Repurposed Energy

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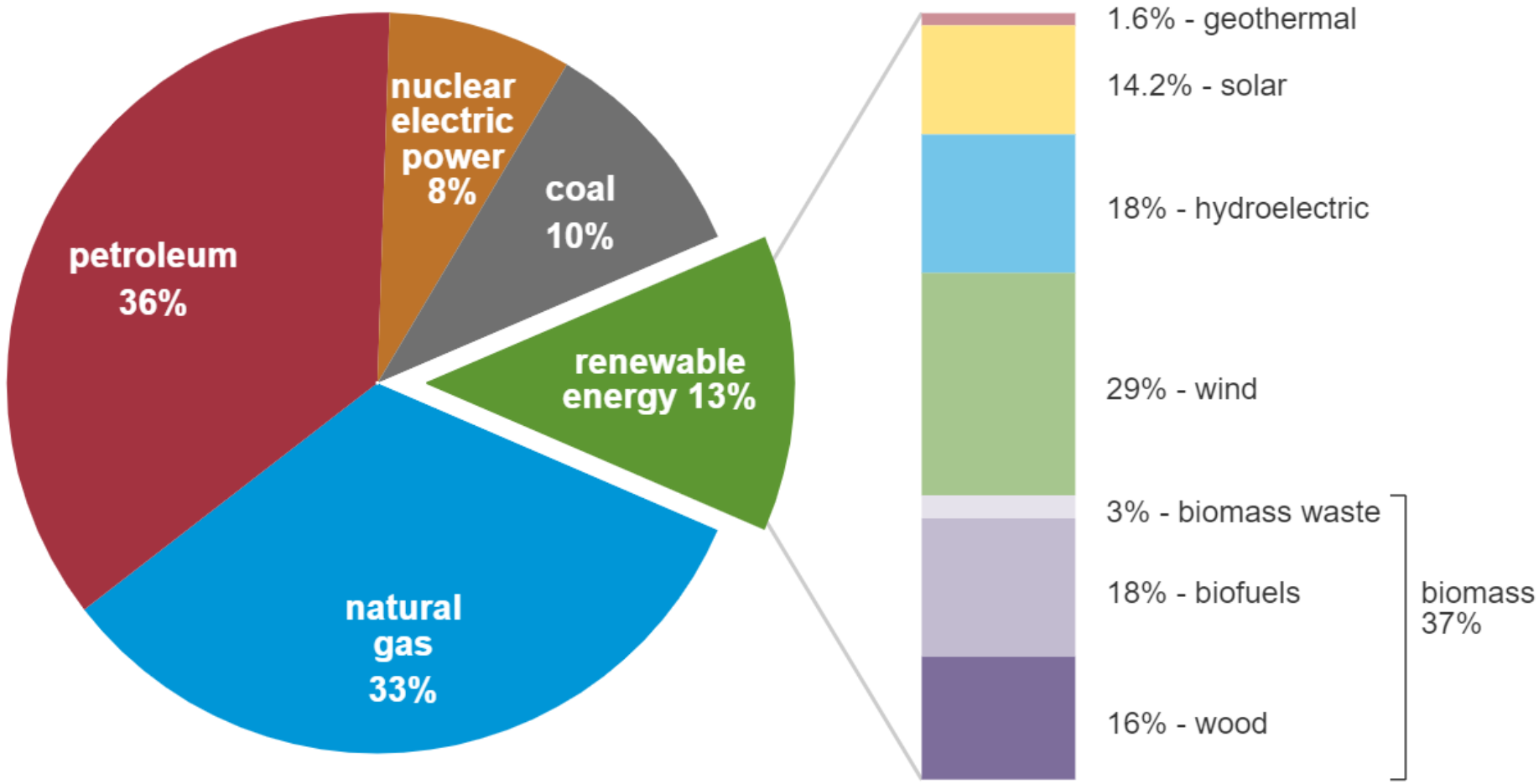
James G. Degnan Professor of Law
University of Michigan Law School

Current Energy Landscape

U.S. primary energy consumption by energy source, 2022

total = 100.41 quadrillion British thermal units (Btu)

total = 13.18 quadrillion Btu

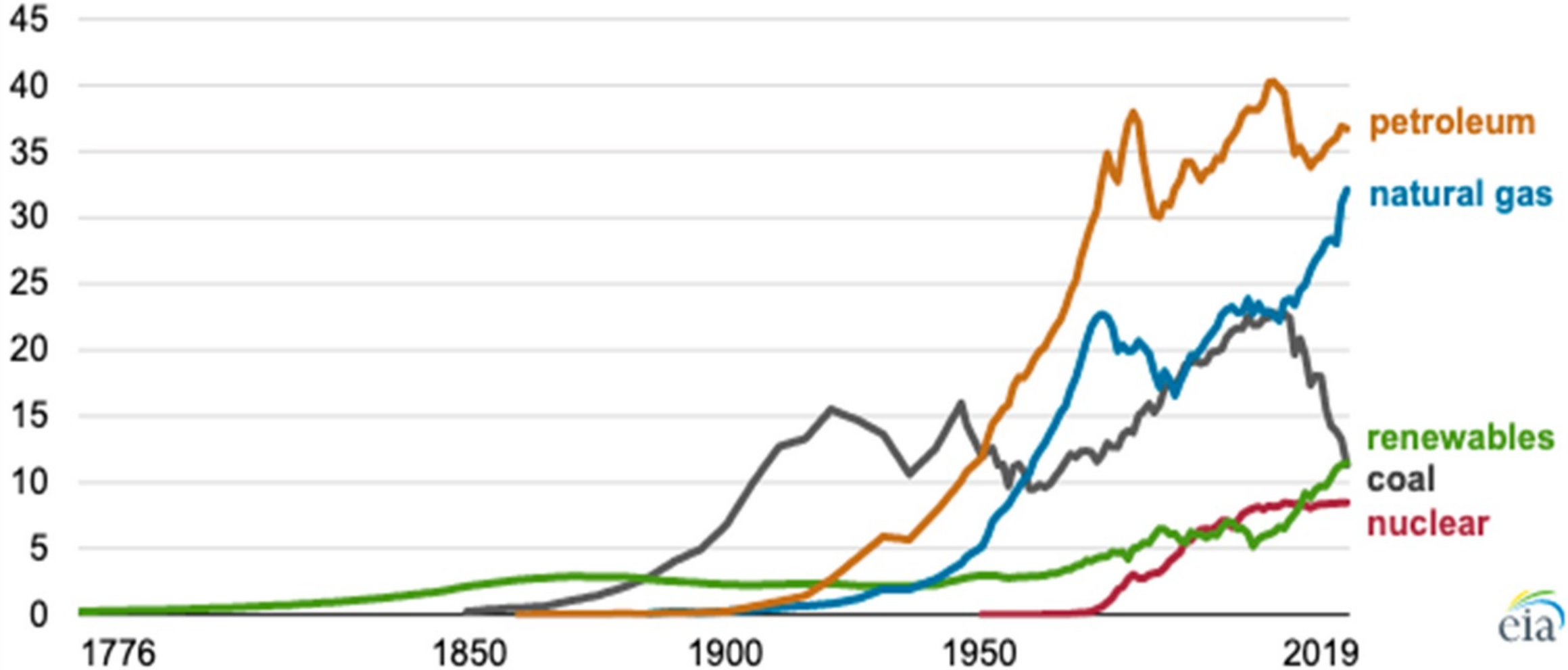


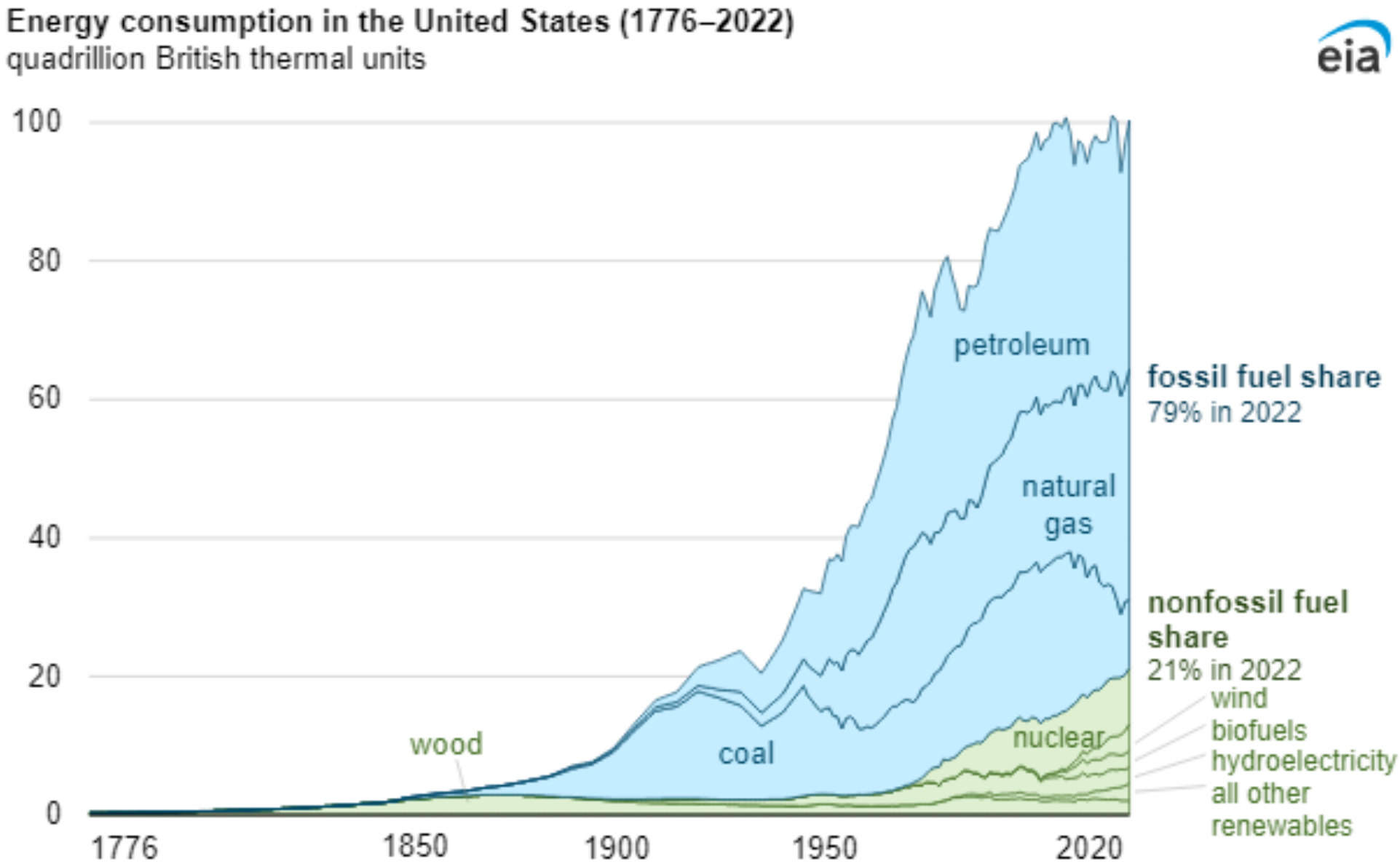
Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2023, preliminary data

Note: Sum of components may not equal 100% because of independent rounding.

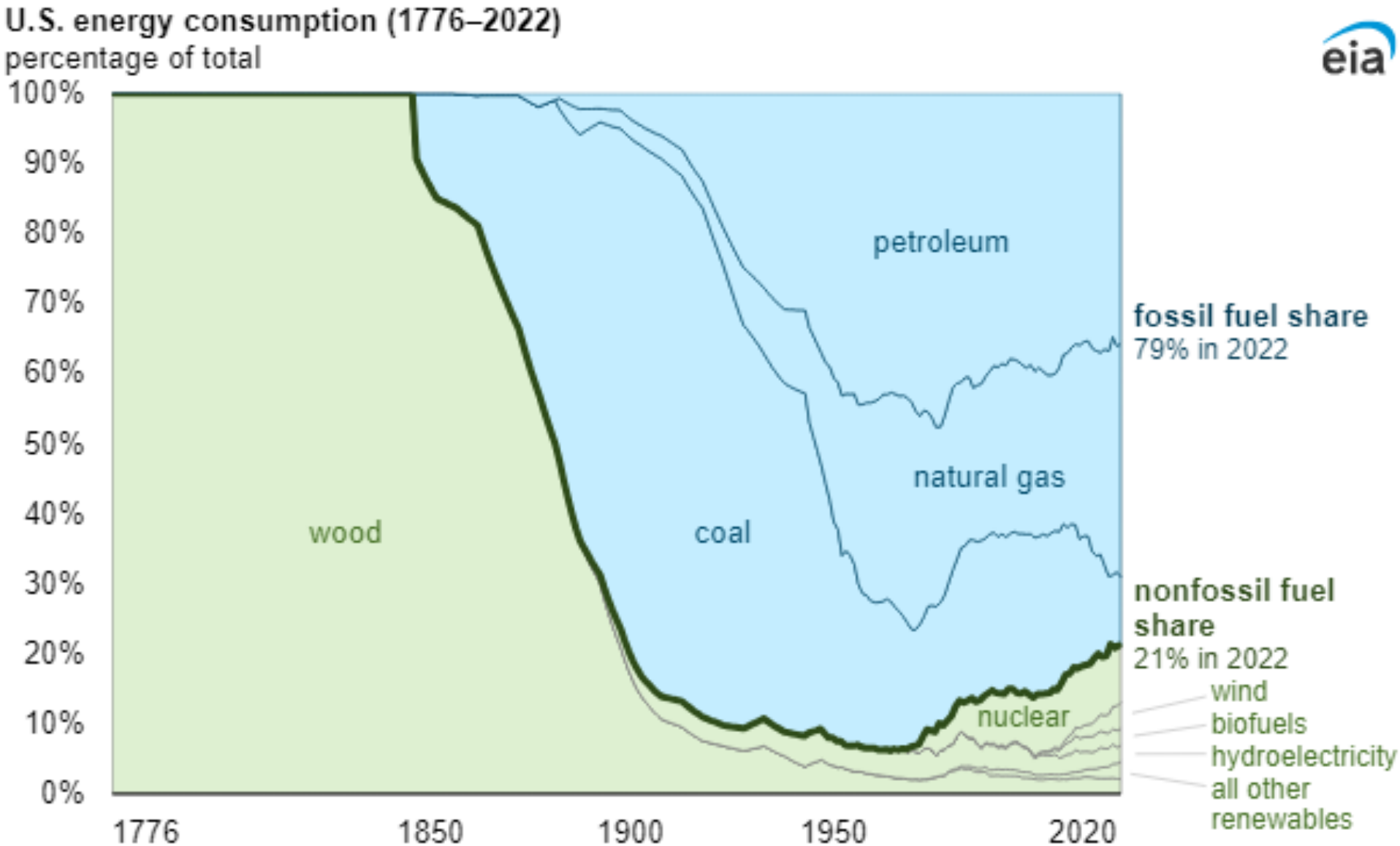
Energy consumption in the United States (1776–2019)

quadrillion British thermal units



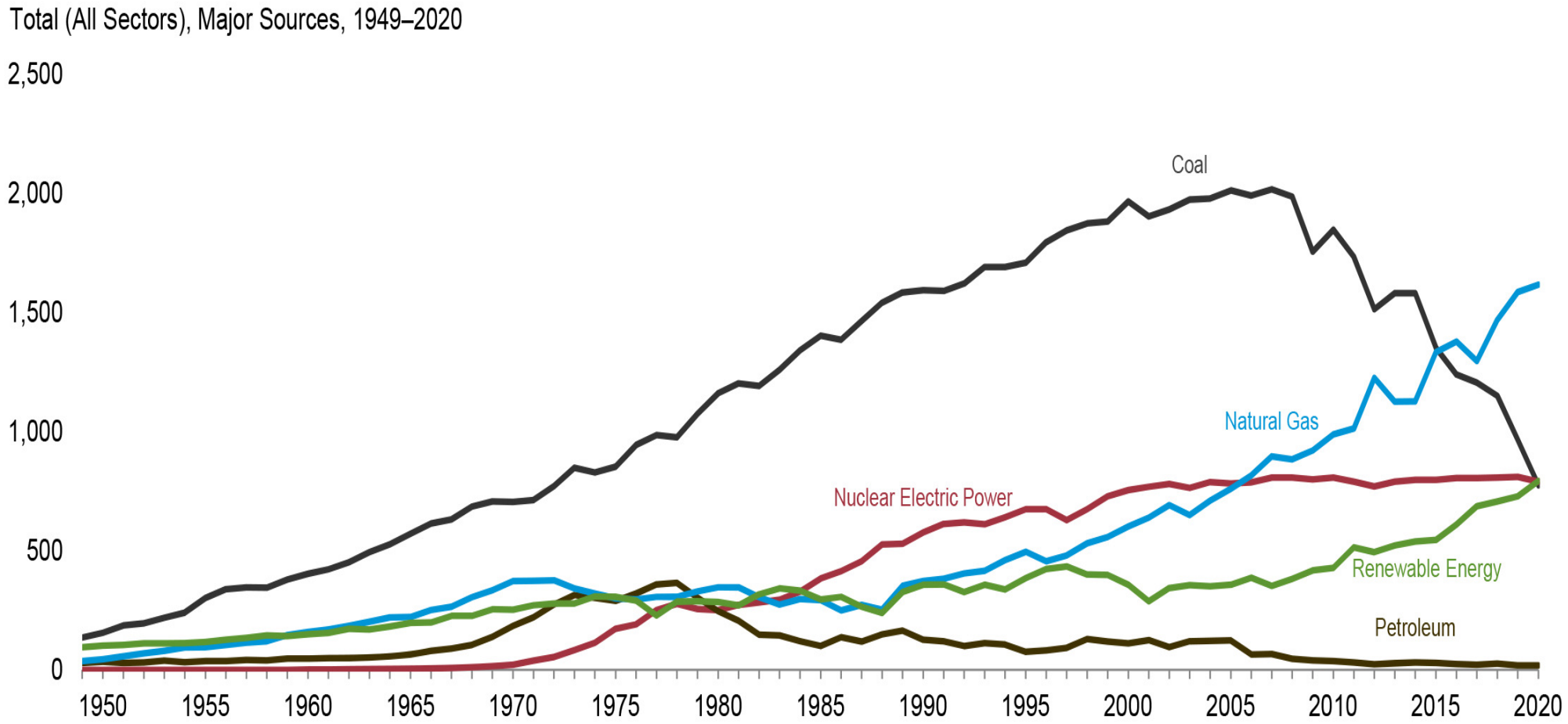


Data source: U.S. Energy Information Administration, *Monthly Energy Review*



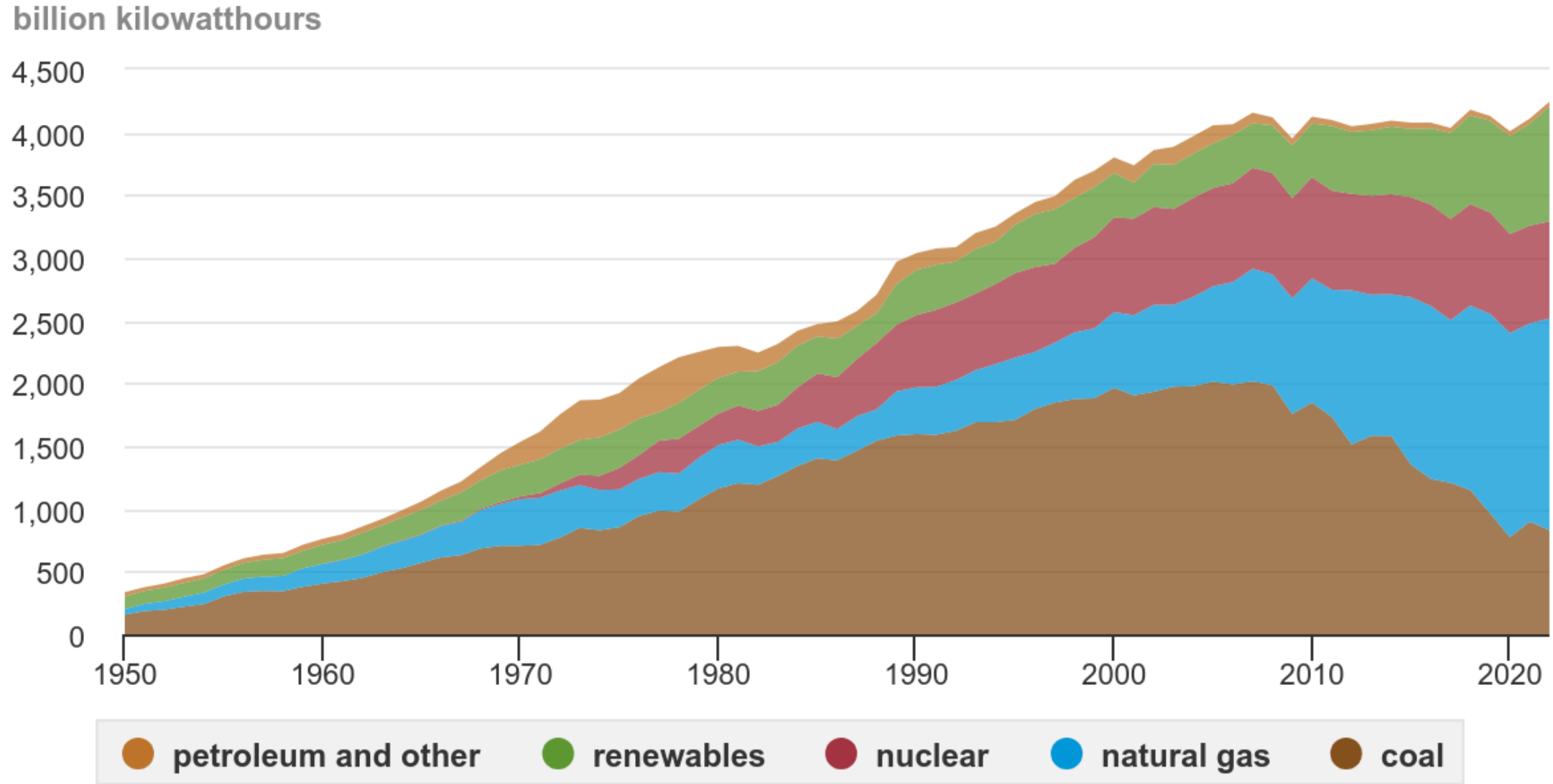
Data source: U.S. Energy Information Administration, *Monthly Energy Review*

U.S. Electricity Generation by Fuel 1949-2020 (in billion kWh)



Source: U.S. Energy Info. Admin.

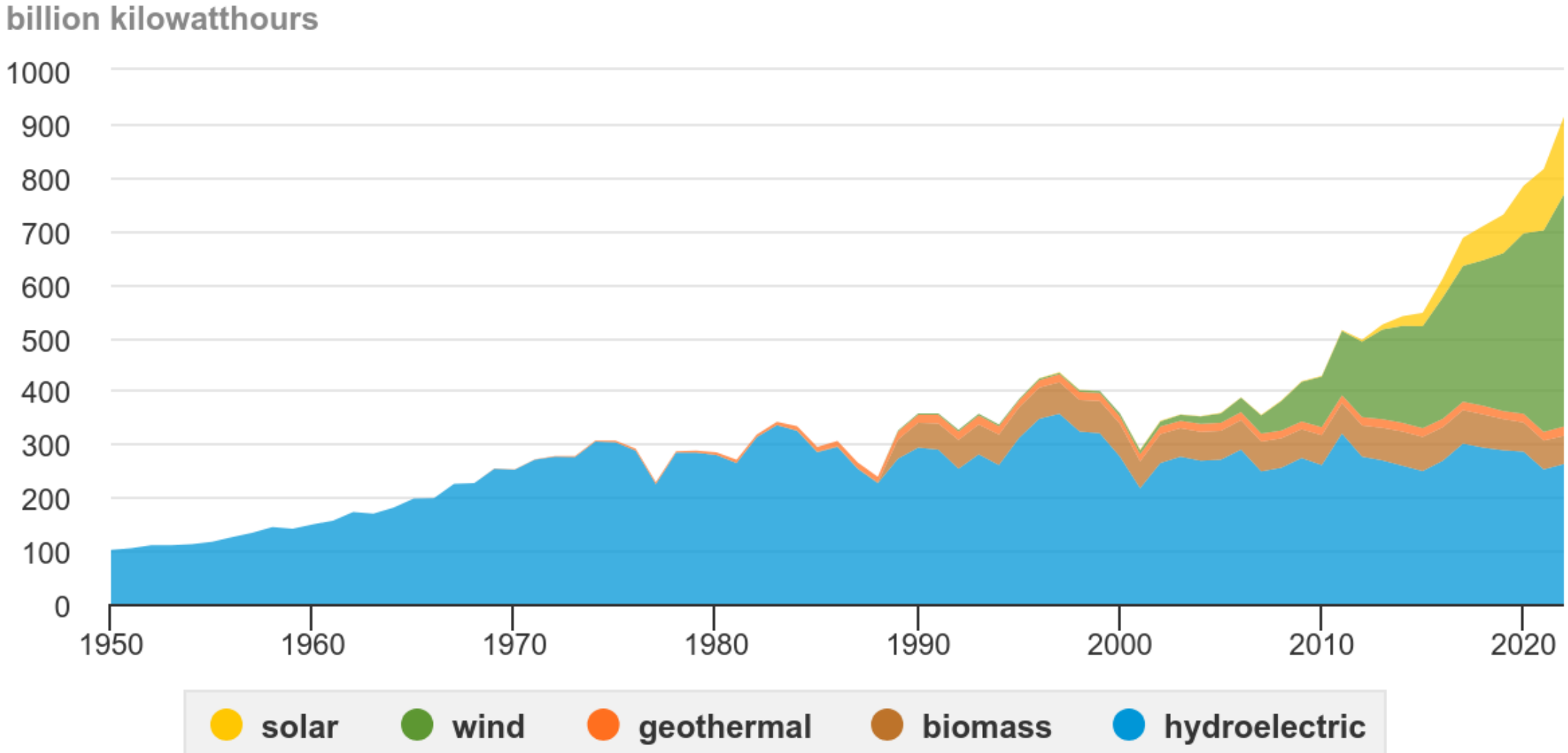
U.S. electricity generation by major energy source, 1950-2022



Data source: U.S. Energy Information Administration, *Monthly Energy Review* and *Electric Power Monthly* , February 2023, preliminary data for 2022

Note: Includes generation from power plants with at least 1 megawatt electric generation capacity.

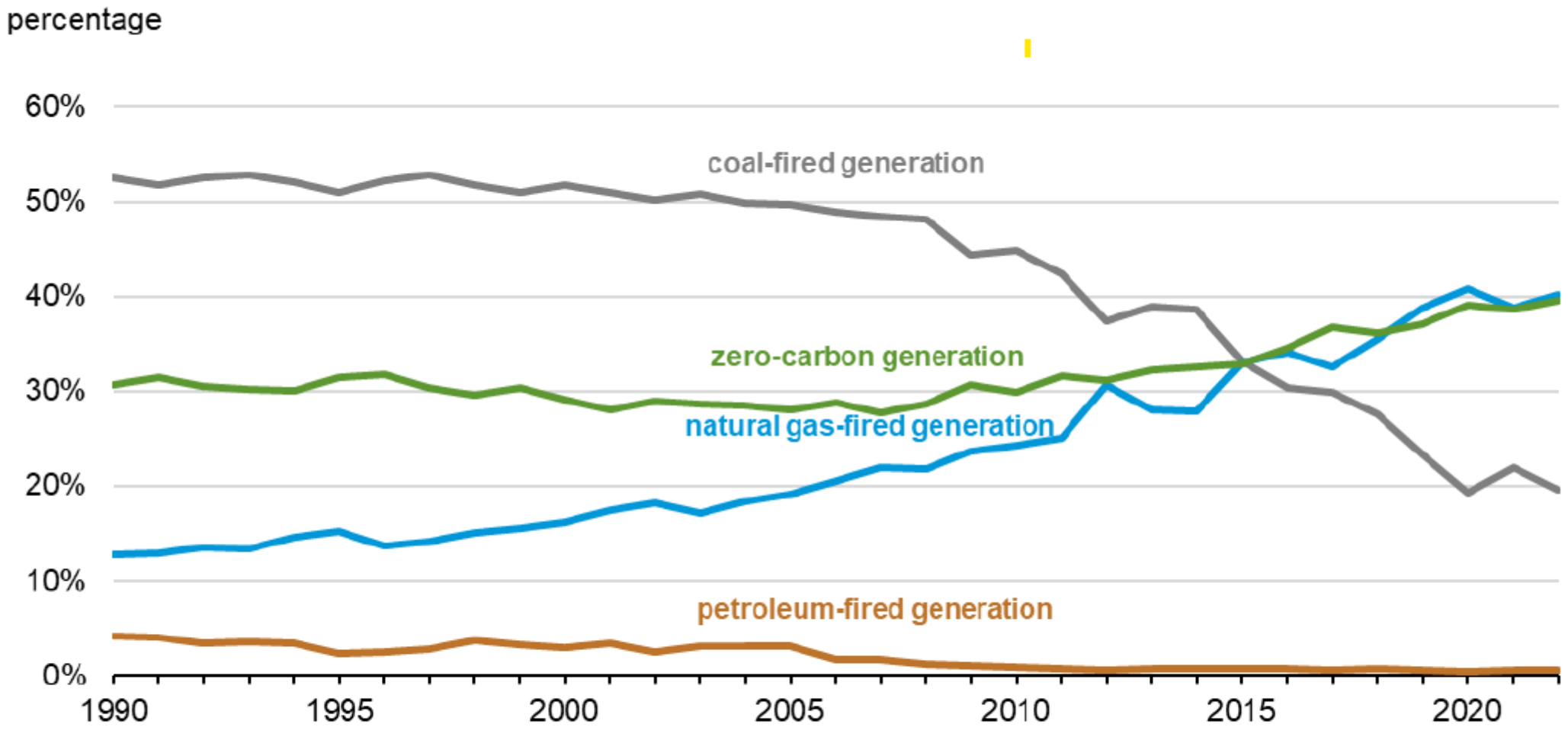
U.S. electricity generation from renewable energy sources, 1950-2022



Data source: U.S. Energy Information Administration, *Monthly Energy Review* and *Electric Power Monthly* , February 2023, preliminary data for 2022

Note: Includes generation from power plants with at least 1 megawatt electric generation capacity. Hydroelectric is conventional hydropower.

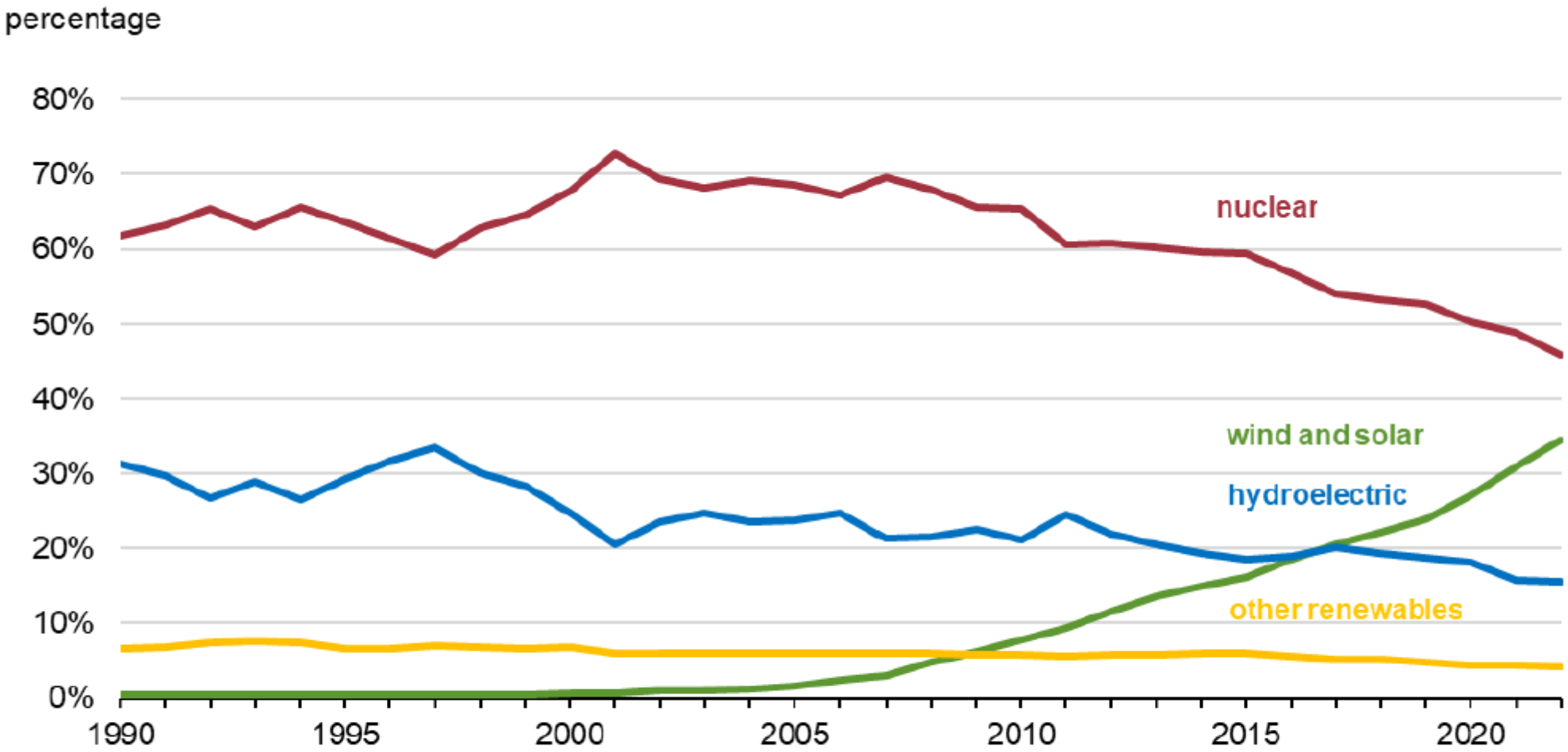
Figure A-5. Annual percentage of electricity generation by source



eia Data source: U.S. Energy Information Administration, *Monthly Energy Review*, October 2023, Table 7.2a Electricity Net Generation Total (All Sectors) and Table 10.6 Solar Electricity Net Generation. Zero-carbon generation does not include generation from distributed or small-scale solar PV.

Source: https://www.eia.gov/environment/emissions/carbon/pdf/2022_Appendix_A_methodology.pdf

Figure A-6. Annual percentage of zero-carbon generation by source



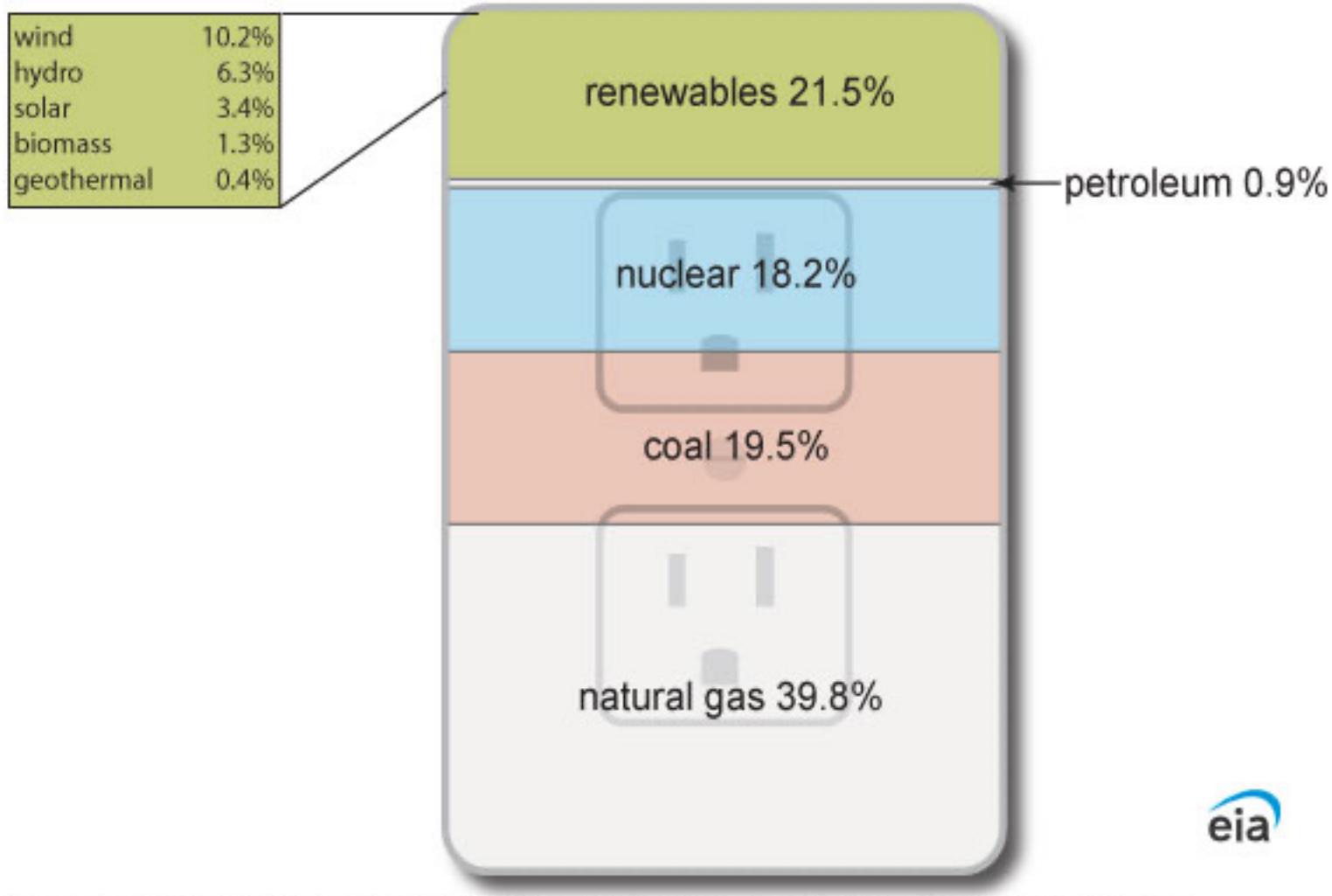
eia

Data source: U.S. Energy Information Administration, *Monthly Energy Review*, October 2023, Table 7.2a Electricity Net Generation: Total (All Sectors) and Table 10.6 Solar Electricity Net Generation.
Note: Wind and solar excludes small-scale solar generation

Source: https://www.eia.gov/environment/emissions/carbon/pdf/2022_Appendix_A_methodology.pdf

Sources of U.S. electricity generation, 2022

Total = 4.24 trillion kilowatthours



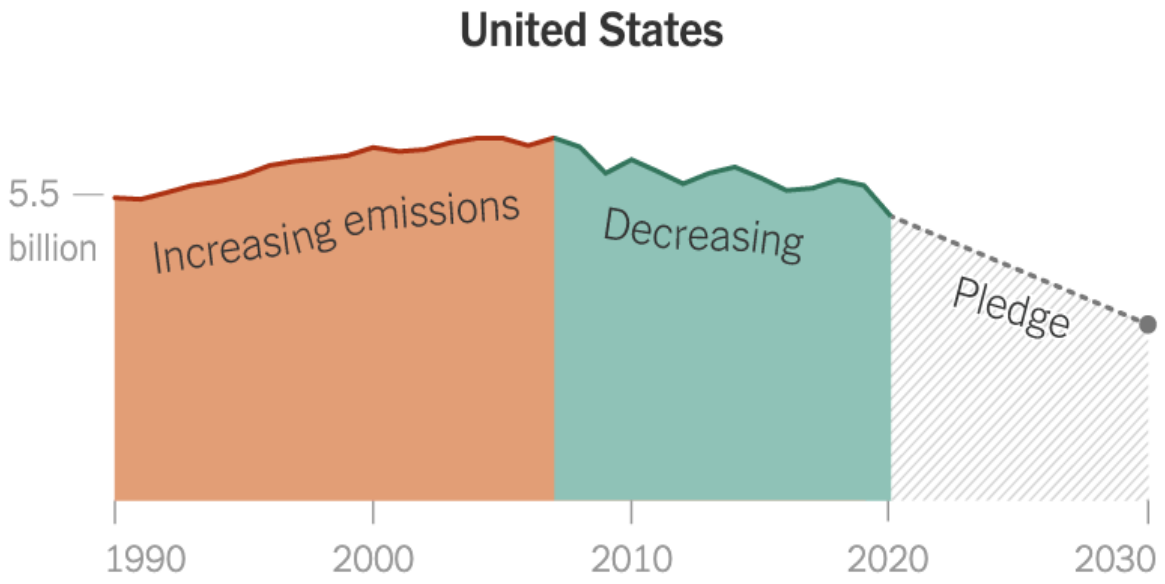
Data source: U.S. Energy Information Administration, *Electric Power Monthly*, February 2023, preliminary data

Note: Includes generation from power plants with at least 1,000 kilowatts of electric generation capacity (utility-scale). Hydro is conventional hydroelectric. Petroleum includes petroleum liquids, petroleum coke, other gases, hydroelectric pumped storage, and other sources.

Federal and State Clean Energy Goals

Biden Administration Goals

- Reduce U.S. emissions 50% from 2005 levels by 2030
- 100% carbon-free electricity by 2035
- Net zero emissions across entire economy by 2050
- 30 GW of offshore wind energy by 2030
- 25 GW of wind, solar, and geothermal energy permitted on public lands by 2025 (Energy Act of 2020, PL 116-260)



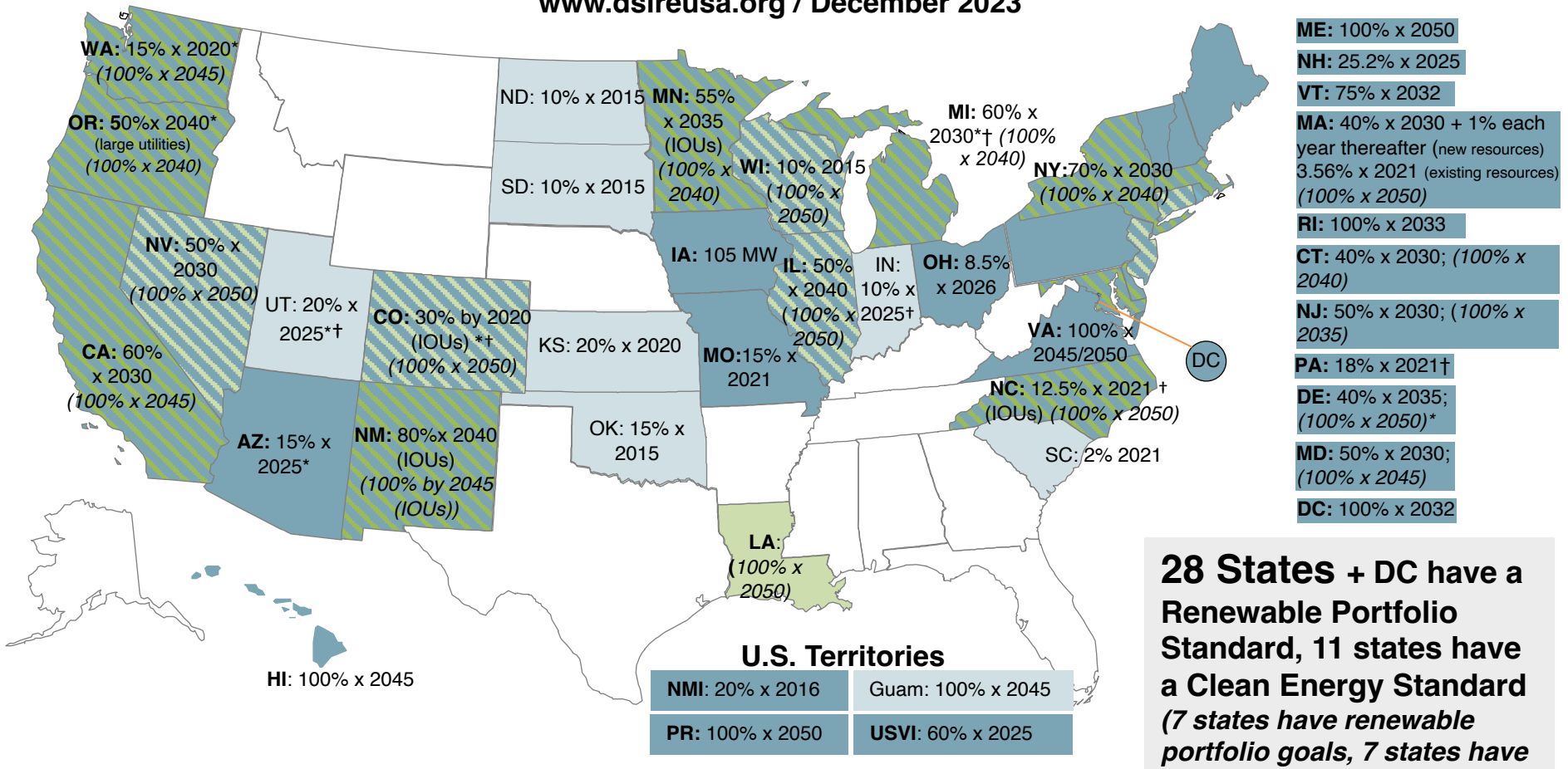
Source: N.Y. Times

Ultimate Goal: Limit global warming to 1.5°C above pre-industrial levels (Paris Agreement)

DSIRE (updated Dec. 2023)

Renewable & Clean Energy Standards

www.dsireusa.org / December 2023



ME: 100% x 2050
NH: 25.2% x 2025
VT: 75% x 2032
MA: 40% x 2030 + 1% each year thereafter (new resources) 3.56% x 2021 (existing resources) *(100% x 2050)*
RI: 100% x 2033
CT: 40% x 2030; *(100% x 2040)*
NJ: 50% x 2030; (*100% x 2035)*
PA: 18% x 2021†
DE: 40% x 2035; *(100% x 2050)**
MD: 50% x 2030; *(100% x 2045)*
DC: 100% x 2032

U.S. Territories

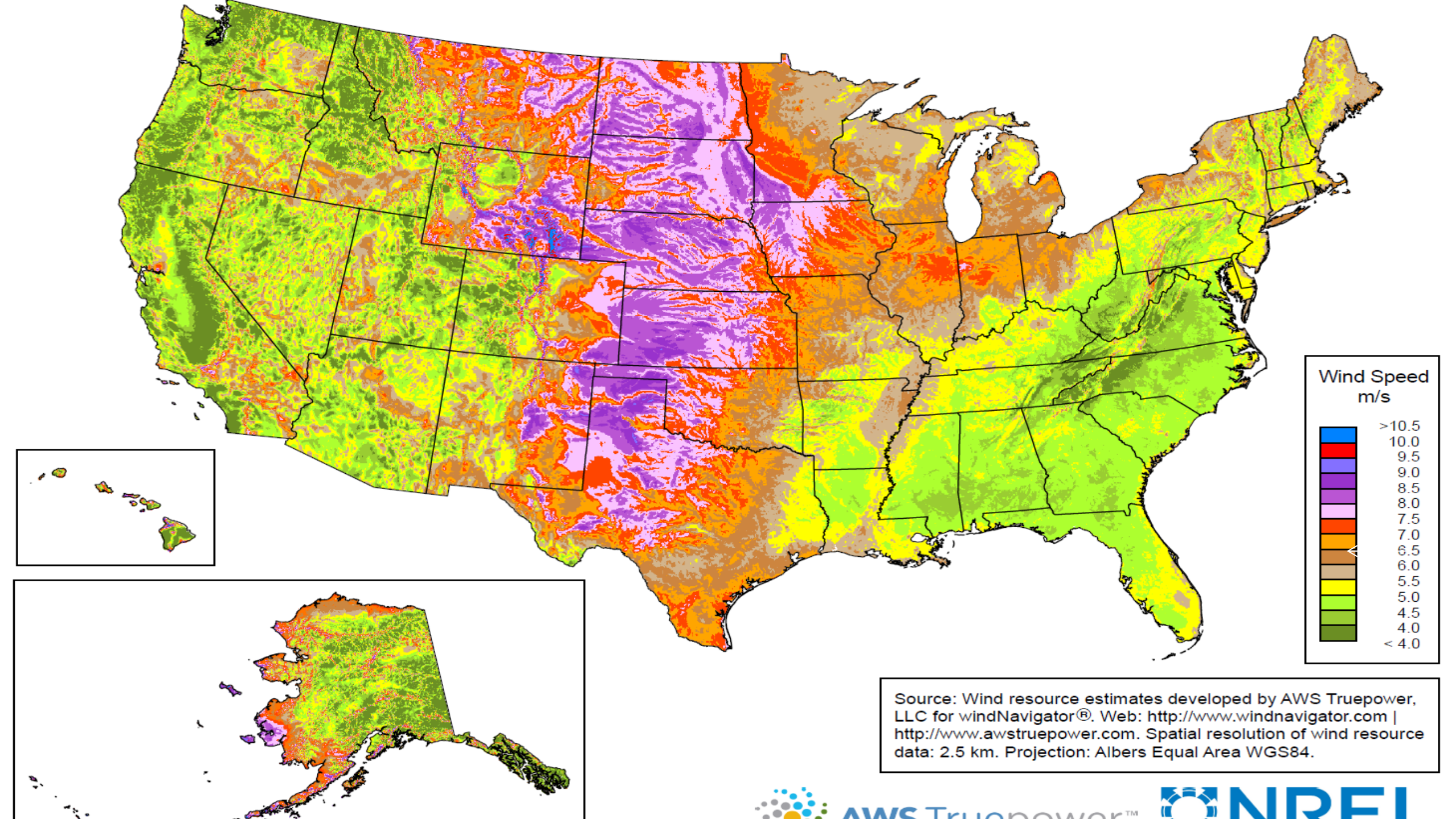
NMI: 20% x 2016	Guam: 100% x 2045
PR: 100% x 2050	**USVI**: 60% x 2025

28 States + DC have a Renewable Portfolio Standard, 11 states have a Clean Energy Standard ***(7 states have renewable portfolio goals, 7 states have clean energy goals)***

Renewable portfolio standard
Renewable portfolio goal
Clean energy standard
Clean energy goal

* Extra credit for solar or customer-sited renewables
† Includes non-renewable alternative resources

Wind and Solar Trends

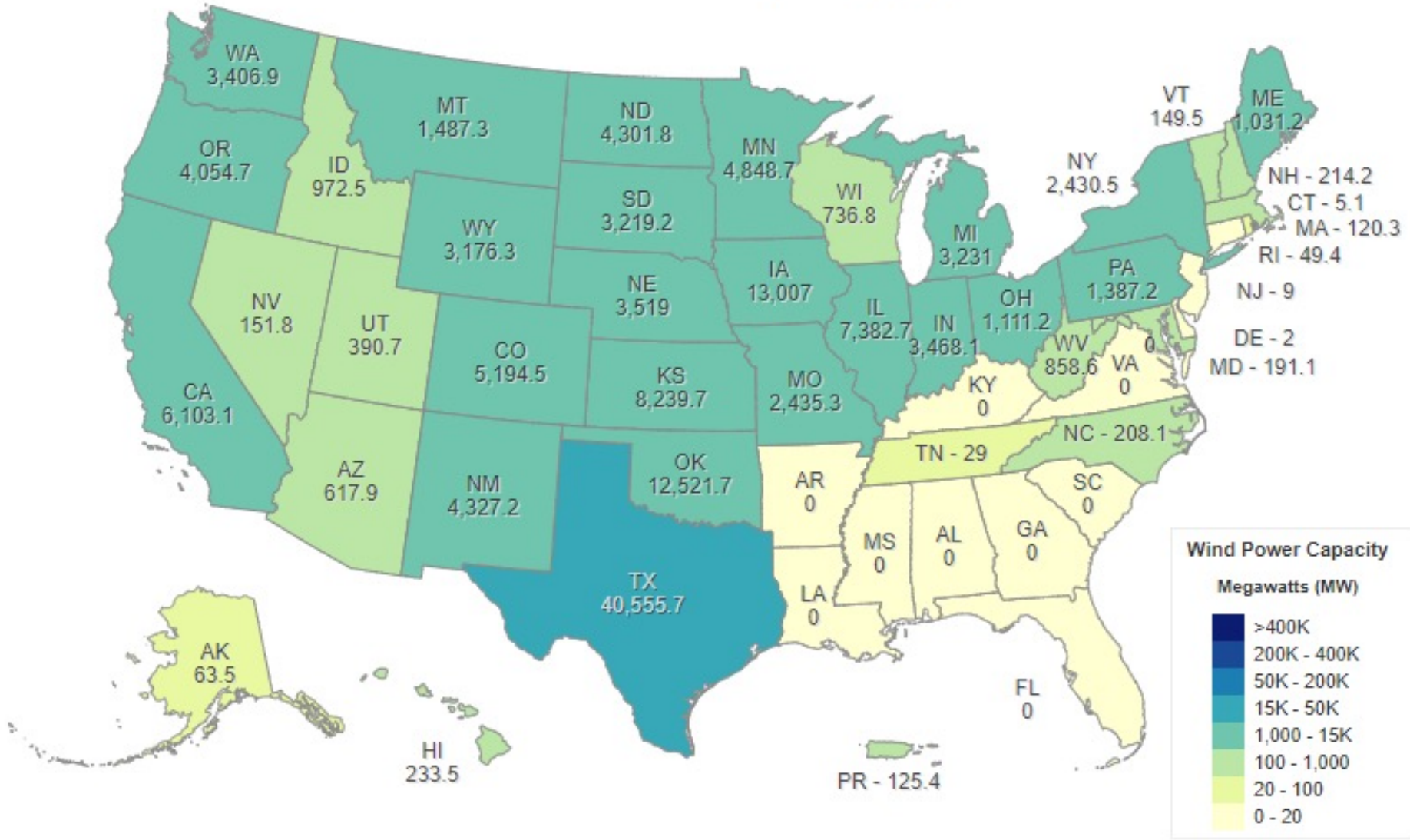


Source: Wind resource estimates developed by AWS Truepower, LLC for windNavigator®. Web: http://www.windnavigator.com | http://www.awstruepower.com. Spatial resolution of wind resource data: 2.5 km. Projection: Albers Equal Area WGS84.

AWS Truepower™

NREL

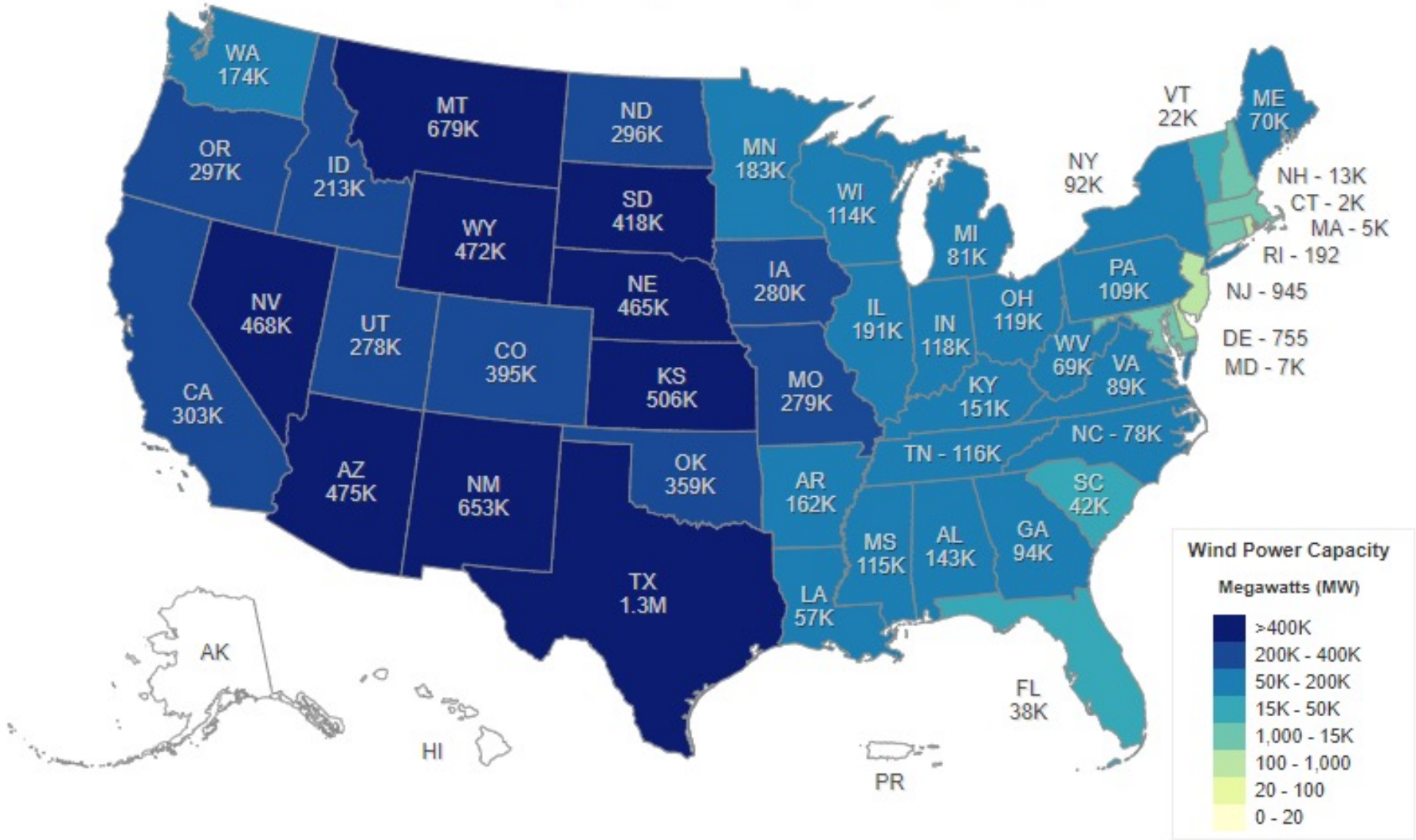
Q1 2023 Installed Capacity by State



Total Installed Wind Capacity: 145,569 MW

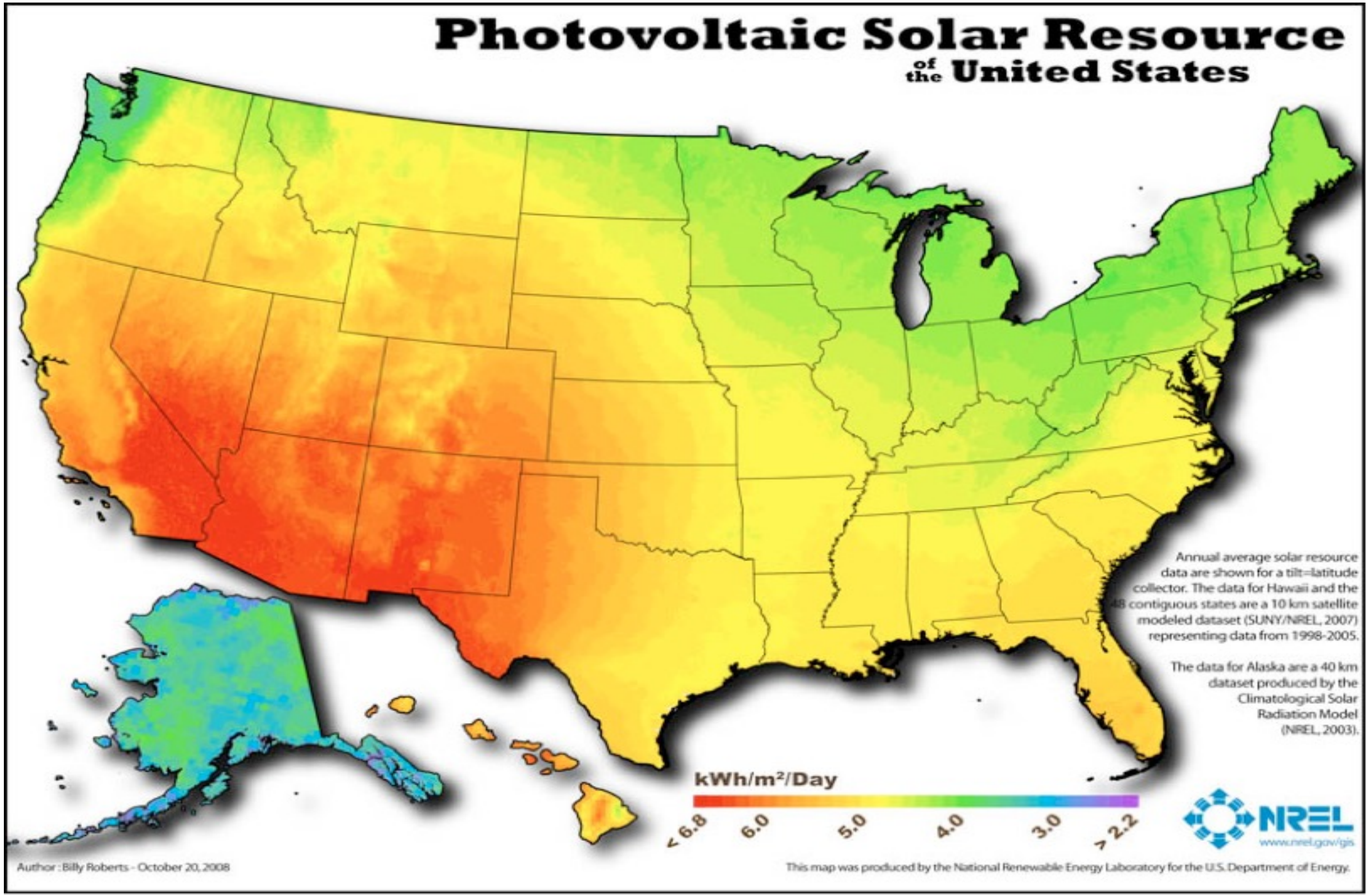
Source: American Clean Power Association

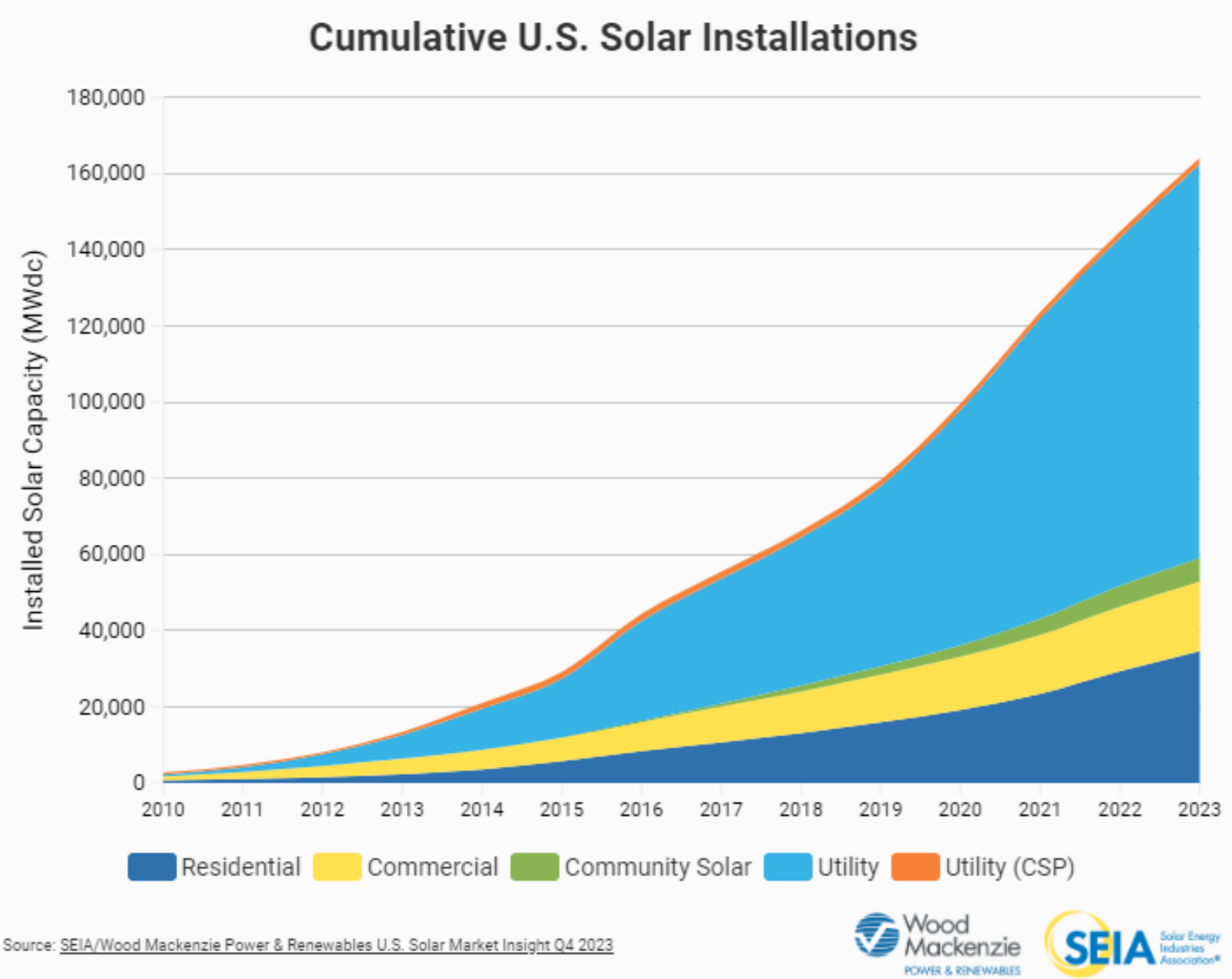
U.S Potential Wind Capacity in Megawatts (MW) at 80 Meters



Total Potential Wind Capacity: 10,640,080 MW

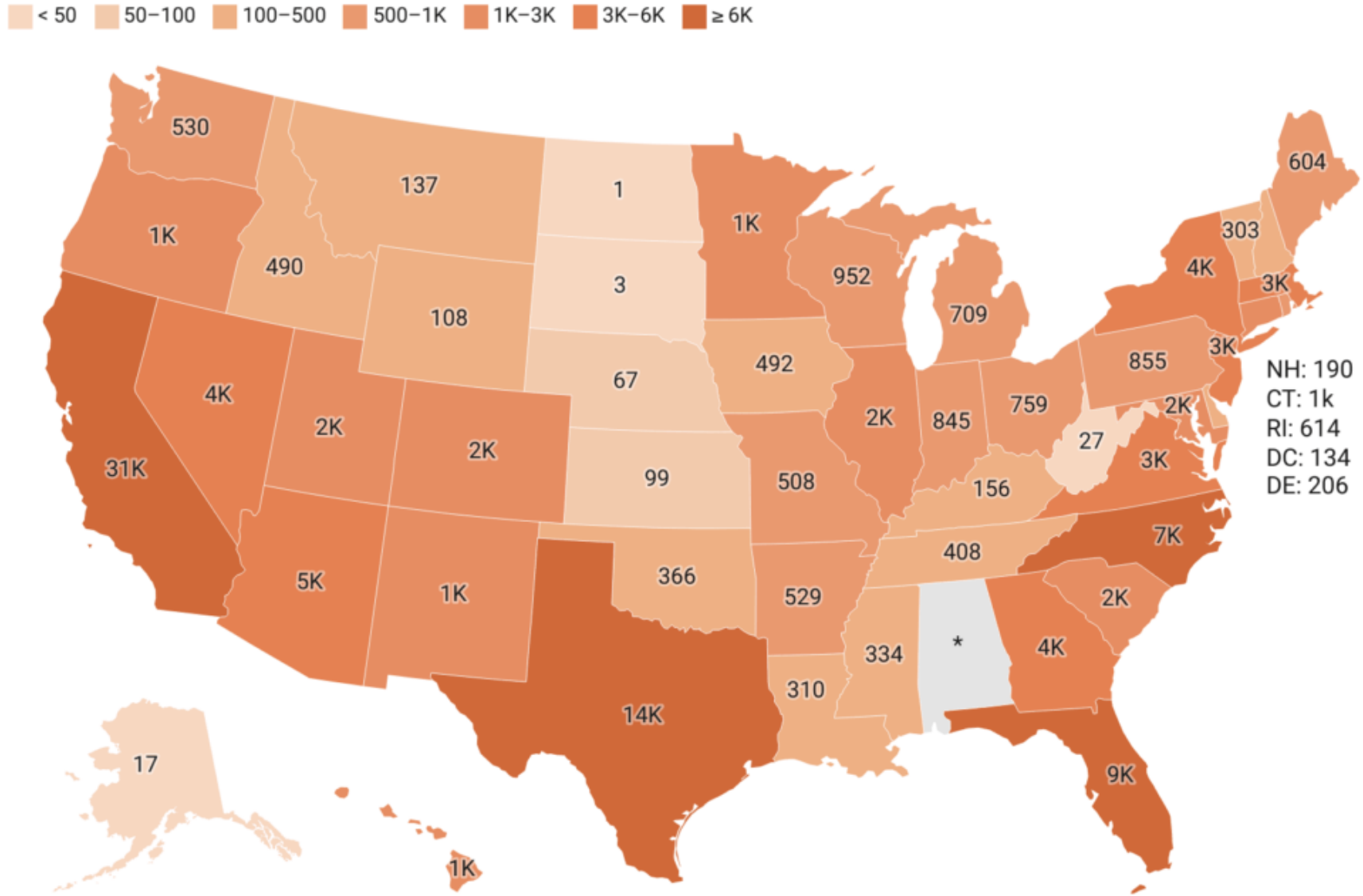
Source: AWS Truepower, NREL


Photovoltaic Solar Resource
of the United States
Annual average solar resource data are shown for a tilt=latitude collector. The data for Hawaii and the 48 contiguous states are a 10 km satellite modeled dataset (SUNY/NREL, 2007) representing data from 1998-2005.
The data for Alaska are a 40 km dataset produced by the Climatological Solar Radiation Model (NREL, 2003).
kWh/m²/Day
< 6.8
6.0
5.0
4.0
3.0
> 2.2
NREL
www.nrel.gov/gis
Author : Billy Roberts - October 20, 2008
This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy.


Cumulative U.S. Solar Installations
Installed Solar Capacity (MWdc)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Residential
Commercial
Community Solar
Utility
Utility (CSP)
Source: SEIA/Wood Mackenzie Power & Renewables U.S. Solar Market Insight Q4 2023
Wood Mackenzie
POWER & RENEWABLES
SEIA
Solar Energy Industries Association®

State Solar Capacity 2022 (All Solar)

Total installed solar generation capacity, including distributed, community, and utility-scale solar.



https://ilsr.org/the-states-of-distributed-solar/

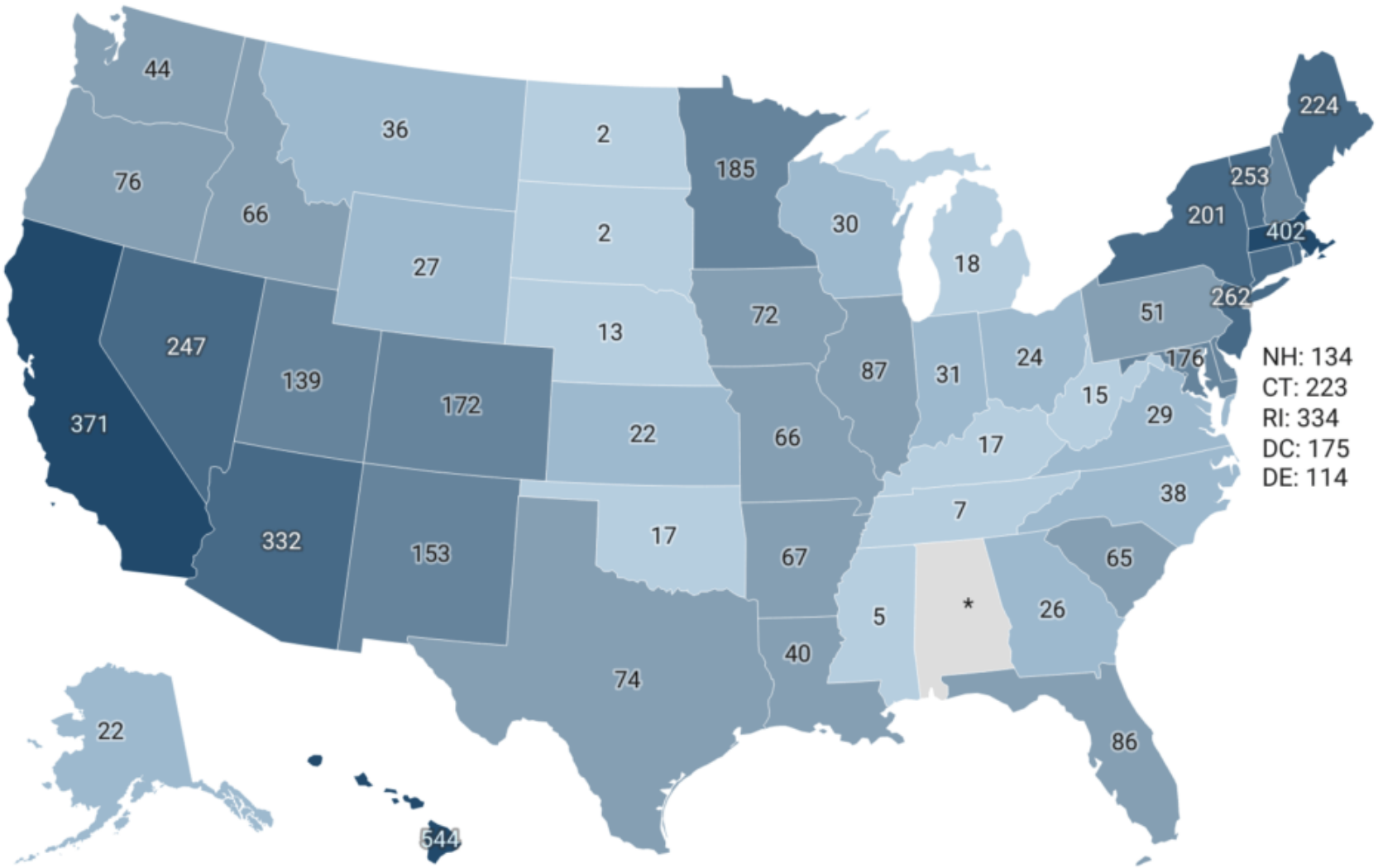
*no reported data for Alabama

Map: State(s) of Distributed Solar – 2022 Update • Source: U.S. EIA and ILSR • Created with Datawrapper

State Distributed Solar Saturation 2022

Distributed solar generation capacity relative to state population

< 20 | 20–40 | 40–100 | 100–200 | 200–350 | ≥ 350



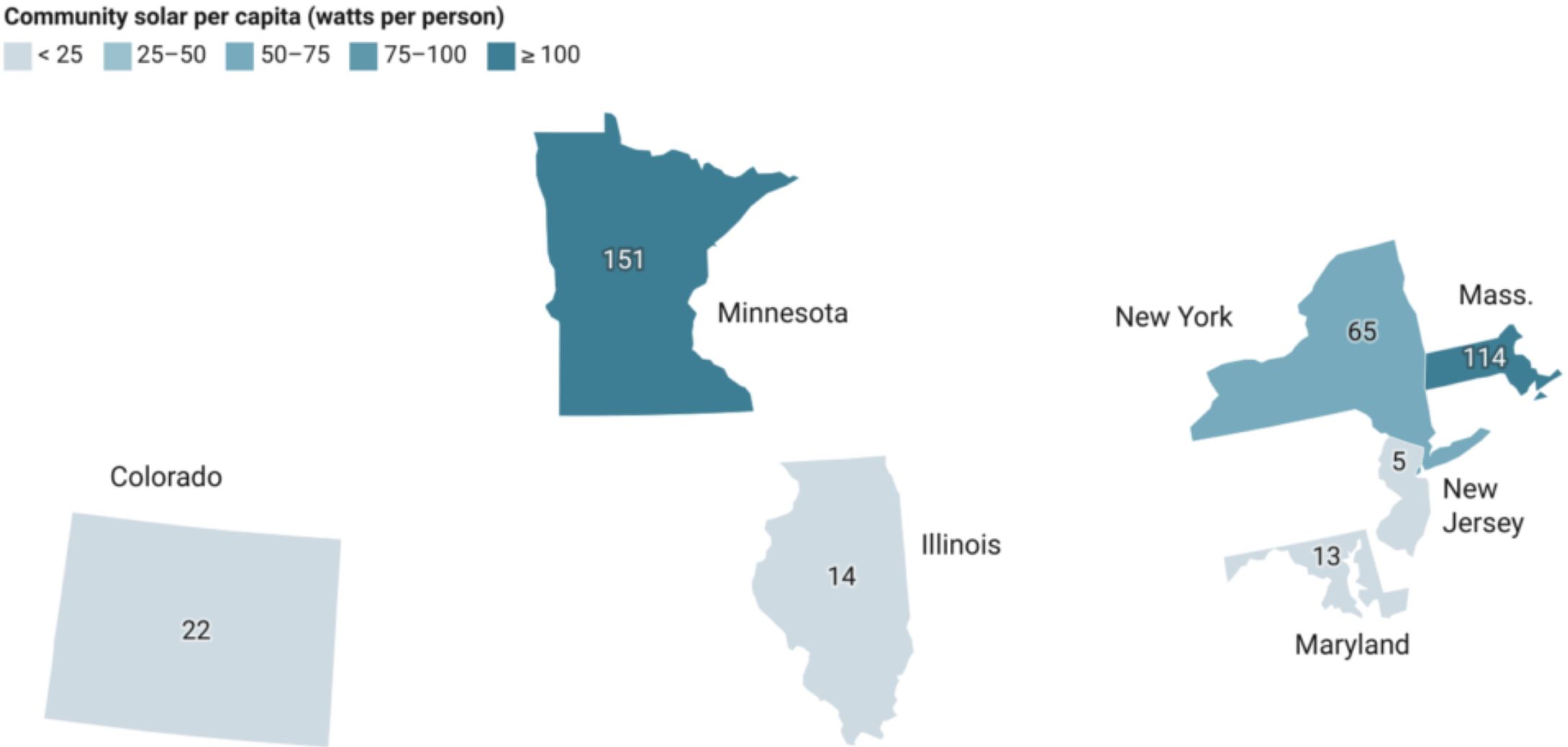
https://ilsr.org/the-states-of-distributed-solar/

*no reported data for Alabama

Map: State(s) of Distributed Solar – 2022 Update • Source: U.S. EIA, U.S. Census Bureau, ILSR • Created with Datawrapper

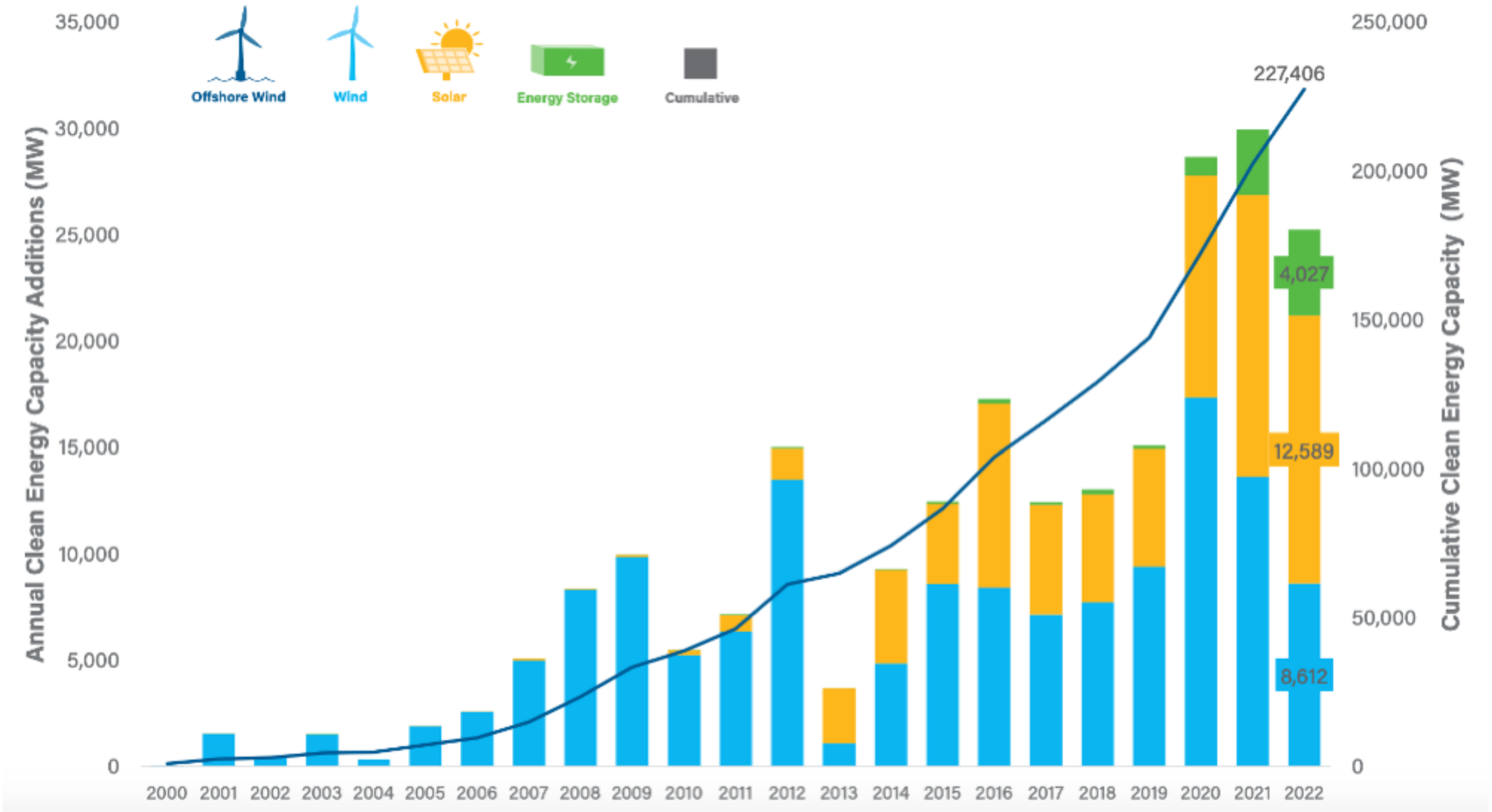
State Community Solar Saturation 2022

Community solar generation capacity relative to state population.



https://ilsr.org/the-states-of-distributed-solar/

Map: State(s) of Distributed Solar – 2022 Update • Source: ILSR • Created with Datawrapper


Offshore Wind
Wind
Solar
Energy Storage
Cumulative
Annual Clean Energy Capacity Additions (MW)
Cumulative Clean Energy Capacity (MW)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
250,000
200,000
150,000
100,000
50,000
0
227,406
4,027
12,589
8,612
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022

What's Needed Next?

How much wind and solar do we need to build to get to 100% clean energy by 2035?

- NREL estimate **four times** the current deployment rates of wind and solar energy
- 946 GW of new solar
- 1,224 GW of new wind
- Continued growth of storage (battery) technology
- Increase of three times existing electric transmission line capacity

How much land will that take?

- "Direct" impacts only: 8.5 million acres of land
  - 0.44% of total U.S. land using highest estimated land use scenarios
- "Indirect" impacts included: 112.7 million acres of land
  - 5.96% of total U.S. land using highest estimated land use scenarios
- Comparisons: See NREL map

Figure 30. Total area occupied by wind turbine and solar infrastructure (solid boxes) is about equal to the land occupied by railroads (ADE demand case).

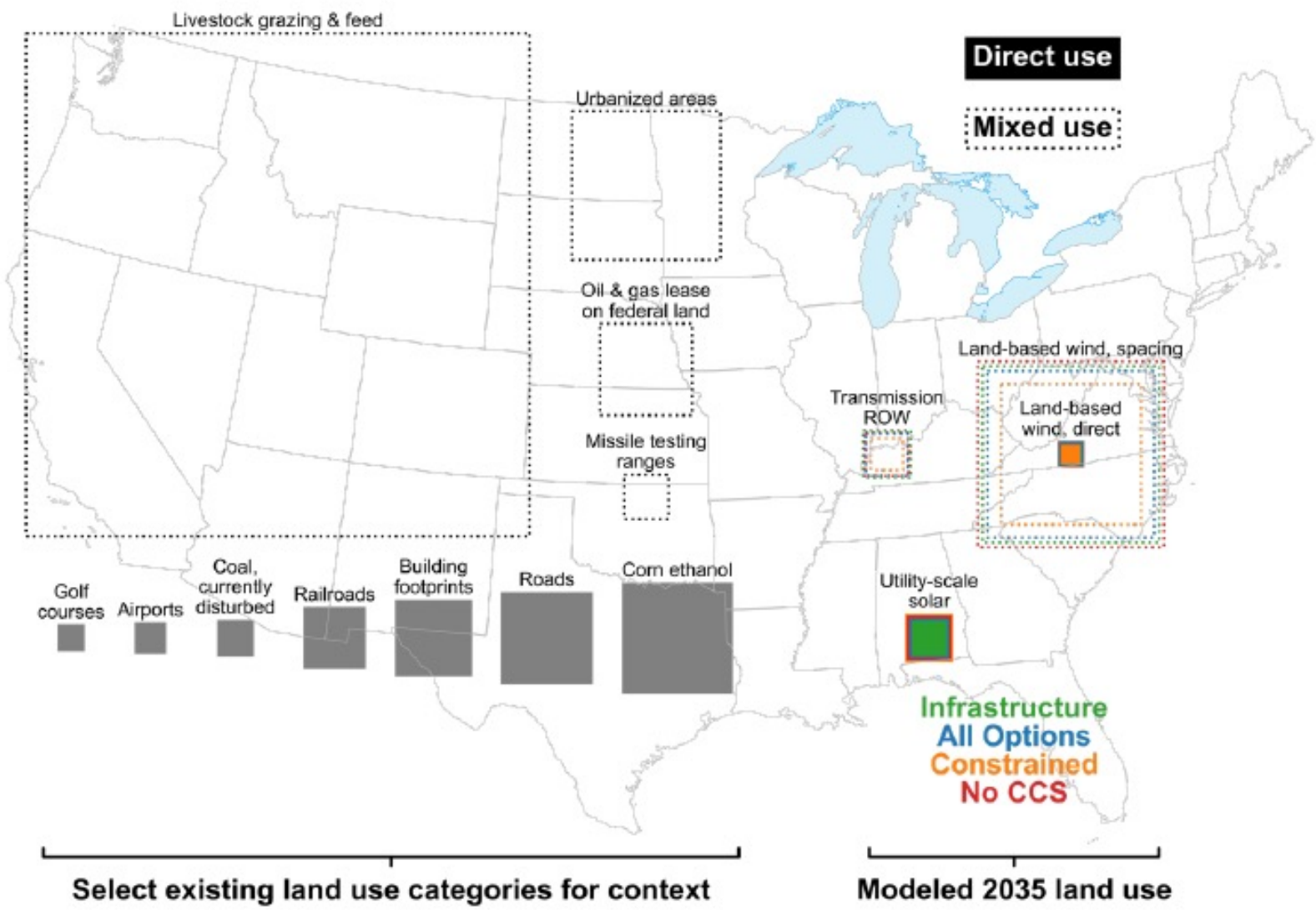


Table 4. Footprint Comparison (ADE Demand Case) (km^2)

	Infrastructure Renaissance	All Options	Constrained	No CCS
Land-based wind	389,000 (spacing) 8,000 (direct)	346,000 (spacing) 7,000 (direct)	247,000 (spacing) 5,000 (direct)	431,000 (spacing) 9,000 (direct)
Utility-scale solar[59]	15,000	20,000	29,000	25,000
Offshore wind	11,000 (spacing)	8,000 (spacing)	11,000 (spacing)	9,000 (spacing)
Interregional transmission rights-of-way (≥500 kV)	28,000	22,000	13,000	24,000

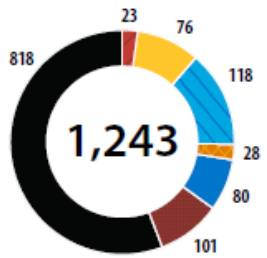
NREL Study Assumptions and Analyses (2023)

- Evaluated four main 100% clean electricity scenarios
  - All scenarios resulted in benefits exceeding costs
  - More certainty at 90% clean energy than 100% clean energy
- Conclusion: “Technologies that are being deployed widely today can provide most U.S. electricity by 2035 in a deeply decarbonized power sector. A 90% clean grid can be achieved at low incremental cost by relying primarily on new wind, solar, storage, advanced transmission, and other technologies already being deployed at scale today.”

2035

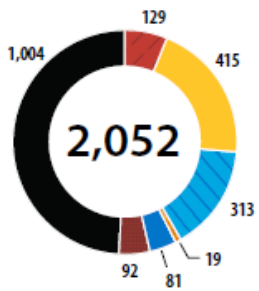
2020

Generation Capacity [GW]



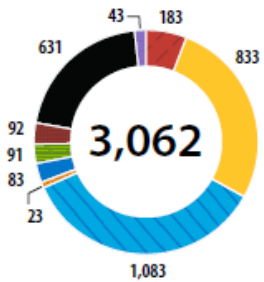
Reference

No new policies but includes accelerated electrification of transportation and end-use demand



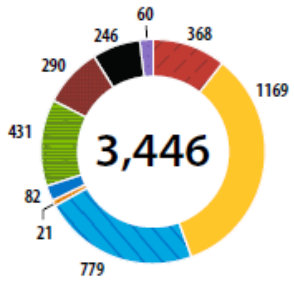
All Options

Cost and performance of all technologies improve, direct air capture becomes cost competitive



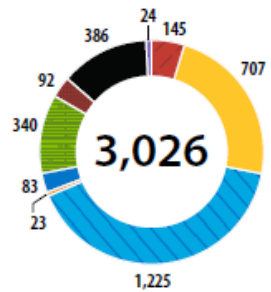
Constrained

Additional constraints limit deployment of new generation capacity and transmission



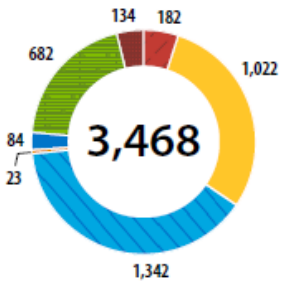
Infrastructure

Transmission technologies improve, new permitting/siting allow greater deployment with higher capacity



No CCS

Carbon capture and storage does not become cost competitive, no fossil fuel generation



Legend
Renewable Energy Sectors

- Storage
- Solar
- Wind
- Biopower, Geothermal, and Imports
- Hydropower
- Hydrogen (Seasonal Storage)
- Nuclear
- Fossil, no CCS
- Fossil and Bio, with CCS

	Reference	All Options	Constrained	Infrastructure	No CCS
Climate Benefit*	$1,190	$1,270	$1,190	$1,260	
Human Health Benefit*	$390	$390	$390	$400	
Additional System Cost*	–$370	–$740	–$330	–$400	
Net Benefits*	**$1,210**	**$920**	**$1,250**	**$1,260**	

*Measured in billions (USD)

Examining Supply-Side Options to Achieve 100% Clean Electricity by 2035, NREL (2022)
Illustration by Nicole Leon, NREL

100% Clean Electricity by 2035 Study

An NREL study shows there are *multiple pathways* to **100% clean electricity by 2035** that would produce significant benefits exceeding the additional power system costs.

Key Findings:

- **Technology deployment must rapidly scale up**
  - 4x the current annual deployment levels for wind and solar
  - Growth of emerging clean energy and storage technologies.
- **Total transmission capacity must grow significantly**
  - Up to 3x today's capacity, or between 1,400 and 10,100 miles of new high-capacity lines per year starting in 2026.
- **The climate and health benefits of decarbonization *offset the costs*, saving:**
  - 130,000 lives and $390–$400 billion in avoided mortality costs
  - $1.2 trillion in avoided damages from climate change
  - $920 billion to $1.2 trillion in overall net benefits to society.

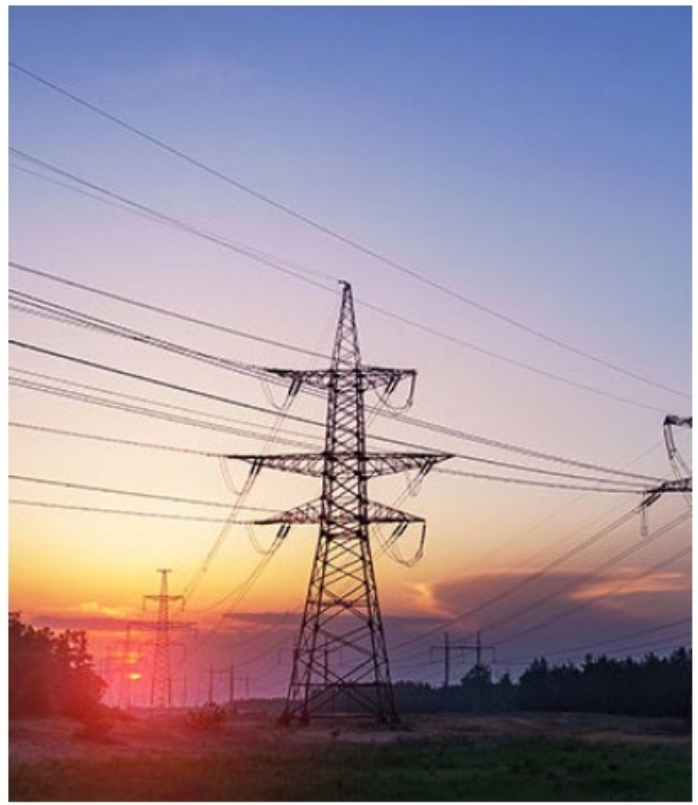


Photo from iStock-1137734382

nrel.gov/analysis/100-percent-clean-electricity-by-2035-study.html

Barriers to New Wind and Solar Projects

Challenges to achieving needed wind and solar buildout

- Finding enough land to build the renewable energy we need to decarbonize
- State and local siting and permitting barriers to new wind and solar plants and interstate transmission lines
- Community opposition to new wind and solar plants
- Funding, incentives, financing
- Environmental justice and energy justice concerns

Categorizing Barriers to Clean Energy Buildout

- Political economic barriers
  - Opposition to clean energy due to politics, distrust of benefits, impacts on open space, aesthetic
- Governance challenges
  - local siting authority over projects with statewide impacts/benefits
- Excess proceduralism
  - Too many permitting requirements/too much process (NIMBY v. YIMBY)
- Environmental and energy justice concerns
  - Potential to burden communities that already host bulk of fossil fuel infrastructure

Climate. Justice. Solutions.

Grist

In Michigan, not-so-sunny prospects for solar farms

Fearful they will lose their small town vibes, some communities say no to solar.

Izzy Ross
Regional Reporter, Great Lakes

Published Oct 02, 2023

ENERGYWIRE

Wind and solar projects stymied by community opposition, zoning and grid issues, DOE lab finds

The survey comes as lawmakers seek a deal to overhaul the nation's energy project permitting rules that could also help ease hurdles for renewable projects.

BY: KELSEY TAMBORRINO | 01/29/2024 06:59 AM EST

They hoped solar panels would secure the future of their farm. Then their neighbors found out

Elizabeth Weise
USA TODAY

Published 5:18 a.m. ET Feb. 4, 2024 | Updated 2:46 p.m. ET Feb. 4, 2024

CLIMATE

States with big climate goals strip local power to block green projects

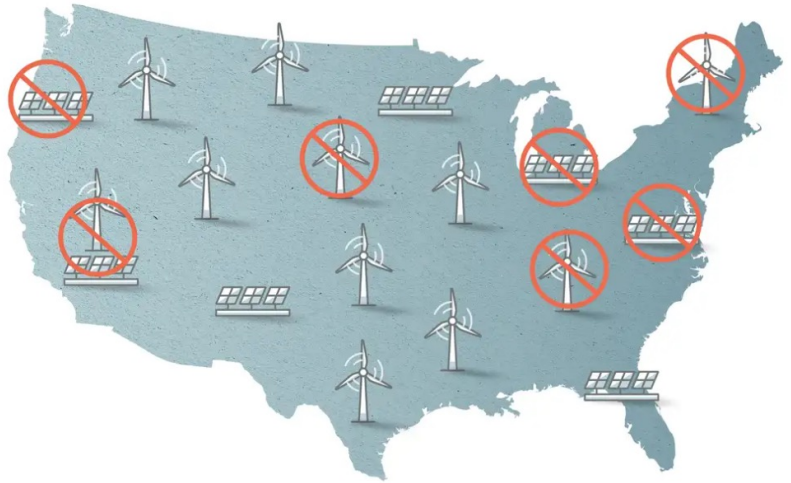
BY JOEY CAPPELLETTI AND JOHN HANNA
Updated 12:12 AM EST, January 14, 2024

Why America Doesn't Build

Even green-energy projects get quashed by local opposition.

By Jerusalem Demsas

The Atlantic



The clock is ticking toward a deadline to meet clean-energy standards. But USA TODAY's analysis finds more local governments are banning clean energy. *Veronica Bravo*

Across America, clean energy plants are being banned faster than they're being built

Elizabeth Weise and Suhail Bhat USA TODAY

Published 5:18 a.m. ET Feb. 4, 2024 | Updated 3:56 p.m. ET Feb. 6, 2024

Potential Solution: Repurposed Energy

Examples of Repurposed Energy

- Closed or abandoned coal mines
- Closing/closed coal plants
- Closed landfills
- Underutilized industrial properties
- Other “brownfields” lands in rural or urban areas
- Marginal farmland

Amazon Announces First Brownfield Renewable Energy Project on Abandoned Coal Mine

COMPANIES / ENERGY TRANSITION

Amazon Announces its First Brownfield Renewable Energy Project on Abandoned Coal Mine

Susan Lahey | November 14, 2023

Amazon announced today that it has invested in 78 new solar and wind energy projects so far this year, including its first brownfield project built on a brownfield, built on a site abandoned due to industrial pollution.

Garrett County, Maryland
https://www.esgtoday.com/amazon-launches-its-first-brownfield-renewable-energy-project-on-abandoned-coal-mine/

A Minnesota utility is turning one of the country's biggest coal plants into a solar farm

Xcel Energy is replacing its massive coal plant in Becker, Minnesota, with a 710-megawatt solar farm, reigniting debate over what society owes rural coal towns struggling amid the energy transition.

The Sherburne County Generating Station, or Sherco, in Becker, Minnesota [Photo: Education Images/Universal Images Group/Getty Images]

https://www.fastcompany.com/91011992/a-minnesota-utility-is-turning-one-of-the-countrys-biggest-coal-plants-into-a-solar-farm

US landfills could host more than 60 GW of solar

Landfill sited solar capacity would nearly double Biden administration goals to grow community solar while increasing total U.S. solar power capacity by about 58%.

NOVEMBER 19, 2021 JOHN FITZGERALD WEAVER

HIGHLIGHTS MARKETS UTILITY SCALE PV UNITED STATES

A Maryland landfill development by BQ Energy Development.

https://www.pv-magazine.com/2021/11/19/us-landfills-could-host-more-than-60-gw-of-solar/

Here's how utility-scale solar farms may just help save the bees

Michelle Lewis | Jan 23 2024 - 11:39 am PT | 20 Comments

Photo: Argonne National Laboratory

A five-year study of solar farms planted with wildflowers and native grasses discovered that native bees showed a 20-fold increase in numbers.

Argonne National Laboratory, Lemont, Illinois
https://electrek.co/2024/01/23/utility-scale-solar-farms-bees/

Doubling up crops with solar farms could increase land-use efficiency by as much as 60%

Weihenstephan-Triesdorf University of Applied Sciences, Germany
https://www.anthropocenemagazine.org/2017/12/doubling-up-crops-with-solar-farms-could-increase-land-use-efficiency-by-as-much-as-60/

Texas
https://iestxsolar.com/resources/solar-power-and-beekeeping/

SolarWise garden in Ramsey, MN
https://www.smithsonianmag.com/innovation/solar-power-and-honey-bees-180964743/

Bolton Bees, St. Paul, MN

TECH

With tech, farms can double up to produce both food and power

Such 'agrivoltaic' ventures find ways to share the sun between crops and solar panels

Agrivoltaic projects bring together farms and solar energy production. Photovoltaic panels can sit atop fields of forage grasses for livestock, such as these sheep.

https://www.snexplores.org/article/agrivoltaic-farm-technology-crops-solar-power

National Renewable Energy Laboratory, or NREL. Golden, Colorado

Bees, sheep, crops: Solar developers tout multiple benefits

Cornell University, Ithaca, NY
https://apnews.com/article/climate-science-business-lifestyle-environment-and-nature-8f388056808946fbc1aa9a4d6bbc812e

Butterflies, bees, sheep, and solar energy production can coexist

EDF Renewables maintains a 23.4 MW agrivoltaic facility that supports local wildlife and agriculture. Since it was installed in 2009, the project pioneered efforts in supporting bees, butterflies, and sheep grazing.

JUNE 7, 2022 RYAN KENNEDY

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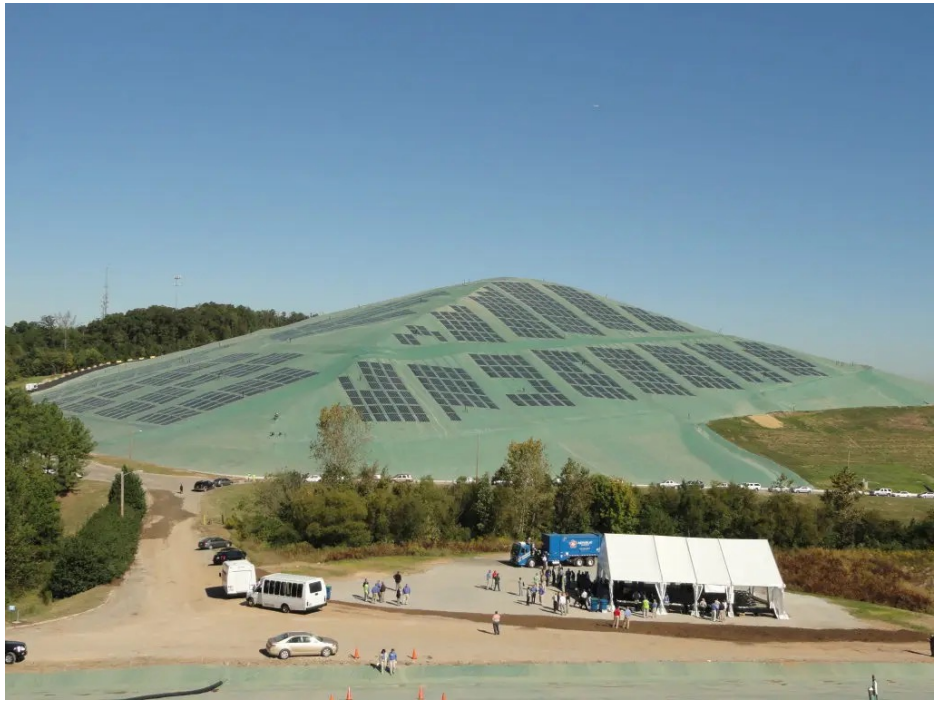
Sheep manage local vegetation at a solar array.

Arnprior solar project in Ottawa, Canada
https://www.pv-magazine.com/2022/06/07/butterflies-bees-sheep-and-solar-energy-production-can-coexist/

The Lackwanna Steel Plant, Buffalo, NY
https://clui.org/projects/old-steel/old-steel-buffalo

The 13-megawatt New Road Solar Project, constructed on a landfill site in New Jersey



Hickory Ridge landfill, outskirts of Atlanta, Georgia.

The largest landfill solar project in North America, a 25.6 megawatt (MW) solar farm in Mount Olive, New Jersey

Wyoming Wind Farm

Wind Farm North of King City, Missouri

The Shiloh wind power plant, Montezuma Hills of Solano County, California, USA

University Of Dayton

Impact and Benefits of “Repurposed Energy”

- Estimated that 11% of total U.S. contiguous land area is “marginal” lands with strong overlap with repurposed energy sites
- Mapping of repurposed energy lands becoming available
- Avoids using “greenfields,” sensitive environmental areas, aesthetically beneficial lands for new renewable energy
- Better balance of urban and rural lands by including urban and rustbelt areas in clean energy transition
- Retired coal plants, closed coal mines, and industrial facilities have good access to transmission lines, interconnections, and roads

Benefits of Repurposed Energy for Communities

- **Benefits of new clean energy projects in general:**
  - Taxes and lease payments
  - Direct provision of wind and solar energy to communities
  - Energy bill savings (N.Y. requirement)
  - Community benefits agreements (MI -- $2,000 per MW of capacity)
- **Additional benefits of repurposed energy projects:**
  - Cleanup of contaminated property
  - reuse of underutilized properties
  - Economic revitalization

Table 1: Policy Tools for Repurposed Energy

Funding	• **Federal, state, and local grants and loans for building on disturbed lands** • **Federal, state, and local clean-up of contaminated sites**
Preemption	• State centralization of siting authority for renewable energy (or repurposed energy only)
Permitting and regulation reforms	• More uniform standards/permits by rule • Offsets for environmental impacts at renewable energy sites • Expedited permitting/clear review and approval or rejection deadlines • "Build-ready" sites
Informational support	• Logistical support—mapping of energy resources and repurposed sites • Legal and permitting navigation and support

Channeling Federal Financial Support for Repurposed Energy Projects (IIJA and IRA)

- **DOE Energy Infrastructure and Reinvestment (EIR) Program:** $250 billion in IRA funding for "the remediation, repurposing and redevelopment" to replace retired energy infrastructure with clean energy infrastructure and fund cleanup costs
- **DOE Energy Improvements in Rural and Remote Areas (ERA):** $1 billion in grants in IIJA
- **DOE Clean Energy on Mine Lands Program:** $500 million in grants in IIJA and IRA for projects on current and former mine lands

Channeling Federal Financial Support for Repurposed Energy Projects (IIJA and IRA) (cont.)

- **Energy Community Tax Credit Bonus:** IRA tax credit bonus for clean energy projects in "energy communities" home to closed coal plants, coal mines, or with employment tied to fossil fuels
- **EPA GHG Reduction Grant Program:** $27 billion for states, tribes, cities to reduce GHG emissions including $7 billion "Solar for All" program
- **USDA Empowering Rural America (New ERA Program):** $9.7 billion to USDA in IRA for grants to rural electric cooperatives for renewable energy and energy efficiency projects/programs

Enhanced State Brownfields Programs

- Many states have brownfields programs to aid redevelopment of contaminated property through financial incentives and CERCLA liability protections ("comfort" letters)
- Create divisions within brownfields programs to target clean energy development on brownfields
  - CT, IL, ME, W. Va (procurement preference for renewable energy on brownfields)
  - MA, MN, NJ, NY (financial incentives through grants and tax credits)

Siting Reforms and Preemption for Repurposed Energy

- Many states have had longstanding statewide siting for renewable energy projects over a certain size (MN, WI, others)
- Other states have created statewide siting authority more recently to meet new clean energy targets (IL, MD, MI, CA, NY)
- Significant local government and rural opposition to state preemption of local authority
- For states without statewide siting of renewable energy projects, consider statewide siting only for repurposed energy projects as a pilot

Streamlined Permitting for Repurposed Energy

- Create time limits (6 months) for granting a permit for projects on repurposed energy sites (e.g., NY)
- Create statewide standards for siting, design, construction, operations (e.g., NY)
- “permits by rule” for renewable energy projects: expedited permits in exchange for agreement to operation and construction conditions (e.g., VA)
- “build-ready” sites offered by state when cleanup of site complete (NY, MA)
- Local governments can create streamlined permitting for projects built on repurposed energy sites

Informational Support and Planning Tools for Repurposed Energy

- DOE Geospatial Energy Mapper for clean energy siting
- EPA's RE-Powering America's Land initiative and mapping tool
  - Has identified "enough mine lands, brownfields, and landfills to build half the solar capacity needed for net-zero GHG emission by 2050"
  - To date, 502 renewable energy facilities on brownfields in 47 states, representing 2.4 GW of capacity
- PA, KY, CO, WY have mapped known abandoned mine lands for energy developers with multiple data layers
- IL and others have completed targeted brownfields assessments for renewable energy projects

Promoting Environmental/Energy Justice

- Work with communities to identify available land in need of cleanup and/or re-development
- IIJA/IRA funding for projects in disadvantaged communities and on brownfields
- IIJA funding requires developers to work with communities on community benefits plans
- State/local requirements (e.g., NY) that require direct energy bill assistance and other community investment

Building Narratives: Centering Repurposed Energy in the Clean Energy Transition

- Narratives for all Clean Energy Projects
  - Creating community and cultural support and pride for renewable energy projects like the coal, oil, and gas industries have done for decades
  - Build excitement and hope around new technologies and innovation rather than despair over climate change
  - Museums, learning centers, tours of projects
- Narratives for Repurposed Energy Projects
  - Illustrates benefits of change: reduction of fossil fuel and contamination-related harms tied directly with new clean energy

Table 2: Recommendations for a Comprehensive Repurposed Energy Regime

Regulatory/permitting	• **See Table 1 (streamlined and expedited permitting, offsets, information support; preemption if needed)**
More ambitious permitting/regulatory reform	• States: establish separate clean energy permitting divisions within state brownfields offices • Congress: grant DOE permitting authority for renewable energy on repurposed sites • FERC: Require priority for repurposed energy projects in regional interconnection queues
Communication	• Track and publicize repurposed energy success stories through community-driven communications plans • Create clean energy funding and outreach programs to inform communities of the specific benefits (monetized) that will flow from projects and over what time period • Hire and support community clean energy coordinators
Benefits to communities	• Require community benefits or ensure that tax benefits from renewable energy flow to host communities and directly to residents through energy bill credits