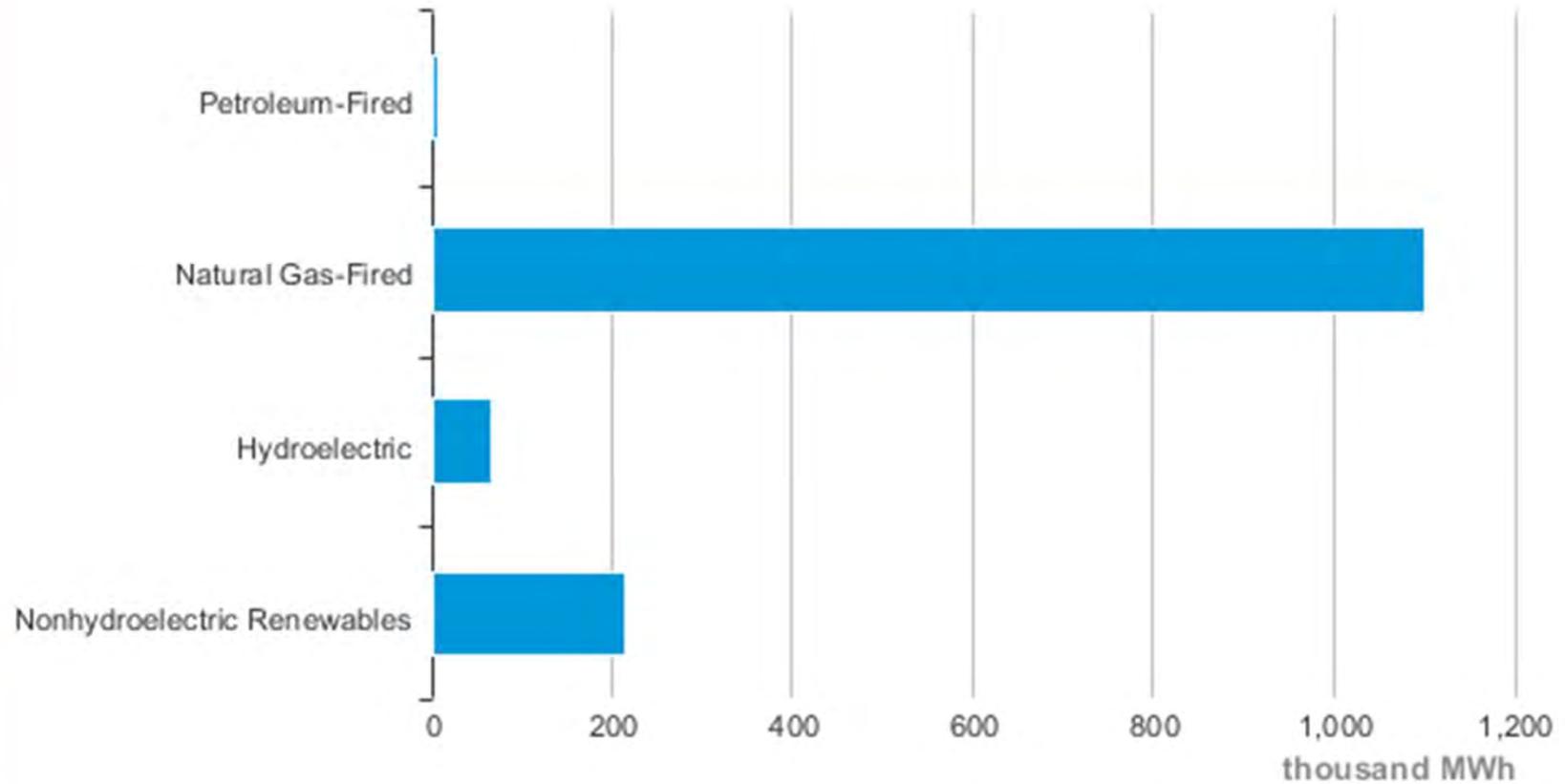
**DECARBONIZE!**

## Connecticut Net Electricity Generation by Source, Nov. 2023



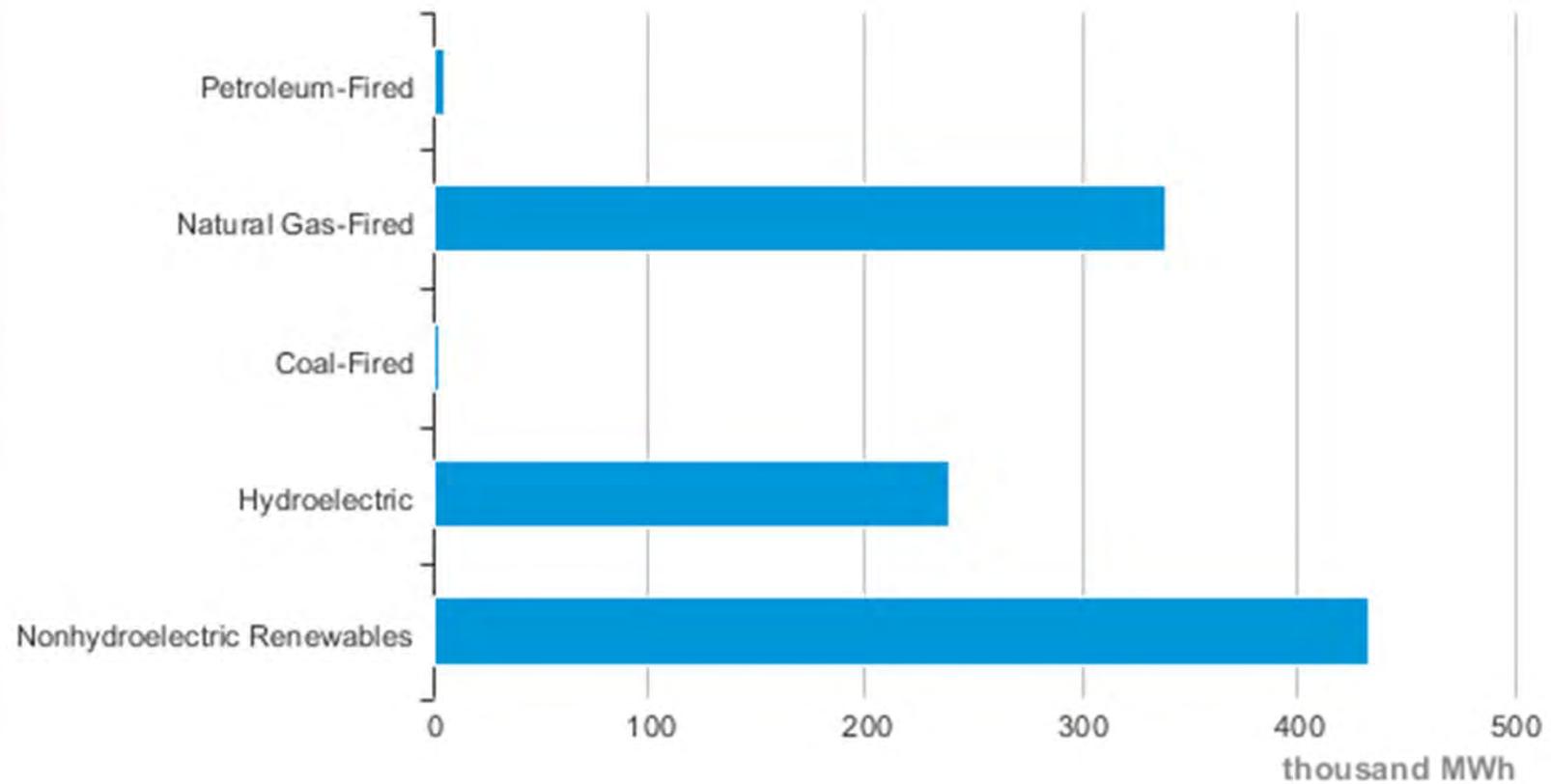
Source: Energy Information Administration, Electric Power Monthly

## Massachusetts Net Electricity Generation by Source, Nov. 2023



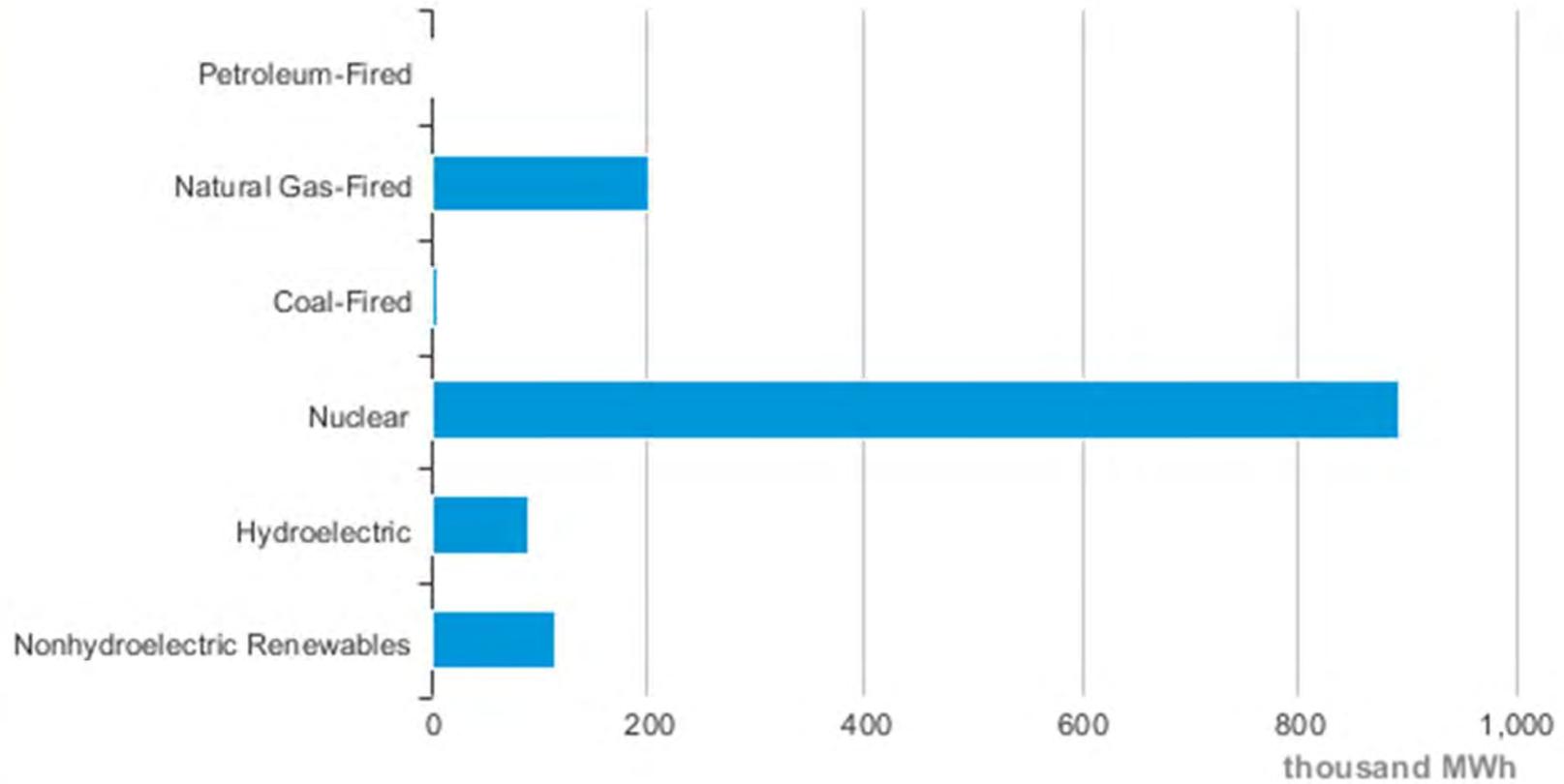
Source: Energy Information Administration, Electric Power Monthly

## Maine Net Electricity Generation by Source, Nov. 2023



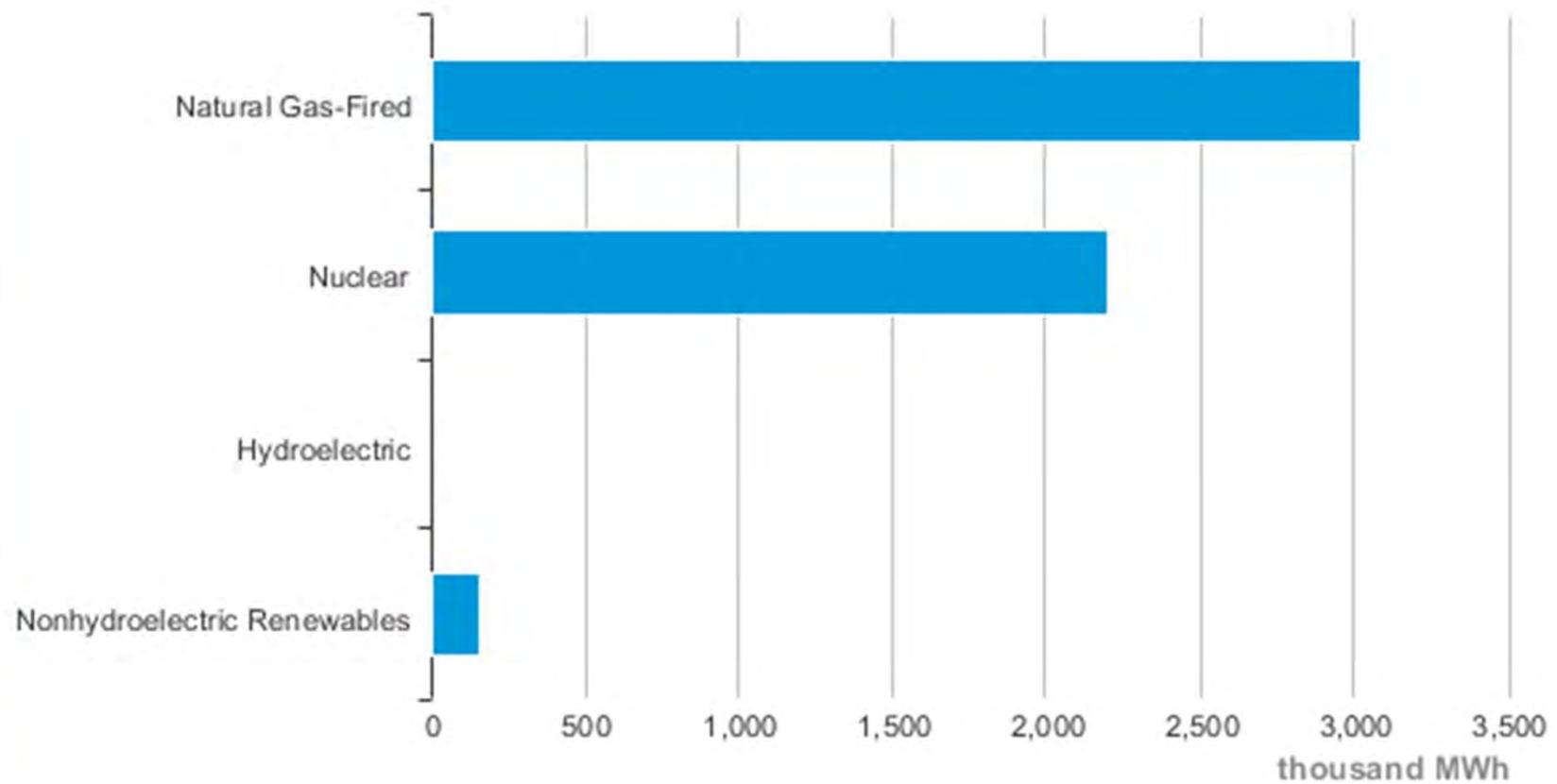
Source: Energy Information Administration, Electric Power Monthly

## New Hampshire Net Electricity Generation by Source, Nov. 2023



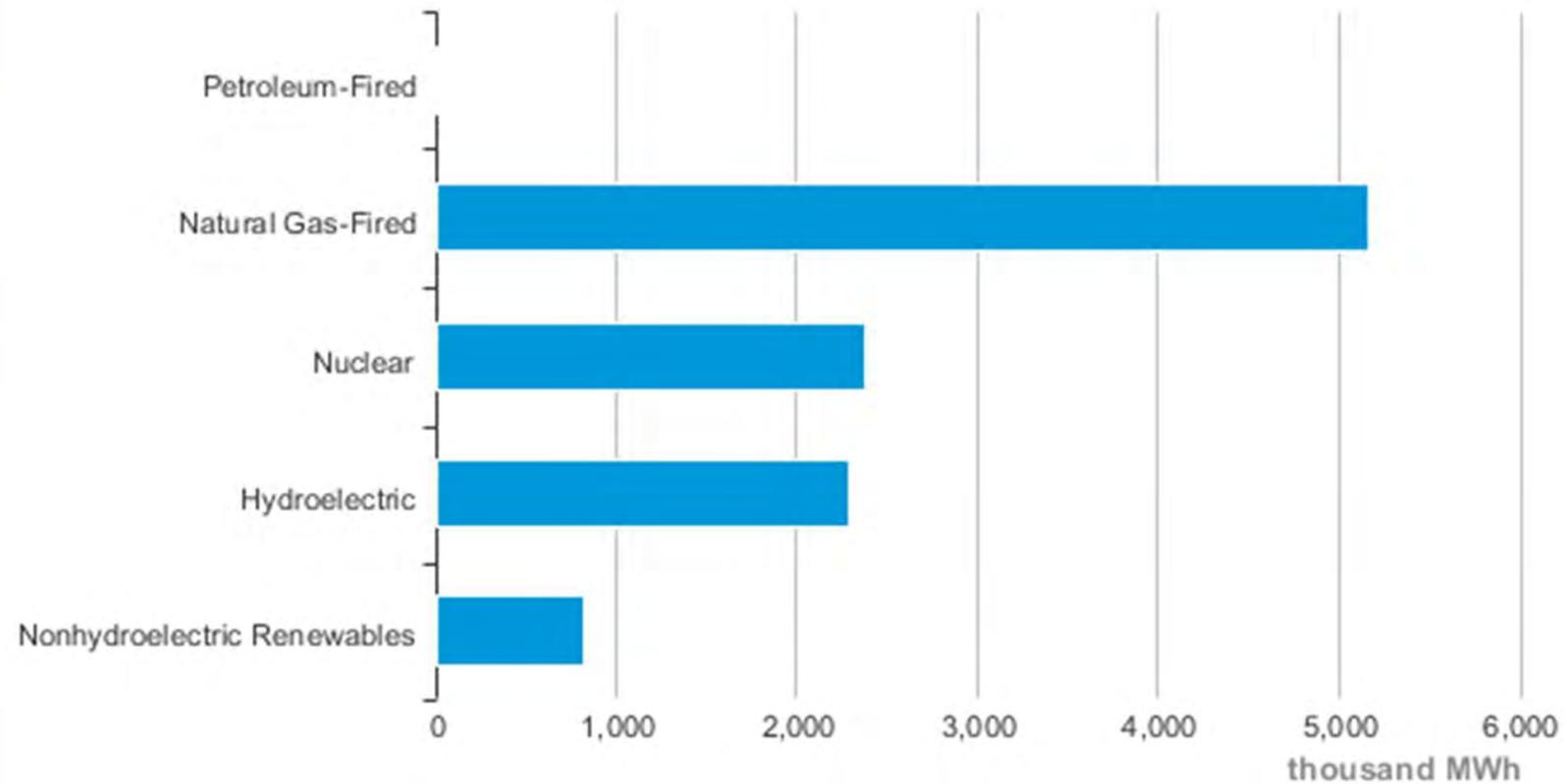
Source: Energy Information Administration, Electric Power Monthly

## New Jersey Net Electricity Generation by Source, Nov. 2023



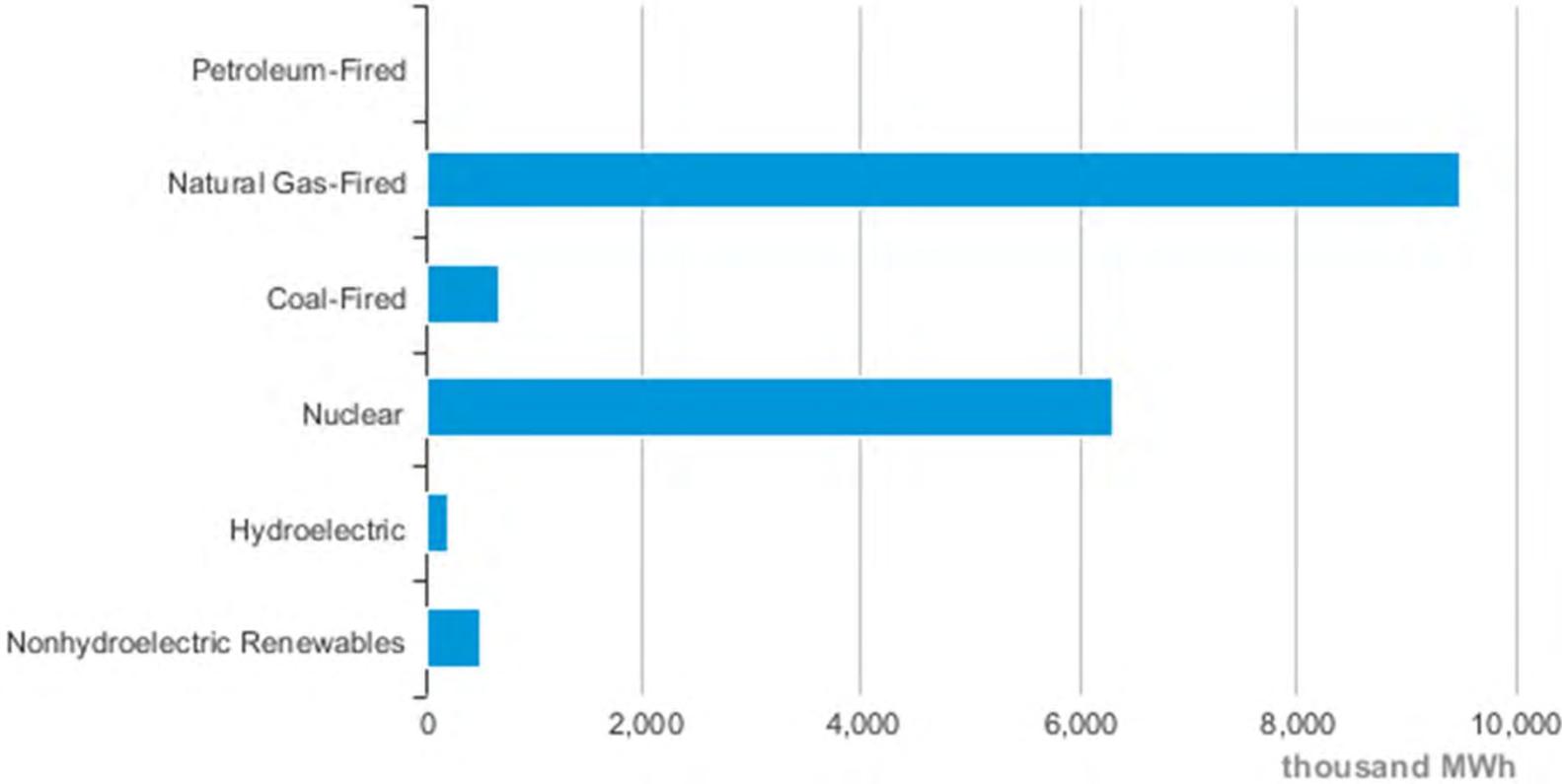
Source: Energy Information Administration, Electric Power Monthly

## New York Net Electricity Generation by Source, Nov. 2023



Source: Energy Information Administration, Electric Power Monthly

# Pennsylvania Net Electricity Generation by Source, Nov. 2023



Source: Energy Information Administration, Electric Power Monthly

# Financing Issues



## SOME ISSUES AND CONCERNS.....

- Worked for a bank for 10 years
- Loan officers and 4<sup>th</sup> Grade Mathematics
- Graduate Level Commercial Loan Class at NYU Stern
- I'm not doin' that Green .....
- Owners:Windows,Windows,Windows,Windows
- Virtually no financing “packagers” or experts
- Tax Credit, Deduction, Depreciation, Grant, Loan
- Dsireusa.org? Residential vs. Commercial vs. ?????

# REDUCING YOUR ENERGY COSTS AND USING INCENTIVES

---

## A GUIDE FOR OWNERS TO:

- **ASSESS THEIR ENERGY USE AND COST IN COMPARISON TO OTHER BUILDINGS**
- **USE GOVERNMENT AND UTILITY INCENTIVES TO HELP PAY FOR IMPROVEMENTS**
- **MAKE A PLAN TO COMPLETE A FULL SCOPE OF WORK TO KEEP ENERGY COSTS LOW**

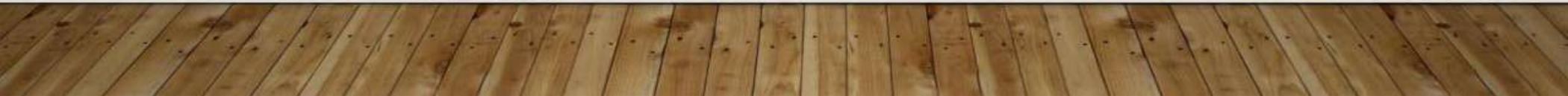
# ALMOST THE LAST PART: TRYING TO DECARBONIZE



TRYING TO DECARBONIZE.....

FIRST, EXTERIOR INSULATION...

HOW NOT TO INSULATE A FLAT ROOF



# RENEWABLE ENERGY ROOF CAVITY DEPRESSURIZATION



**TRYING TO DECARBONIZE.....**

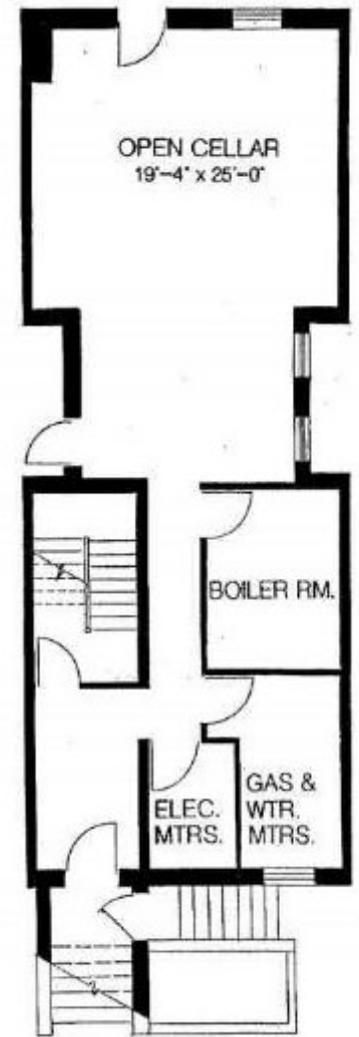
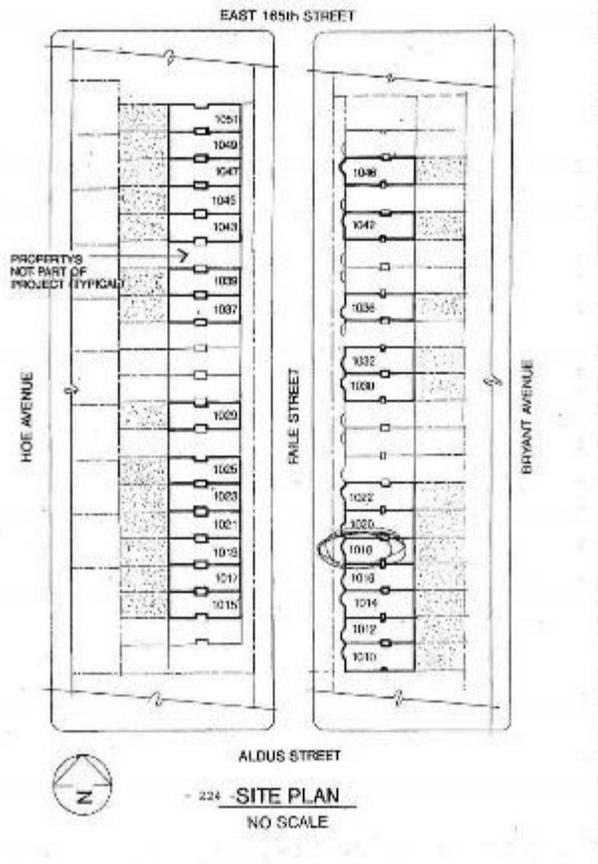
**NEXT, AIR SEALING...**





## RESULTS:

- 50% oil hydronic + DHW; 50% electric resistance
- \$10,000 Electric + \$10,000 oil/year
- Attic Connected to house 100% - Most Cost Effective
- Solar Very Cost Effective Considering Tax Credit
- HP System \$43,674.00; \$6,700 CH rebate + \$2,000 Fed Tax Credit
- Proposal calls for keeping oil + electric heat

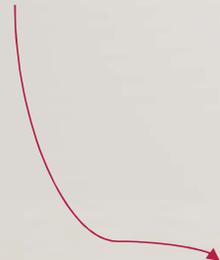




## SOME INSTITUTIONAL BARRIERS:

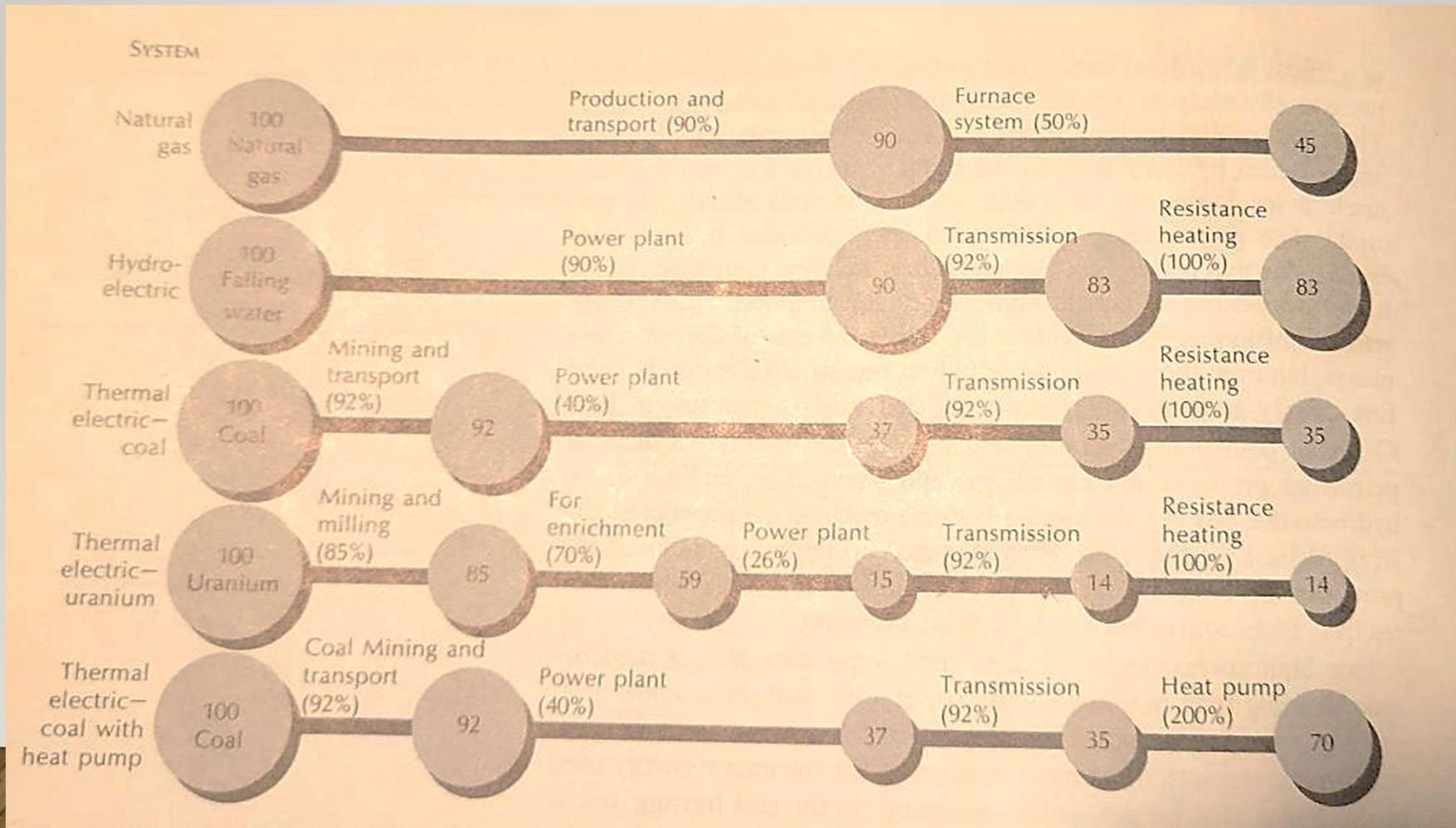
- Rental units that don't pay for heat, DHW, or electricity
- Electrical systems that cannot provide enough electricity
- Electric and gas utilities overwhelmed by requests to upgrade
- Really expensive electricity
- Renewable electricity that isn't
- 75% of my work is psychology
- Training a workforce? Who leads the league in trade education in the US?
- How many torque wrenches are there in the State of Texas?

Locally, we have some of the highest electricity costs in the country.



<b>STATE</b>	<b>April 2021</b>
<b>Alaska</b>	22.54¢ / kWh
<b>California</b>	19.90¢ / kWh
<b>Connecticut</b>	21.62¢ / kWh
<b>Hawaii</b>	32.76¢ / kWh
<b>Massachusetts</b>	21.11¢ / kWh
<b>New Hampshire</b>	19.63¢ / kWh
<b>New Jersey</b>	15.64¢ / kWh
<b>New York</b>	19.30¢ / kWh
<b>Pennsylvania</b>	14.38¢ / kWh
<b>Rhode Island</b>	18.64¢ / kWh
<b>Vermont</b>	18.50¢ / kWh

**Over 60% of energy used in electricity generation is lost in conversion.**



# AND WHAT ABOUT NATURAL GAS BANS IN NEW CONSTRUCTION?

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The Energy Institute at Haas (University of California at Berkeley) included this statement in their review of this issue:

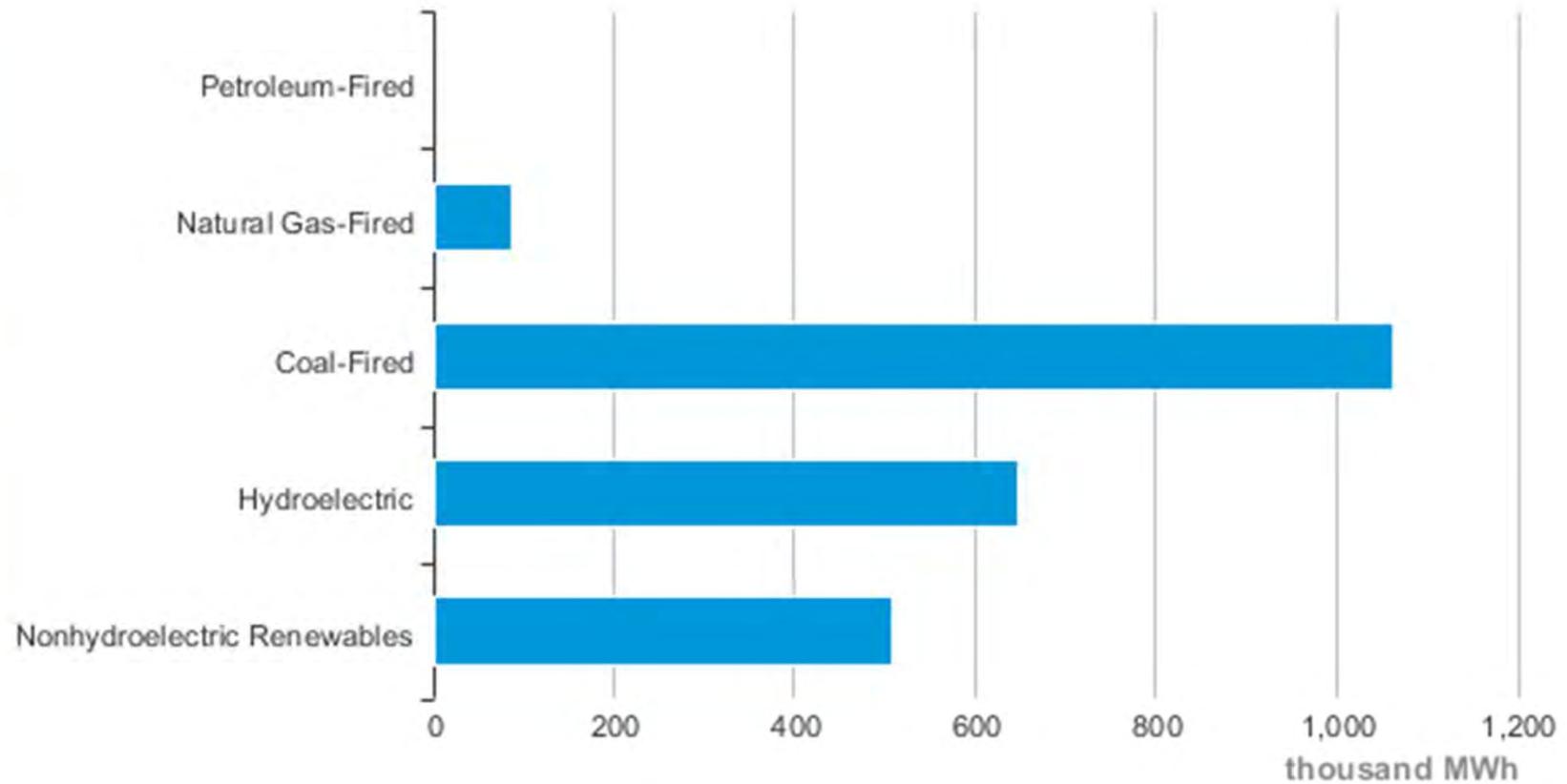
“Regulators can mandate and ban natural gas for new buildings. However, without additional policy and rate reform, California’s high electrical prices mean that electrification mandates will raise costs for households.”

# PLEASE ADJUST THE MESSAGE!

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- Bill McKibben “United States of Anxiety”
- NPR re: Fusion
- .....don’t get me started on Fox.....
- Science Friday on Retrofitting Buildings?

## Montana Net Electricity Generation by Source, Nov. 2023



Source: Energy Information Administration, Electric Power Monthly

# PLEASE ADJUST THE MESSAGE!

- First, we're all environmentalists here, we want to reduce energy use
- When we do this, we reduce carbon
- The most environmental way to do this is through efficiency
- The nearly forgotten “negawatt”
- None of this means that we are opposed to decarbonization



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**THANK YOU FOR  
ATTENDING AND  
PARTICIPATING!**

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**DISCUSSION?**