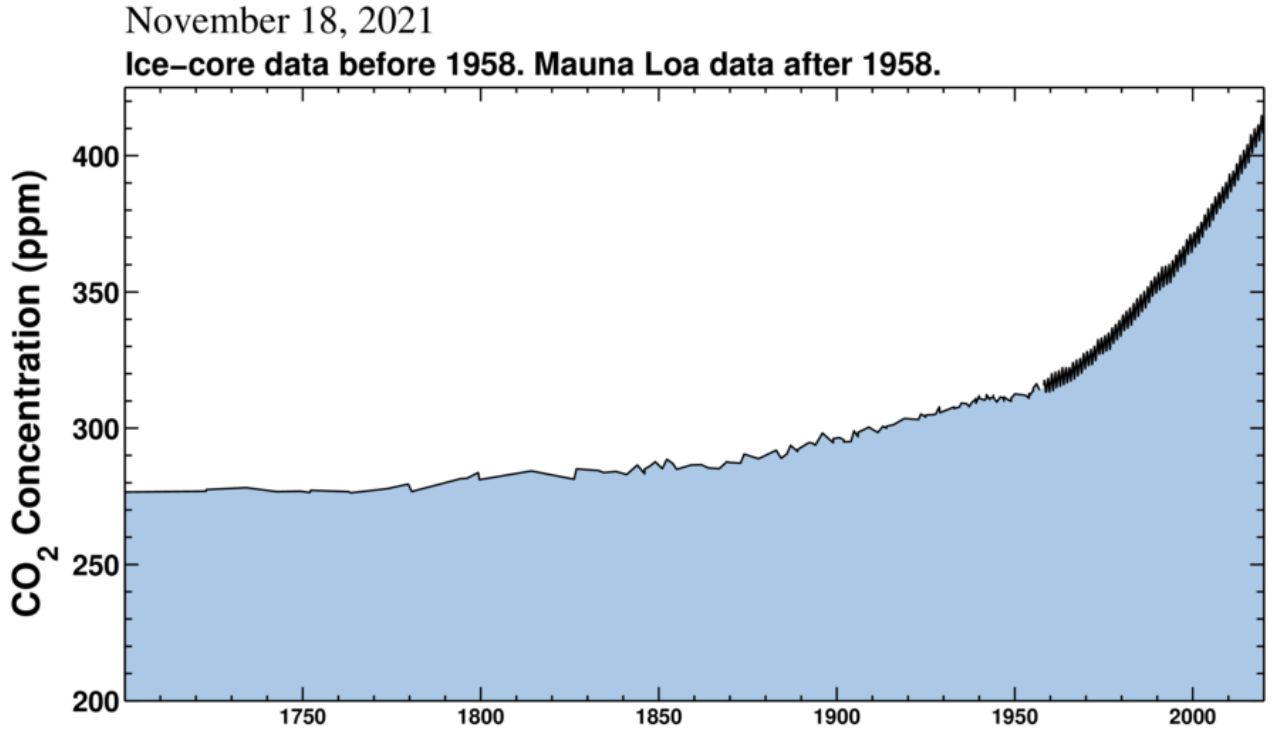
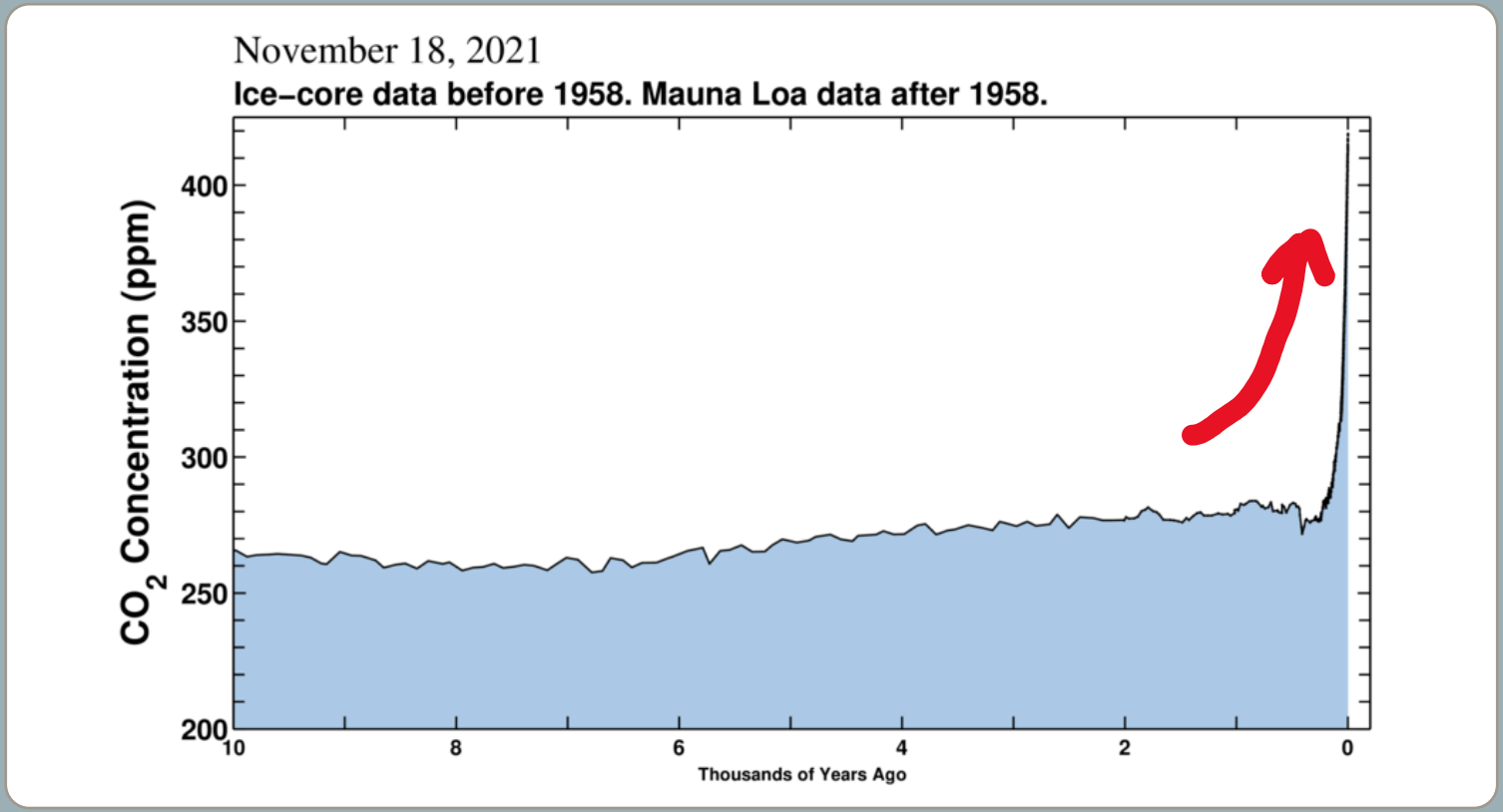
Combating Climate Change

Joel Grayson



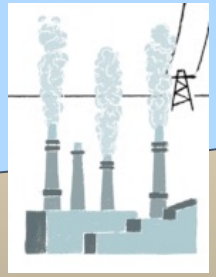
Rising Carbon Levels



Rising Carbon Levels

CO_2

CO_2



Transportation 29%

Electricity 25%

Industry 23%

Commercial/Residential 13%

Agriculture 10%

C

N_2O

CO_2

HFC

CH_4

SF_6

C

C

C

Source: epa.gov

Without Greenhouse Gases

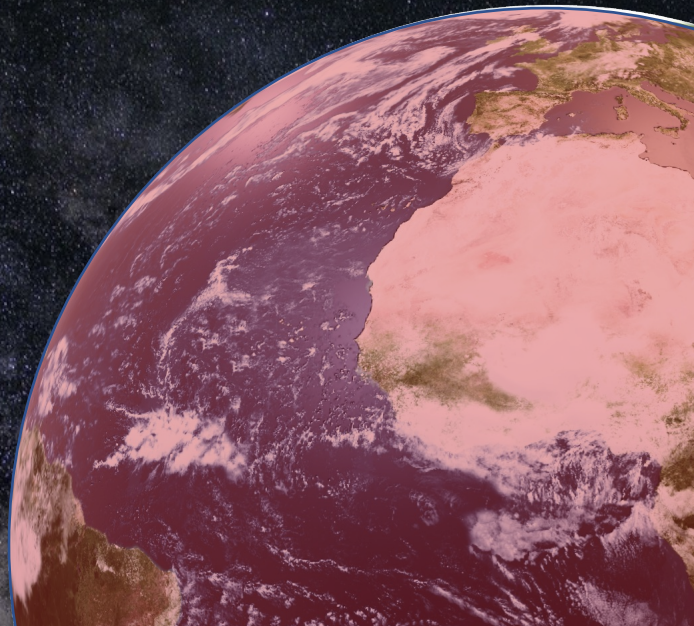
With Greenhouse Gases

N_2O

CO_2

CO_2

NH_4



Consequences

Direct

- Rising Sea Levels
- Acidic Ocean
- Less fresh water
- Extreme Weather
  - Heat Waves
  - Drought
  - Flooding
  - Frequent Hurricanes
  - Wildfires

Indirect

- Famine & starvation (agricultural instability)
- Escalated food prices
- Trillions of dollars in infrastructure damage
- Increased disease & pests (such as malaria)
- 20 million climate refugees per year
- Power outages

NYC Flood Preparation

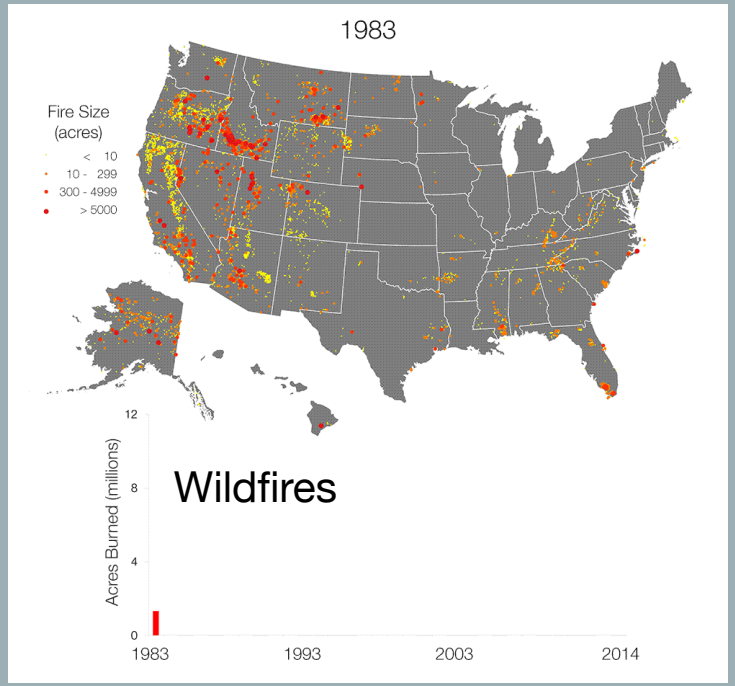
Today

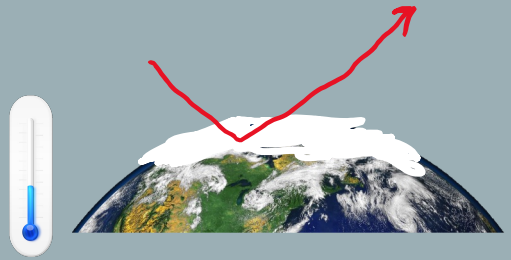
2100

Climate Change Has Momentum

<u>Vicious cycles examples:</u>

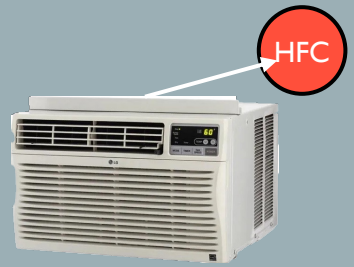
1. Ice caps melt, reflecting less heat ⇄ warming
2. More heat causes more AC use ⇄ warming
3. Permafrost melts, releasing methane ⇄ warming
4. Wildfires intensify ⇄ warming





Heat reflected

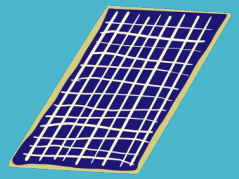
Heat absorbed

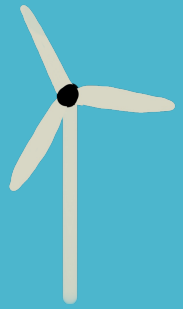


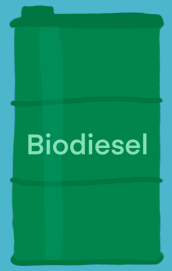
Solutions

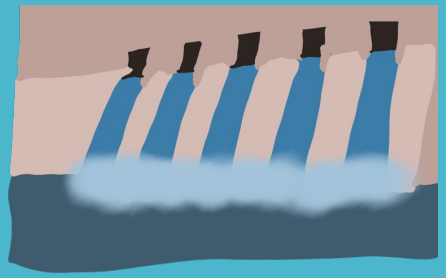
1. Implement Low-Carbon Energy Sources & Electrify

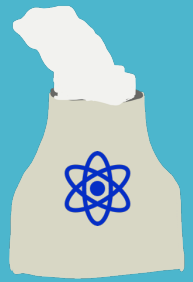
- Renewables
  - Solar
  - Wind
  - Biomass
  - Hydropower
  - Geothermal
  - Many more…
- Nuclear fills in gap in place of fossil fuels

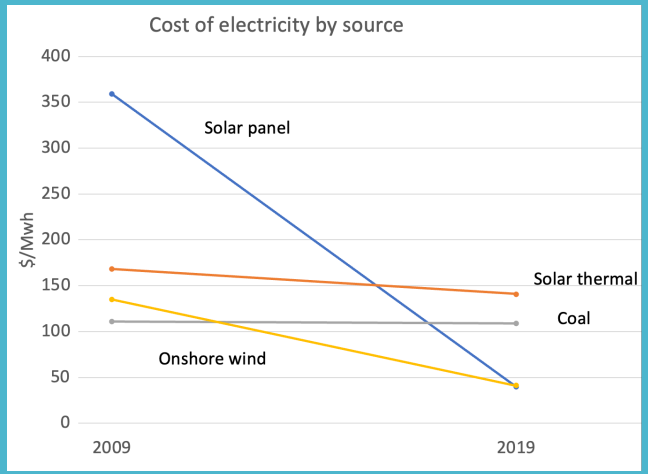




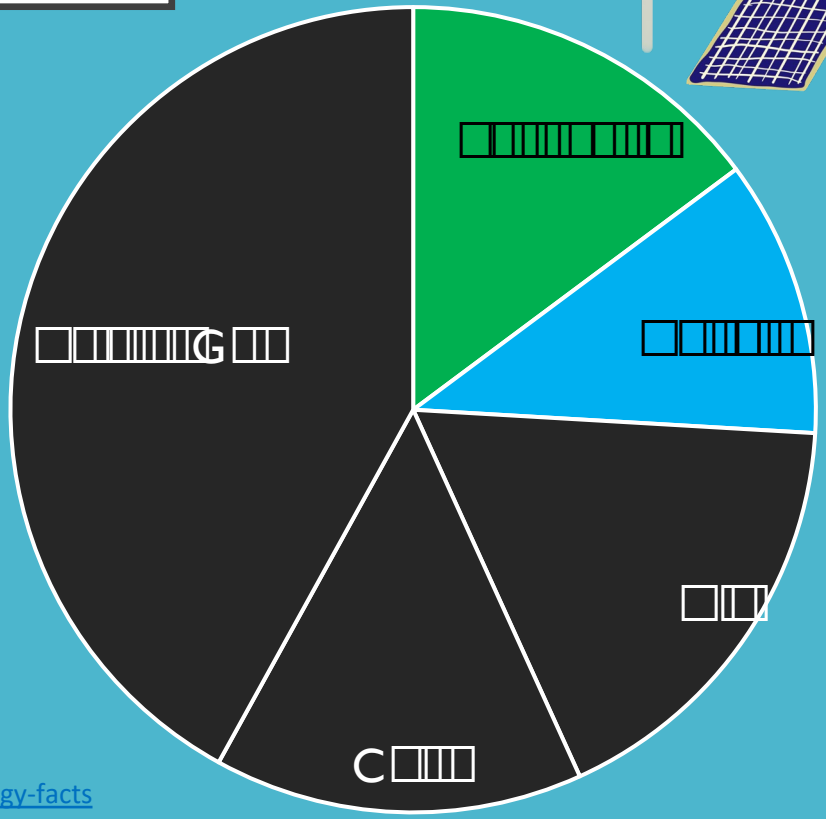


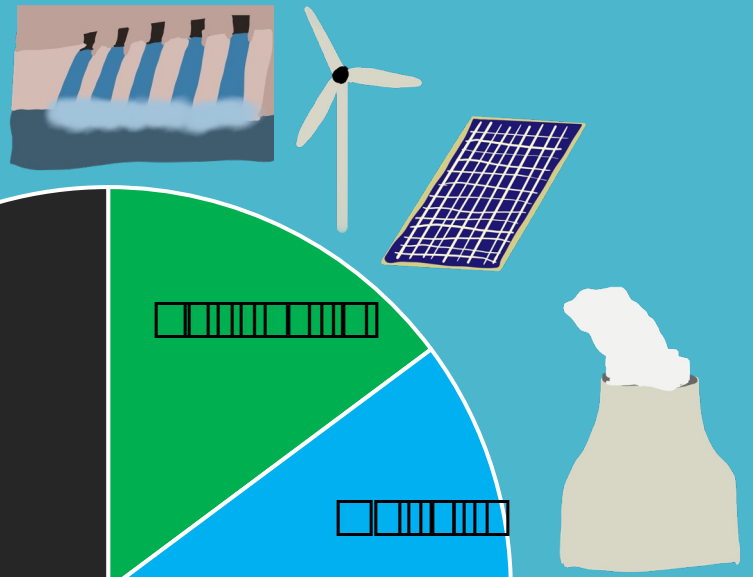






Energy Sources in U.S.





Black=Fossil Fuels

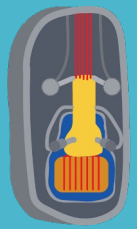
Source: eia.gov/energyexplained/us-energy-facts
Data as of 2020

2. Carbon Pricing & Subsidies

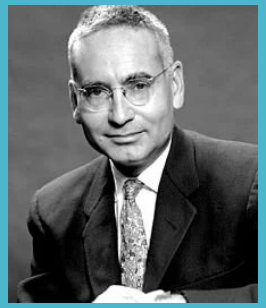
- Tax carbon emissions ($ per ton of CO_2e)
- Subsidize others
- Fund research (see next slide)
- Encourage electrification & energy efficiency

3. Research New Energy Sources

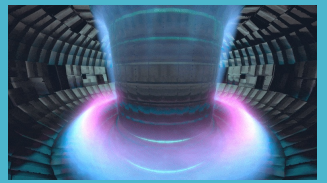
1. Advancing Nuclear Power
    a. New Generation of Nuclear Power Plants
    b. Small Modular Reactors
    c. Thorium Reactors
    d. Fusion
2. Efficient batteries for storing renewable energy



Small Modular Nuclear Reactor



Alvin Weinberg, advocate
& researcher of thorium energy



Fusion, a long sought-after energy source

4. Carbon Sequestration

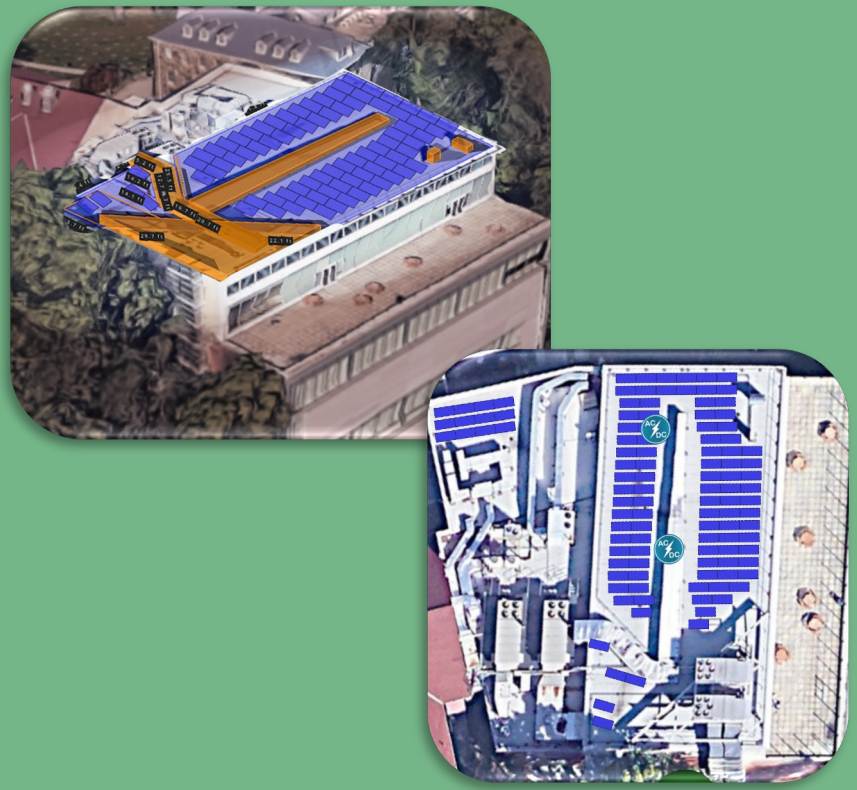
- Flue gas extraction in existing coal plants
- Carbon capture & storage
- Reforestation & protecting existing forests
    - Protect Amazon forest

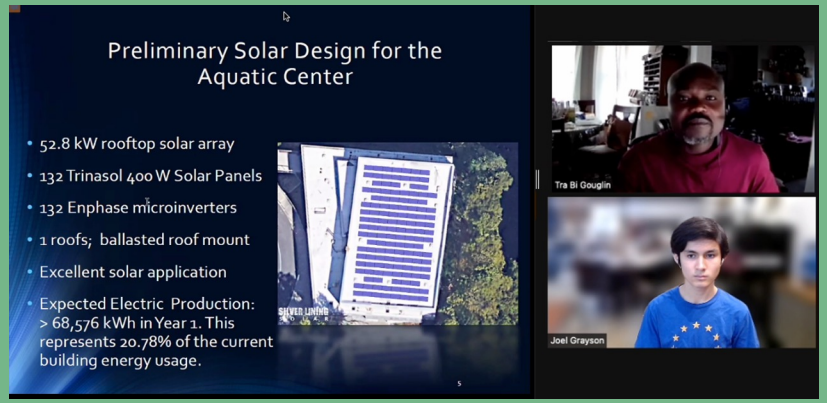
Orca, a direct air capture and storage plant

Tree planting in Ethiopia

My Actions

Solar for Riverdale





Meeting with solar installers

Electric School Buses

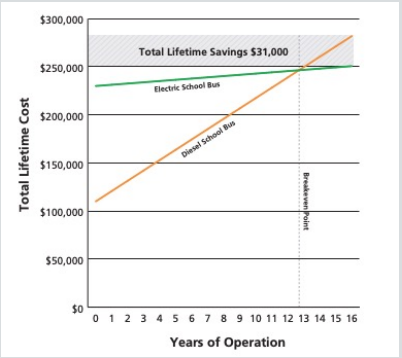
+ Lower emissions, helping fight climate change

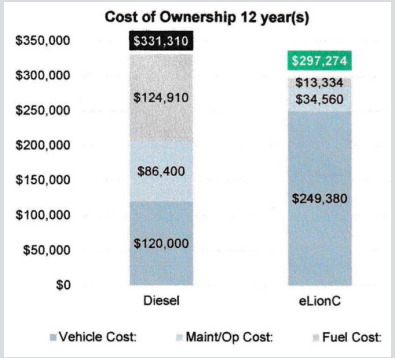
+ Stabilizes the grid by charging at night

+ Improves student health (diesel causes asthma)

E□□□□□ □□□

- Over 12 years, electric is **cheaper** than diesel
  - Higher upfront cost
  - Lower cost of fuel and maintenance





□□□E□□□□□□(□□□□□□□□□□□)

Charge overnight

Composting

Installing an EcoRich Composter

Benefits

- Reduces landfill food waste
- Reduces emissions
- Improve campus plant health

Food waste

Compost for Soil

Electric Leaf Blowers

Gas Leaf Blowers	**Electric** Leaf Blowers
Pollute nitrous oxides	Do not pollute on spot
Loud	Quiet
Emit carcinogens and asthma-inducing toxins	Better for health

1 hour of gas powered leaf blower operation

=

1100 miles of automobile driving

Nuclear

Article for the Riverdale Review

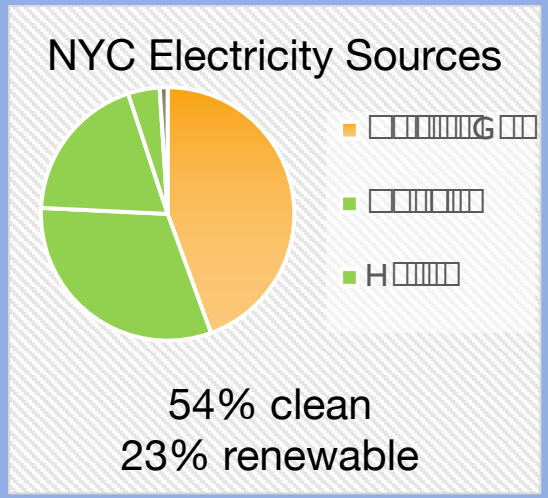
What can you do?

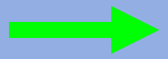
Active Citizen

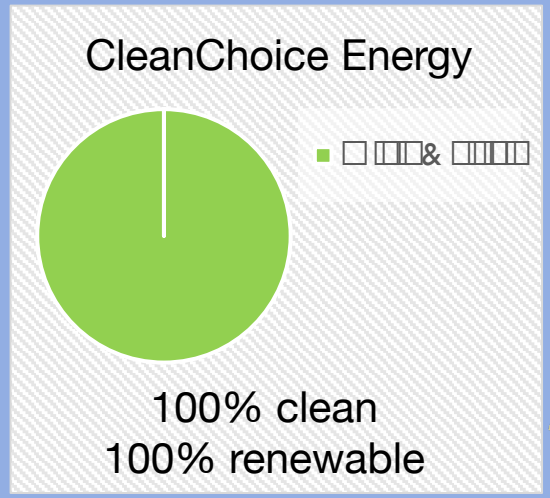
- Stay informed, inform others
  - Read the news on climate change
- Vote for climate policies when you are older
- Protest

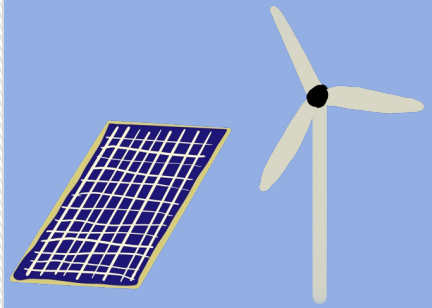
Switch to Con Edison CleanChoice Energy

100% [illegible]









Family & Home

- Electric car
- LED Lighting
- Insulate your home
- Buy local food
- Eat less meat
- Avoid wasting food

Write to your politicians

community.citizensclimate.org/tools/write-congress-about-the-energy-innovation-and-carbon-dividend-act

Put pressure on them to enact carbon pricing.

Sign Petition for Electric School Buses

forms.gle/XXSiWhcDd7howzKH8

Thank You