

# Creation Care: Electricity

and caring for God's creation

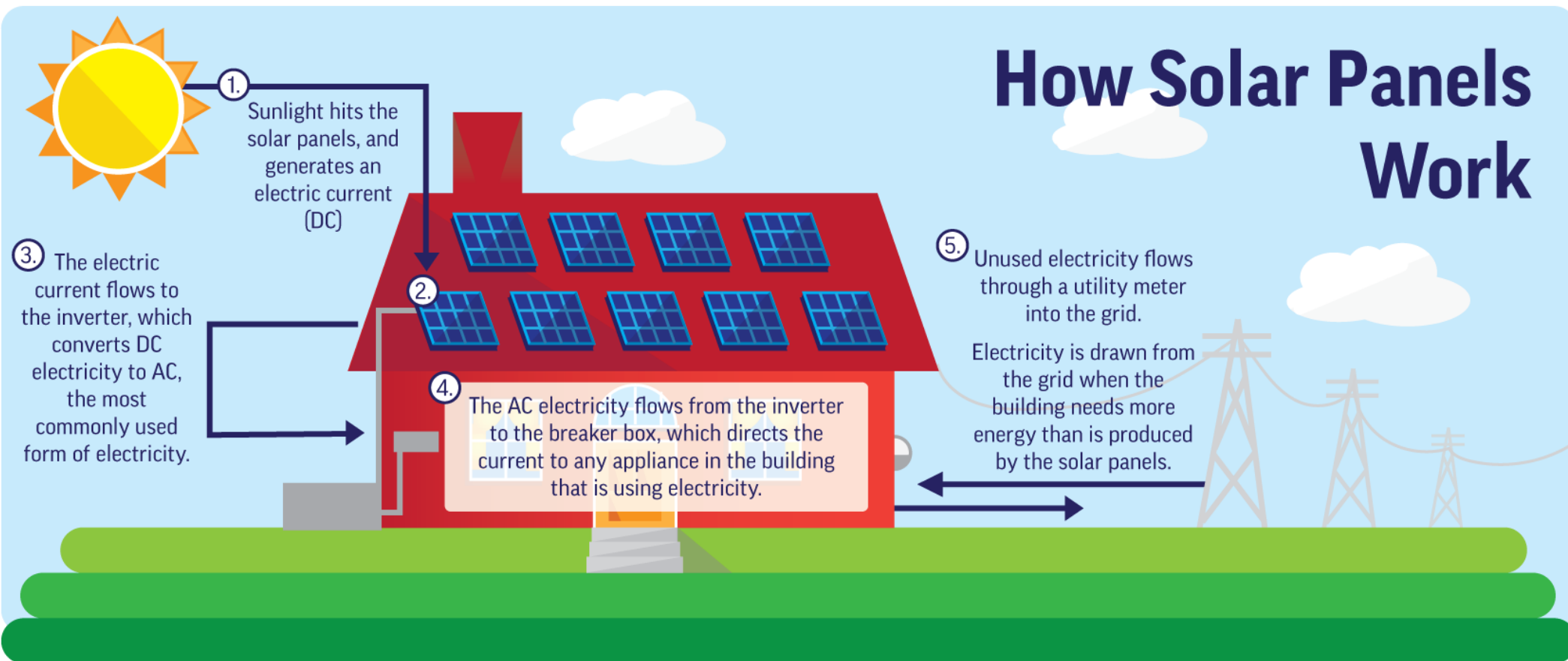
# Stewardship

Then God said, 'Let us make man in our image, in our likeness, and let them rule over the fish of the sea and the birds of the air, over the livestock, over all the earth, and over all the creatures that move along the ground.' (Genesis 1:26)

For by him all things were created, in heaven and on earth, visible and invisible, whether thrones or dominions or rulers or authorities—all things were created through him and for him. And he is before all things, and in him all things hold together. (Colossians 1:16-17)

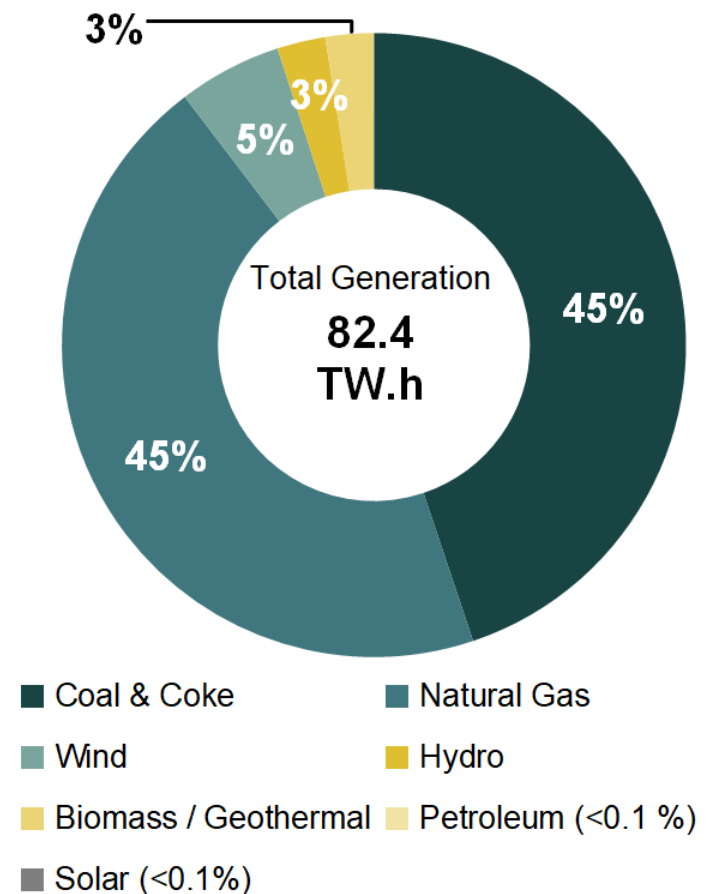
# How do solar panels work?

We're applying to get a grant to install solar panels on the roof of St. Luke's.



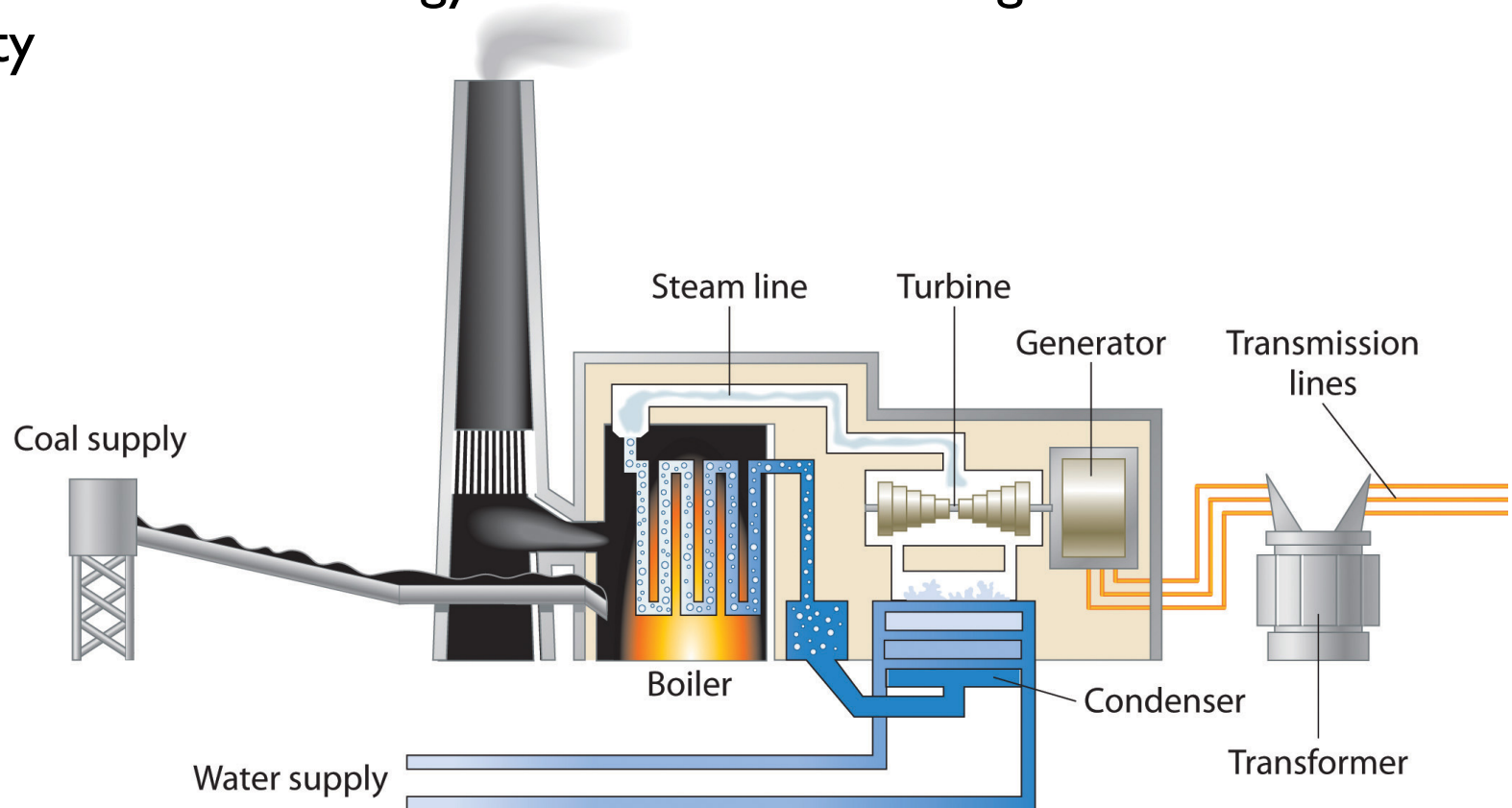
# How is power normally generated?

- Most electricity in Alberta is generated by burning fossil fuels
  - coal and coke 45%
  - natural gas 45%
  - wind power 5%
  - hydro 3%



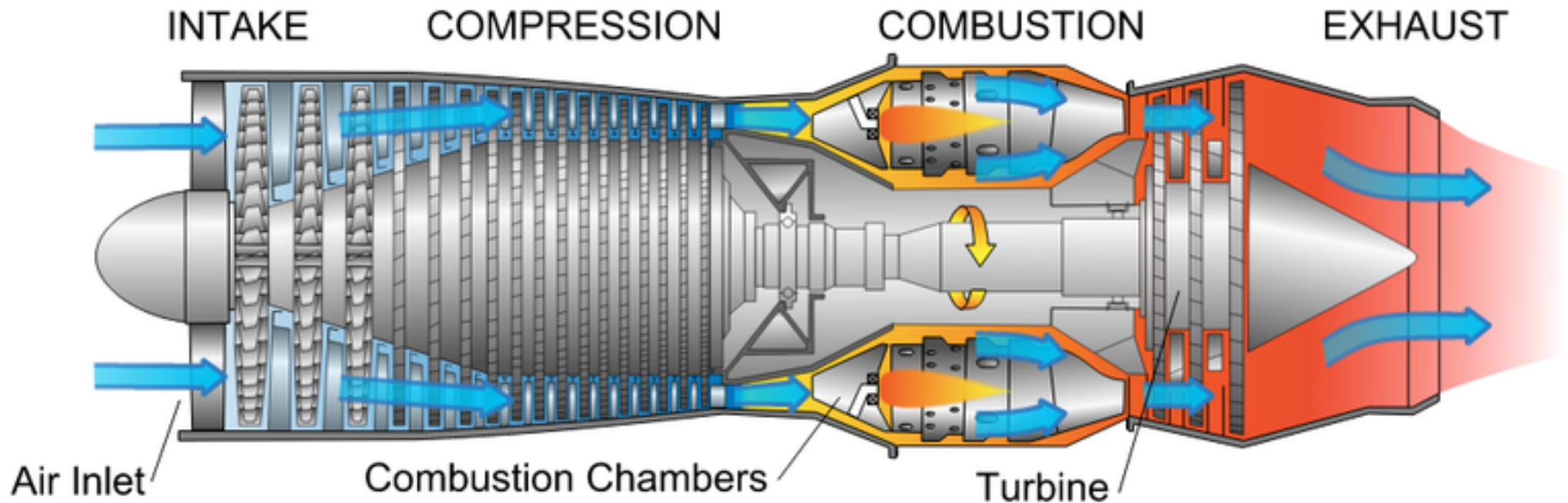
# Coal

- Coal is burned to produce steam
- Steam drives a turbine (spins)
- The turbine powers a generator, producing electricity
- Overall: ~38% of the energy released from burning coal is converted to electricity



# Natural gas

- Similar principle to coal, but cleaner burning and fewer steps (so more efficient)
  - Hot gasses from the burning gas directly turn the turbine (no steam needed)
- Combined cycle gas plants can get up to 60% efficiency, but simple cycle (see diagram) are cheaper to build and run

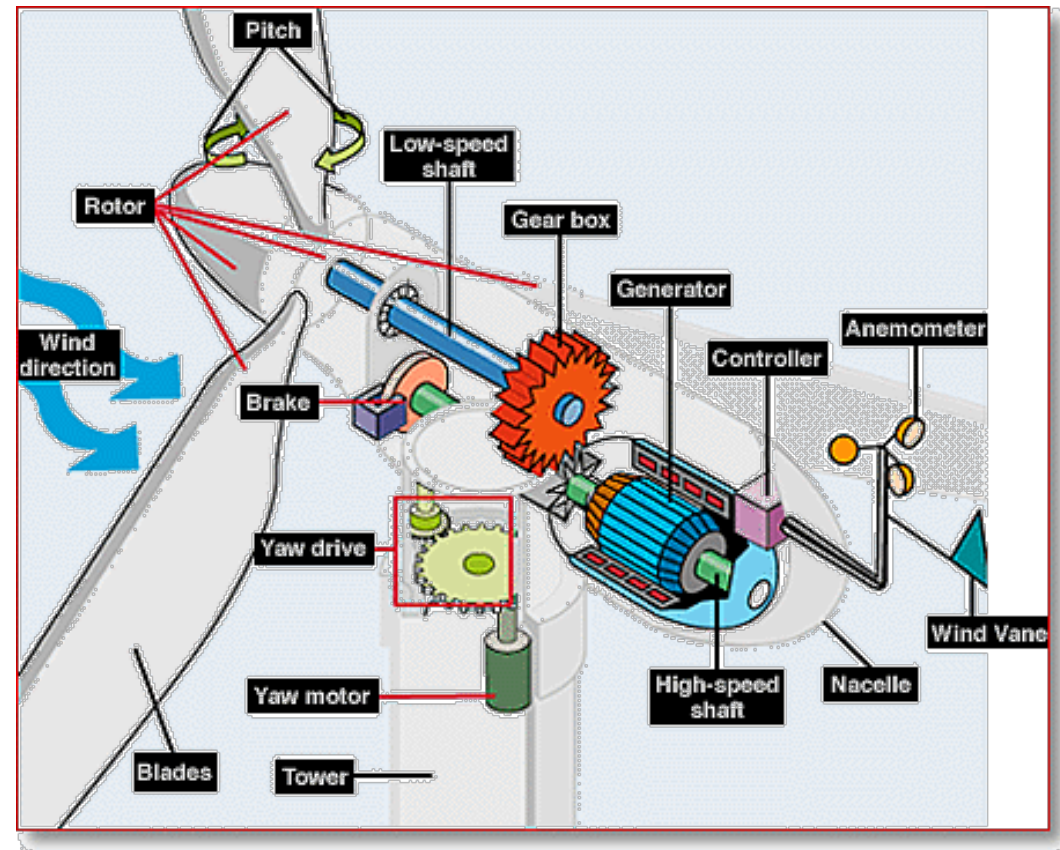


# Wind power

- Wind turns rotors, converting wind energy into electrical energy
- An electric fan in reverse!



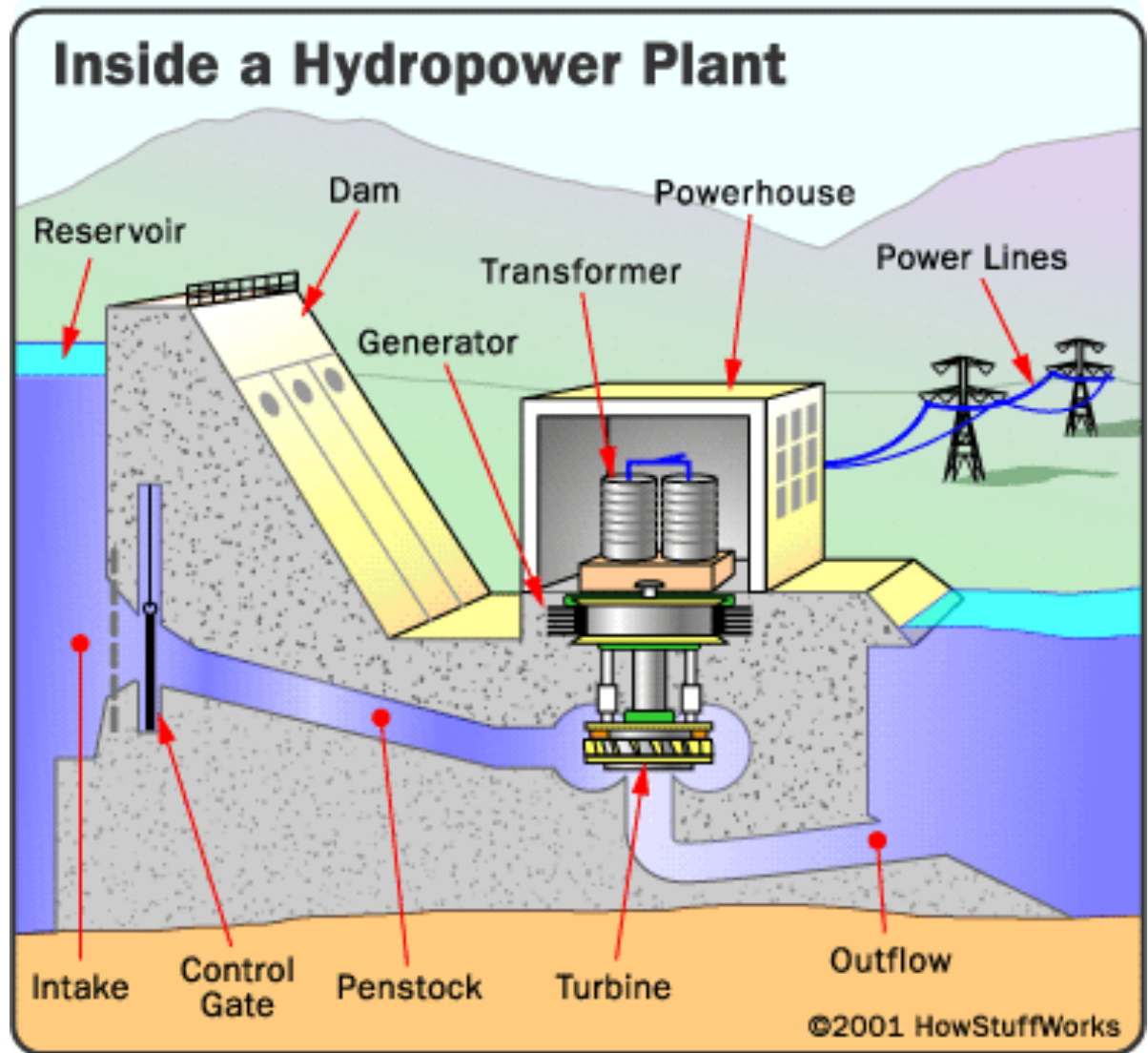
<http://windeis.anl.gov/guide/photos/index.cfm>



# Hydro

Water from a reservoir (held behind a dam) flows through a turbine, generating electricity

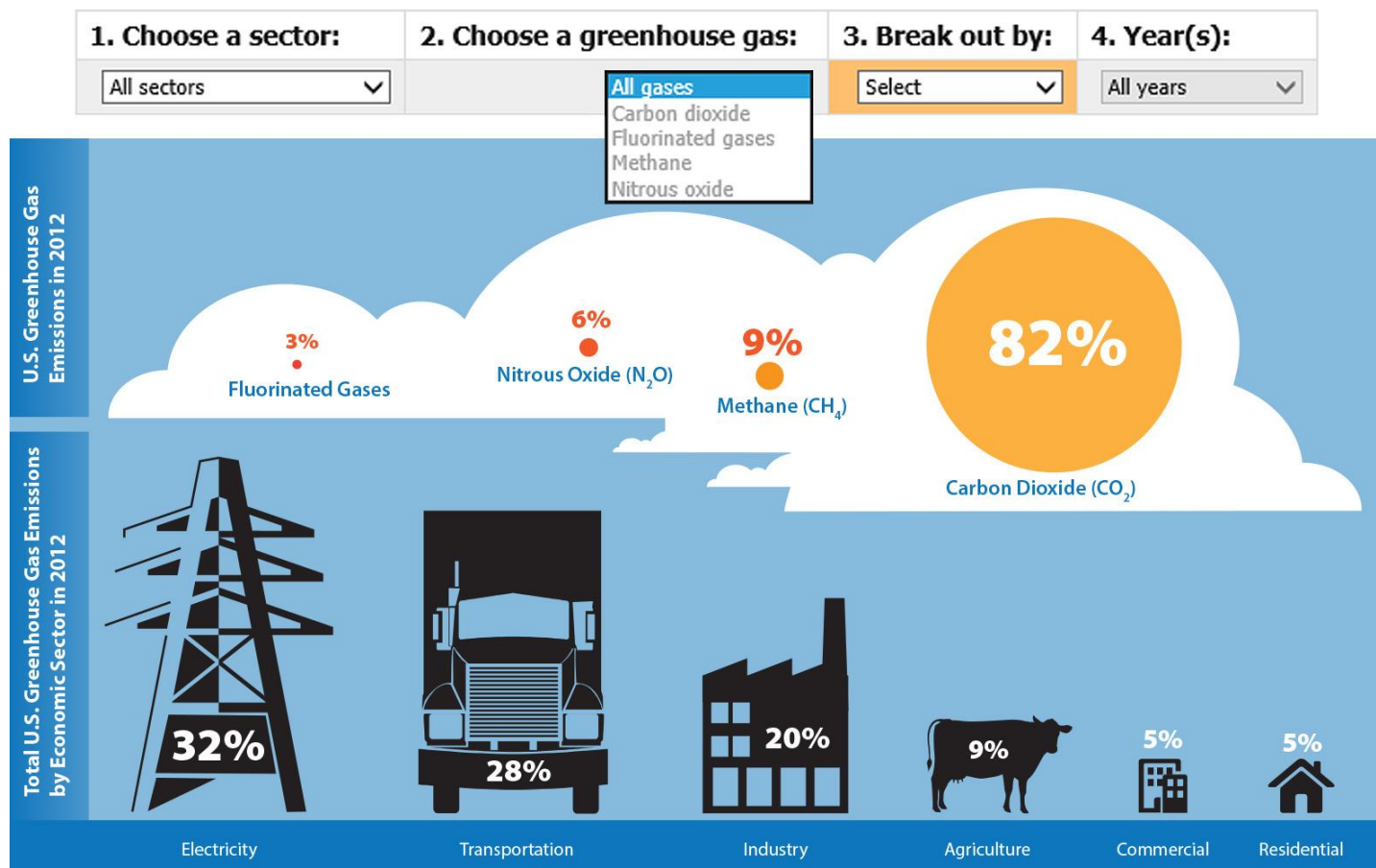
- Up to 90% efficiency\*



\*[http://www.wvic.com/content/facts\\_about\\_hydropower.cfm](http://www.wvic.com/content/facts_about_hydropower.cfm)

# Why do we need to change?

- Right now, ~90% of our electricity comes from burning things. Producing CO<sub>2</sub>.
- Natural gas burns more cleanly than coal, and is less dangerous to produce, but it still results in greenhouse gas production.

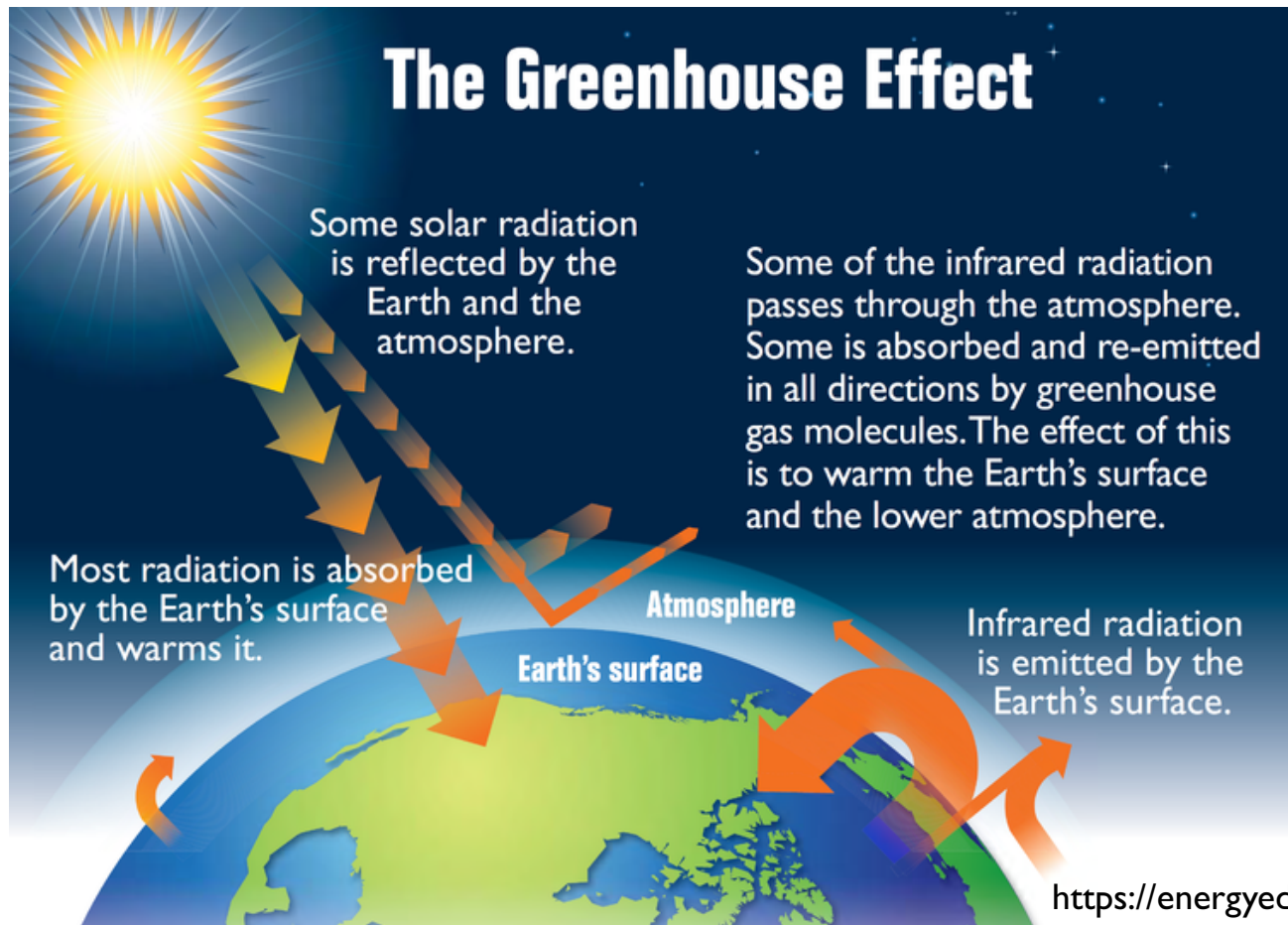


Digital transformation  
of the EPA's  
greenhouse gas  
emissions report

# Greenhouse gas?

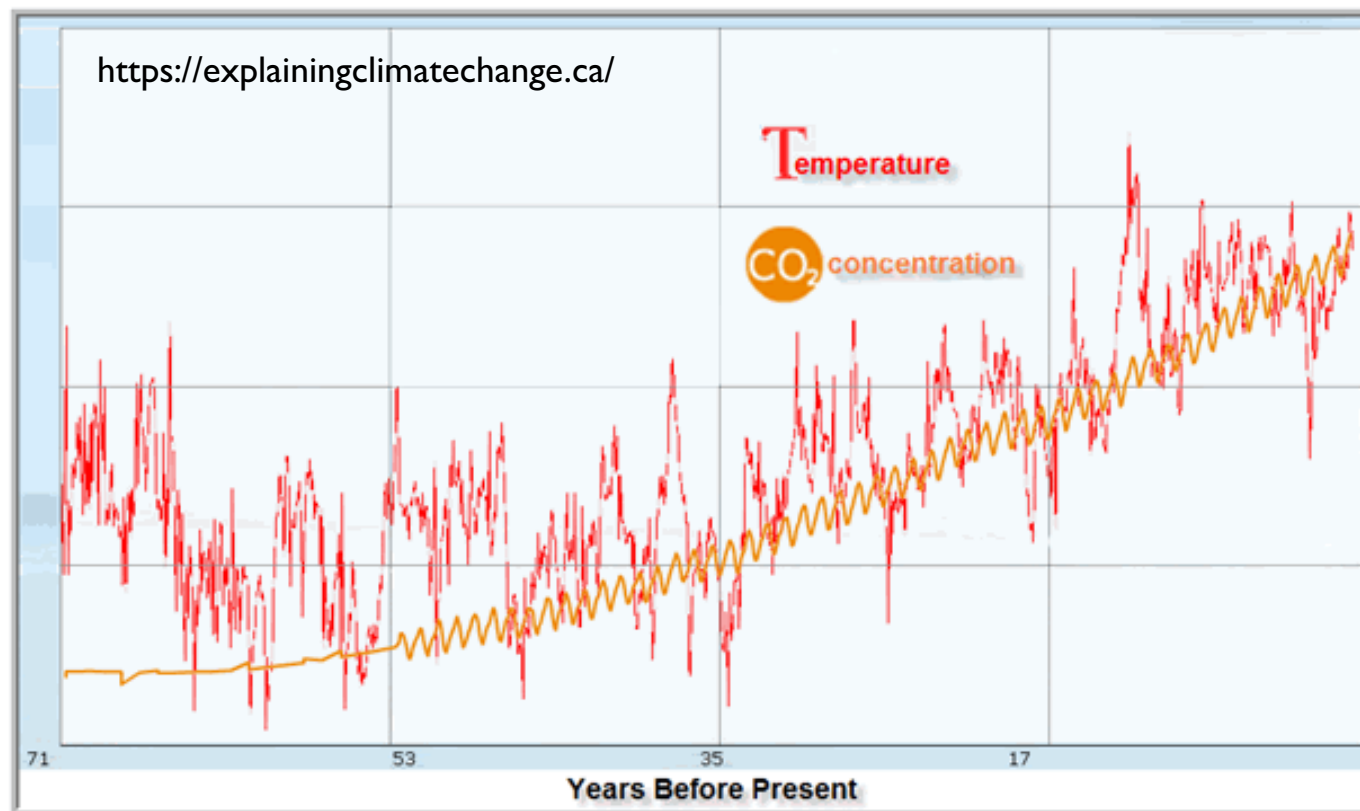
Earth needs to hold on to some of the heat from the sun to stay warm enough for us to live

There is a balance between gasses that trap heat (CO<sub>2</sub>, methane, and others) and reflection of energy from the top of the atmosphere



# Climate change

- Right now, we're producing enough greenhouse gasses to upset the balance of energy in: energy out
- The temperature of the planet **as a whole** is increasing



# But it has been so cold!!

- Overall warming doesn't mean we'll never get snow
- More energy does mean more volatile weather, more violent storms, more droughts, more forest fires



15 July 2018: Due to the dry weather, about 80 wildfires have been burning in Sweden



24 July 2018: Burned cars are seen following a wildfire at the village of Mati near Athens

# I'm not so sure about this...

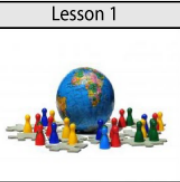

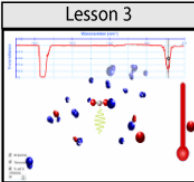

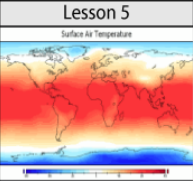


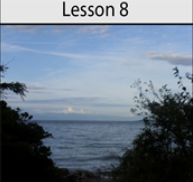

You don't have to take anyone's word for it. There are some really good explanations available.

Go to  
*Explaining Climate Change*  
by The King's Centre for Visualization in Science.

Home About Lessons Applets Definitions KCVS

## Visualizing and Understanding the Science of Climate Change

"Education in and about chemistry is critical in addressing challenges such as global climate change, in providing sustainable sources of clean water, food and energy and in maintaining a wholesome environment for the well being of all people..." -UN International Year of Chemistry resolution

<b>Lesson 1</b>  Introduction to Earth's Climate	<b>Lesson 2</b>  Is Climate Change Happening?	<b>Lesson 3</b>  Heating It Up: The Chemistry of the Greenhouse Effect
<b>Lesson 4</b>  Climate: A Balancing Act	<b>Lesson 5</b> Surface Air Temperature  A Global Issue: The Impacts of Climate Change	<b>Lesson 6</b>  Greenhouse Gases: A Closer Look
<b>Lesson 7</b>  Climate Feedback Loops	<b>Lesson 8</b>  Climate Change and the Oceans	<b>Lesson 9</b>  What Now? Responding to Climate Change

IUPAC KCVS The King's Centre for Visualization in Science RSC Advancing the Chemical Sciences ACS Chemistry for Life United Nations Educational, Scientific and Cultural Organization NSERC CRNSG International Year of CHEMISTRY

<https://ExplainingClimateChange.ca>