

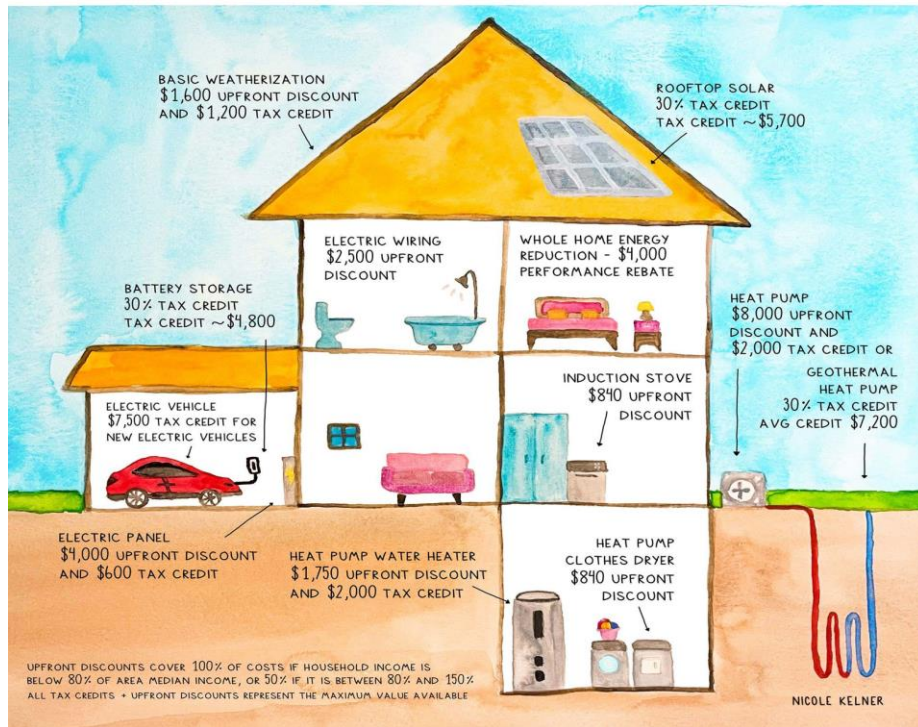
“Electrify” your home with the help of the IRA (Inflation Reduction Act)

A New Jersey Focused View

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Morristown Chapter



POTENTIAL SAVINGS FROM THE IRA BASED OFF A 2 PERSON HOME WITH A COMBINED INCOME OF \$150,000 IN NEW YORK CITY



NJ Home Electrification

- Given several presentations on the topic over the last year
- Designed to give the “average” NJ homeowner **information and confidence** to **begin** the process of electrifying their home
- Concern that **more could be done** to help home electrification **succeed in NJ**
 - Have some idea but looking for input/advice

Inflation Reduction Act of Aug 2022

- Tax credits and rebates for home electrification
 - Tax Credits: available for 2023 tax year (30% limit with caps)
 - Rebates: administered by states so NJ needs an approved plan
- Rebates coming: mid-2023, late-2023, early-2024...
 - Rebates for households up to 150% of Area Median Income
- NJ plan approval: late 2024 or early 2025
 - Coincide with Jan 1 start of NJ 2nd Triennium Energy Efficiency Programs

NJ 2nd Triennium EE Programs

- Administered by the utilities
- Proposed plans filed December 1, 2023

Appliance	Current	Proposed Rebate	Unit Basis
Heat Pump - Air Source	\$1,000	\$3,500	Per unit
Ductless Mini-Split Heat Pump	\$400	\$3,500	Per unit
Heat Pump Water Heater	\$1,000	\$2,500	Per unit

Presentation Overview

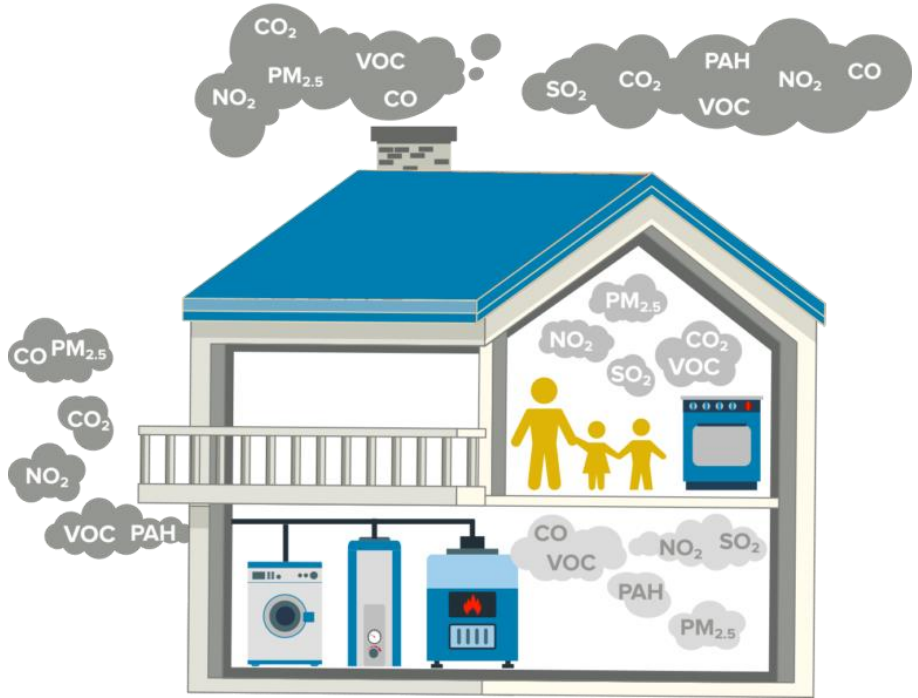
- Begin with a few basic questions about electrification
 - Covers basics such as the what, why and how of electrification
- Explore the main items that can be part of electrification
 - Such as: heat pumps, electric system updates and weatherization
- Explain the financial support from the IRA
 - Tax credits and rebates (mostly for low and moderate incomes)
- Examples of some families electrifying
 - Low, moderate and higher income families

The Questions

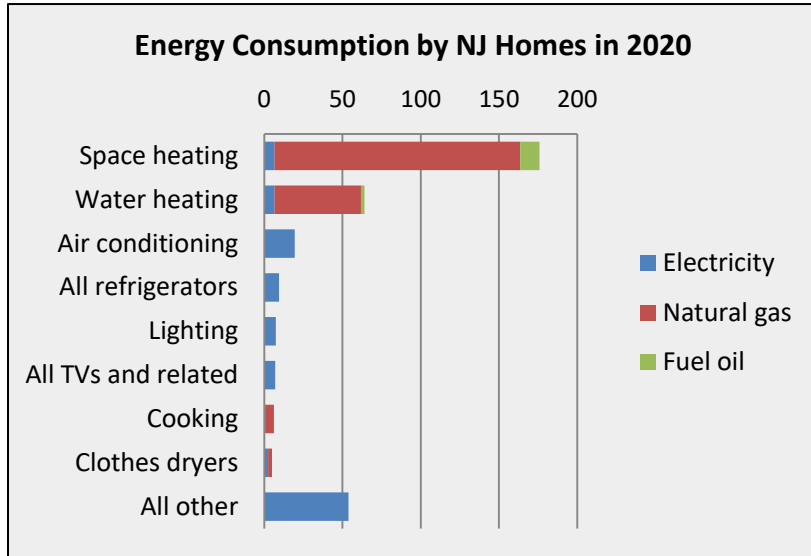
- 1) *What does electrifying my home mean?*
- 2) *What are the big users of gas/oil (fossil fuel) in my home?*
- 3) *What do I replace my gas/oil appliances with?*
- 4) *Why should I electrify?*
 - *Decrease harmful emissions*
 - *Save money on energy bills*
 - *Save money on new electric appliances*
- 5) *I'm not ready to electrify, what else will decrease emissions and save money on energy bills?*
- 6) *Can I prepare so it goes smoothly and limit time without heat or hot water?*

Q1: What does electrifying my home mean?

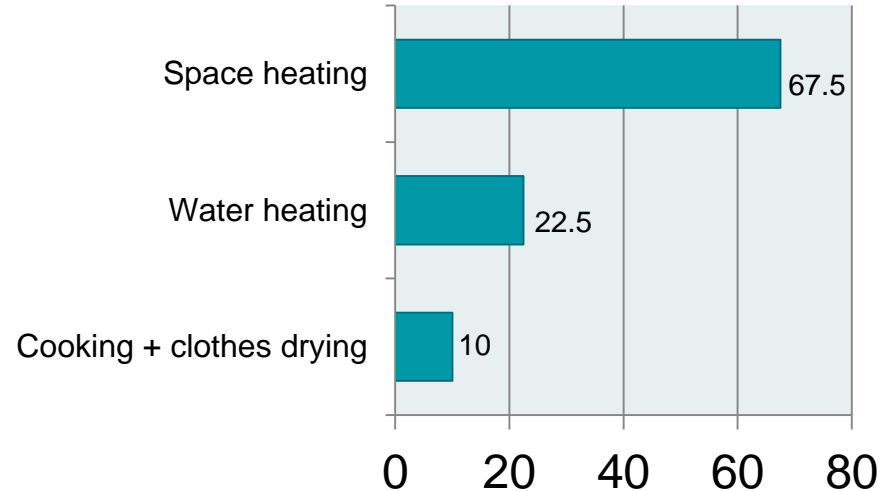
- Replace gas and oil burning appliances
 - Furnaces and boilers
 - Hot water heaters
 - Clothes dryers
 - Cooking
- Electrical system updates
- Make and save your own electricity
 - Rooftop solar with battery backup



Q2: What are the big users of gas/oil?



New Jersey Homes: Energy Use (%)



Home with fossil fuel appliances: home heating and water heating use about 90%

Q3: What will replace my gas/oil appliances?

- **Heat pumps for:**

- Home heating
- Water heating
- Clothes drying



- **Cooking:**

- Oven: regular electric “resistance”
- Stove: electric “resistance” or **induction**



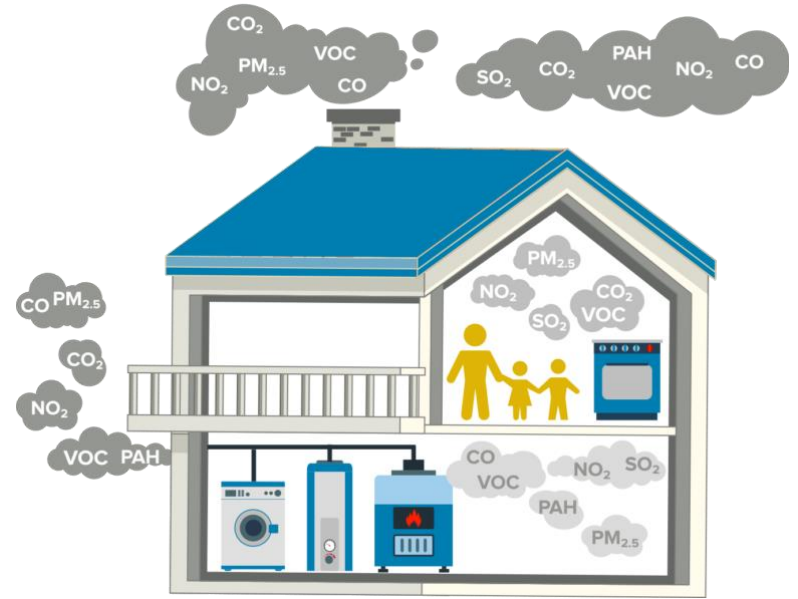
Q4: Why should I electrify?

There are 3 main reasons:

- a) Decrease harmful emissions
- b) Save money on energy bills
- c) Get new electric appliances for much **less** than the cost of a gas or oil replacement (covered later)

Q4a: Harmful emissions, what are they?

- Global warming gases:
 - CO₂, methane, NO_x
- Unhealthy pollutants:
 - PM_{2.5}, ozone, NO_x



Q4a: Harmful emissions: decrease expected?

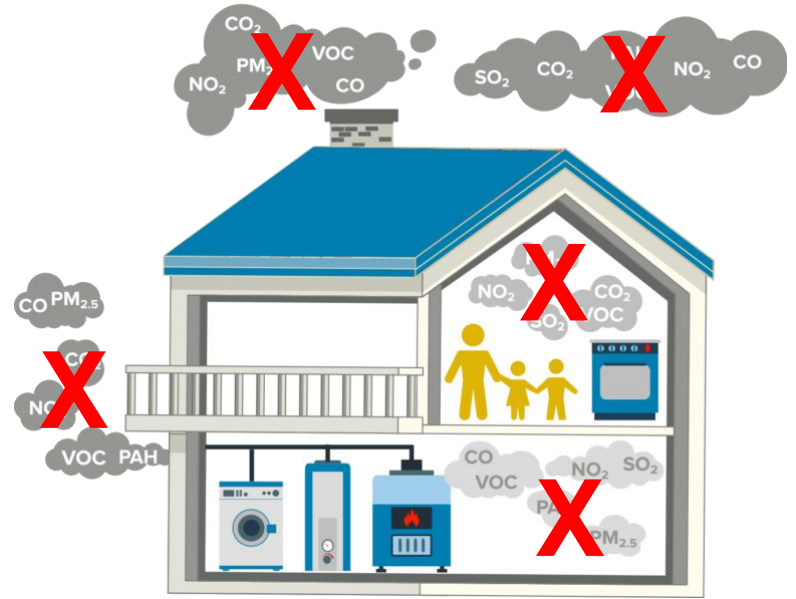
- No emissions from the home

BUT BECAUSE:

- ~50% of NJ electricity is from natural gas

DECREASE WILL BE:

- ~75-80% (could be 100% if you contract to use only “clean” electricity)



Q4b: Save money on energy bills?

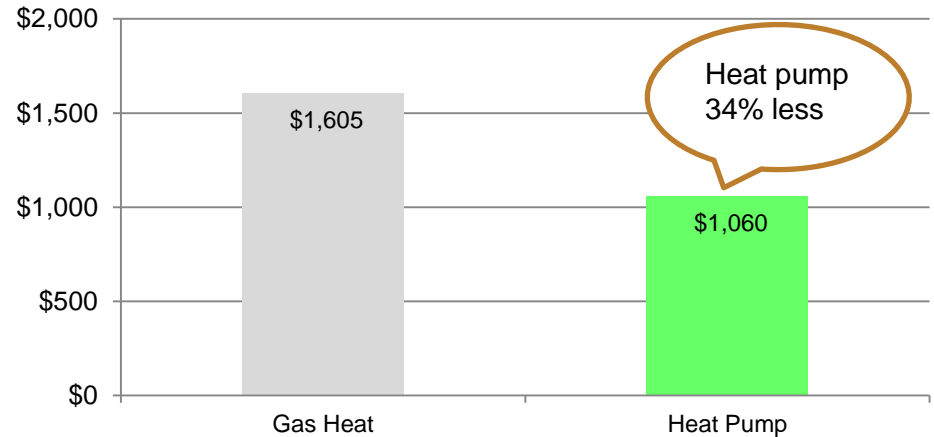
- Will I save a **lot** on heating bills if I **switch now** from fossil fuel heat to a heat pump?
 - Yes if 1) you switch from oil or propane heating 2) you weatherize your home at the same time or 3) install a **ground** source heat pump
 - But right now in NJ, an efficient gas furnace and an **air source** heat pump will have similar heating bills (especially if with PSE&G)
- However, the cost of gas is expected to increase much more than the cost of electricity as more people electrify!

Q4b: Save money on energy bills: How much?

Save money on energy bills

- Customers switching from gas to electricity will mean gas prices will rise more than electricity prices
- NJ BPU study in 2022
 - Price of electricity will increase less than gas
 - More savings each year using electricity!

**In 2030: NJ Average Home Heating Costs
(NJ BPU Ratepayer Study)**



Q5: How else could I decrease emissions and save money on energy?

- **Weatherize** your home
 - Reduces the amount of energy required to heat & cool your home
 - Mostly air sealing and increasing insulation
 - First step is a home energy audit (30% tax credit to \$150)
- Typically can reduce energy needs by 15-20% and possibly twice that in older “leakier” homes

Q6: What can I do so replacements go quickly and smoothly?

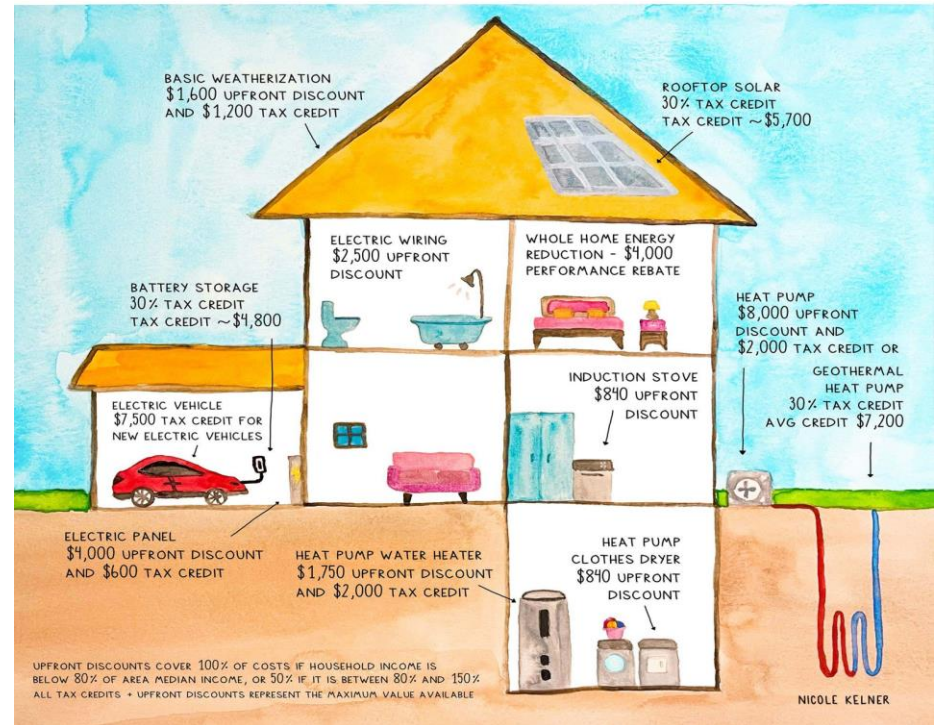
- Heat pump installation can be slow
- So, *make a plan*:
 - Replace heat and hot water systems before they “die” (Are they old? Have they needed service?)
 - Home heating: get contractors advice on what system would be good for your home and how much it will cost
 - Early on, figure out what electrical system changes will be needed to fully electrify your home and work into plan

What things does the IRA help with?

- Weatherization (covered Q5)
- Electrical panel + wiring
- Heat pump indoor air
- Heat pump water heater
- Heat pump clothes dryer
- Electric/induction cooking
- Rooftop solar + battery storage
- Ground source heat pump

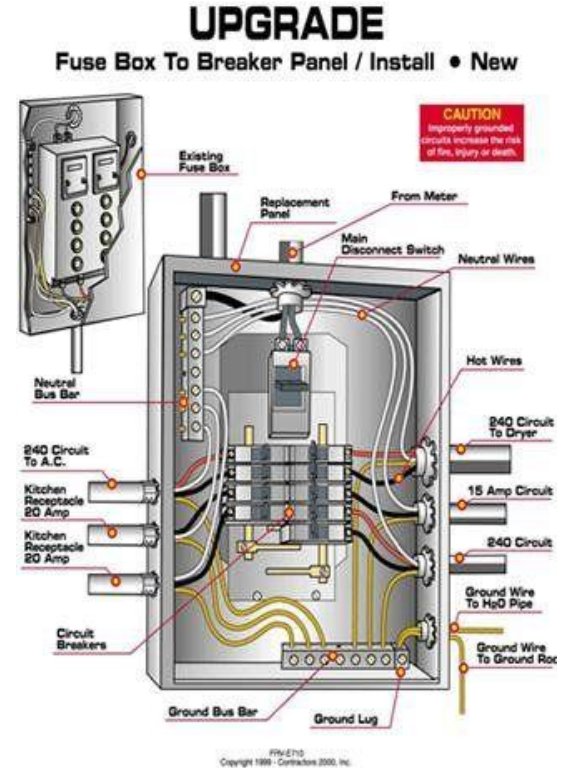
POTENTIAL SAVINGS FROM THE IRA

BASED OFF A 2 PERSON HOME WITH A COMBINED INCOME OF \$150,000 IN NEW YORK CITY



Electrical panel and wiring

- Electrical panel (circuit breaker box)
 - Increased amperage panel may be needed
- Electrical wiring
 - New wiring particularly for 240 volt appliances may be needed



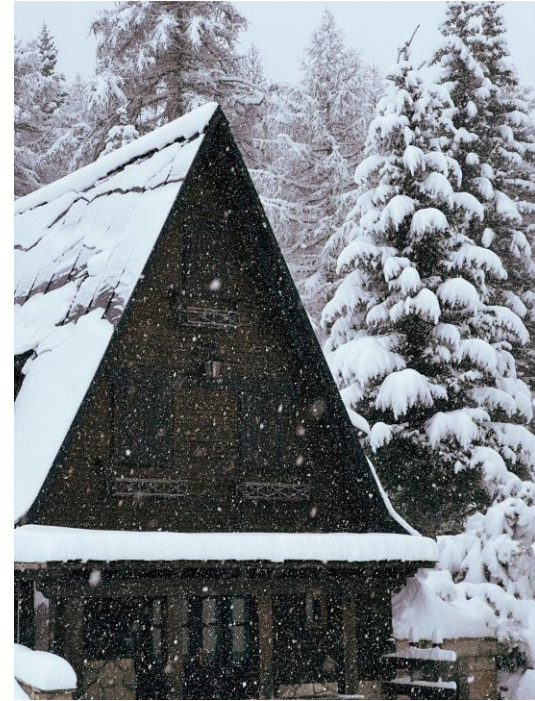
Heat Pump Indoor Air

- Electricity can create heat (resistance heat like a toaster) or move heat with a heat pump
- Heat pumps are 3-5x more efficient than resistance heat or gas heat
- Heat pump efficiency (how much heat it can move for an amount of electricity) has improved greatly and continues to improve
 - Variable speed heat pumps with inverter technology



Heat Pump Indoor Air: NJ “Cold Climate”

- Mitsubishi H2i works down to -13°F
- US companies are developing heat pump units that can work below -20°F
- 60% of homes in Norway, 43% in Sweden, and 41% in Finland have heat pumps
- 27,000 heat pumps installed in Maine in 2021
 - 5% of homes in one year
 - Aiming for 100,000 by 2025



Heat Pump Water Heater

- Heat pump water heaters work the same way
 - 3-5 times more efficient than resistance heaters potentially saving hundreds of dollars a year in energy costs

A couple of things to note:

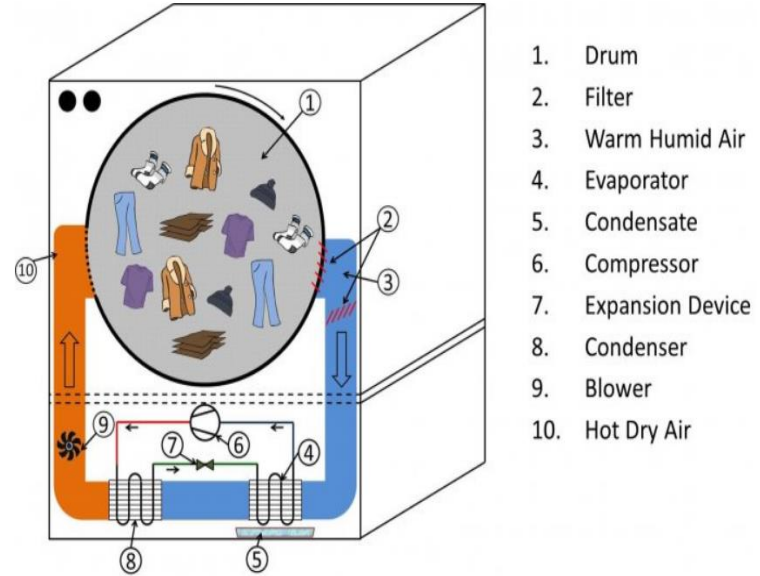
- 120 volt versions and now becoming available
- Can cool the area nearby (though usually in a basement)
- Will need a condensation drain



Heat Pump Clothes Dryer

- Is 3-4 times more efficient than a regular electric clothes dryer
 - Note: drying may take a little longer
 - Will need a condensation drain
- Condensing dryer is a good alternative

Buildings » Heat Pump Clothes Dryer



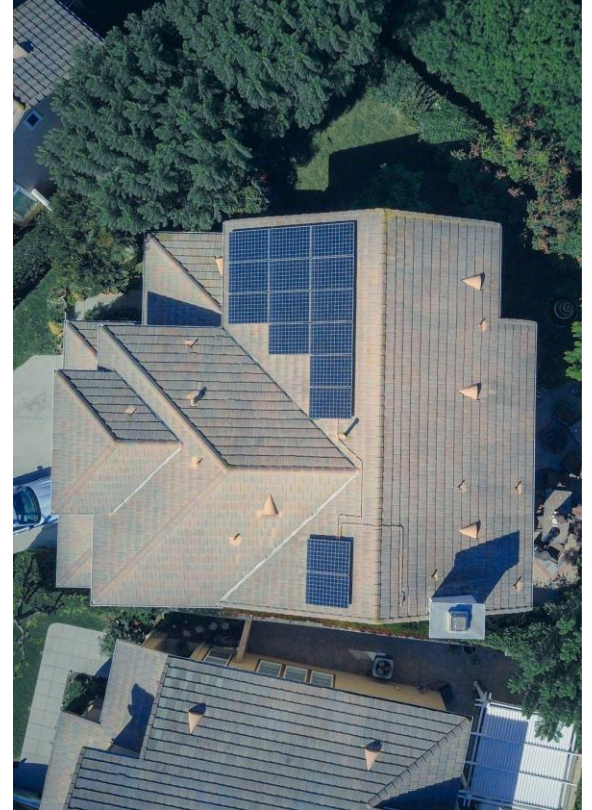
Electric/induction Cooking

- All electric cooktops
 - No harmful indoor air pollution
- Resistance electric
 - Slow to heat up, change temperature and cool down
- Induction electric
 - Uses magnetic field
 - Very quick to heat and change temperature
 - Stovetop never gets hot



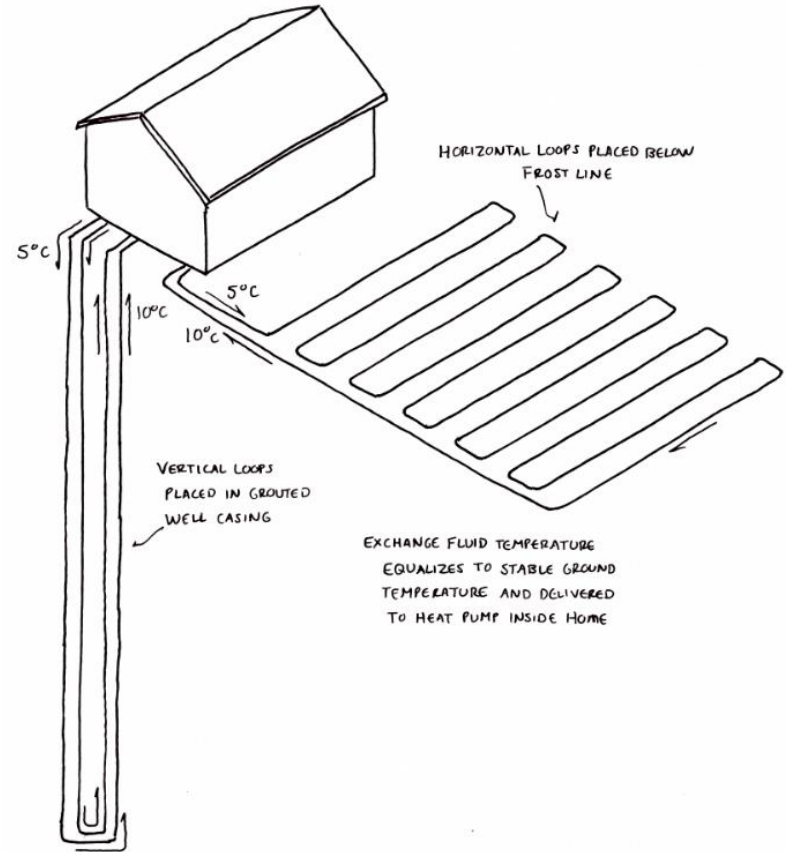
Rooftop solar + battery storage

- Produces zero-emissions electricity
- Guards against fluctuating electricity rates
- Solar plus battery storage can protect against power outages



Ground source heat pump

- Loop types
 - Horizontal: need large property size
 - Vertical: may be geological issues
- Expensive
- Few experienced contractors



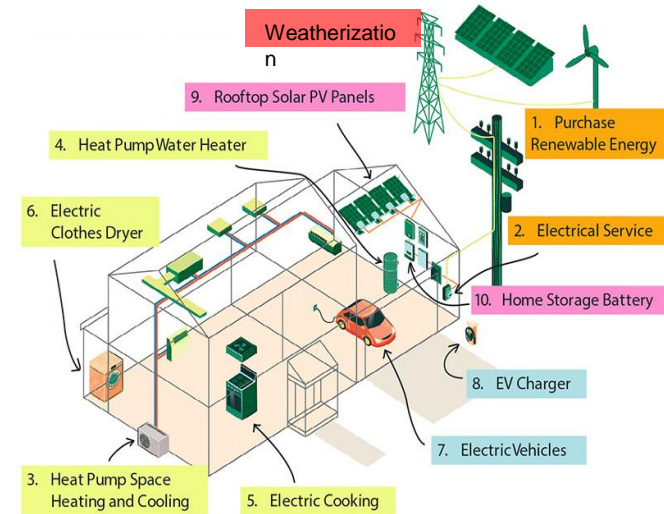
Types of IRA Incentives

- Tax Credits: **available now!**

- 25C: has \$ cap, no carryover of unused credit
- 25D: no \$ cap, may carryover unused credit
- Can take credit on cost after rebate!

- Home Energy Rebates

- HOMES or Home Efficiency Rebate
 - In effect now
- HEEHRA or Home Electrification and Appliance Rebate
 - Once DOE approves NJ program



HOMES/HER-Home Efficiency Rebate

- A whole house energy efficiency project (one contractor)
 - All improvements must reduce home energy use
 - Primarily weatherization (e.g. insulation, air sealing)
 - May also include replacing inefficient electric resistance heat with heat pumps

Energy Savings	20% to 35%	Greater than 35%
Low income*	80% of cost up to \$4,000	80% of cost up to \$8,000
Other incomes	50% of cost up to \$2,000	50% of cost up to \$4,000

* Less than about \$95,000 for a family of 4 in NJ (depends on family size)

HEEHRA/HEAR- Home Electrification and Appliance Rebate*

- **Discount** for a single item (e.g. heat pump, stove, electrical panel)
- Available to households <150% of the area median income
 - Approximately \$178,000 for a family of 4 in NJ (depends on family size)
- For replacing fossil fuel appliances only

* Available by the end of 2024?

Area Median Income: NJ Metro

	Number of Family Members							
	1	2	3	4	5	6	7	8
AMI for NJ Metro Area	82,875	94,688	106,500	118,313	127,813	137,250	146,750	156,188
80% AMI	66,300	75,750	85,200	94,650	102,250	109,800	117,400	124,950
150% AMI	124,313	142,031	159,750	177,469	191,719	205,875	220,125	234,281

<https://www.huduser.gov/portal/datasets/il/il2023/2023summary.odn>

HEEHRA Rebate and Tax Credits

Buying	HEEHRA Rebate*		25C Tax credit/yr **	25D Tax credit/yr
	Low income <80% AMI	Moderate income 80-150% of AMI	All incomes	
Weatherization	100% to \$1,600	50% to \$1,600	30% to \$1,200^	
Electrical wiring	100% to \$2,500	50% to \$2,500		
Electrical panel	100% to \$4,000	50% to \$4,000	30% to \$600	
Heat pump	100% to \$8,000	50% to \$8,000	30% to \$2,000	
Heat pump water heater	100% to \$1,750	50% to \$1,750	30% to \$2,000	
Heat pump clothes dryer	100% to \$840	50% to \$840		
Electric/induction stove	100% to \$840	50% to \$840		
Rooftop solar				30% no \$ limit^^
Battery storage				30% no \$ limit
Ground source heat pump				30% no \$ limit

* \$14,000 maximum discount: all items combined over the multi-year duration of the program

** \$2,000/year maximum discount: heat pumps combined; \$1,200/year all other items combined

^ Includes replacing windows and doors and to \$150 for home energy audit

^^ Credit can also include any cost for electrical panel if needed

Rewiring America: Your Savings from the IRA

Enter your household information to find out.

[Reset calculator](#)

Zip Code [?]

07928

Rent or Own [?]

Homeowner

Household Income [?]

\$200,000

Tax Filing [?]

Married Filing Jointly

Household Size [?]

8 people

Calculate! 

Your Personalized Incentives

UPFRONT
DISCOUNTS [?]

\$14,000


[Covers up to 50% of costs](#) [?]

AVAILABLE
TAX CREDITS [?]

\$28,500

ESTIMATED ENERGY
SAVINGS PER YEAR [?]

\$1,050

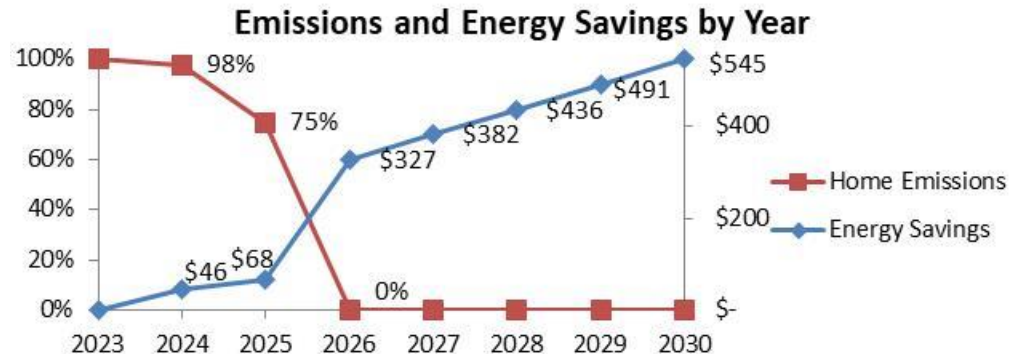
Total Incentives \$42,500 

Disclaimer: These values are estimates. The rebates may be implemented differently in each state, so we cannot guarantee final amounts, eligibility, or timeline. And without additional appropriations from Congress, the rebate programs will end once their initial IRA funding is exhausted. Tax credits can only be used to offset your federal taxes owed, which we estimate but do not know.

Colemans: <80% Area Median Income

	2024			2025	2026			Totals
Replacing	Gas range	-	100 Amp panel	Gas water heater	-	Gas furnace	Gas clothes dryer	
Buying	Electric range	Wiring	200 Amp panel	Heat pump water heater	Weatherize	Central heat pump system	Heat pump clothes dryer	
Cost	\$749	\$1,500	\$2,000	\$3,000	\$1,600	\$7,500	\$840	\$17,189
Rebate	\$749	\$1,500	\$2,000	<u>\$1,750</u>	<u>\$1,600</u>	\$7,500	<u>\$840</u>	\$15,939
Tax credit	-	-	-	\$375	-	-	-	\$375
Out of pocket cost	\$0	\$0	\$0	\$875	\$0	\$0	\$0	\$875
								5% of total cost

- Paid \$875 for equipment costing \$17,189
- Zero emissions by 2026
- Energy costs hundreds of dollars less per year



Garcias: 80-150% Area Median Income

	2024		2025	2027		2028	Totals
Replacing		100 Amp panel	Gas range		Gas furnace; central AC	Gas water heater	
Buying	Wiring	200 Amp panel	Induction range	Weatherize	Central heat pump	Heat pump water heater	
Cost	\$2,500	\$2,000	\$1,300	\$1,600	\$12,000	\$3,000	\$22,400
Rebate	\$1,250	\$1,000	\$650	\$800	\$6,000	\$1,500	\$11,200
Tax credit		\$300			\$1,800	\$450	\$2,550
Out of pocket cost	\$1,250	\$700	\$650	\$800	\$4,200	\$1,050	\$8,650
							39% of total cost

- Paid \$8,650 for \$22,400 of equipment
- Zero emissions by 2028
- Energy costs hundreds of dollars/year less by 2027

Garcias: 80-150% Area Median Income

Heating system: hot water baseboard or radiators and no central AC

	2024		2025	2027		2028	Totals
Replacing		100 Amp panel	Gas range		Boiler system; no central AC	Gas water heater	
Buying	Wiring	200 Amp panel	Induction range	Weatherize	Heat pump: ducted central or multiple minisplit	Heat pump water heater	
Cost	\$2,500	\$2,000	\$1,300	\$1,600	\$20,000	\$3,000	\$30,400
Rebate	\$1,250	\$1,000	\$650	\$800	\$8,000	\$1,500	\$13,200
Tax credit		\$300			\$2,000	\$450	\$2,750
Out of pocket cost	\$1,250	\$700	\$650	\$800	\$10,000	\$1,050	\$14,450
							48% of total cost

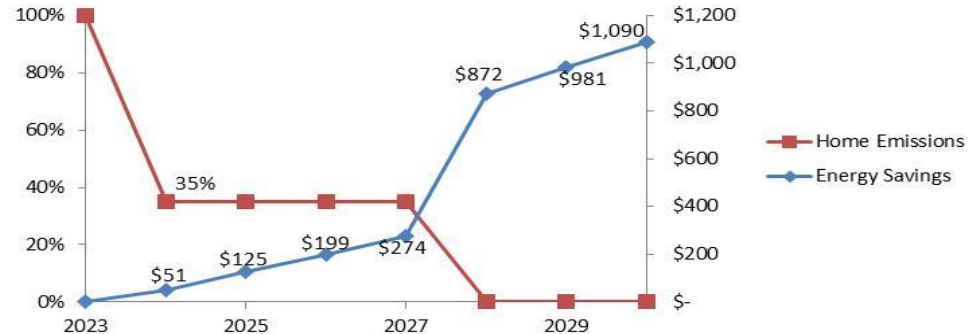
- If cannot take tax credit system HVAC cost \$12,000 OOP
- Maximum HVAC rebate is \$8,000

Sandovals: >150% Area Median Income

	2024	2025	2028			Totals
Replacing	Gas furnace + central AC	Window AC units	Gas water heater	Gas range	Electric clothes dryer	
Buying	Central heat pump	Ductless heat pump	Heat pump water heater	Induction range	Heat pump clothes dryer	
Cost	\$13,000	\$7,000	\$4,000	\$1,300	\$1,500	\$26,800
Rebate						
Tax credit	\$2,000	\$2,000	\$1,200			\$5,200
Out of pocket cost	\$11,000	\$5,000	\$2,800	\$1,300	\$1,500	\$21,600
						81% of total cost

- Tax credits only
- Savings of about 20%
- Zero emissions by 2028
- Energy cost savings up to \$1,000/year

Emissions and Energy Savings by Year



With IRA: Third Reason to Electrify

It will cost less to install new electric appliances than to install new gas or oil replacements

- This will be the case for low and moderate income households due to rebates and tax credits
- Possible savings exception: boiler system* with no central AC** where a heat pump system with new ductwork or several ductless heat pumps costs >\$10,000 than new boiler (or >\$8,000 if not eligible for tax credits)

* Heat pumps to replace boilers likely to be available soon (propane refrigerant)

**Bonus for heat pump installation, it would provide central AC

Higher income and appliance costs

- **30% tax credits but no rebates**
 - Electric appliances that qualify for tax credits may sometimes be 30% more than a basic gas/oil replacement
- However higher income homes usually have higher energy bills so they will more quickly accumulate savings on their energy bills once they electrify

What Can I Do Now?

- Get a home energy audit
 - Will assess need for weatherization
 - Should advise on the status of space and water heating appliances
 - Make sure a blower door test is included to test “leakiness” of home
- Begin making a plan on electrifying your home
 - Decide what to do and when (or at least the order in which things will be needed)
 - Maximize IRA incentives
 - Begin a plan to revise your home space heating system, especially if have a boiler with baseboards or radiators

References

Website	Google terms	About
Rewiring America	Electrify Everything	2021, 106 pages, pamphlet, excellent resource
Rewiring America	Your Guide to the Inflation Reduction Act	Frequently revised, 34 pages
Redwood Energy	Pocket Guide to All-Electric Retrofits	2022, 91 pages, excellent guide

NJ 50x30 Building Electrification

- To “Decarbonize” our homes we need to:
 - **Stop burning** fossil fuels in buildings: furnaces, boilers, water heaters
 - Use **electricity** instead of fossil fuels: heat pumps (resistance, induction)
 - Decarbonize our electric **grid** (no shifting of emissions to power plants)
 - **Weatherize** to reduce the demand for energy to heat buildings
- What **policies** will drive this transformation?
 - **Financial incentives**: tax credits and rebates (IRA, NJ utility rebates)
 - **Rules + Regulations**: heat pumps required, no gas hookups
 - **Not a carbon fee** (CCL supported policy a fee and dividend)

Home Decarbonization: Very Complex

- Complicated process
 - Difficult to compare estimates (sometimes not possible)
 - May involve two or more contractors (coordinate, act as go-between)
 - Deciding the sequence of tasks can be complex
 - Contractors may push favored systems and products
- Complicated financial incentives
 - Federal Tax credits: \$ caps, efficiency requirements (e.g. windows)
 - IRA rebates: income cutoffs by location, \$ limits (by item and by total), efficiency requirements, may depend on decrease in energy use
 - NJ utility rebates: probably increase substantially in 2025, restrictions?

Successful Home Decarbonization

- Quickly **reach and maintain** a **high %** of all new heating systems (space and water) be heat pumps
 - Without fossil fuel backup
- Will the policies of rebates, tax credits, rules + regulations be enough to achieve this?
 - Financial incentives maybe if all income groups are highly subsidized
 - Strict regulations forcing electrification: Politically feasible? Held up by lawsuits?

Homeowner Satisfaction the Key to Success?

- High % of homeowners need to be happy with the process and the results (over a heating and cooling season)
- Influencing homeowner satisfaction:
 - HVAC contractors: will the current pool likely to lead to a high percentage of satisfied customers?
 - NJ state agencies: NJ is a laggard compared to states like Maine, NY, California, Massachusetts, Vermont
- Will the contractor pool and state support improve quickly enough?

What can WE do to make sure building electrification is a success?

- Lobby for NJ programs to provide a high level of homeowner support
 - Guidebooks
 - Help lines
 -
- Subsidized or free electrification consultants
 - Electric coaches, heat pump coaches