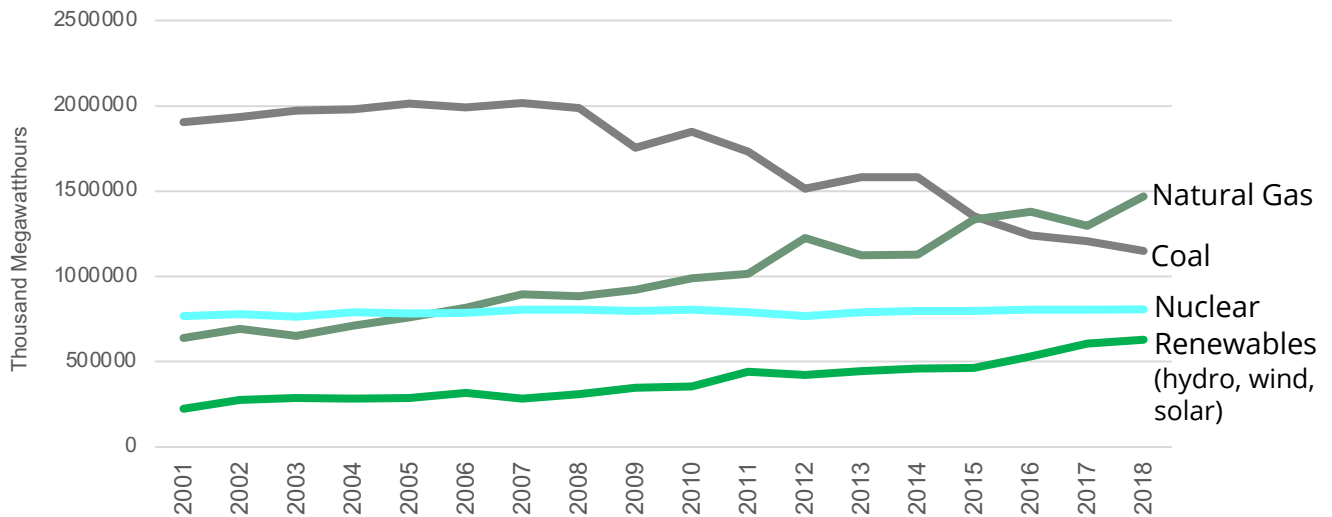


Today I Learned About Energy & Electricity

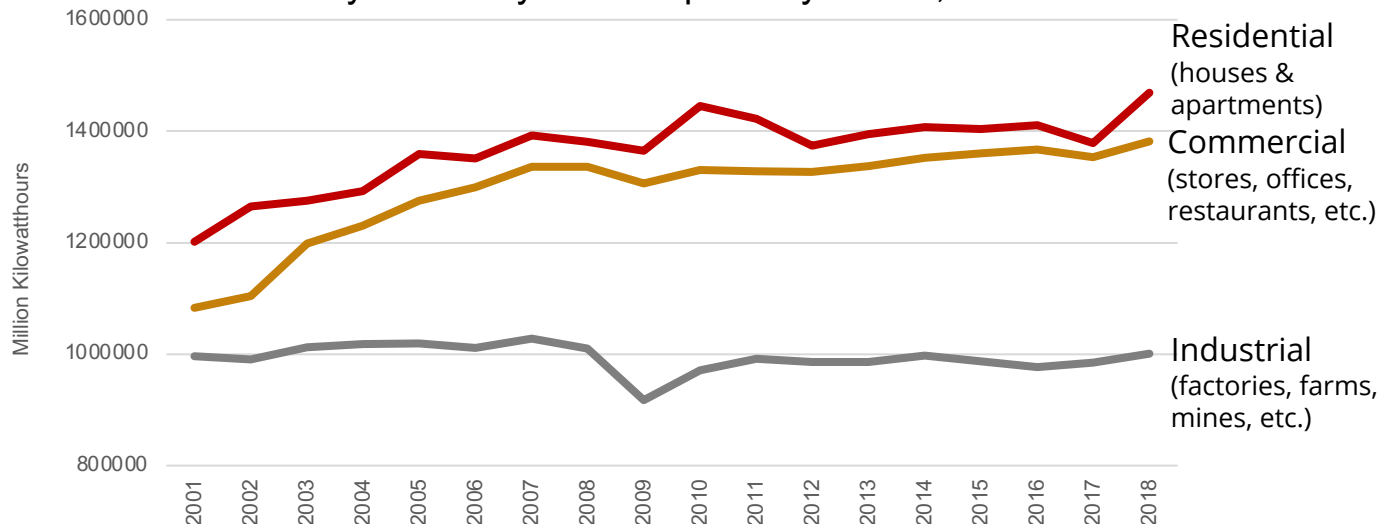
“Energy can be generated in a lot of different ways and be used to do lots of different kinds of things, and making electricity is one of those things.”

*Laur Hesse Fisher, MIT Environmental Solutions Initiative
TILclimate podcast: Is it energy or electricity?*

US Utility Electricity Generation by Source, 2001-2018



US Utility Electricity Consumption By Sector, 2001-2018



These graphs only show electricity in the retail/utility market. Most of our electricity is produced and sold through electric utility companies. Smaller amounts of electricity are also produced and used directly, such as in certain factories.

<https://www.eia.gov/beta/states/data/dashboard/consumption>

Today I Learned About Energy & Electricity

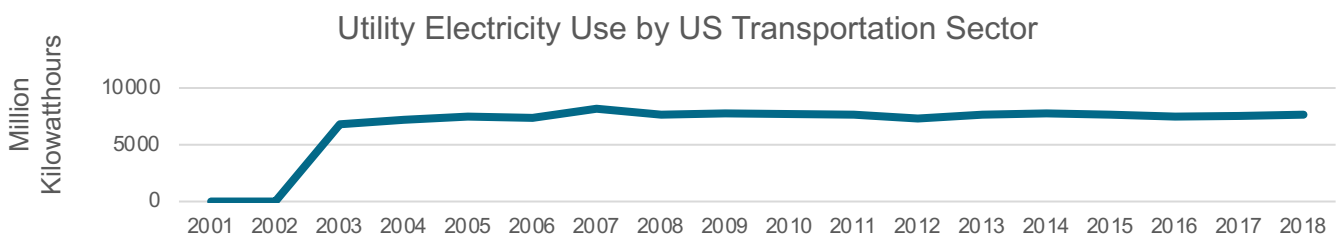
“About 40% of the energy that’s used in the U.S. is used to make electricity, which powers our lights, our computers, our appliances, our air conditioning units. Electricity is typically made in big power plants and then travels over wires to our buildings.”

Laur Hesse Fisher, MIT Environmental Solutions Initiative
TILclimate podcast: Is it energy or electricity?

Explore

1. What do you notice about electricity generation in the US?
2. What do you notice about electricity use by each sector?
3. What questions do you have about how electricity is generated and used in the US?

Transportation



Between 2001-2018, electricity use for cars and buses was so low that the line was barely visible on the larger graph and had to be moved here at a different scale.

In 2020, multiple major car and truck manufacturers announced that they would be moving to all-electric fleets within the next decade.

4. How would you expect this shift to change electricity use in the US?

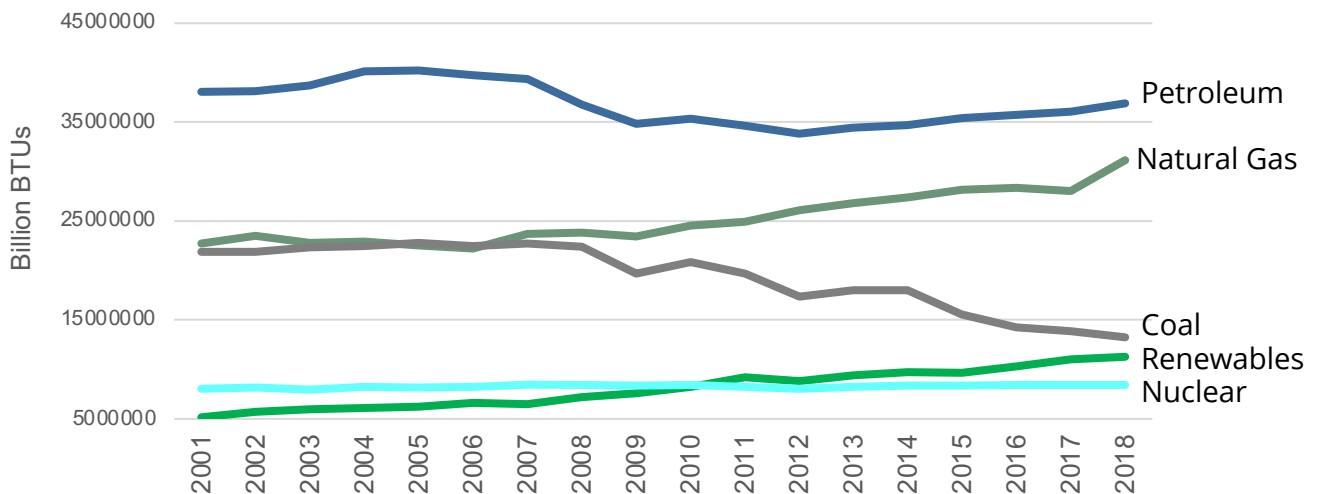
Today I Learned About Energy & Electricity

“Energy is kind of a catch-all term, whereas electricity is a specific form of energy. Think of a fire and think of the flames of a fire as energy. The flames can warm a pot a water for cooking pasta, or they can keep a room warm. You could also boil water to create steam that turns a turbine and generates electricity.”

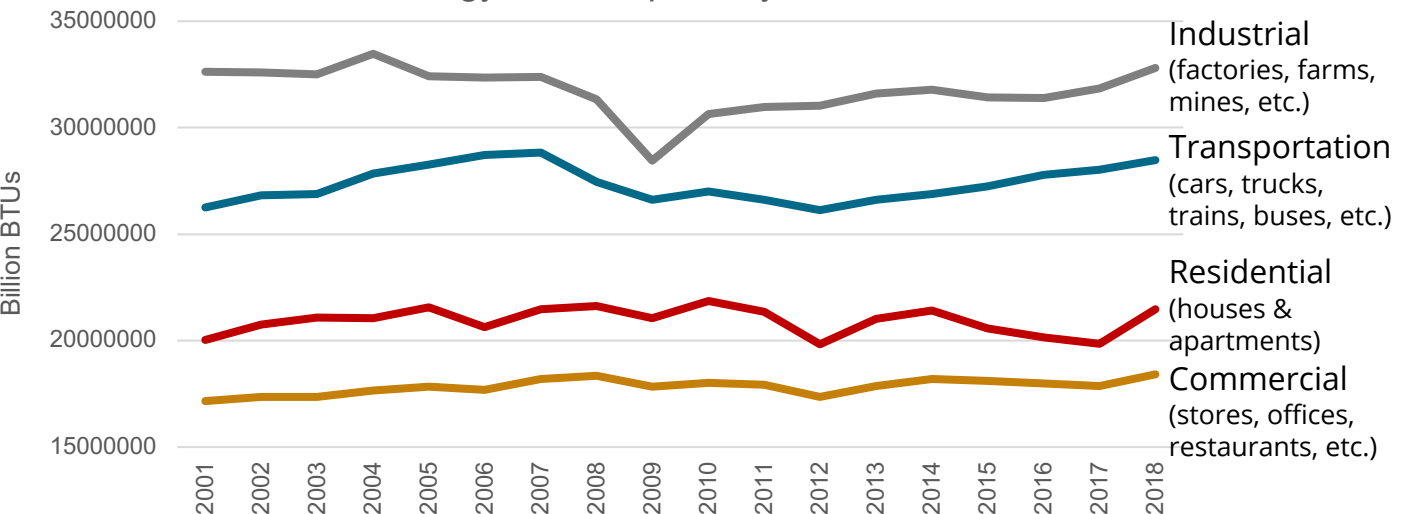
Laur Hesse Fisher, MIT Environmental Solutions Initiative
TILclimate podcast: *Is it energy or electricity?*

Only about 37% of the energy used in the US goes to produce electricity. Most energy is used as fuel for transportation, industry, and heating.

US Energy Consumption By Source, 2001-2018



US Energy Consumption by Sector, 2001-2018



Today I Learned About Energy & Electricity

“So what about the other 60% of the energy that’s used in the U.S.? This isn’t used to produce electricity. Some of it is used to produce heat for our homes and buildings, and to heat our water. A lot of energy is consumed by industry and manufacturing plants, who use it to produce heat to help create products like paper, steel, plastics, and chemicals.”

Laur Hesse Fisher, MIT Environmental Solutions Initiative

TILclimate podcast: Is it energy or electricity?

Explore

1. What do you notice about energy consumption in the US?
2. What do you notice about energy use by each sector?
3. What questions do you have about how energy is generated and used in the US?

We often use the terms electricity and energy interchangeably (“My phone is running out of energy.”) However, electricity is just one form of energy that we use every day.

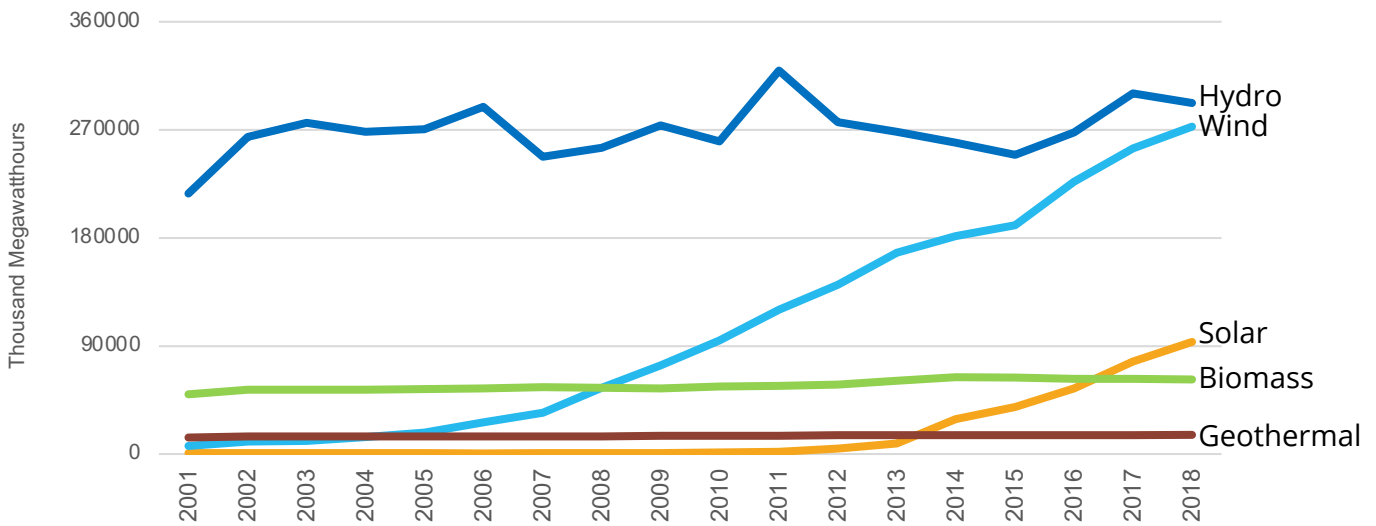
4. In your own life, how do you use energy that is *not* electricity? List three ways. If you know what the source of that energy, list it.

Today I Learned About Energy & Electricity

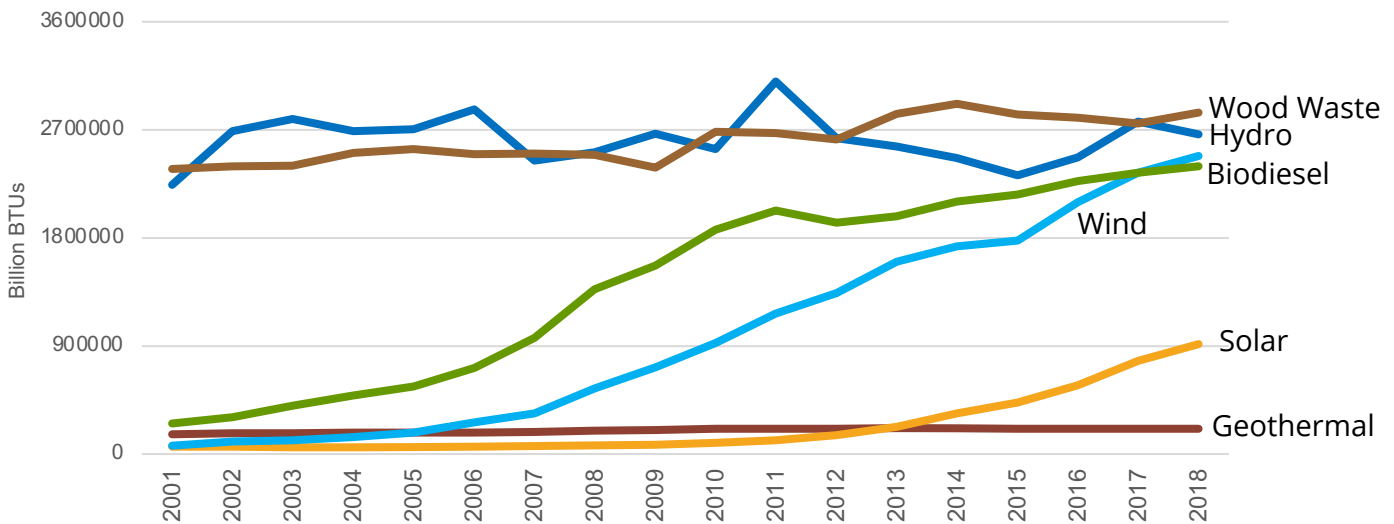
“Renewable energy is energy from sources we cannot run out of. Some types of renewable energy, like wind and solar power, come from sources that are not depleted when used. Others, like biomass, come from sources that can be replenished.”

*Jennifer Morris, MIT Joint Program on the Science and Policy of Global Change
MIT Explainer: Renewable Energy on climate.mit.edu*

US Electricity Generation by Renewables, 2001-2018



US Energy Production by Renewables, 2001-2018



Today I Learned About Energy & Electricity

“One strategy to reduce CO₂ from energy is to electrify heat and transportation. Instead of burning gas to heat water in our homes, we’d all use electric water heaters. Instead of oil to fuel our cars, we’d all have electric cars that we plug into electrical outlets. And then at the same time, we make it so that our electricity is being created in a way that doesn’t produce CO₂.”

*Laur Hesse Fisher, MIT Environmental Solutions Initiative
TILclimate podcast: Is it energy or electricity?*

What is Next?

When we burn fossil fuels like coal, oil, and natural gas, we release carbon dioxide (CO₂) into the atmosphere. Carbon dioxide and other gases act like a blanket, trapping heat on Earth. This trapped heat is changing our climate, causing dramatic changes in extreme weather and other effects all over the world.










1. Given what you know about how energy and electricity was generated and used between 2001 and 2018, what would you expect to change by 2030?

The switch to a carbon-neutral future includes both energy shift (moving away from fuels and processes that produce heat-trapping gases) and energy efficiency (using less energy overall.)





2. What is one solution you have heard about or seen?
3. Does that solution support energy shift, energy efficiency, or both?
4. The most effective solutions act at the level of a neighborhood or city. If your solution above is an individual action, how could you grow it to a larger community?

Today I Learned About Energy & Electricity

Energy Definitions

Energy Source	Where it comes from and how it is used	Renew-able	Low CO ₂
 Natural Gas	Pumped from deposits underground. Refined & burned to create steam for electricity or used directly to create heat.	✗	✗
 Petroleum	Pumped from deposits underground. Refined into oil, diesel, and gasoline and burned for electricity, heat, and transportation.	✗	✗
 Coal	Mined and burned to create steam for electricity or used directly to create heat.	✗	✗
 Nuclear	Uranium is mined and refined. Atoms are split to create heat and steam to generate electricity.	✗	✓
 Biomass	Burning trees, plants, and other organic matter for heat or to generate electricity.	✓	✗
 Wind	Using wind power to turn a turbine and generate electricity.	✓	✓
 Hydro-power	Using flowing water to turn a turbine and generate electricity.	✓	✓
 Solar	Materials mined from underground are used to capture light from the sun and generate electricity	✓	✓
 Geothermal	Using the natural heat and water below Earth's surface to heat & cool buildings or generate electricity.	✓	✓

Sector Definitions

 Industrial	Manufacturing, agriculture, forestry, mining, oil & gas extraction, and construction. Energy use is mostly heat for manufacturing processes, powering machinery, and heating and cooling buildings.
 Transportation	Cars, trucks, buses, trains, airplanes, and ships that are used to transport people and/or goods. Energy use is mostly fuel for engines.
 Residential	Houses, apartments, condominiums, etc. Energy use is mostly heating, cooling spaces and water, lighting, refrigeration, cooking, etc.
 Commercial	Businesses, restaurants, hotels, stores, government buildings, religious or social organization buildings, institutional living spaces. Energy use is mostly heating, cooling spaces and water, lighting, refrigeration, cooking, etc.

Images from the Noun Project Becris, Koson Rattanaphan, Hamel Khaled, Nawicon, ArmOkay, Jacqueline Fernandes, Tom Fricker, Ivan, Eragon, Ben Davis, Monkik, and Charif Deffa