

Gallery Walk

First walk around on your own and then I'll pair you up with a partner!

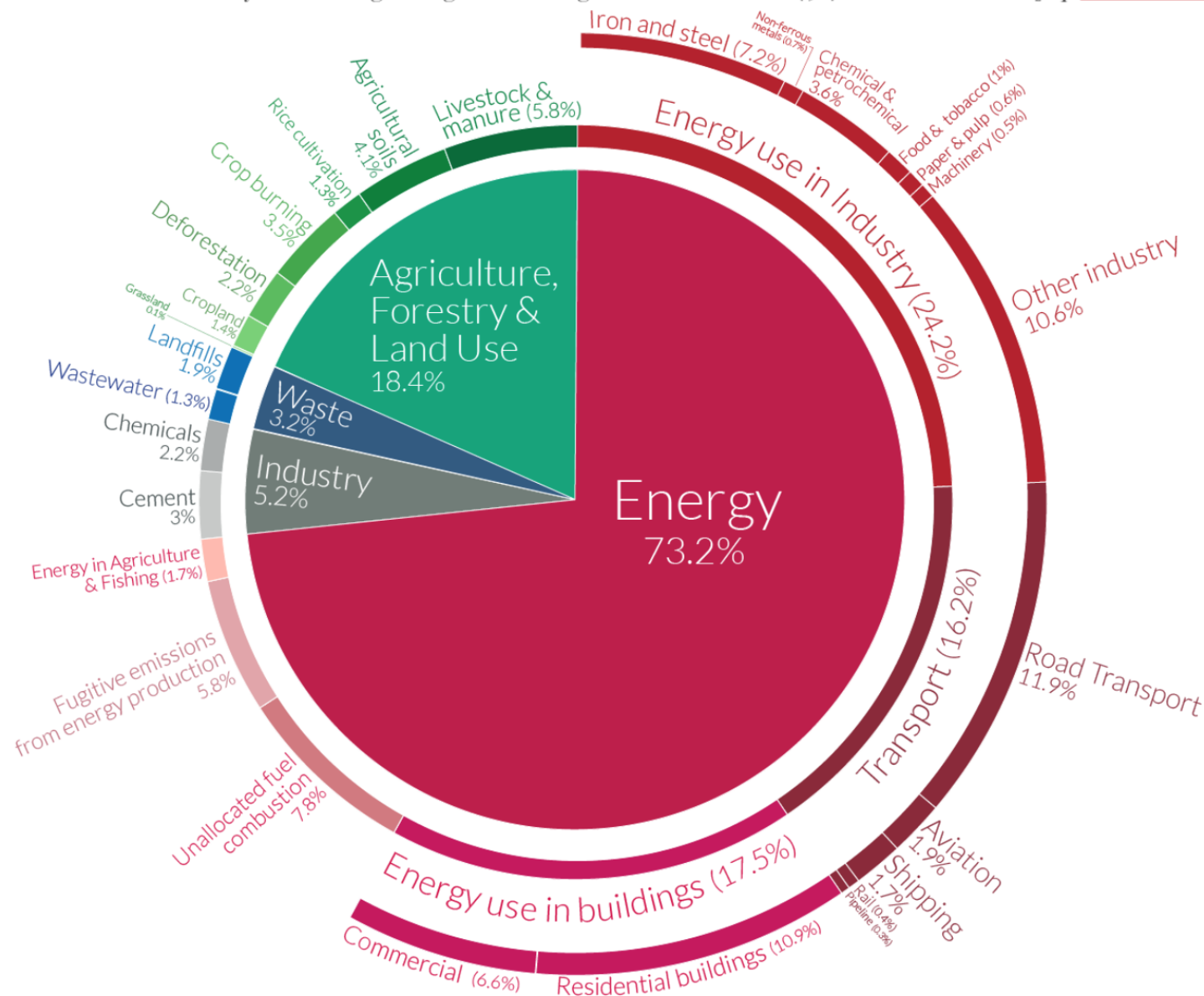
- What are the take-away messages of the images?
- What does each image add to any discussion of energy use?
- Note whether the images is focusing on the US or the whole World.
- Note whether the image is focusing on electricity generation vs other sectors!

1.

Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.

Note that
this is all
greenhouse
gasses so
CO₂ and
Methane!

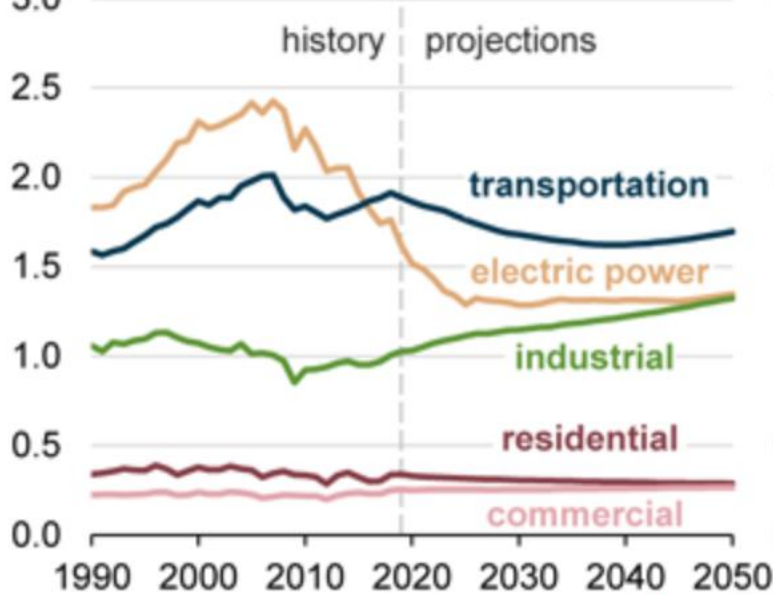


2.

U.S. energy-related carbon dioxide emissions, AEO2020 Reference case (1990-2050)

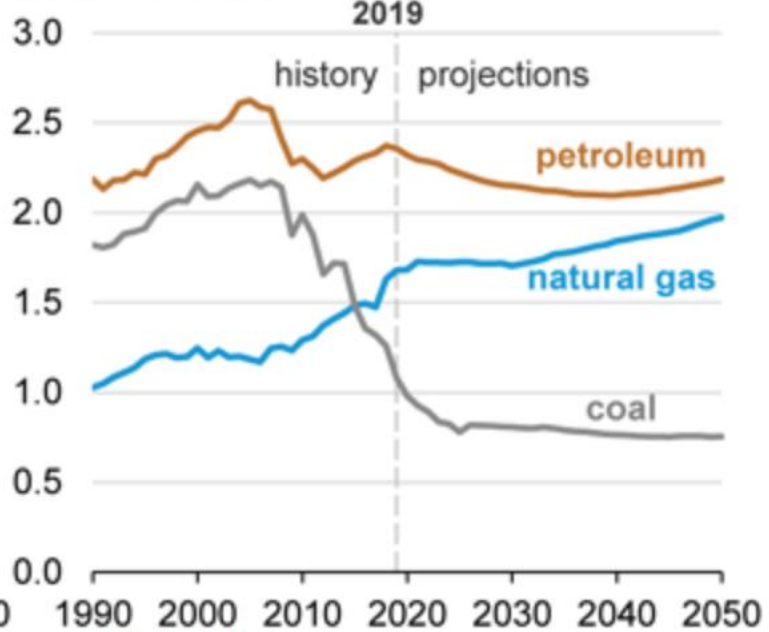
by energy sector

billion metric tons



by fuel

billion metric tons



Source: U.S. Energy Information Administration, [Annual Energy Outlook 2020](#)

3.



ON AIR 0:00
MPR News with Angela Davis

Oil and water: The Line 3 debate

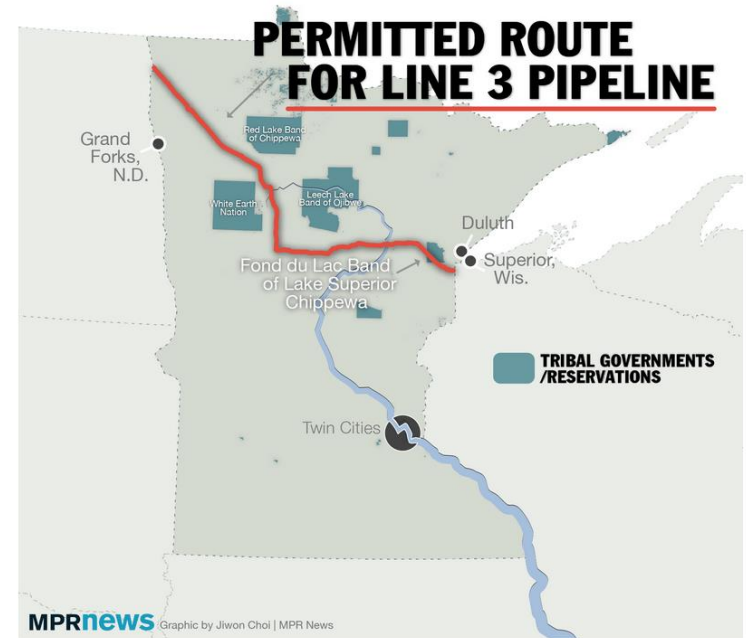
A year after breach, Enbridge says it's stopped Line 3 groundwater aquifer leak

Kirsti Marohn Brainerd, Minn. January 20, 2022 4:25 PM



The site of an aquifer breach near the Clearbrook terminal is shown in a drone video taken on Jan. 8. The breach occurred in January 2021 during Enbridge's construction of the Line 3 oil pipeline, and resulted in an uncontrolled flow of groundwater from the breach. Screen capture courtesy of Honor the Earth

The company built along a new route that avoids the reservation of the Leech Lake Band of Ojibwe, which opposed locating the new line across its land. [Find a map of the current route here.](#)

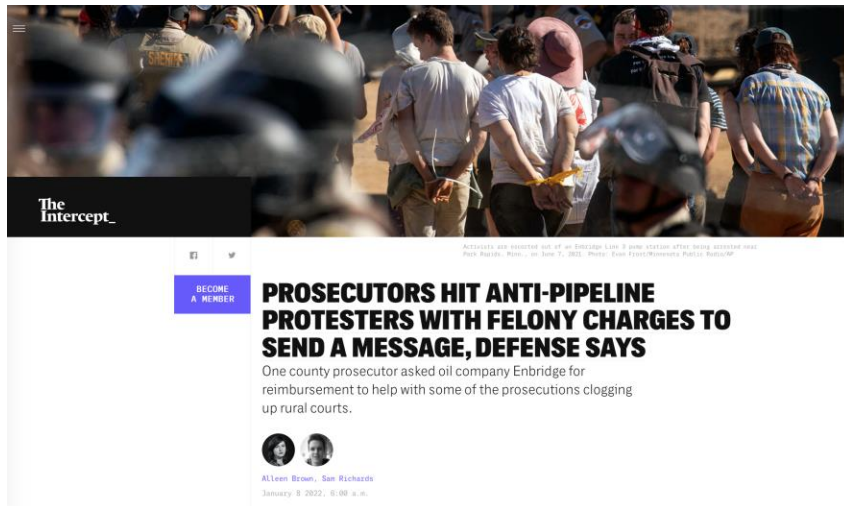


A map of the permitted route for the Line 3 oil pipeline replacement project. Jiwon Choi | MPR News

What's the argument for replacing Line 3?

Enbridge has long said that the rationale for building a new Line 3 is driven by safety and maintenance concerns. The company says it's much safer to build a new pipeline, using modern construction methods, than operating an aging, corroding pipe with a history of significant leaks.

<https://www.mprnews.org/story/2022/01/20/enbridge-says-its-stopped-line-3-groundwater-aquifer-leak>



<https://www.mprnews.org/story/2021/07/16/the-line-3-oil-pipeline-project-what-you-need-to-know>

<https://theintercept.com/2022/01/08/pipeline-protesters-prosecutions-felony/>

3.

Enbridge's new, larger Line 3 pipeline, which carries crude oil across northern Minnesota, was completed in 2021 and began operating in October. But the debate over the project's impact on climate, water and tribal treaty rights continues.

▼ Understand what's at stake [Rivers of Oil, an MPR News podcast](#)

Contributors



Dan Kraker



Kirsti Marohn



Dan Gunderson

MPRnews
Stay Curious. Stay Connected.



February 9, 2024 10:53 AM

Enbridge appeals to vacate an order that would shut down its pipeline

The Tribe fears the aging pipeline could rupture. Enbridge's attorney told a three-judge federal appellate panel Thursday that Conley lacked authority to issue such an order. Bad River's attorney is calling for an immediate...

▲ by The Associated Press

Save



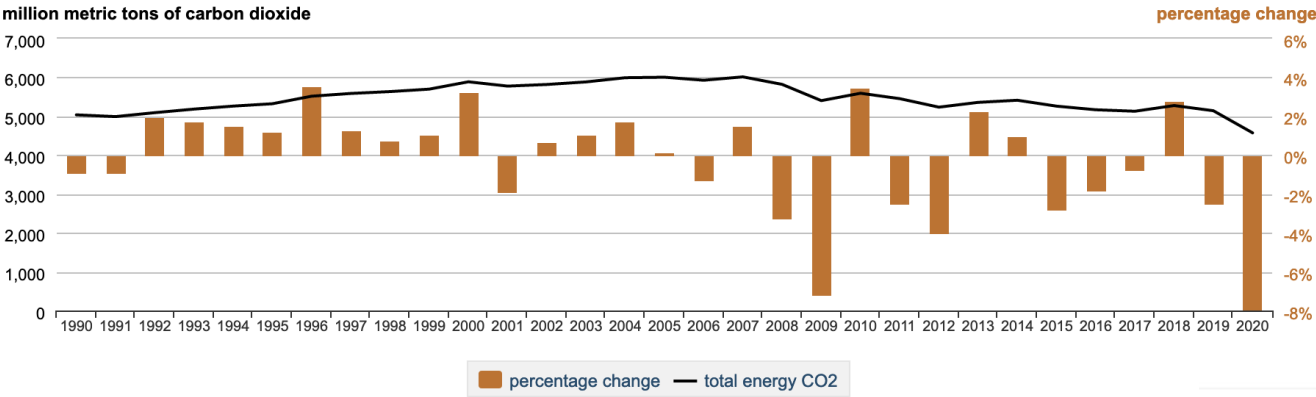
<https://www.mprnews.org/environment/pipeline>

The 2020 decline in U.S. energy-related CO₂ emissions was historic

In 2020, energy-related CO₂ emissions declined to a level not seen since 1983. Much of this decline was related to the COVID-19 pandemic and the resulting economic downturn. Since peaking in 2007, emissions have declined in 9 of the past 13 years. The magnitude of the 2020 decline in emissions was bigger than all previous years on record, both in absolute and percentage terms.

4.

Figure 1. Annual emissions of and percentage change in energy-related carbon dioxide



Source: Graph created by the U.S. Energy Information Administration (EIA).

The New York Times

U.S. Greenhouse Gas Emissions Bounced Back Sharply in 2021

Emissions rose 6 percent last year after a record 10 percent decline in 2020, fueled by a rise in coal power and truck traffic as the U.S. economy rebounded from the pandemic.

f WhatsApp Twitter Email Share Bookmark 133



Traffic on the Williamsburg Bridge in Manhattan last year. Transportation emissions, the nation's largest source of greenhouse gases, rose 10 percent in 2021. Brittainy Newman for The New York Times

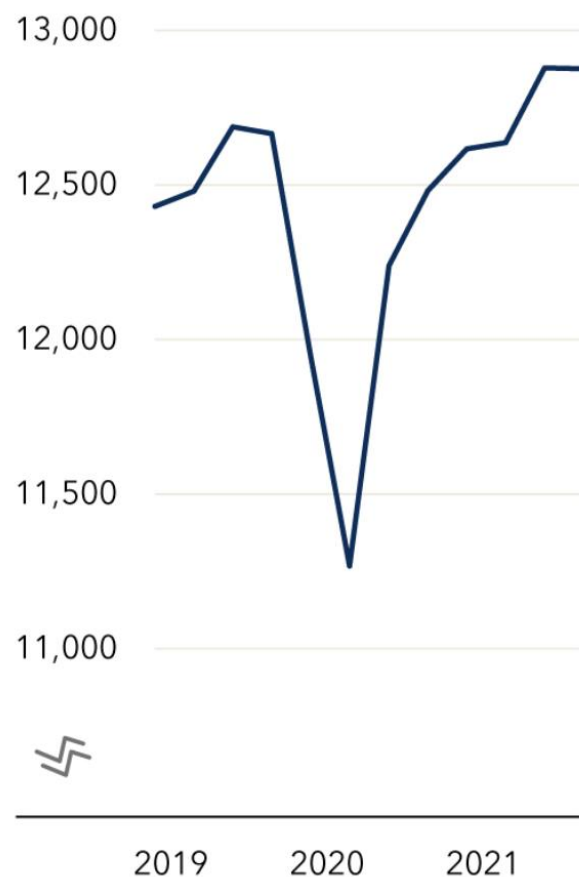
By Brad Plumer
Jan. 10, 2022

4.

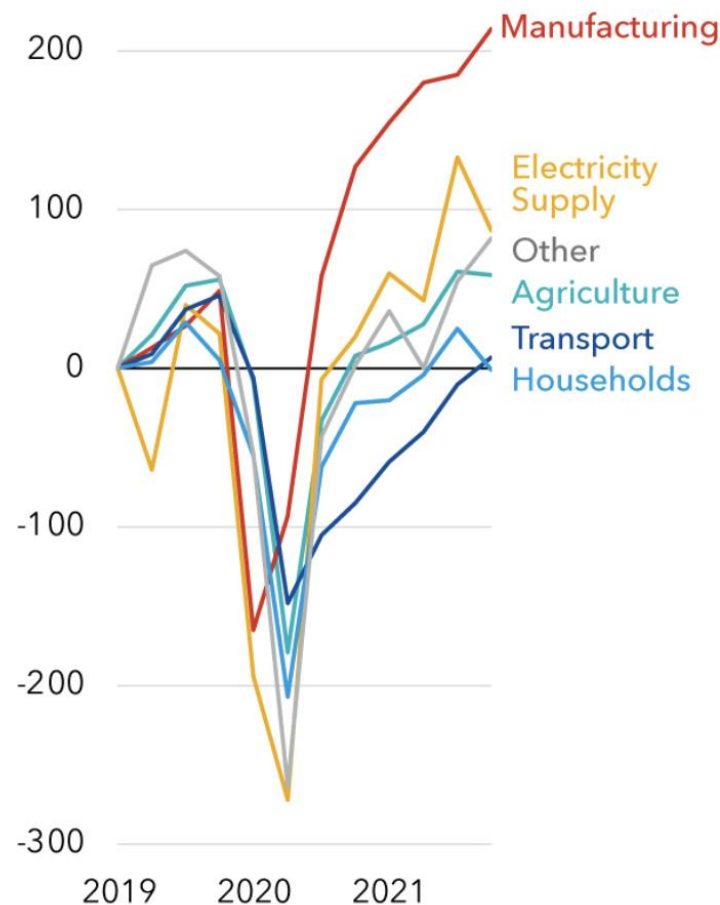
All but a blip

Global greenhouse gas emissions are back above pre-pandemic levels, with emissions rising across all sectors again in 2021.

Global greenhouse gas emissions
(million metric tons of CO₂ equivalent)



Change in emissions by sector since 2019
(million metric tons of CO₂ equivalent)

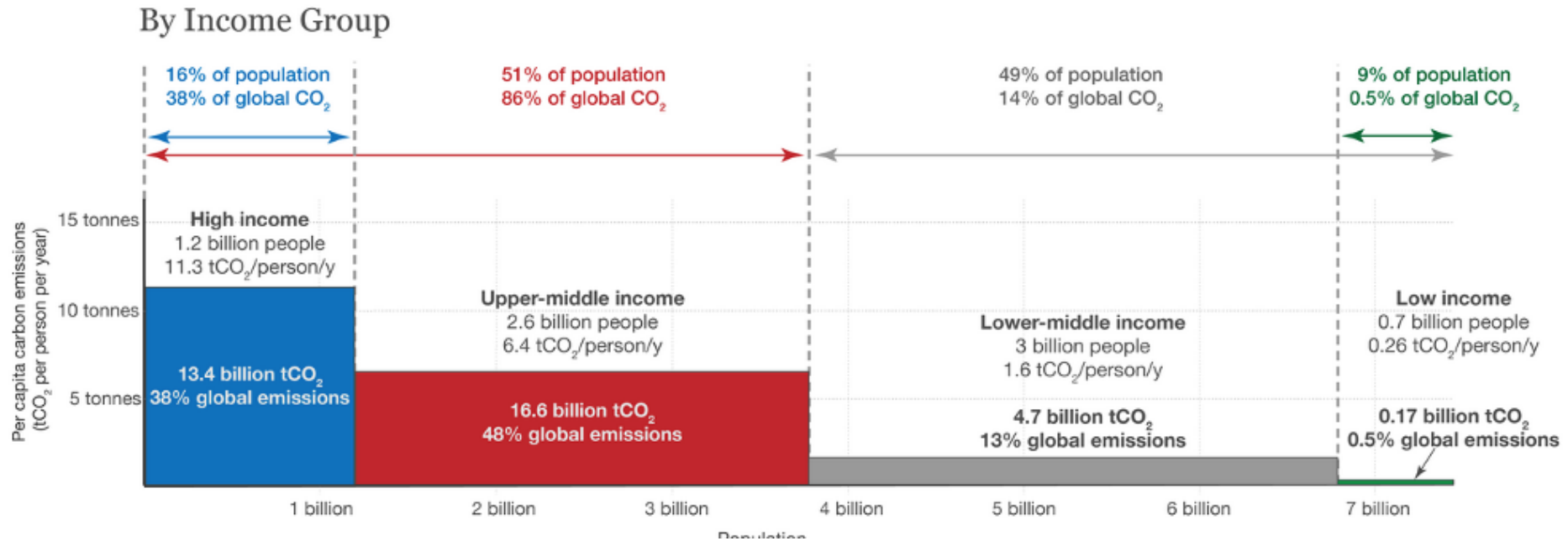


<https://www.imf.org/en/Blogs/Articles/2022/06/30/greenhouse-emissions-rise-to-record-erasing-drop-during-pandemic>

Source: IMF Climate Change Indicators Dashboard.

Note: Emissions are seasonally adjusted. The right panel shows change in greenhouse gas emissions from Q1-2019 levels.

5.

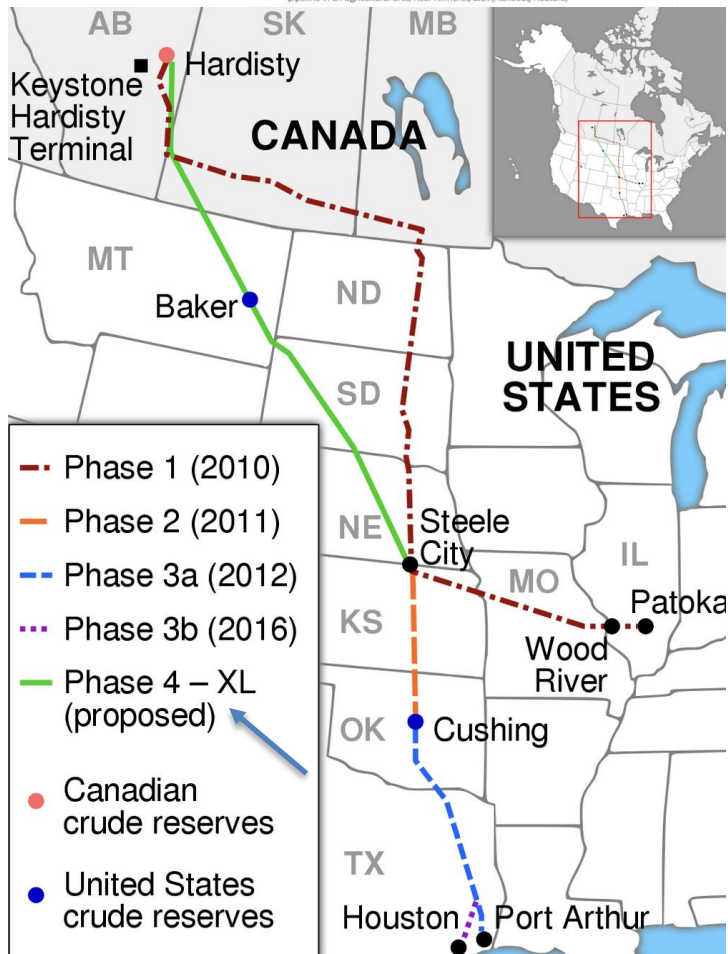


6.

Keystone pipeline spill injects new uncertainty into Nebraska decision



An aerial view shows the darkened ground of an oil spill that shut down a TransCanada pipeline in an agricultural area near Amherst, S.D. (Handout/Reuters)



The Keystone XL pipeline project has been terminated.

The embattled project to carry oil from Canada to Nebraska had been on life support since President Biden's first day in office and stalled by legal battles for years before that.



The Keystone XL pipeline faced stiff opposition from environmental activists for years. Jabin Botsford/The New York Times

<https://www.nytimes.com/2021/06/09/business/keystone-xl-pipeline-canceled.html>



By Coral Davenport

June 9, 2021

The Canadian pipeline company that had long sought to build the Keystone XL pipeline announced Wednesday that it had terminated the embattled project, which would have carried petroleum from Canadian tar sands to Nebraska.

6.

Gone but not forgotten: Trump aims to revive the Keystone XL pipeline

The company behind the project cancelled it and the steel that was in ground has been removed, but it's on the president-elect's energy to-do list.



BY: **BEN LEFEBVRE** | 11/20/2024 03:42 PM EST



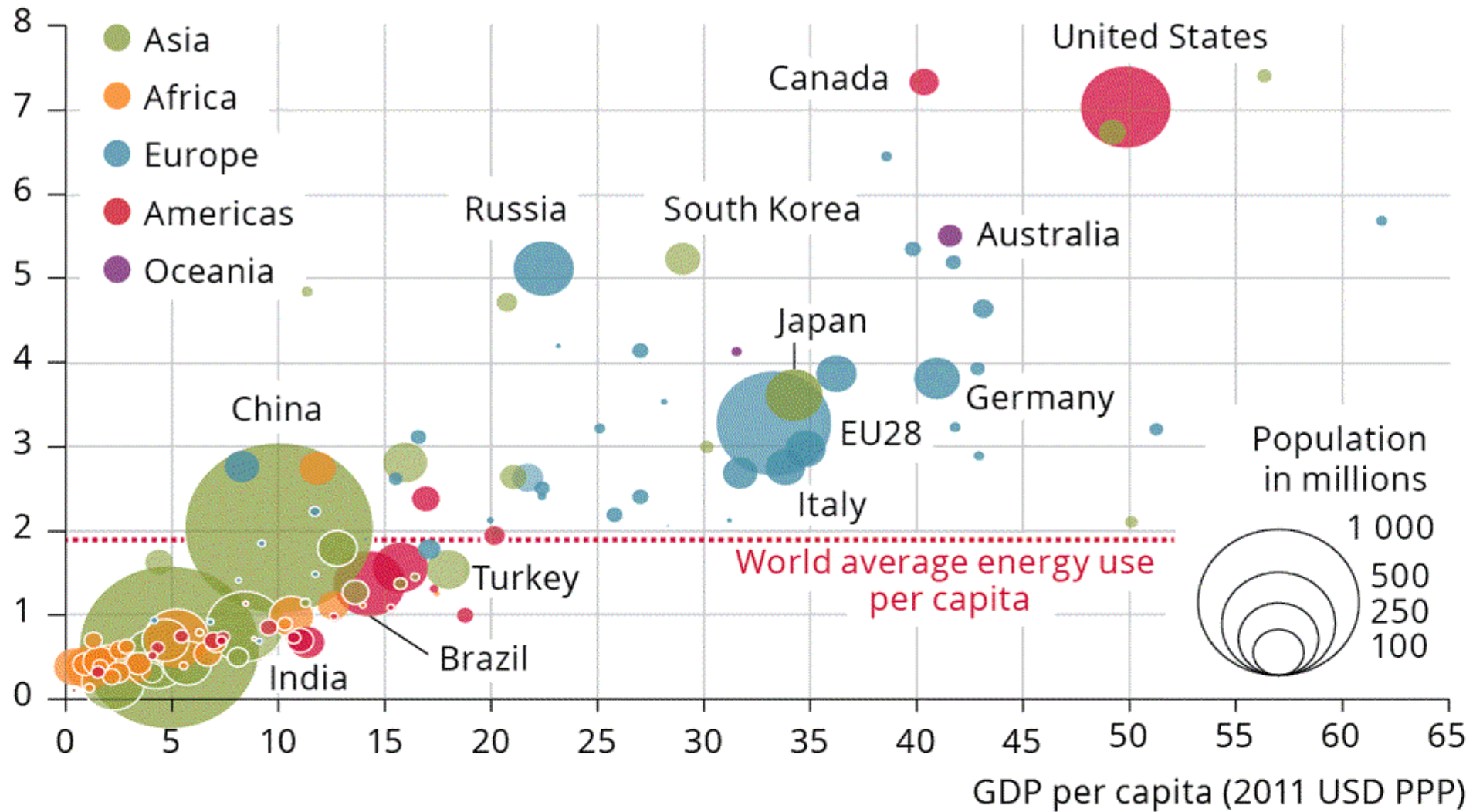
Activists wait to rally to protest the Keystone XL Pipeline in 2017. President-elect Donald Trump's renewed interest in the pipeline faces a sharply different reality now than existed when he first entered office. | Brendan Smialowski/AFP via Getty Images

Donald Trump is looking to revive the Keystone XL oil pipeline on his first day back in the White House, according to three people familiar with the president-elect's plan, even though no companies are trying to build it anymore.

Trump believes declaring the 1,200-mile Canada-to-Nebraska crude project back on the table would drive the pro-oil message he delivered in his campaign, said people involved in the transition team discussions about the idea. Trump also wants to show he can defy President Joe Biden, who reversed Trump's initial 2017 approval of the project, which was strongly opposed by the climate movement.

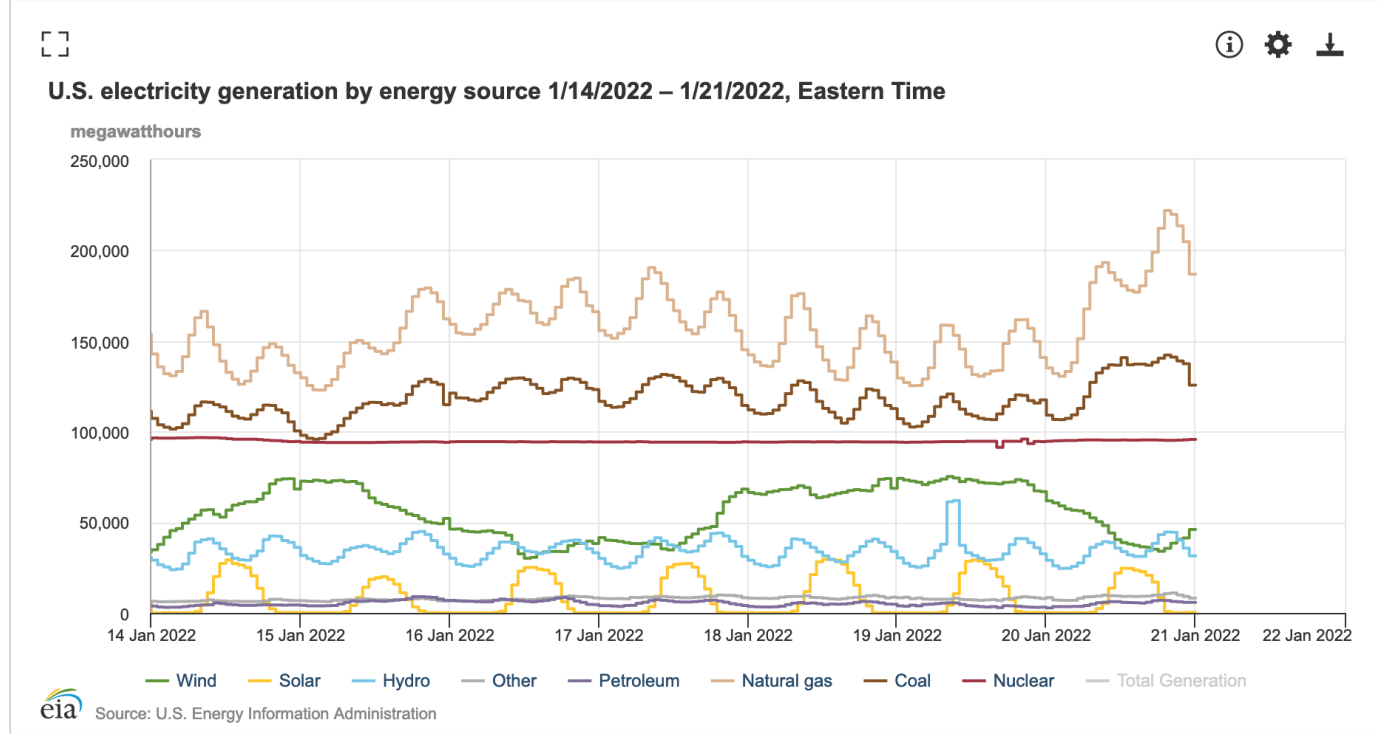
7.

Energy use in tonnes of oil equivalent per capita

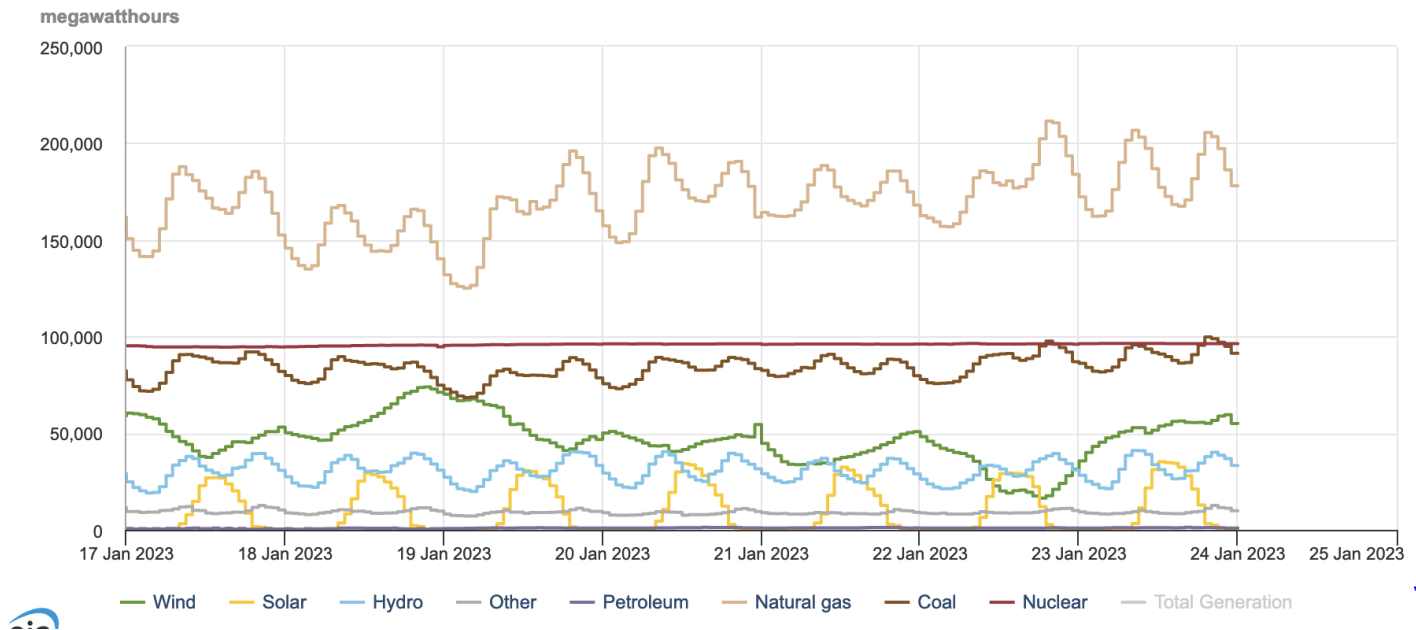


8.

2022



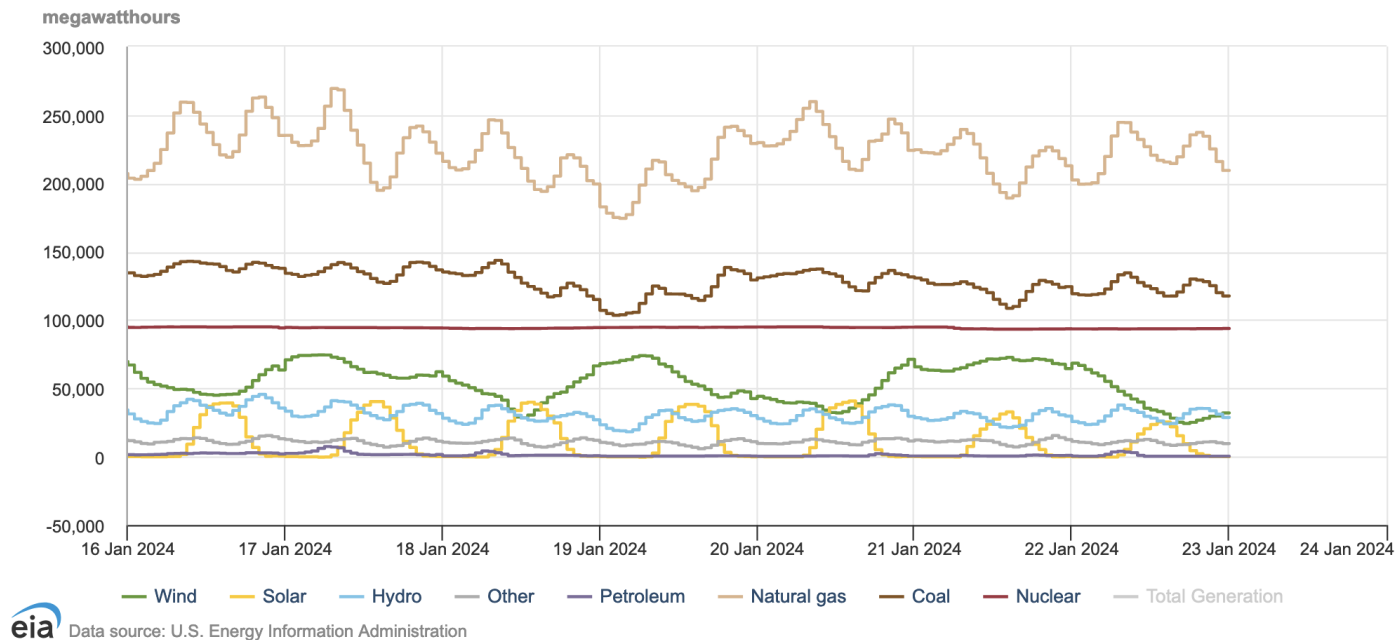
U.S. electricity generation by energy source 1/17/2023 – 1/24/2023, Eastern Time



8.

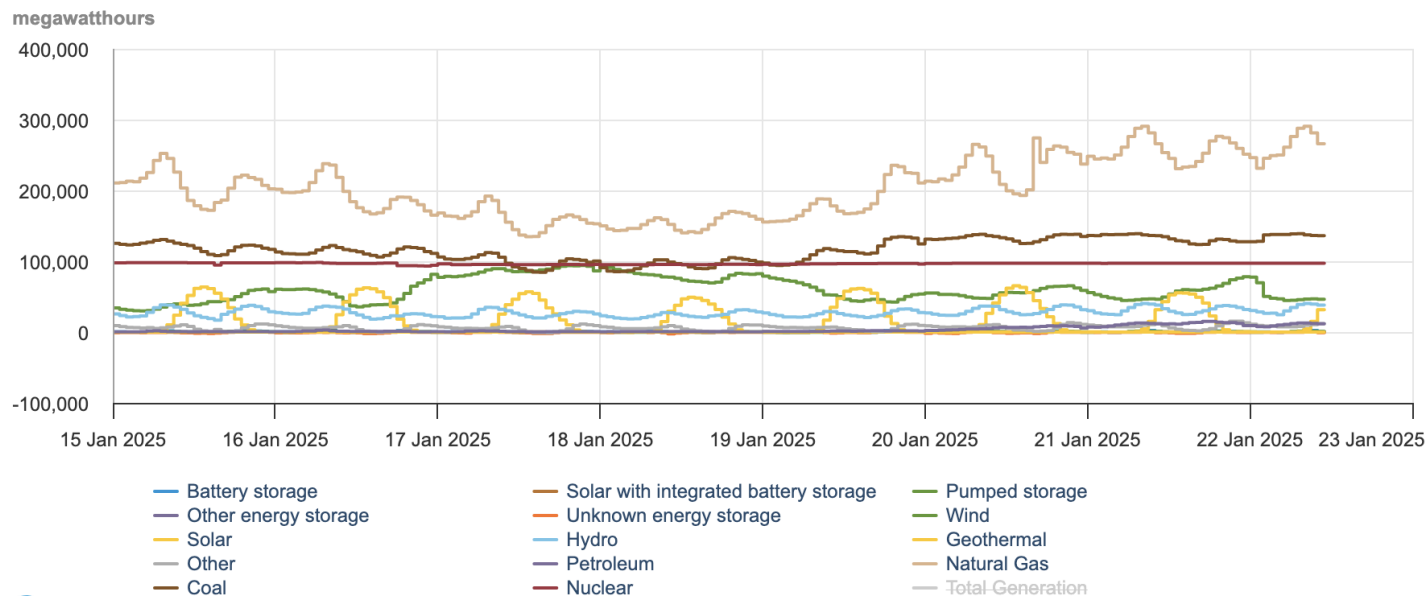
2024

U.S. electricity generation by energy source 1/16/2024 – 1/23/2024, Eastern Time



2025

U.S. electricity generation by energy source 1/15/2025 – 1/22/2025, Eastern Time



9.

Van cover to:
Japan - 4,300 miles
Taiwan - 5,600 miles
S. Korea - 4,600 miles
China - 5,100 miles

San Francisco - 800 miles
Los Angeles - 1,100 miles



CANADIAN ASSOCIATION
OF PETROLEUM PRODUCERS

For Information Contact: (416) 267-1141 / www.capp.ca

Newfoundland & Labrador
Shear Range (Come by Chance) ... 115

Come by Chance
Hibernia
Hebron
Terra Nova

2014 Canadian Crude Oil Production		
	000 m3/d	000 b/d
British Columbia	8	49
Alberta	461	2,899
Saskatchewan	82	515
Manitoba	7	47
Northwest Territories	2	11
Western Canada	560	3,522
Eastern Canada	35	220
Total Canada	595	3,742

Pipeline Tolls for Light Oil (US\$ per barrel)	
Edmonton to:	
Burnaby (Trans Mountain)	2.20
Anacortes (Trans Mountain/Puget)	2.50
Sarnia (Enbridge)	4.50
Chicago (Enbridge)	4.05
Wood River (Enbridge/Mustang/Capwood)	5.50
USGC (Enbridge/Seaway)	6.15*-11.10
Hardisty to:	
Guernsey (Express/Plate)	1.65*
Wood River (Express/Plate)	2.00*
Wood River (Keystone)	4.60** 5.20
USGC (Keystone/TC Gulf Coast)	6.95** 11.75
USC to Montreal (Portland/Montreal)	1.40
St. James to Wood River (Capline/Capwood)	1.30
Pipeline Tolls for Heavy Oil (US\$ per barrel)	
Hardisty to:	
Chicago (Enbridge)	4.25
Cushing (Enbridge)	5.45*-6.80
Cushing (Keystone)	6.00** 6.80
Wood River (Enbridge/Mustang/Capwood)	6.15
Wood River (Keystone)	5.25** 5.90
Wood River (Express/Plate)	2.45*
USGC (Enbridge/Seaway)	6.95*-11.30
USGC (Keystone/TC Gulf Coast)	7.85** 12.75

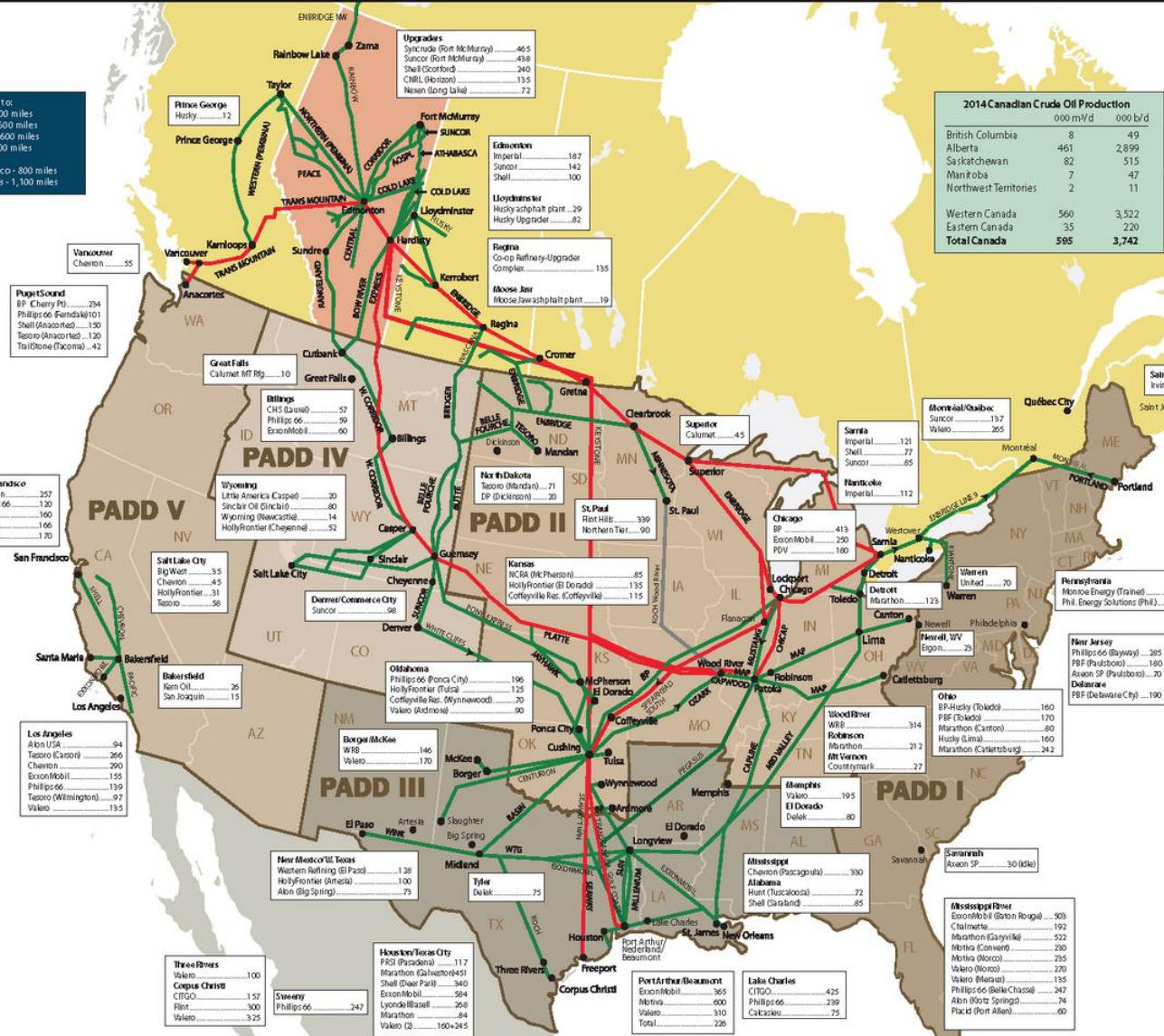
Notes: 1) Assumed exchange rate = 0.82 US\$/1 CAD May 2015 average
2) Tolls rounded to nearest 5 cents
3) Tolls in effect July 1, 2015
* 10-year committed toll
** 20-year committed toll
† Next Open Season 15-year, \$100m/bbl committed volumes

Canadian and U.S. Crude Oil Pipelines and Refineries

Area Refineries - Capacities as at Jun 1, 2015
(in '000s barrels per day)

PADD Petroleum Administration for
Defense District

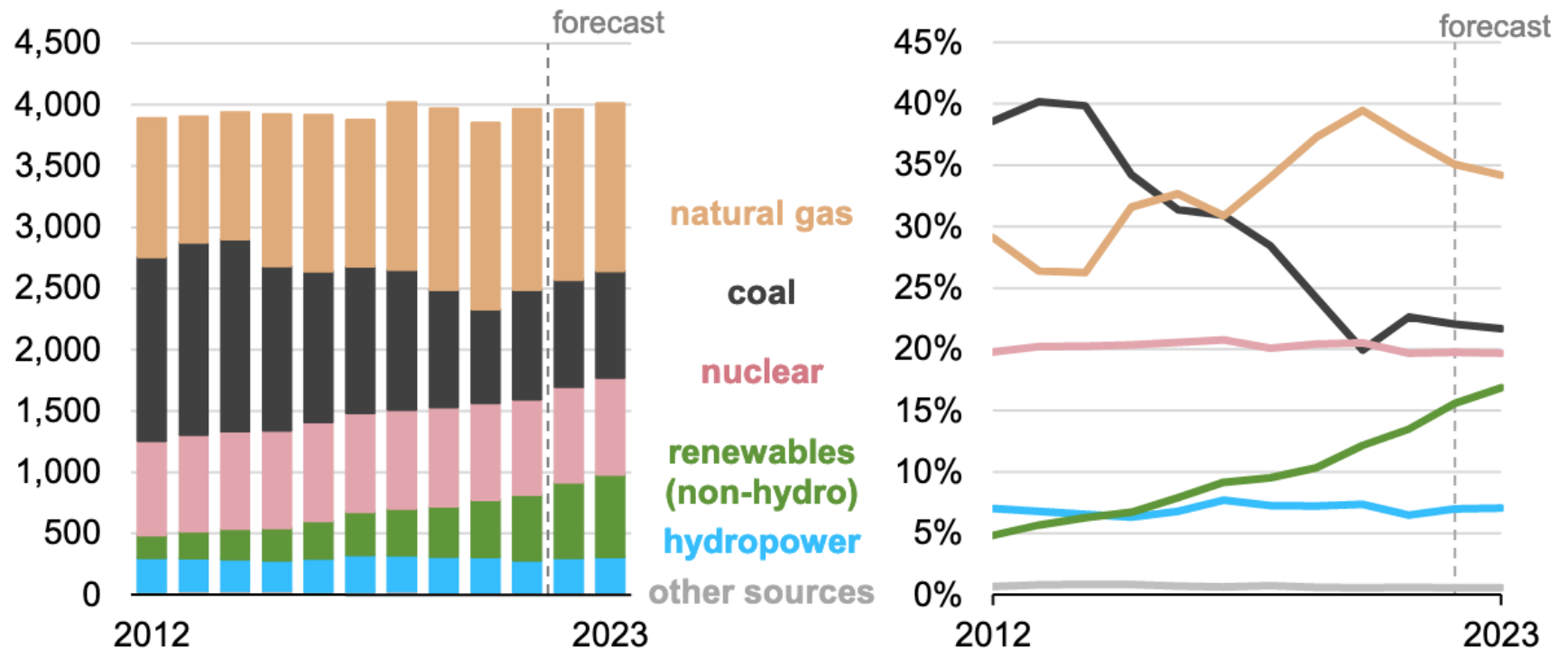
Major Existing Crude Oil Pipelines carrying
Canadian crude oil
Selected Other Crude Oil Pipelines



10.

JANUARY 18, 2022

Annual U.S. electric power sector generation by energy source (2012–2023)

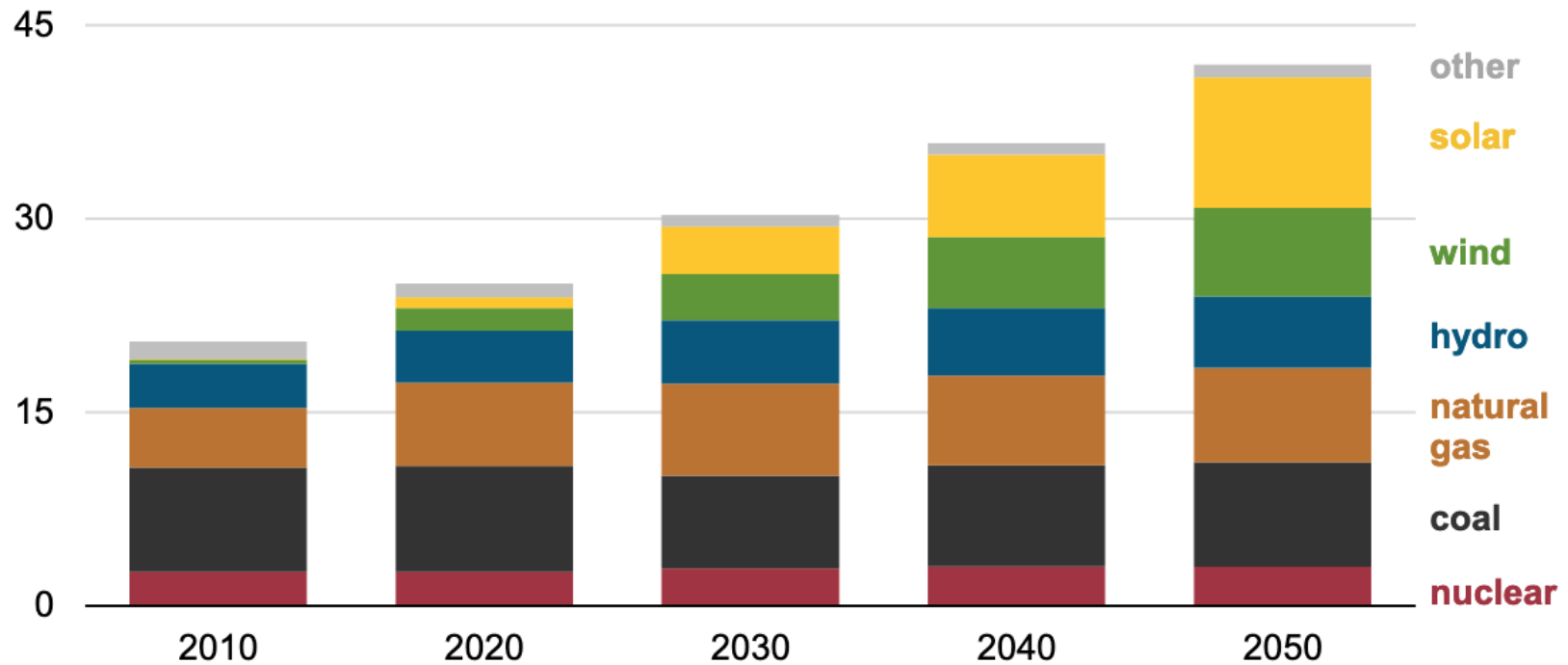


Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, January 2022

OCTOBER 15, 2021

World net electricity generation by source (2010–2050)

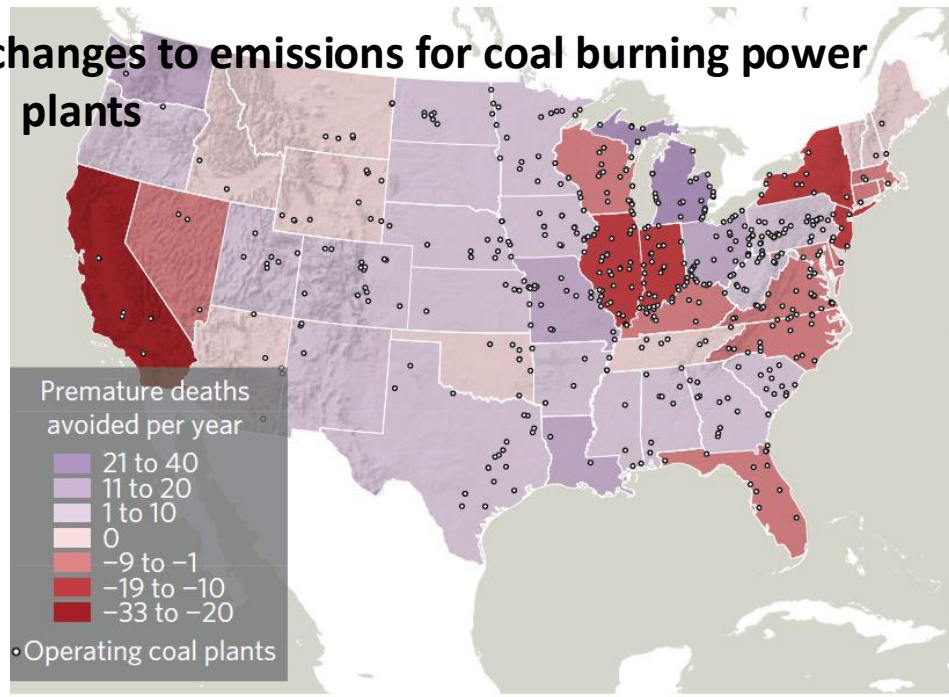
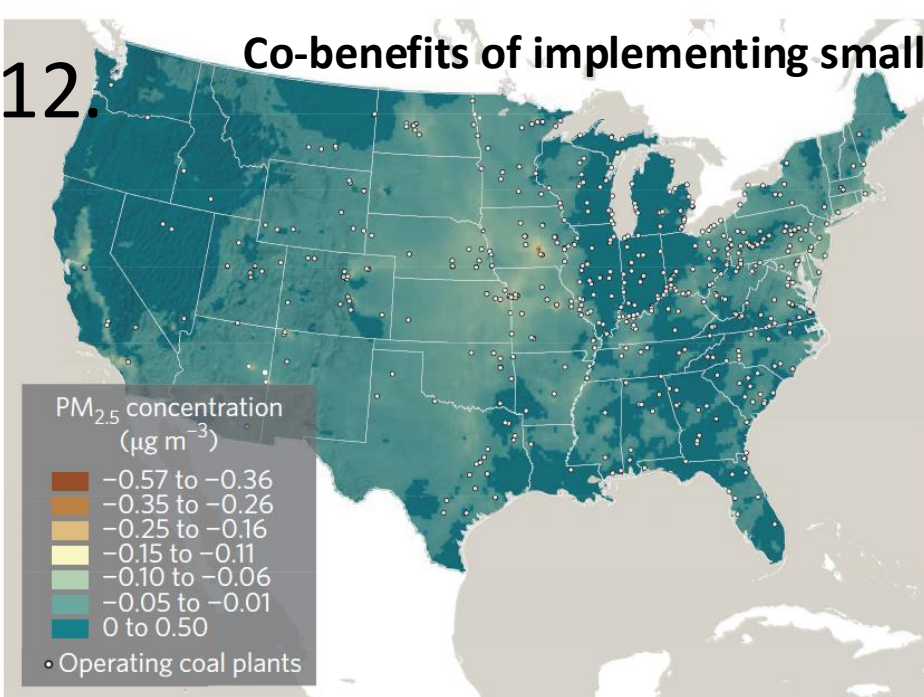
trillion kilowatthours



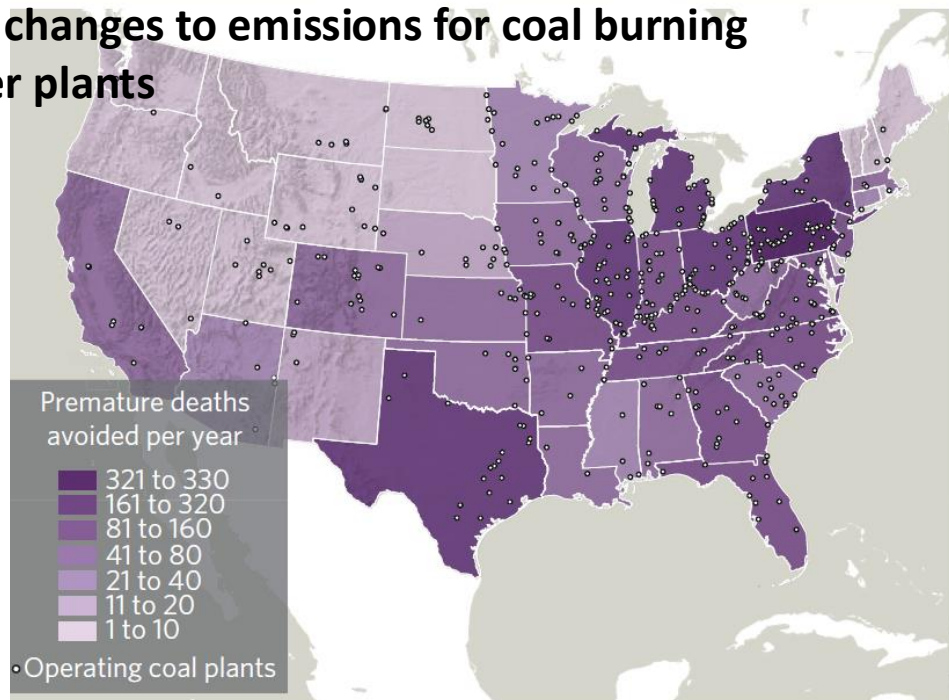
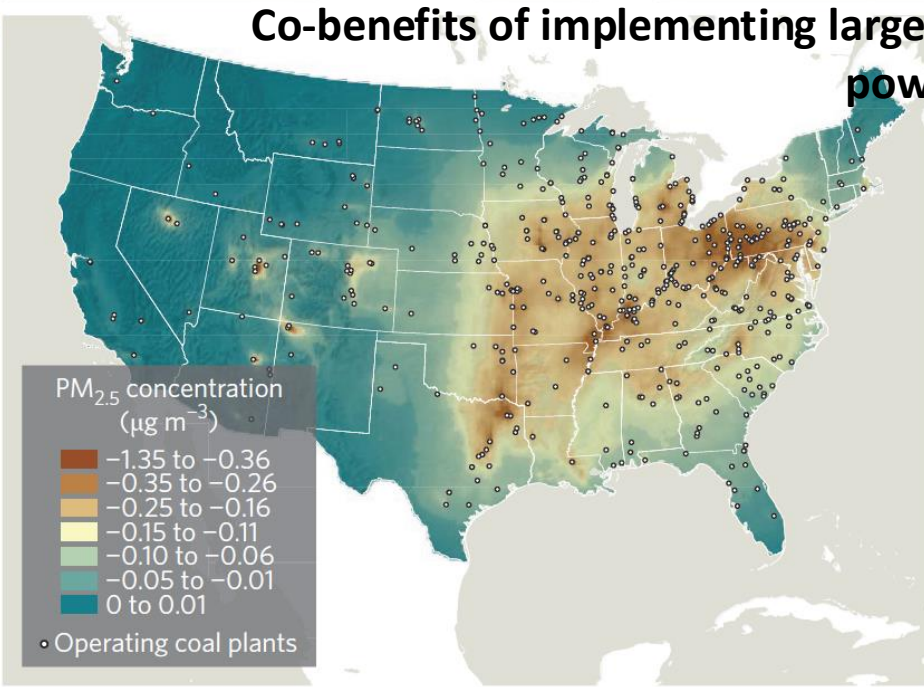
Source: U.S. Energy Information Administration, [International Energy Outlook 2021](#) (IEO2021) Reference case

12.

Co-benefits of implementing small changes to emissions for coal burning power plants



Co-benefits of implementing larger changes to emissions for coal burning power plants

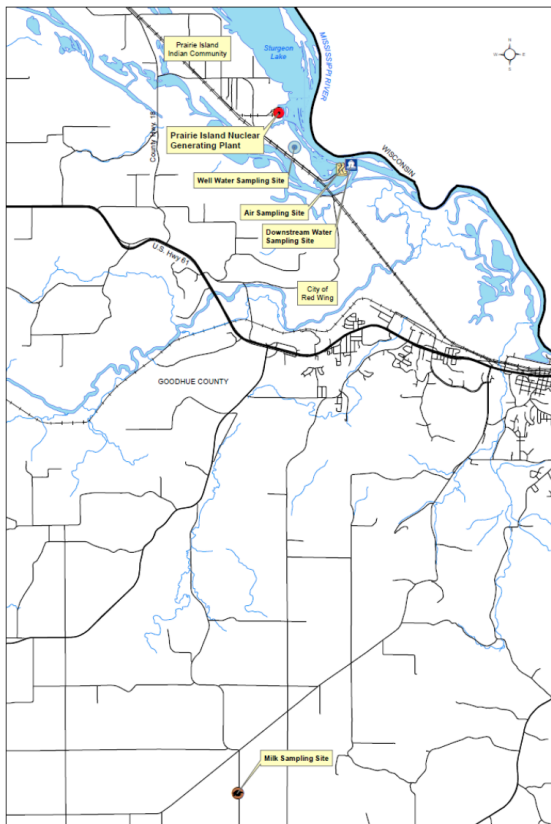


13.



The Prairie Island Nuclear Generating plant looms in the distance beyond a lock and dam on the Mississippi River near Red Wing, Minn., in October 2019. — Evan Frost | MPR News 2019

Image 2: Prairie Island Environmental Sampling Sites



Constant danger

Prairie Island tribal members are descendants of the Mdewakanton Band of Eastern Dakota, who made their home in the southern half of Minnesota — land they lost in 1851 as a result of the Treaty of Traverse des Sioux.

After the U.S. government hanged 38 Dakota men in Mankato, Minn., in 1862, that treaty was invalidated and the Dakota were banished from the region.

“What’s unique about the Prairie Island Dakota people is that they’ve got strong evidence that many never left this area,” said Franky Jackson, the tribe’s compliance officer for historic preservation.

He said a small group remained on land near Lake Pepin intended for people who have some Dakota ancestry. “Many found creative ways to retain and occupy land here around the island,” he said.

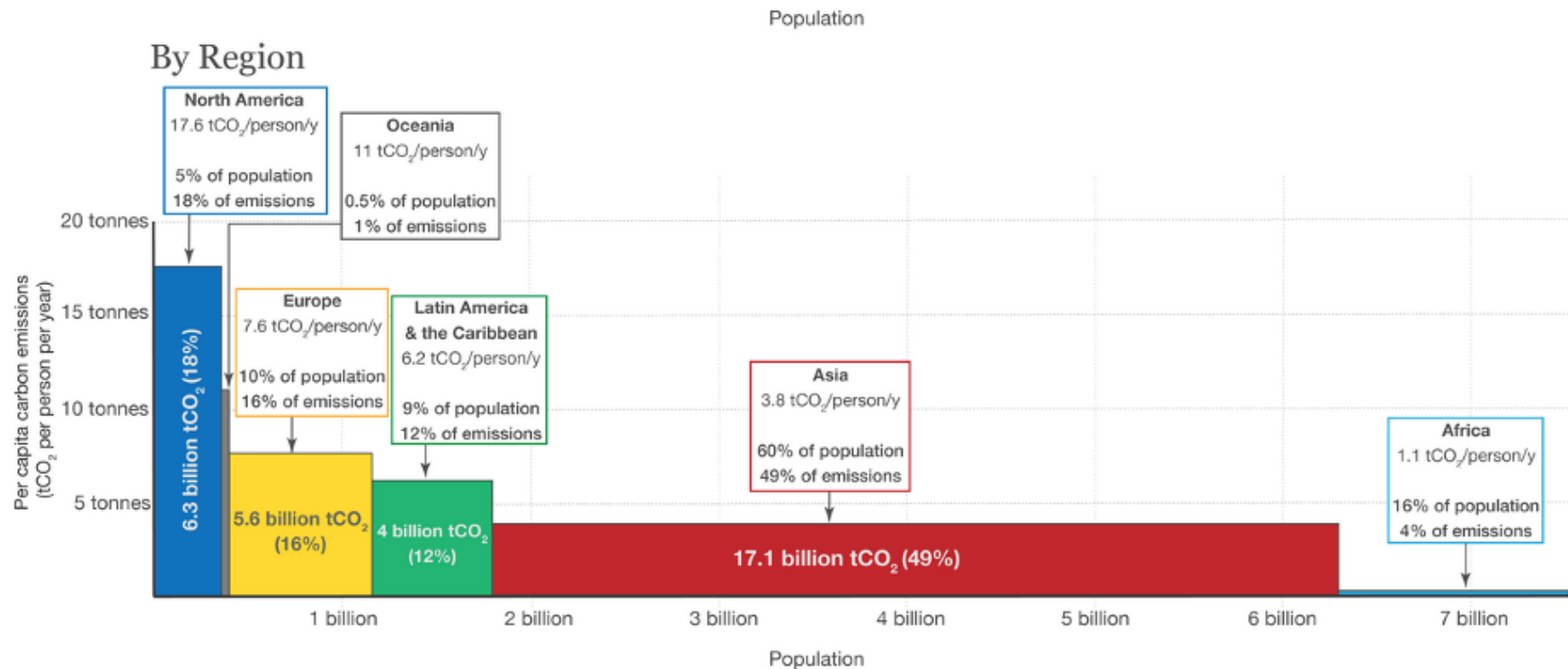
Prairie Island tribal members slowly returned. And in 1934, the land on the banks of the Mississippi where tribal members live now was federally recognized as a 534-acre reservation.



<https://www.mprnews.org/story/2022/01/01/xcel-seeks-change-in-prairie-island-nuclear-waste-storage>

<https://www.mprnews.org/story/2019/12/13/environmental-nuclear-worries-force-prairie-island-tribe-to-see-new-lands>

14.



Source: Our World in Data based on data from the Global Carbon Project, UN Population Division (2018) & World Bank income groups.
This is a visualization from [OurWorldinData.org](https://ourworldindata.org), where you find data and research on how the world is changing.

Licensed under [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) by the authors Hannah Ritchie and Max Roser.

Facilities Department

FACILITIES DEPARTMENT		MENU	CONTACT
FACILITIES HOME	STAFF +	SERVICES +	WORK REQUEST +
FRAMEWORK PLAN 2016 +	POLICIES AND SAFETY PROGRAMS +	SUSTAINABILITY AND ST. OLAF FACILITIES +	ENERGY & UTILITIES -
CARBON	ELECTRICITY	EVOLUTION OF THE HEATING PLANT	UTILITY CONSUMPTION
WATER SYSTEM	WIND AT ST. OLAF		

15.

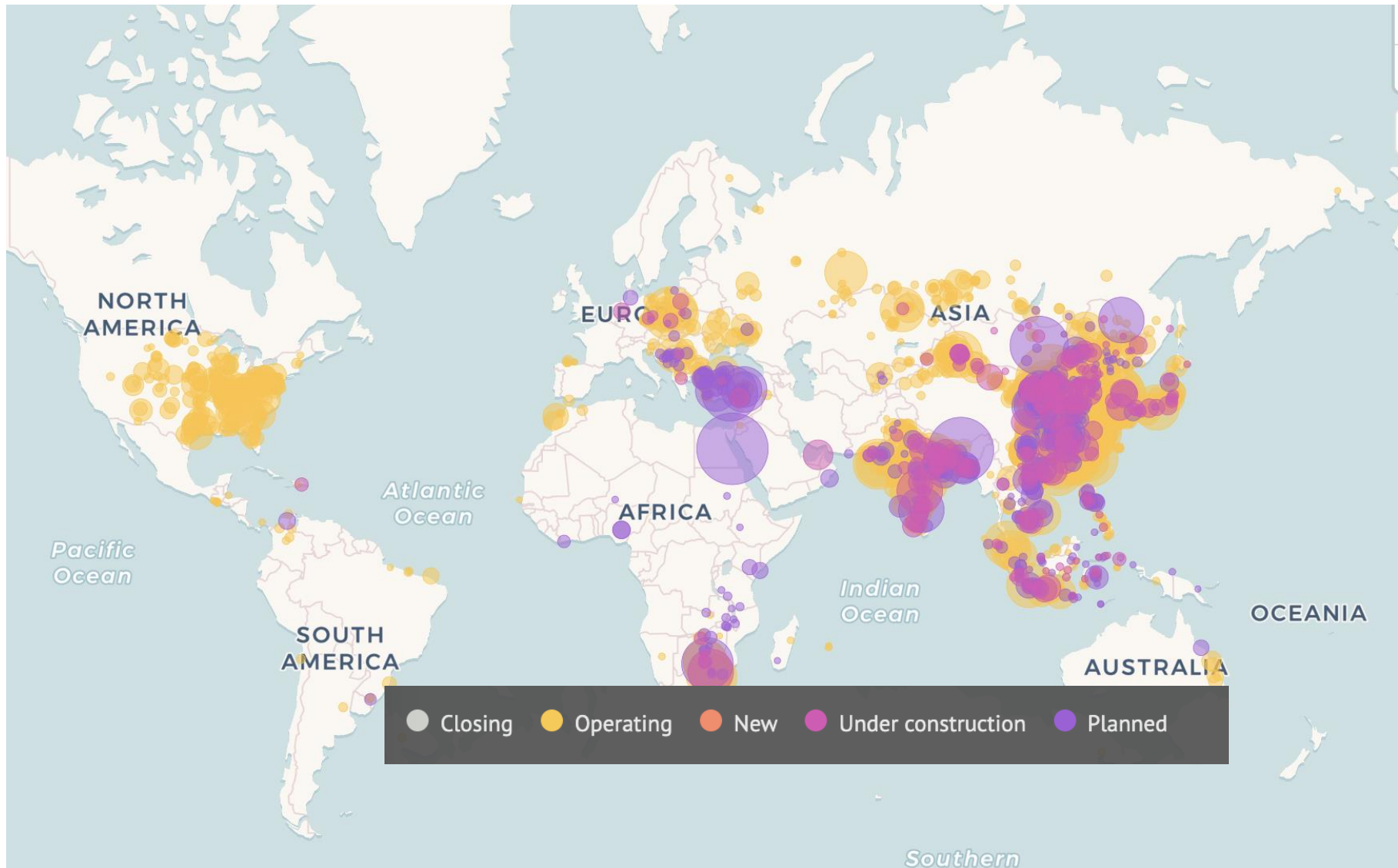
St. Olaf College currently leases 40 acres of college-owned land to solar developers and subscribes to 40 percent of the solar project's output, the maximum allowable by state law. The college's solar subscriptions, combined with the energy generated by its wind turbine, enable St. Olaf to achieve 100 percent carbon-free electrical power.

At our latitude, and mid-continent position, we need a great many BTUs worth of energy between October and May each year. Because of the mid-continent location at the head of the Mississippi Valley, there is a significant air conditioning load as well. All this means we need to burn materials to generate heat to make steam, and consume KWH to make chilled water. We are constantly working to curb the college's carbon emissions and enhance energy conservation.



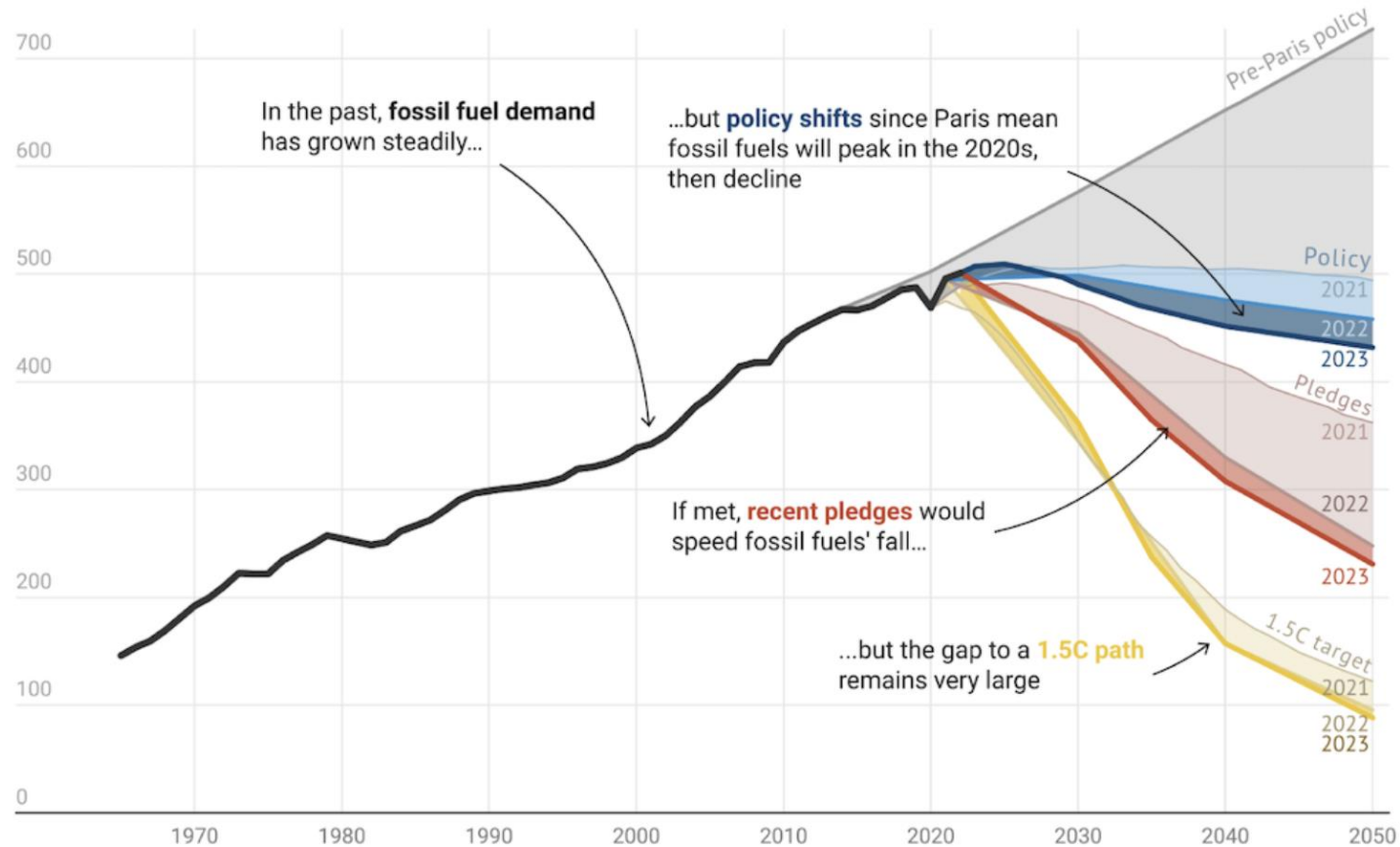
16.

<https://www.carbonbrief.org/mapped-worlds-coal-power-plants/>



17. Climate policy is bringing world closer than ever before to a peak in fossil fuel use

Global use of fossil fuels, exajoules



Source: IEA World Energy Outlooks

CarbonBrief
CLEAR ON CLIMATE

Global use of fossil fuels, exajoules, 1965-2050. Chart shows historical demand (black), the pre-Paris policy baseline (grey, 2015 “current policies scenario”), policy in 2021-2023 (blue, “stated policies scenarios”), as well as pledges in 2021-2023 (red, “announced pledges scenarios”) and the IEA’s suggested paths to staying below 1.5C in 2021-2023 (yellow, “net-zero emissions by 2050 scenarios”). Source: Carbon Brief analysis by Simon Evans and Verner Viisainen of IEA world energy outlooks 2015-2023.

Chart by Tom Prater for Carbon Brief.

<https://www.carbonbrief.org/analysis-global-co2-emissions-could-peak-as-soon-as-2023-iea-data-reveals/>