



## **ELECTRIFYING THE EMPIRE STATE**

WITH ALL-ELECTRIC, EMISSIONS-FREE HOMES











#### **ANSHUL GUPTA**

IBM Research
Climate Reality Project
Renewable Heat Now
New Yorkers for Clean Power

The views expressed in this presentation are those of the speaker and are not endorsed by any of the organizations listed here.



### **ELECTRIFYING THE EMPIRE STATE**

On the Science, Technology, Economics, and Politics of cleaning up the largest source of climate destroying carbon pollution in New York State

### <u>OVERVIEW</u>

#### Science

- O What is the state of climate?
- Why buildings and why electrify?
  - Climate, Health, Energy, Comfort, Savings

### Technology

- Space Heating
- Water Heaters and Clothes Dryers
- Cooking

#### Economics

- New building economics
- Retrofit economics
- Gas system economics

#### Politics

- Fossil fuel industry disinformation
- Where things are at with the Senate, Assembly, and the Governor
- Action of the evening!



### **ELECTRIFYING THE EMPIRE STATE**

On the <u>Science</u>, Technology, Economics, and Politics of cleaning up the largest source of climate destroying carbon pollution in New York State

# SCIENCE

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### March 1, 2020

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### March 4, 2020

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### March 8, 2020

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### March 13, 2020

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### March 19, 2020

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### March 26, 2020

10,428 average daily cases

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### <u>April 2, 2020</u>

24,733 average daily cases

"...when you have 15 people, and the 15 within a couple of days is going to be down to close to zero, ..."

### **April 10, 2020**

32,027 average daily cases



9 August 2021 | Climate and Environment

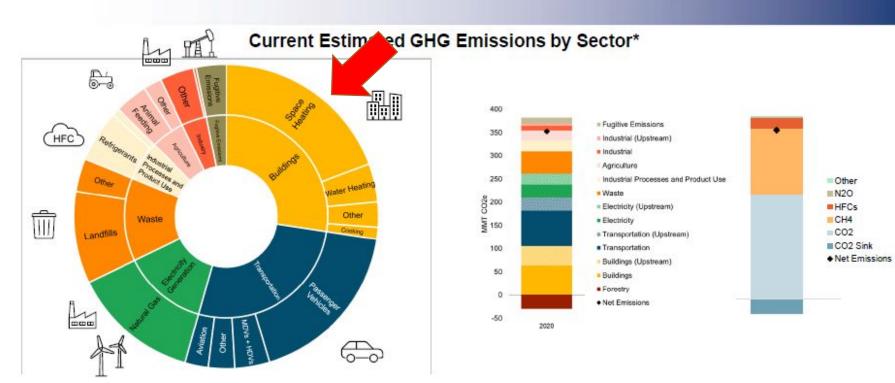
Climate change is widespread, rapid, and intensifying, and some trends are inframe, according to the latest much-anticipated Intergovernmental Panel on Monday.



## What exactly is Code Red for humanity?

- Human activities have caused 1.2° C (2.2° F) of average global warming so far.
- Without <u>immediate transformative</u> action, we are headed to 2.7° C (4.9° F) or more by the end of the century.
- Climate impacts worsen exponentially with temperature:
  - 2° is not twice as bad as 1°, it's more like 10 times worse!
  - 3° could be another 10 times more damaging.
- End of century is well within the lifetime of a child born today.
- Time for baby steps is over; we need big bold steps, and we need them now!
- IPCC: We have we have all the knowledge, tools, and financial resources; what's missing is political courage and political will.

## Current Emissions in New York State



\*Draft 2020 results in line with DEC CLCPA accounting including upstream emission factors, 20-year GWP, and estimates from NY PATHWAYS

Page 35 of NYS CAC Oct 1, 2021 report.



# Climate Change 2021 The Physical Science Basis

Over time scales of 10 to 20 years, the global temperature response to a year's worth of current emissions of SLCFs is at least as large as that due to a year's worth of CO<sub>2</sub> emissions (high confidence). Sectors producing the largest SLCF-induced warming are those dominated by methane emissions: fossil fuel production and distribution, agriculture and waste management (high confidence). On these time scales, SLCFs

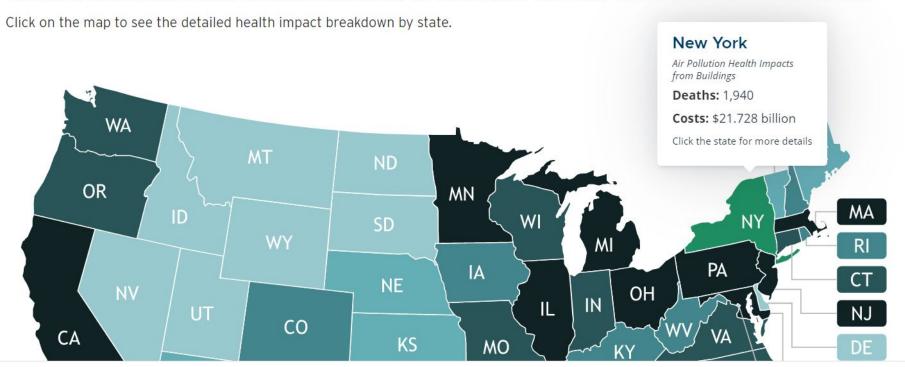
**Page 821** 

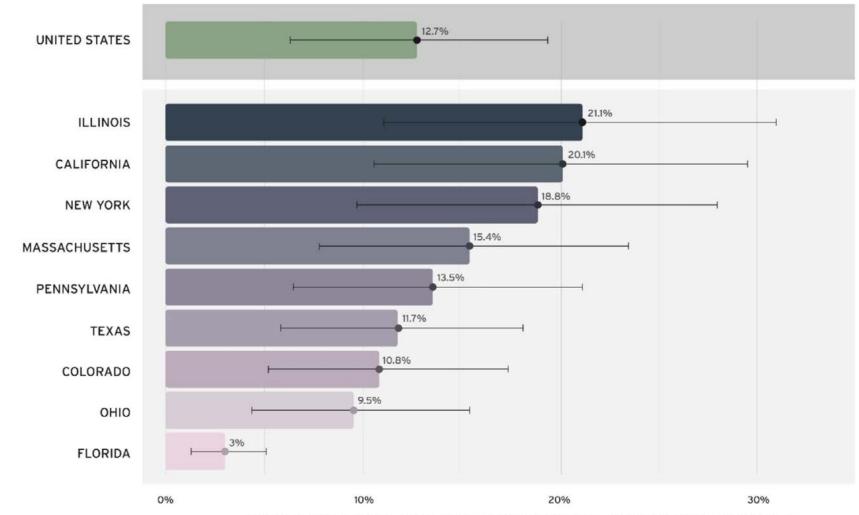
### WHAT IS THE HEALTH IMPACT OF BUILDINGS IN YOUR STATE?

Outdoor air pollution from buildings harms public health across the United States

Buildings release many harmful pollutants outdoors. Particulate matter ( $PM_{2.5}$ ) is a particularly dangerous pollutant due to its tiny size—the microscopic particles can penetrate deep into the lungs and even the bloodstream.

The map below represents outdoor air pollution health impacts, represented in early deaths and costs, from burning fuels-including gas, oil, biomass, and wood-in residential and commercial buildings. The health impacts depicted are for 2017, the most recent available data.





Population attributable fraction of current childhood asthma associated with gas stove usage



Gas Appliance Pollution Inequitably Impacts Health

Who Would Gain the Most from Electrification?

Although exposure to gas appliance pollution is harmful to everyone, the following groups of people are at particularly <a href="https://doi.org/line.com/high-risk">high risk</a>: Low-Income Communities, People of Color, Infants and Children, Pregnant Women, Individuals with Preexisting Conditions, and Older Adults.



## #ElectrifyEverything

# Questions?



### **ELECTRIFYING THE EMPIRE STATE**

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## **TECHNOLOGY**



## Space Heating (~64%)

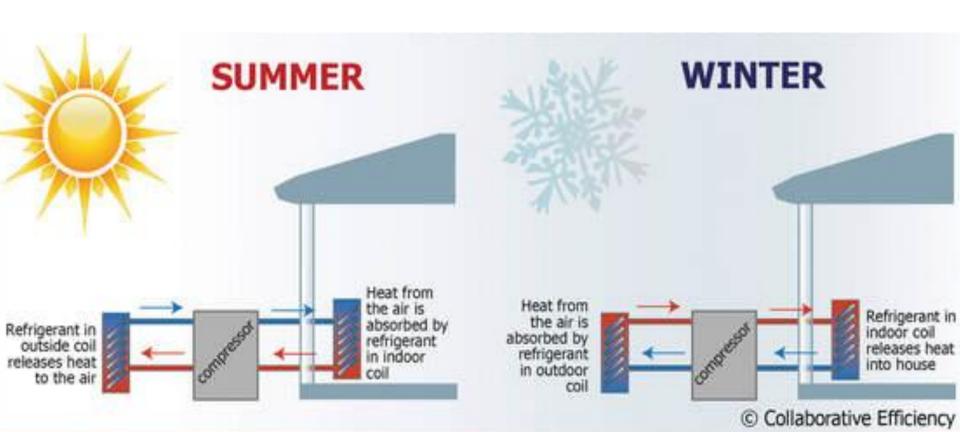
### **Electric Alternative to Fossil Fuels: HEAT PUMPS**

EXPLAIN HOW A HEAT PUMP WORKS LIKE I'M A 5 YEAR OLD

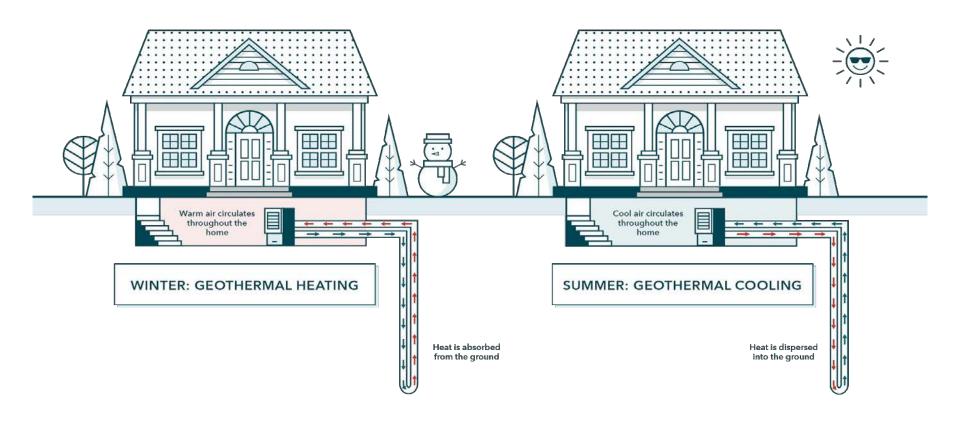


- Heat Pumps move heat.
- Heat Pumps are not a source of heat.
- Air-source heat pumps consume 1/2 to 1/3
   of the energy of gas or oil furnaces on
   average.
- Ground-source heat pumps consume 1/4 to 1/5 of the energy of gas or oil furnaces.

### **Air-Source Heat Pump**



### **Ground-Source (Geothermal) Heat Pump**



The Inflation Reduction act provides thousands of dollars for households to go electric.

How much can you get?

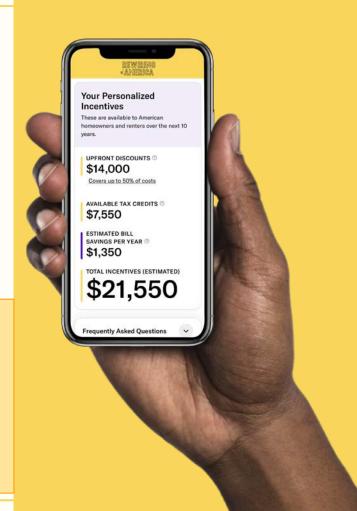
Try Rewiring America's IRA calculator!

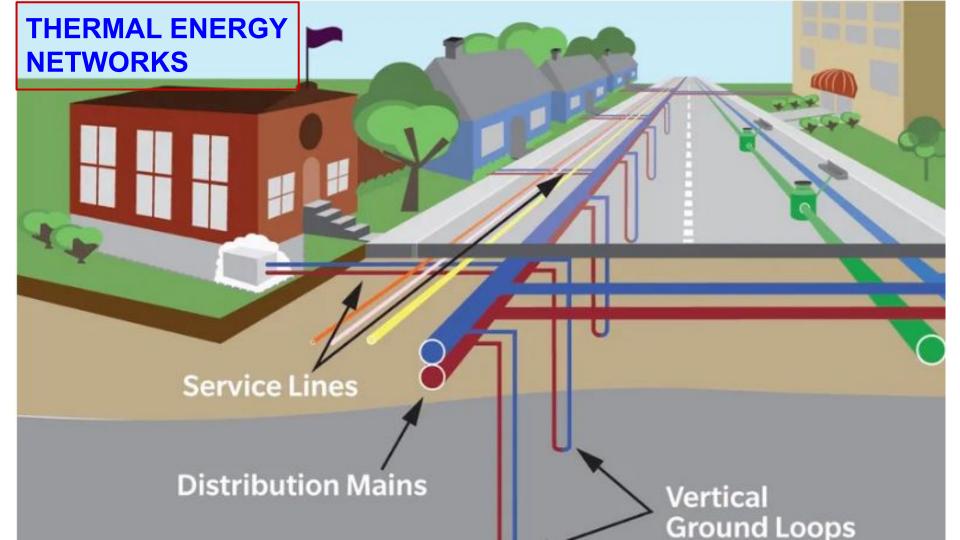
**REWIRINGAMERICA.ORG** 

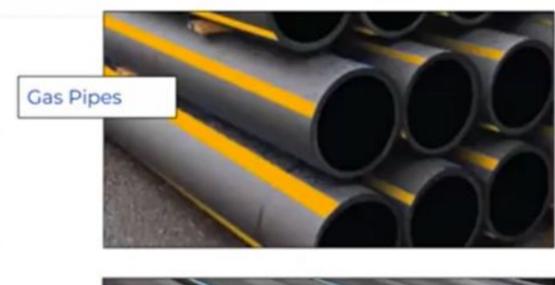


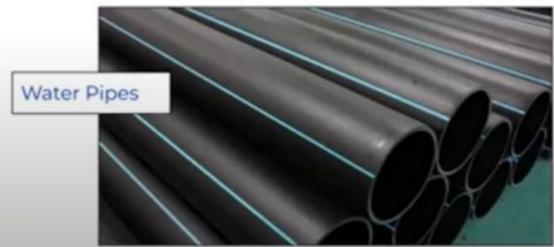
### Questions?

Contact: Janice Kruger
NYS Chapter Lead
Rewiring America
kruger.janice@gmail.com

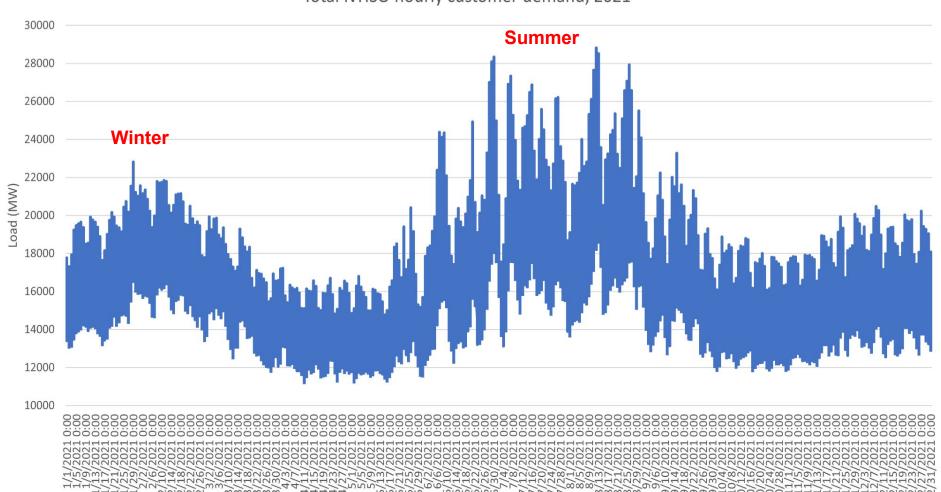








### Total NYISO hourly customer demand, 2021





## Water Heating (~32%)

### **Electric Alternatives**

Ordinary Resistance Water Heater	Heat-Pump Water Heater	
Cheaper	More expensive	
Less efficient (higher electricity usage)	Uses about a third of electricity	
Fewer constraints on installation location	Would emit some compressor noise	
Fewer constraints on installation space	Cannot be installed in a closet; needs air circulation	
No ambient impacts	Would cool and dehumidify space around it	

Both types can be connected to the HVAC heat-pump system for hyper-efficient water heating. Beyond the scope of today's presentation.



## Clothes Dryer (~1-2%)

### **Electric Alternatives**

Ordinary Resistance Dryer	Heat-Pump Dryer	
Cheaper	More expensive	
Less efficient (higher electricity usage)	Uses about a quarter of the electricity	
Economical models need venting	No vent needed; can share drain with the washer	
Would require a 240 V outlet	Several 120 V models available	



## Cooking (~2-3%)

### **Electric Alternatives**

Radiant cooktop	Induction cooktop
Slightly cheaper	More expensive
Can use any flat-bottom utensils	Must use utensils with magnetic base
Can use only flat-bottom utensils	Induction woks are available
Less energy efficient	More energy efficient
Not as fast (but at least one "burner" is faster than gas)	Very fast to heat and cool down
Less precise temperature control	Very precise temperature control
Access to direct heat	No access to direct heat















## #ElectrifyEverything

# Questions?



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# **ECONOMICS**

nbi new buildings



# Cost Study of the Building Decarbonization Code

An analysis of the incremental first cost and life cycle cost of two common building types



# Summary and Key Findings

The study found that implementation of NBI's Decarbonization Code will lead to savings for homeowners, building owners, and society. Costs and savings related to the code provisions for typical buildings were studied for costs related to:







First cost for single-family me prototype probuildings buil

First cost for medium office prototype buildings. Life cycle cost for single-family prototype buildings.

- The all-electric single-family home is \$7,500-\$8,200 cheaper to construct than the baseline code home.
- The all-electric scenario reduced total energy consumption by 34%, while the mixed-fuel scenario reduced energy consumption by 9% compared to baseline.

The impact of the				2	Average yearly savings vs. conventional heating				g		
ALL-EL	ECT	RIC		Geography		Cold Climate Heat Pump W		leat Pump +		ource Heat Pump + p Water Heater	
BUILDING ACT				Climate Zone 4		\$375			\$473	\$473	
on the cost of heating new			Climate Zone 5		\$609			\$848			
			Climate Zone 6		\$2,079			\$2,486			
			Statewide		\$904			\$1,165	\$1,165		
	·		Average yea	rly savings v	s. conventio	nal heating, b	y heating sys	tem and fuel			
	3		ccASHP	+ HPWH		<u>.</u>	GSHP +	- HPWH			
	Geo-	G	as	Prop	oane	G	as	Prop	ane		
	graphy	Furnace +Water Heater +Central AC	Boiler +Water Heater +Central AC	Furnace +Water Heater +Central AC	Boiler +Water Heater +Central AC	Furnace +Water Heater +Central AC	Boiler +Water Heater +Central AC	Furnace +Water Heater +Central AC	Boiler +Water Heater +Central AC		
	Climate Zone 4	\$170	\$324	\$2,406	\$2,553	\$268	\$422	\$2,505	\$2,652		
	Climate Zone 5	\$8	\$180	\$2,725	\$2,897	\$273	\$445	\$2,990	\$3,162		
	Climate Zone 6	-\$137	\$61	\$3,067	\$3,265	\$270	\$468	\$3,474	\$3,672		
	Statewide	\$11	\$185	\$2,733	\$2,906	\$271	\$445	\$2,993	\$3,166		

# Washington state to require electric heating in building code update



Author Tom DiChristopher

Theme Energy



Washington state will follow Seattle in approving changes to its energy code that will require all-electric space and water heating in new commercial buildings.

Washington will require all-electric space and water heating in new commercial and multifamily construction, making it the **first state to incorporate building electrification mandates** into statewide energy codes.

On April 22, the Washington State Building Code Council, or SBCC, voted 11-3 to include the mandates in an update to the state's commercial energy code. The council also advanced proposals that would restrict fossil fuel use in residential buildings, which would **go into effect in 2023** alongside the commercial code updates.



Canada

UK & Europe

**Fossil Fuels** 

Ending Emissions Community Climate Finance

Clean Electricity Grid

Cities & Communities





**☆ FEATURED** 

Ontario Power Emissions to Rise 400% After Ford Cancels Hundreds of Renewables Projects May 12, 2022



CITIES & COMMUNITIES

#### Montreal Sets Zero-Emission Target for All New Buildings by 2025

announced Tuesday.

May 6, 2022 Reading time: 2 minutes



Beginning in 2024, construction permits for small buildings (below 2,000 square metres) will only be granted to buildings whose operations will produce no greenhouse gas emissions," Le Devoir reports. The requirement will be extended to larger buildings in 2025.

Montreal will mandate a zero-emission standard for all new construction beginning in 2025, Mayor Valérie Plante

Plante's municipal administration also said it would back up its deadline to run the city's entire building stock on renewable energy from 2050 to 2040, the news story states.

"This is really a decisive move to accelerate the ecological transition," said Verdun borough mayor Marie-Andrée Mauger, who holds the city executive committee portfolio for environment and ecological transition.

The plan will treat renewable natural gas as a carbon-neutral fuel. Le Devoir says. To work within its jurisdiction as a municipality, Montreal won't try to regulate the choice of heating systems, but will instead focus on the carbon dioxide released into the atmosphere.

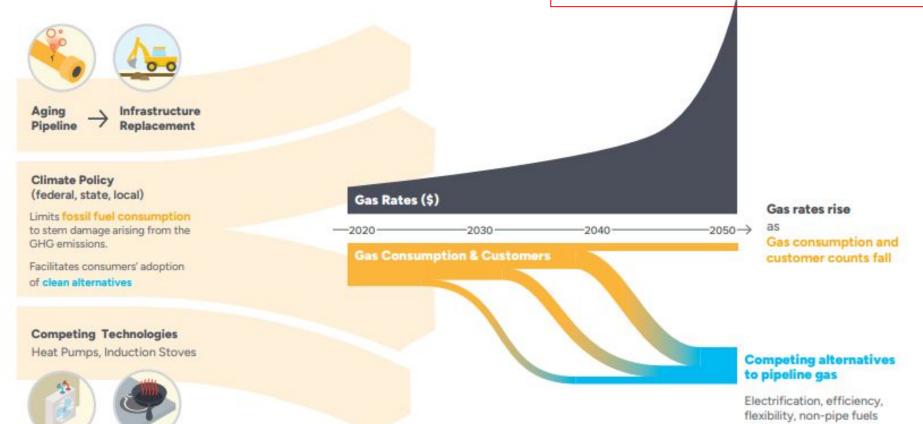
For existing buildings, the city will adopt a set of performance standards that get tougher over time, ending with a carbonneutral target by 2040. Building owners will also have to reveal whether their properties run on fossil gas or fuel oil.

# How Gas Infrastructure Spending is Paid for by our Gas Delivery Charges

- Two components of gas bill:
  - Supply charges pay for the actual fuel
  - Delivery charges pay for building & maintaining the delivery infrastructure
- 100 Foot Rule:
  - Free new gas connection within 100 ft. of existing line
  - Distribute the cost among all existing customers

Figure 5. Causes and effects of the self-reinforcing negative feedback loop on gas utilities and their ratepayers

The cost of pipe replacement can be as high as \$6 million per mile of \$60,000 per customer.



#### Summary Information Sheet for CECONY January 28, 2022 Electric & Gas Rate Filing

#### Electric and Gas Rate Filing - One Year (2023) Proposal; Other Years (2024 and 2025) Illustrated\*

(\$ millions)		Electric		Gas			
	Rate Change	Average Rate Base	Capital Expenditure	Rate Change	Average Rate Base	Capital Expenditure	
2023	\$1,199	\$26,286	\$3,472	\$503	\$10,030	\$1,170	
2024	853	28,983	3,685	234	10,982	1,186	
2025	608	30,618	3,771	218	11,884	1,143	

<sup>\*2023</sup> amounts were proposed. CECONY provided 2024 and 2025 amounts in rate filing for illustration and to facilitate settlement discussions.

#### Proposed Rate of Return and Equity Ratio

Return on equity ......10.00%

Equity ratio.....50%

#### **Test Year**

- Historic test year: Twelve months ended September 30, 2021
- Rate year: January 1, 2023 December 31, 2023

#### Key Drivers of Proposed 2023 Rate Increase (\$ millions)

	Electric	Gas
New infrastructure investment	\$250	\$161
Financing costs	201	77
Property and other taxes	180	74
Sales revenue change	259	77
Amortization of deferred credits and costs	191	(1)
Operating expenses	79	32
Depreciation changes	15	64
Income Taxes and Other	24	19
Total	\$1,199	\$503

	New infrastructure investment	\$250	\$161
Proposed Rate of Return and Equity Ratio	Financing costs	201	77
Return on equity10.00%	Property and other taxes	180	74
Equity ratio50%	Sales revenue change	259	77
	Amortization of deferred credits and costs	191	(1)
Test Year	Operating expenses	79	32
Historic test year: Twelve months ended	Depreciation changes	15	64
September 30, 2021	Income Taxes and Other	24	19
<ul> <li>Rate year: January 1, 2023 – December 31, 2023</li> </ul>	Total	\$1,199	\$503
Other Major Provisions: Proposed			
<ul> <li>Requesting full reconciliation of property taxe fees, and long-term debt cost rate.</li> </ul>	ironmental remediation, and storms (electric). es, municipal infrastructure support costs, uncolle extent that actual inflation exceeds the annual infl 6 threshold.		
<ul> <li>Requesting full reconciliation of property taxe fees, and long-term debt cost rate.</li> <li>Requesting reconciliation for inflation to the easumed in the revenue requirement by 1.6%</li> </ul>	es, municipal infrastructure support costs, uncolle extent that actual inflation exceeds the annual infl	ation rates of	3.4%
<ul> <li>Requesting full reconciliation of property taxe fees, and long-term debt cost rate.</li> <li>Requesting reconciliation for inflation to the easumed in the revenue requirement by 1.6%</li> <li>Requesting to reduce certain gas asset services.</li> </ul>	extent that actual inflation exceeds the annual infl 6 threshold. ce lives by 5 years in alignment with the gas tran	ation rates of	3.4%

Electric

Continuing provision for recovery of cost of purchased power, gas, and fuel.
 Continuation of earnings opportunities from Earnings Adjustment Mechanisms (EAM) for meeting energy efficiency goals and other potential incentives.



# #ElectrifyEverything

# Questions?



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# **POLITICS**



### **POLITICS**

- Dominated by the fossil fuel industry's lobbying and disinformation machine.
- Industry worried about not just NYS business, but of the precedent.
- Massive outreach effort with Plain Disinformation, Fear Mongering, and Greenwashing.
  - Direct public outreach through robocalls and social, broadcast, and print media.
  - Community boards
  - Business groups
  - Community groups
  - Lobbyists
  - Bill inserts and propaganda emails to customers
  - o Earned media
  - Extremely well-coordinated (fossil-fuel industry, business groups, lawmakers)



Services

News Government

COVID-19



Our Impact >

Get Involved ~

News & Events >

Change Language

#### **Climate Action Council**





# SCOPING PLAN December 2022

# FRONTLINE.

#### The Power of Big Oil

FRONTLINE examines the fossil fuel industry's history of casting doubt and delaying action on climate change. This three-part series traces decades of missed opportunities and the ongoing attempts to hold Big Oil to account.



Part Three: Delay | The Power of Big Oil

MAY 3, 2022

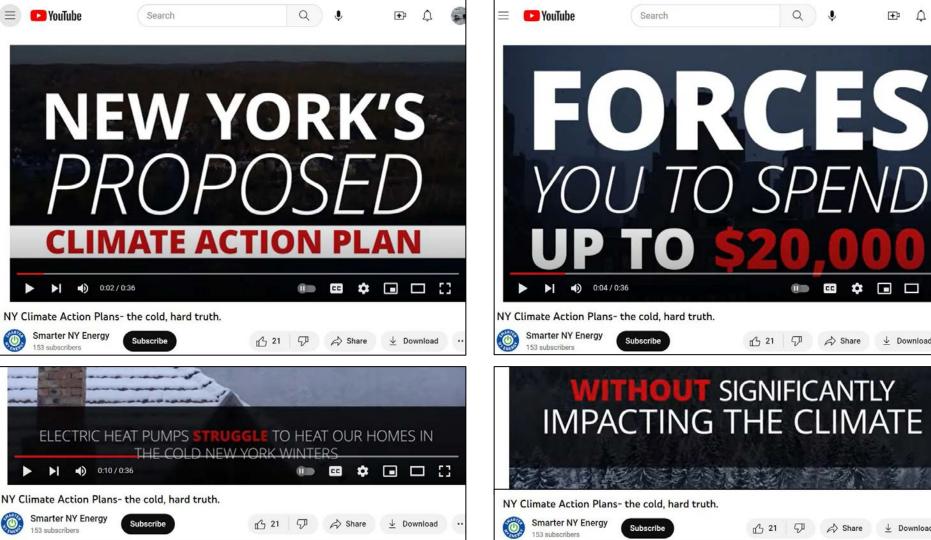


Part One: Denial | The Power of Big Oil



Part Two: Doubt | The Power of Big Oil

APRIL 26, 2022



#### **CRAIN'S** NEW YORK BUSINESS

NEWS & DATA **POLITICS** REAL ESTATE **HEALTH CARE** TECHNOLOGY SPECIAL REPORTS Home > Op-Ed

July 06, 2022 01:55 PM

**Op-ed: A diversified, hybrid approach is the** 

best way to meet emissions goals Philip DeCicco

Because methane is one of the most potent and plentiful greenhouse gasses, removing it from the atmosphere is vital. Green hydrogen is another important fossil-free fuel produced by separating hydrogen out of the water molecule,

leaving only water vapor behind. Investing in fossil-free fuels as part of a diversified clean energy portfolio, instead of relying on a single solution, will allow us to meet the critical climate

change mitigation goals set out in the climate leadership-community protection

general counsel of National Grid.

act without imposing unsustainable costs on New Yorkers and businesses. Philip DeCicco is vice president and deputy

Commentary: CHIPS Act's success depends on sound energy policy

Mark Eagan Sep. 16, 2022

Renewable natural gas, or RNG, and green hydrogen can be used in the same way as natural gas but are significantly better for the environment.

RNG captures methane - one of the most potent greenhouse gases - from landfills, farms, wastewater treatment plants, and other sources and

repurposes it as fuel. Green hydrogen is an emissions-free alternative to fossil fuels produced by separating hydrogen out of the water molecule, leaving only water vapor behind.

Mark Eagan is president and CEO of the Center for Economic Growth and the Capital Region Chamber.

Newsday

**RESTAURANTS** OPINION **NEWS** 

**BUSINESS** 

THINGS TO DO

**SCHOOLS** 

Gift this

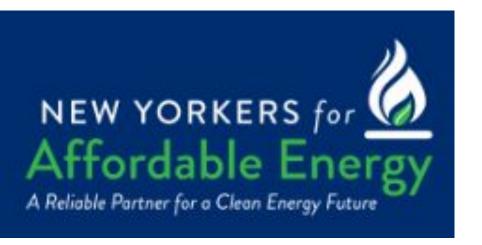
OPINION / COMMENTARY / GUEST ESSAYS New York's new climate change plan would be devastating for many businesses



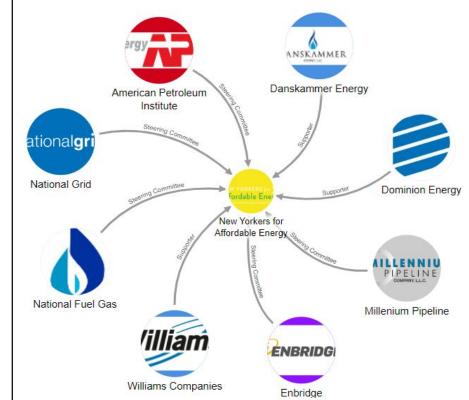
ABOUT / MEMBERSHIP

#### **Current Business Council Chairman**

Donna DeCarolis, President, National Fuel Gas Corporation



#### Fossil Fuel Industry Mobilizes Front Group To Weaken NY Climate Law





TAKE ACTION!

Understanding the CLCPA

The Challenge for NY

**Money Matters** 

**Consumer Comments** 

In the News

URGENT! Albany is considering these plans right now, and will vote on the budget shortly. Make your voice heard!



#### **Right Goal/Wrong Path**





#### 🖟 The Gas Industry is Gaslighting New York 🔥





#### **How to obtain the NY Gaslighting report?**

The gaslighting report (the gas industry's recent and continuing underhanded efforts to throw sand in the wheels of climate action in NY state) is available at <a href="https://bit.ly/GaslightV2">https://bit.ly/GaslightV2</a> or by scanning the QR code below. The online version allows access to dozens of links to sources and videos.



#### **Building Electrification in the NYS Budget Negotiations**

#### 1. NY Home Energy Affordable Transition (HEAT) Act

- Eliminates ratepayer-funded subsidies; starts gas system planning, limits LMI energy burden.
- b. In Senate's one-house (TED Part MMM)
- c. Not in Assembly or Governor's proposals (she had it last year!!)

#### 2. All-Electric (New) Building Act

- a. Applies to new construction only
- b. Senate has the best version
  - i. Starts 1/1/25 for buildings < 7 floors; 1/1/28 for the rest; fewest exemptions
- c. Assembly: Starts 1/1/26 for buildings < 7 floors; 1/1/29 for the rest.
  - i. Has a weird caveat that can be abused by utilities
- d. Governor's proposal is the worst
  - i. Starts 1/1/26 for residential buildings < 4 floors; 1/1/29 for the rest.
  - ii. Riddled with loopholes and exemptions.

From: Michelle Hook <info@ny4affordableenergy.com>
Date: Sun, Mar 19, 2023 at 9:56 PM
Subject: NYAE Recent Activities
To:

Hello NYAE Supporters,

I am reaching out to share some of our recent activities in hopes that you will help spread the word. Please feel free to share the below links with your professional circles and elected officials in your meetings.

First, I have put links to the results of our recent polling, which was meant to gauge what New Yorkers feel about energy policy issues in the state. I am also including the link to our press release about the polling to help offer some context to the numbers.

Second, we have started our marketing campaign with digital and TV ads - the link for that is below as well.

Press release with direct link to crosstabs

https://www.ny4affordableenergy.com/2023/03/01/poll-new-yorkers-support-efforts-on-climate-change-but-they-want-to-keep-their-natural-gas/

crosstabs exist on the website, but aren't ON the website, as in, you have to know what the link is – here it is: <a href="https://www.ny4affordableenergy.com/sienapoll/">https://www.ny4affordableenergy.com/sienapoll/</a>

New ad is up on the homepage https://www.ny4affordableenergy.com

Also uploaded to NYAE voutube page

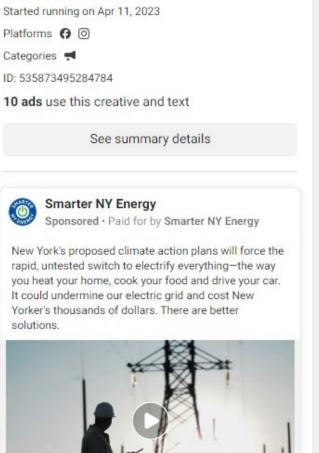
https://www.ny4anordableenergy.com

https://www.youtube.com/watch?v=mvxsv8Nstnw&embeds\_euri=https%3A%2F%2Fwww.ny4affordableenergy.com%2F&source\_ve\_path=MjM4NTE&feature=emb\_title

We will also be starting robocalls this week as well, which will focus on the building electrification bills currently being considered in the Senate and Assembly.

Please reach out with questions or comments on the items included here. Thank you all for your continued support!





the electric grid is radically altered. It could be a costly, disastrous mess

Active



Active

Platforms (3 (6)

Categories <

Started running on Apr 6, 2023



# Links to Fossil-Fuel Industry Videos

- 1. Scheming to influence moderate democrats and target women with misleading messaging optimized through focus groups: <u>Video Link</u>
- 2. Three most effective disinformation tropes are Affordability, Reliability, and Choice. Hear about them in the fossil fuel marketer's own words: <a href="Video Link">Video Link</a>
- 3. Coordination between fossil-fuel executives, business groups, and right-wing lawmakers: <u>Video Link</u>
- 4. Hear industry scheming to leverage the blizzards in Buffalo to drive anti-electrification messaging: <u>Video Link</u>



### **Action of the Evening**



https://bit.ly/GasFreeNY



### Action of the Evening

Take this guick action to support renewable heat **this guick action to support renewable heat this guick action to support renewable heat** 

(less than 1 minute)

Equally easily, you can leave a voicemail for the Governor with this straightforward script



https://bit.ly/CallHochul (less than 1 minute)

Now that you've got the hang of this, would you mind leaving similar messages for leaders of NYS Assembly and Senate?

https://bit.ly/CallSpeaker ... and ... https://bit.ly/CallASC (2-3 minutes)

Finally, in another couple of minutes, you can leave messages with your own <u>Democratic</u> state senator and assembly member. Here, you won't even have the wait time that you sometimes encounter when calling the leadership.

https://bit.ly/CallAssembly ... and ... https://bit.ly/CallNYSenate (3-5 minutes max)



# #ElectrifyEverything

# Questions?