

Climate Conversations

Renewable Energy

St Mark's Creation Care Ministry

June 2024



Agenda

➤ Land Acknowledgement:

Saint Mark's Cathedral acknowledges that we gather on the traditional land of the first people of Seattle, the Duwamish People, who are still here, and we honor with gratitude the land itself and the life of all the Coast Salish tribes.

➤ Opening Prayer

➤ Framework

➤ Energy Reduction

➤ Discussion

➤ Renewable Energy Alternatives

➤ Sharing and Q&A

➤ Closing Prayer

Opening Prayer

Lord, show us how to do things well today.

Show us how to make our contribution as we change the way we live and travel, make and consume, distribute and sell, use and reuse, energy and products.

Show us how to do simple things well in our home, places of work and daily lives.

Show us how to protect the world you made, in all it's diversity and goodness, from carbon emissions, global warming and climate change, rising temperatures and sea levels, the displacement of peoples, environmental poverty, harm and destruction.

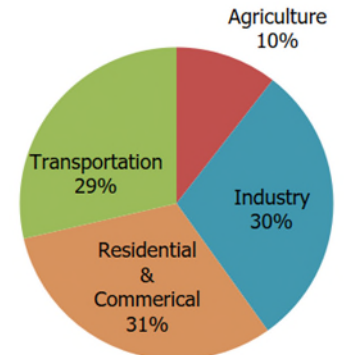
Show us how and why, so that alone and with others our contribution will make a difference.

Amen



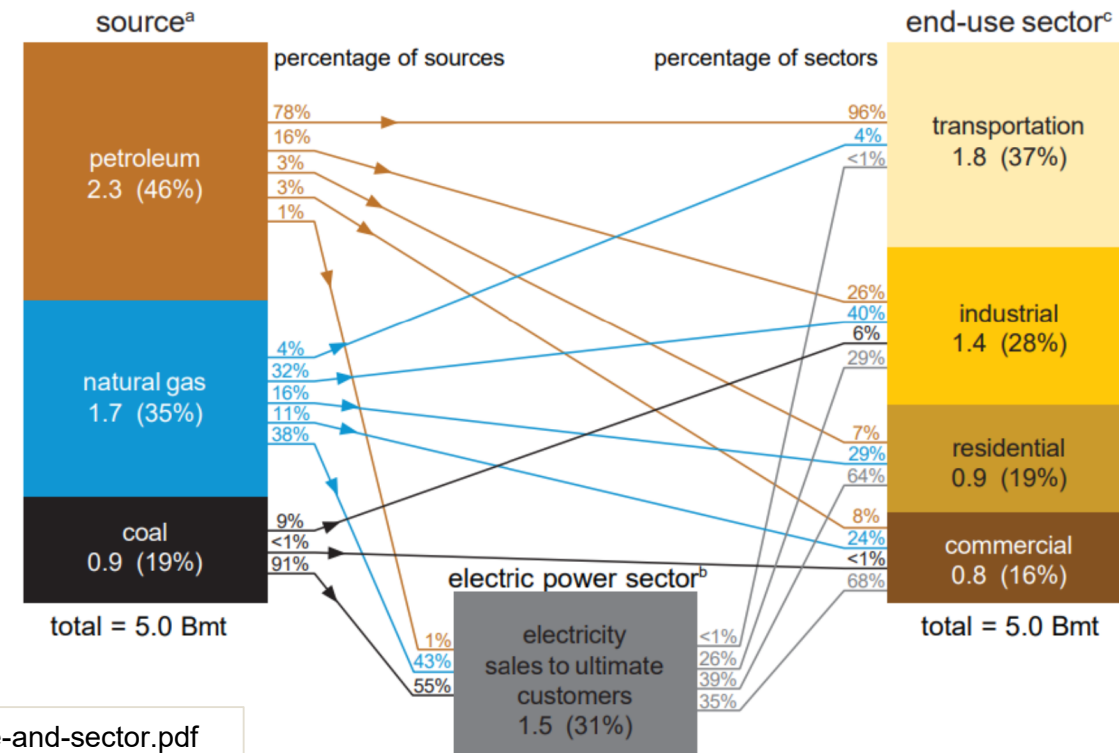
The Energy Dilemma

- Global GHG emissions have started to grow, after dropping during the pandemic
 - In 2022 it reached 53.8 Gt CO₂eq
- GHG emissions were primarily CO₂ from fossil fuels (71.6%). Methane (CH₄) was 21%, N₂O 4.8% and fluorinated gases 2.6%.
- % of GHG from energy that is used for:
 - Electricity & heat 34%
 - Industry 24%
 - Transport 15%
 - Buildings 6%



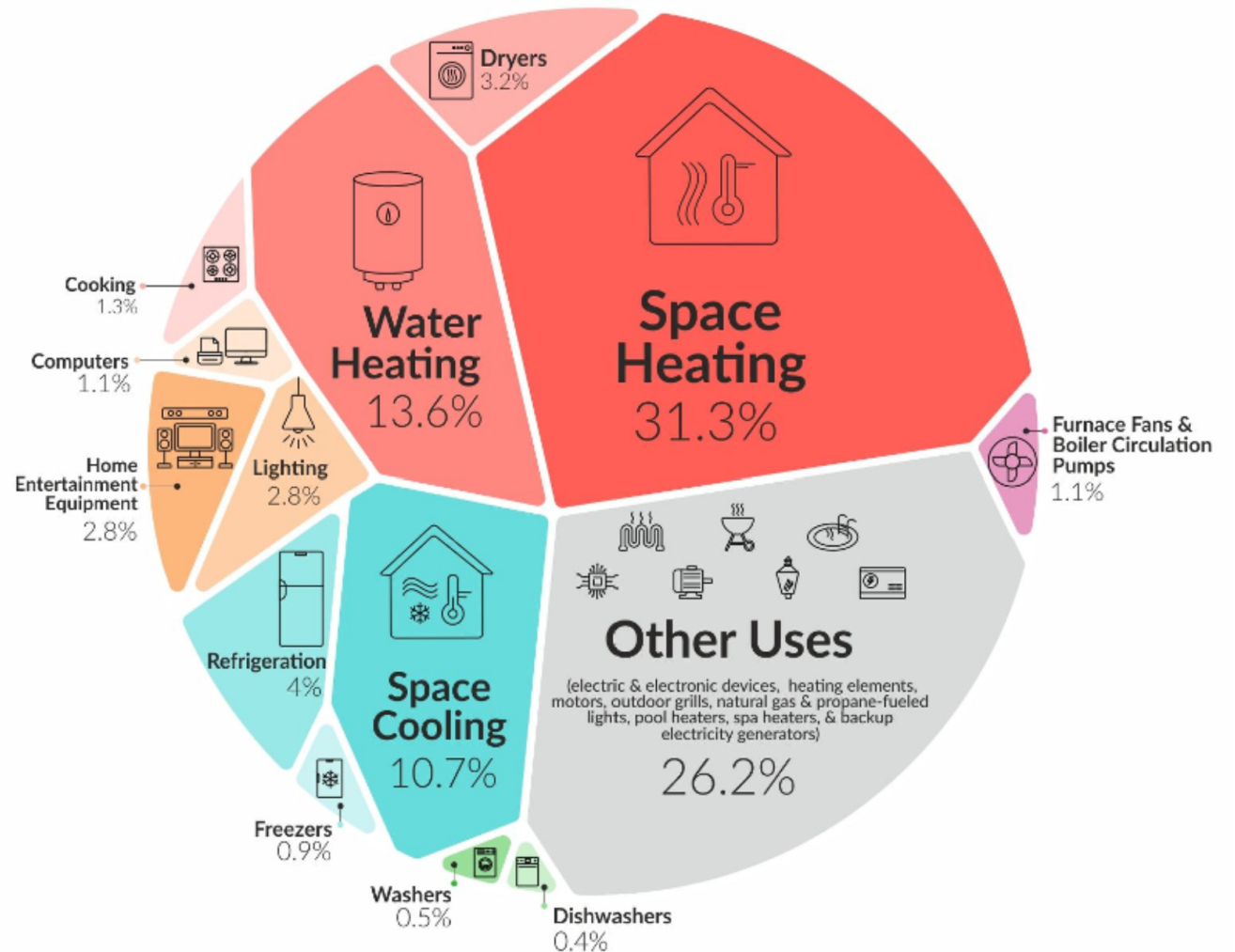
U.S. CO₂ emissions from energy consumption by source and sector, 2022

billion metric tons (Bmt) of carbon dioxide (CO₂)



US Home Energy Usage

- Average electricity consumption per US home is about 10,600 kilowatt-hours (kWh) (WA 984 kwh/mo vs US avg 886 kwh/mo)



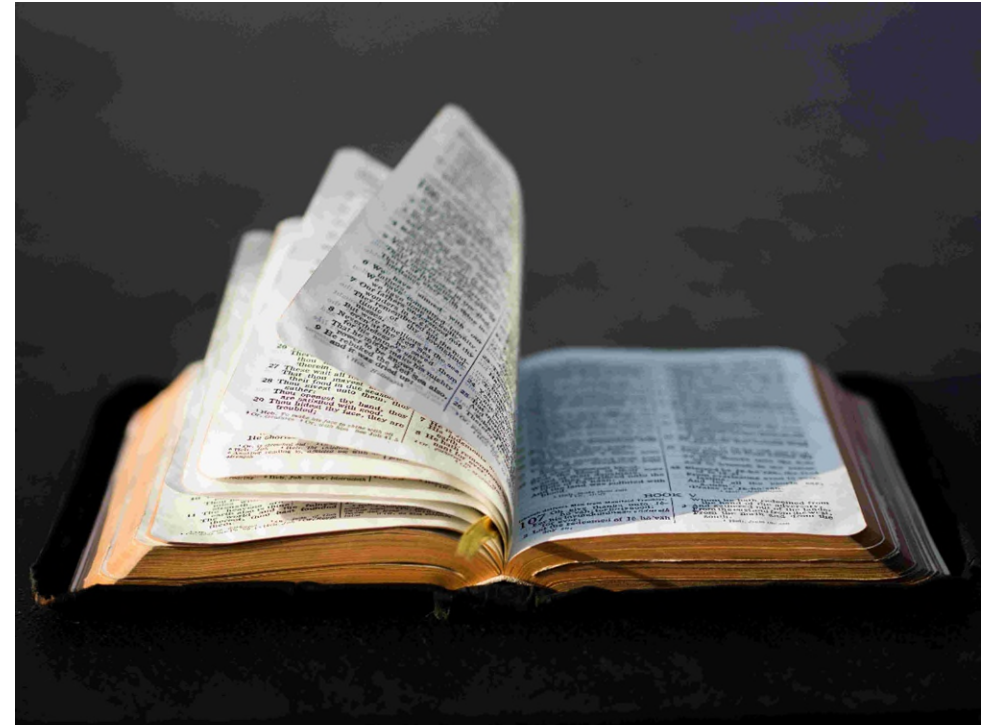
The Energy Conundrum

- Emissions from activities to meet needs
 - Agriculture for food
 - Transport for family and work
 - Industry for items we use
 - Buildings & heating/cooling for our lives
- Our activities use energy, causing emissions
 - Heating, cooking, transport, manufacturing what we buy & more
- Activities are seen as needed for our lives
- Eliminating or even reducing energy usage & GHG emissions seems difficult
- Reason for hope: Energy usage may peak in 2024 (IEA)



The Bible and Energy

- Numbers 35: You shall not defile the land in which you live, in the midst of which I dwell, for I the LORD dwell in the midst of the people of Israel
- Proverbs 12: Whoever is righteous has regard for the life of his beast
- Romans 12: Do not be slothful in zeal, be fervent in spirit, serve the Lord



A Framework for Eco-Friendly Energy Action

Amid explosive demand, America is
running out of power

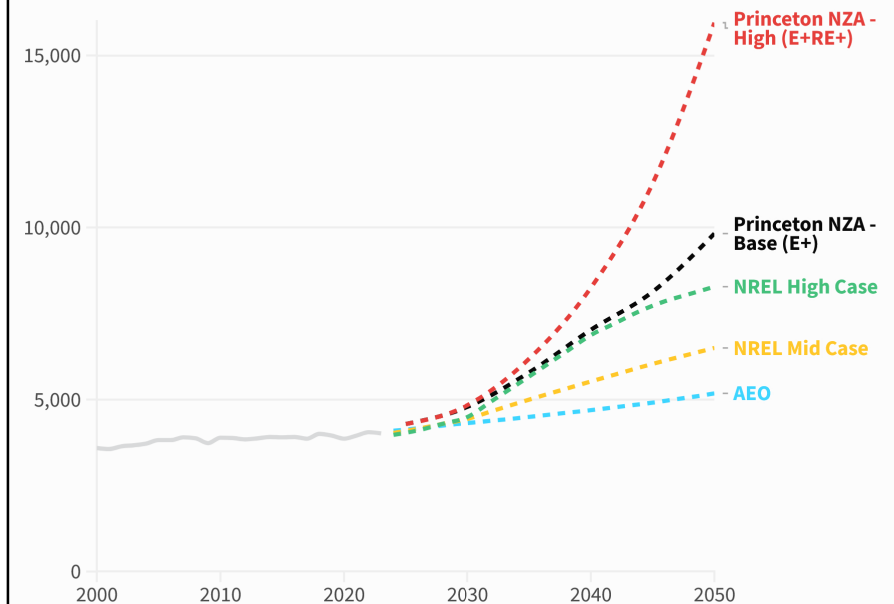
- Reduce energy usage
 - Reduction can have the biggest impact
- Use renewables
 - Renewables are more eco-friendly
- Store energy
 - Store renewable energy for times when solar or wind is not produced



AI and the boom in clean-tech manufacturing are pushing America's power grid to the brink. Utilities can't keep up.

Certain Load Growth, Uncertain Speed & Scale

Selected Load Growth Forecasts: Annual Consumption (TWh)



Source: [U.S. Energy Information Administration \(Historic\)](#),
[U.S. Energy Information Administration \(AEO\)](#), [Net-Zero
America \(Princeton\)](#), [National Renewable Energy
Laboratory \(NREL\)](#).

CSIS | ENERGY SECURITY AND
CLIMATE CHANGE PROGRAM

A Framework for Reduction

- Home
 - Heating, cooling, lighting and devices
- Transport
 - Reduce or combine trips
 - Private or public vehicle - ICE or EV
- Office
 - Energy & consumption reduction plan
- Food
 - Local, seasonal and plant-based
 - Reduce food loss and food waste
- Purchases
 - Reduce, reuse, recycle



Actions at Home to Reduce Energy Usage

- Home electrification
- Conduct a home energy audit
- Install a heat pump
- Use smart power strips
- Install a smart thermostat
- Purchase energy-efficient appliances
- Lower temp water or a heat pump water heater
- Insulate and weatherize your home
- Wash clothes in cold water and air dry them
- Average internet usage of 3,230 hours/yr causes 229 kg GHG emissions, 3-4% of total



Renewable Energy Framework

- Types of renewable energy
 - Solar
 - Wind
 - Geothermal
 - Biomass
 - Ocean
 - Hydro
 - Nuclear fusion
- Renewable energy is:
 - >5.5% of global energy generation
 - ~25% of US electricity generation



Discussion & Breakout Session

Questions:

- What does the data about the impact of energy usage mean to you personally?
- What actions might you take to reduce energy usage?
- What types of renewable energy resonate with you the most and least



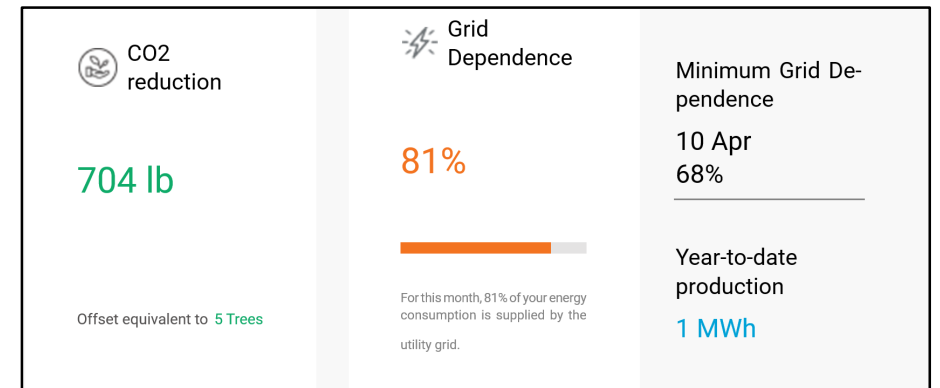
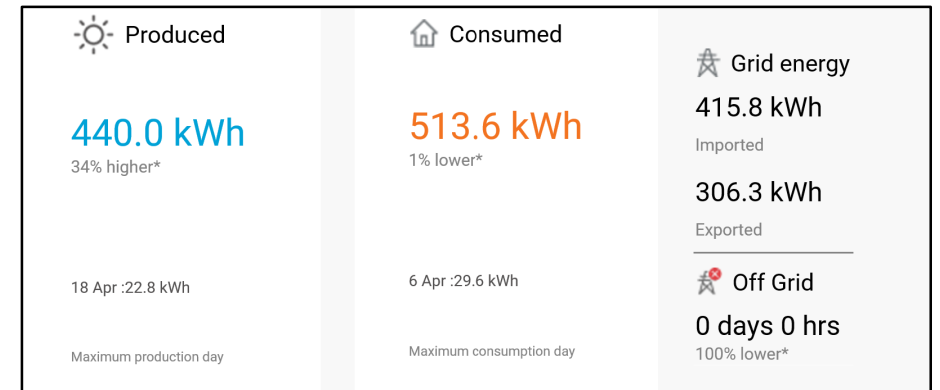
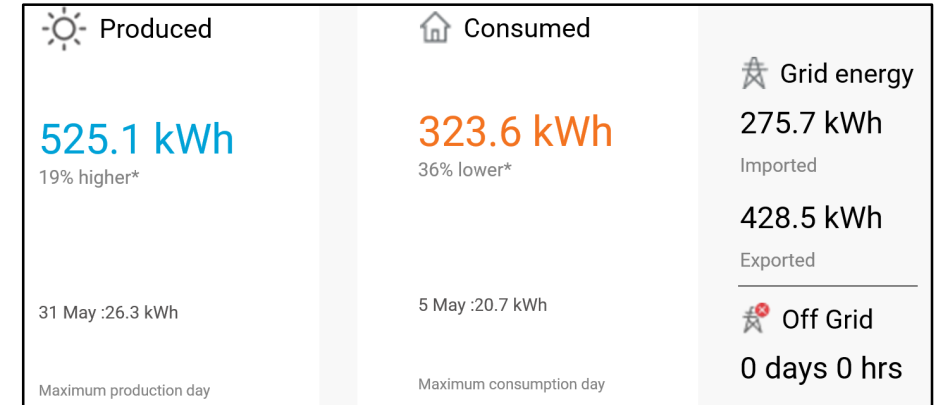
Solar Panel Basics

- Solar panels
 - Panels can last about 25 years
- Home suitability – sunshine and roof
- Considerations
 - Energy needs (average 7.15 kwh) & number of panels
 - Incentives: US 30% + no sales tax in Washington + some grants available
- Average installation cost of \$15,400
- Washington breakeven averages 16 years



Solar How-to

- Installer proposals
 - Contact reputable installers
 - Request analysis & multiple proposals
- Review proposals thoroughly
 - Select installer & read contract details
- Financing
 - Loans
 - Grants
- Installation management
- Usage
 - Dashboards to track & manage solar



Alternatives for Solar

- Residential building solar installation
 - Apartments, condos & offices
- Buy renewable energy from the utility
 - Green power options, at a fee
- Community solar
- Invest in solar
 - Stocks
 - Entrepreneurs
 - Loans



Green Power offers a simple and affordable way to match up to 100% of your electricity use with renewable energy like wind and solar from right here in the Pacific Northwest. When you enroll, we'll purchase renewable energy from independent resources on your behalf. Easily reduce your environmental impact while growing demand for more renewable energy, starting at just \$4 per month.

Plus, your participation helps fund grants for [solar projects at local community organizations](#).

Join the more than 100,000 PSE customers reducing their environmental impact with local renewable energy, starting at just \$4 per month.

ENROLL NOW



Solar Water Heater

- Uses collectors on the roof to capture the sun's energy and storage tanks to maintain a supply of hot water
- Types
 - Passive: The sun warms water in large black storage tanks or thermosyphon systems heat small batches of water
 - Active: Uses circulating pumps and controls



Source: Puget Sound Plumbing

Wind Energy

- Wind is feasible
 - Abundant
 - Federal incentives for installation
- Small wind power devices exist
 - 3 ft to 30+ feet high
 - Vertical wind turbines start at low speeds and capture wind from any direction
 - Energy depends on size & wind speed
 - \$4K-\$8K/kwh
- Process
 - Evaluate wind
 - Analysis
 - Proposal
 - Installation

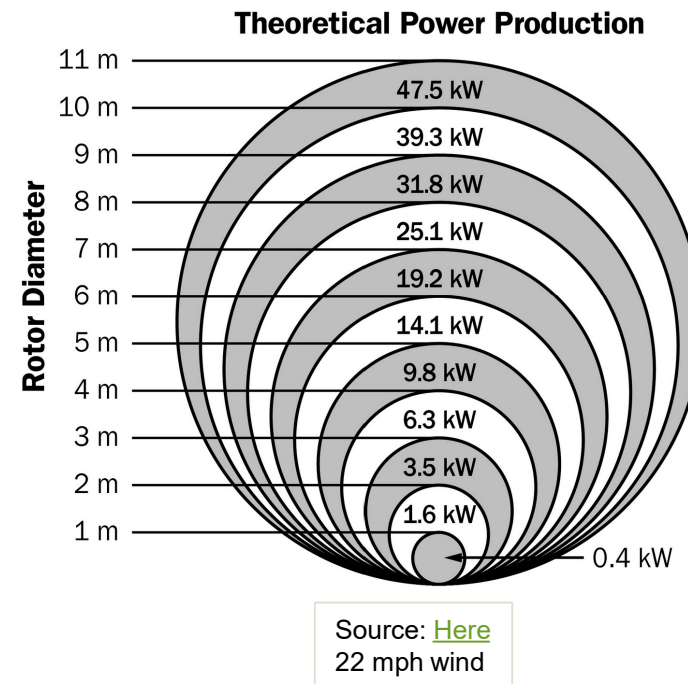


Photo: Flower Turbines

Energy Storage

- Solar & wind energy is not always produced when it is needed most
- Residential solar paired with a battery provides power & self-sufficiency
- Solar power system & inverters deliver power, including during outages, with a switch energy from DC to AC and back
- Battery installation costs \$12K-\$22K
- New solutions are on the way, replacing stand-alone lithium batteries
 - EV charging
 - Vanadium, potassium, other batteries



Source: Enphase

Portable Energy Storage

- Portable large-scale battery
 - Charge, and use when needed
- EV
 - A typical EV stores about 67 kWh, three days' worth of electricity
 - Connect an EV to your home electrical system – coming soon



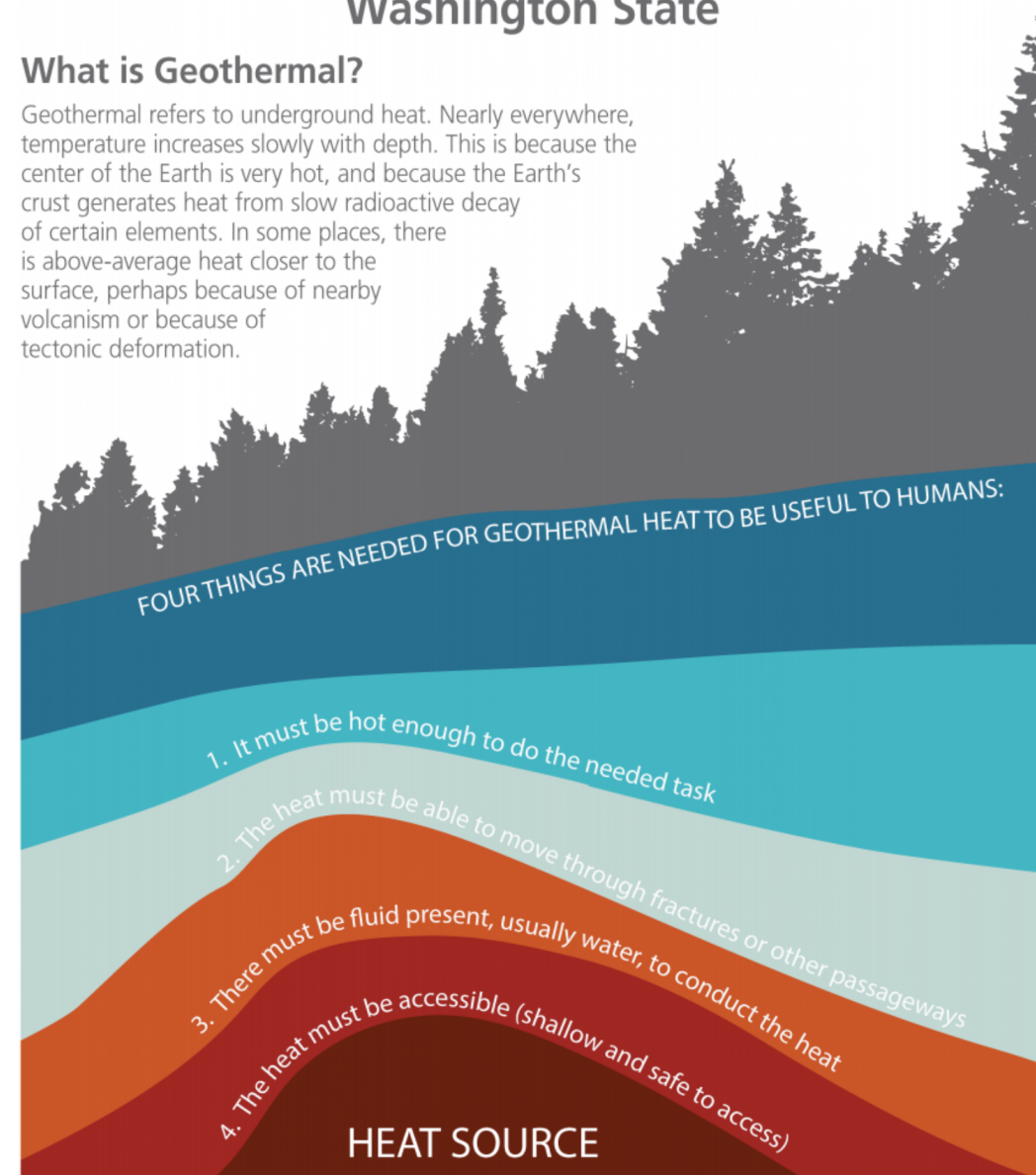
Geothermal Energy

- Hydrothermal: Uses naturally occurring hot water and steam to generate electricity
 - Thermal energy storage
- Geothermal heat pumps: Heating and cooling systems use heat stored in the ground to regulate indoor temperatures
 - Most geothermal for homes is for heating & cooling
- WA DNR: “We believe that geothermal resources will play a vital role in a sustainable energy future for Washington State.”

Geothermal Resources in Washington State

What is Geothermal?

Geothermal refers to underground heat. Nearly everywhere, temperature increases slowly with depth. This is because the center of the Earth is very hot, and because the Earth's crust generates heat from slow radioactive decay of certain elements. In some places, there is above-average heat closer to the surface, perhaps because of nearby volcanism or because of tectonic deformation.



How Home Geothermal Works

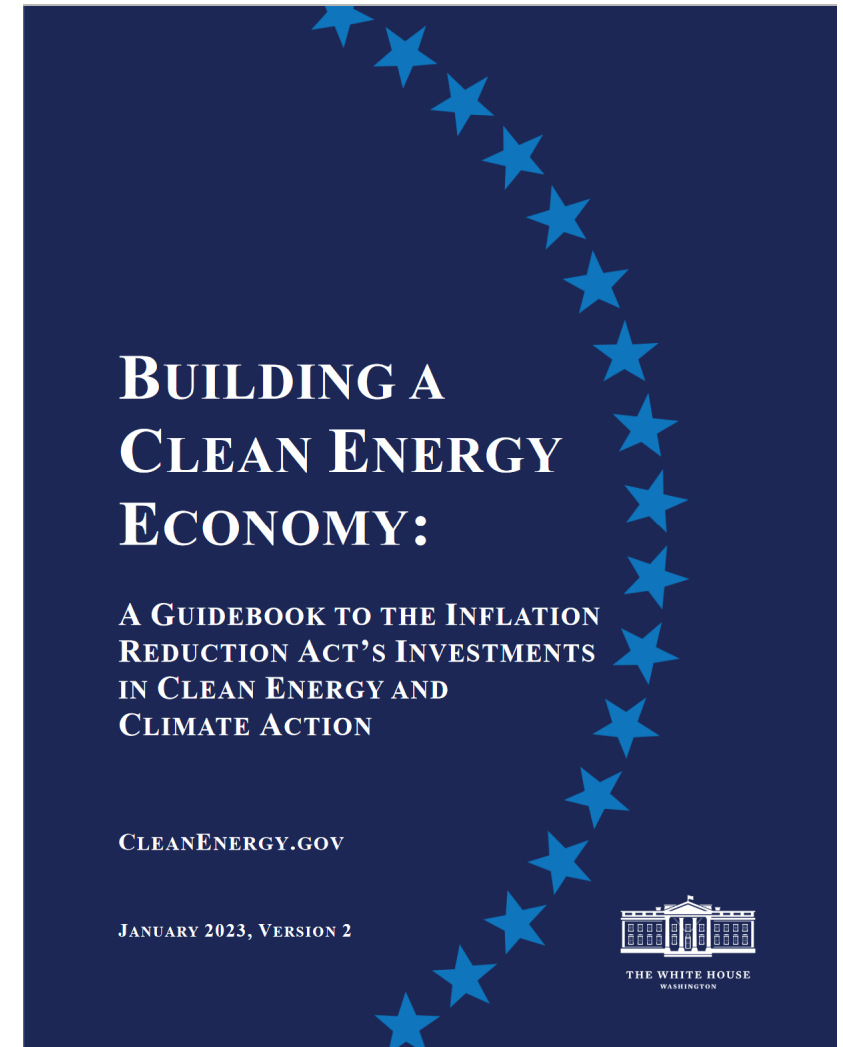
- The ground temperature is between 50° and 60° all year. Geothermal uses this temperature to keep a home comfortable.
- There are three main components to a geothermal heating system:
 - Ground heat exchanger
 - Heat pump
 - Ductwork or radiant floor system
- The ground heat exchanger is buried in the ground and the heat pump pulls warmth from the exchanger, disseminating it via an air system such as ductwork or floor tubing
- Geothermal systems save up to 75% off energy bills



Source: Greenwood Heating & Home

Financing Renewables - Rebates

- IRA
 - 30% in tax credits for making energy efficiency
 - Solar panel, wind, geothermal and battery rebates of 30%
 - Eligible EV owners can receive a tax credit up to \$7,500 for new cars and up to \$4,000 for used cars
 - Review IRA details for actual rebates or credits
- Washington sales tax exemption
- Grants and loans



Sharing, Discussion and Q&A

Questions

- Is solar energy and option for you, and if so, how, if not, why not?
- Do wind or geothermal power seem feasible, and if so, when?
- What can you do to support a transition to renewable energy?



Make a Difference

I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait 'til oil and coal run out before we tackle that. - Thomas Edison (1847–1931)

First, there is the power of the Wind, constantly exerted over the globe... Here is an almost incalculable power at our disposal, yet how trifling the use we make of it. - Henry David Thoreau, 1834

*The answer is to end our reliance on carbon-based fuels...
If we succeed, we create booming new industries, wealth, clean secure energy and maybe we prevent the greatest disaster so far in human history, saving millions of lives while improving billions more. If we fail, basically it's business as usual while things slowly get worse all around us.
– Al Gore*

Closing Prayer

Lord, we thank you for the gift of creation and ask for your forgiveness. We are responsible for the environmental degradation that we are experiencing.

As we undergo an ecological conversion, we ask that this pain transitions to hope as we endeavor to find new ways to rectify our transgressions.

We pray for a 'Just Transition' from fossil fuels to more sustainable energy sources; a better future, whereby, our biosphere, nature and humanity are at the center of the energy transition.

We ask that those in positions of authority, power and wealth shoulder their grave responsibilities and recognize the consequences their actions have.

Amen.

