



SEVEN PRINCIPLES OF

SOUND **ENERGY** POLICY

Is more wind and solar a solid energy plan for Michigan?

Jason Hayes, Director Environmental Policy



MACKINAC CENTER
FOR PUBLIC POLICY



ONE.

Energy is an essential aspect of human flourishing

Confusion reigns on energy requirements...



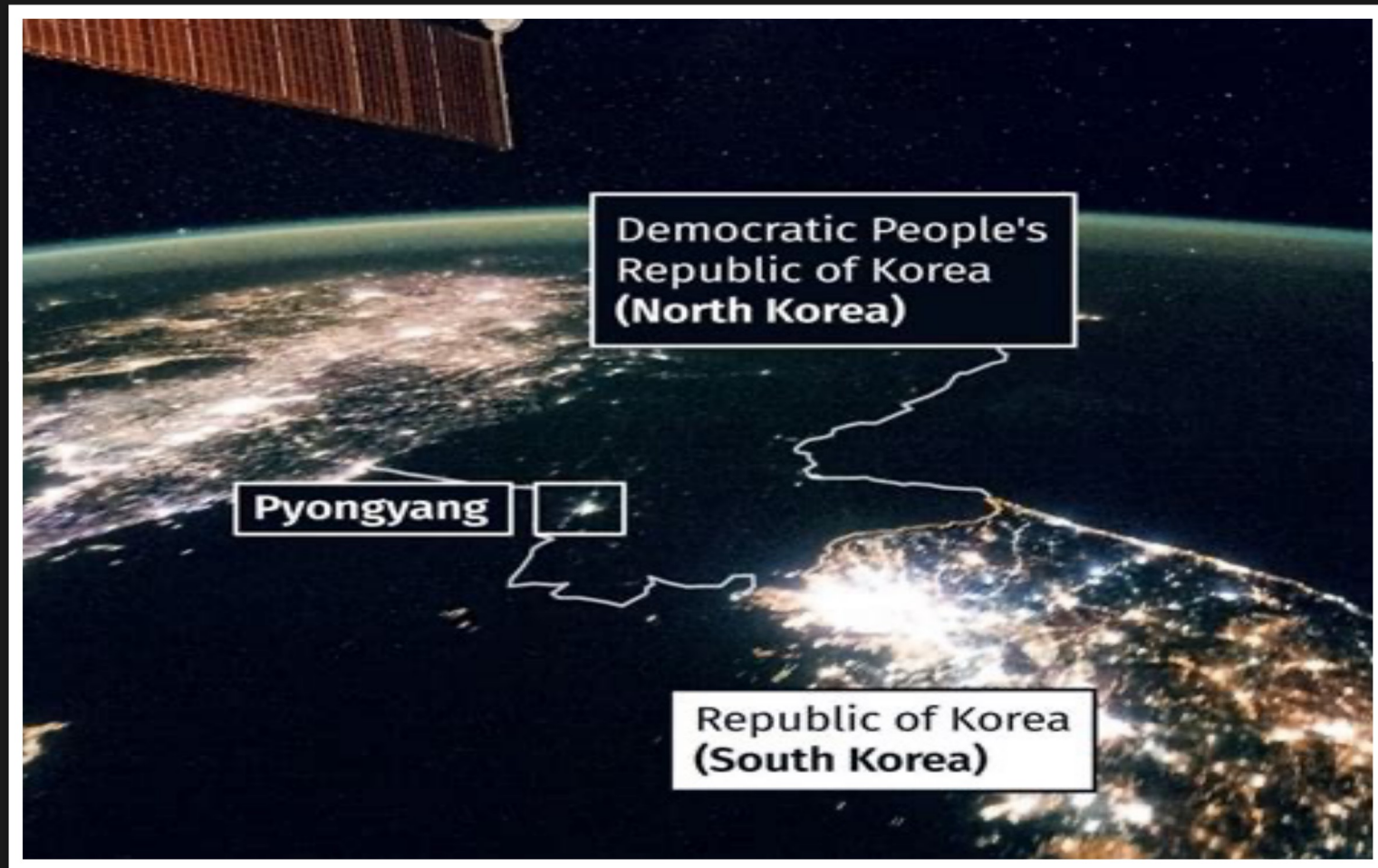
ENERGY IS ESSENTIAL

Direct link to

- Quality of life
- Economic prosperity
- Environmental health



One way to make it simple...



ENERGY IS ESSENTIAL

Michigan's push to limit reliable, affordable sources of energy is driving costs higher and harming reliable service

- MI Healthy Climate Plan
- SB 271-277
- HB 4759 - 4761





MATTER
of FACT

Jim Robb

PRES. AND CEO, NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION (NERC)

“The disorderly retirement of older generation is happening too quickly.

Electric sector...needs to find ways to balance reliability, affordability, and environmental impact.”

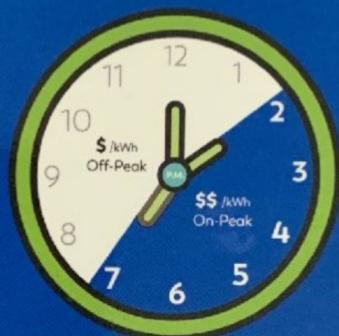
Jim Robb, CEO of NERC



TWO.

All energy sources have an environmental impact.

Summer Peak Rate



Reduce Energy Use

2 - 7 p.m. Weekdays

June 1 - Sept. 30

ConsumersEnergy.com/summerrate

Consumers Energy

Count on Us®

NEWS

Consumers Energy starting program that raises rates, **helps the environment**

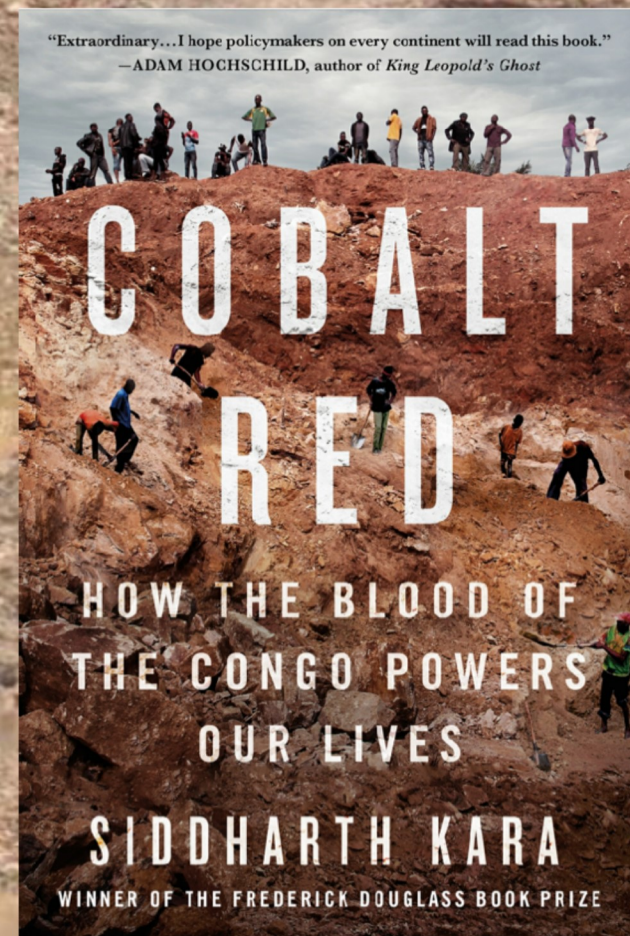
Starting June 1, they will be charging 1.5x's the normal rate for electricity during specific hours.



Credit: Adobe Stock

All forms of energy have an impact





All forms of energy have an impact

Joshua Tree & Yucca plants being cleared for solar facilities



AROUND THE COUNTY

JOSHUA TREE CONCERNS

NEIGHBORS UPSET OVER TREES GETTING CHOPPED DOWN

23abc
KERO-BAKERSFIELD

23abc
KERO-BAKERSFIELD

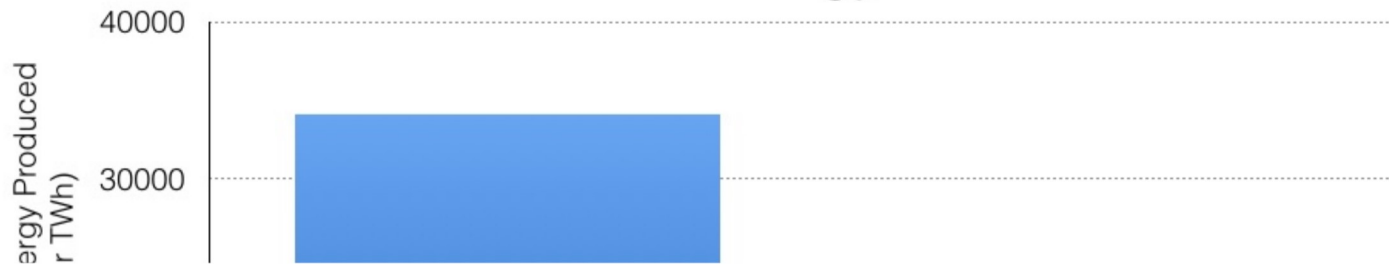
6:15

56°

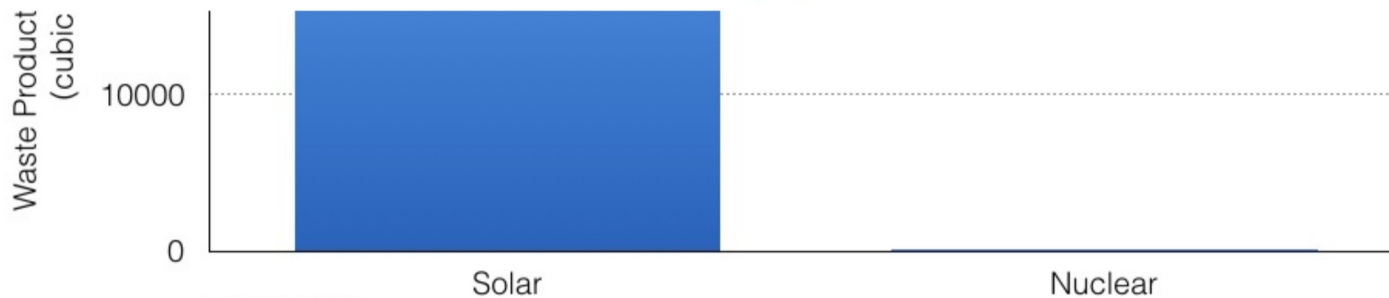
23abc

All forms of energy have an impact

Solar panels produce ~300x more waste than nuclear reactors when providing the same amount of energy.



All forms of energy have an impact



Sources and Notes:

US GAO, http://www.gao.gov/key_issues/disposal_of_highlevel_nuclear_waste/issue_summary

World Nuclear Association, <http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-waste-management.aspx>

<http://www.world-nuclear.org/information-library/facts-and-figures/world-nuclear-power-reactors-archive/reactor-archive-december-2015.aspx>

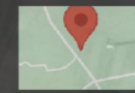
IAEA, <https://www.iaea.org/PRIS/home.aspx>

BP, <http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>

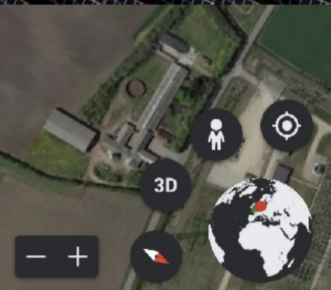
Solar panels specifications vary. Panel specifications were standardized according to TrinaSolar's Duomax Dual Glass 60-Cell Module:

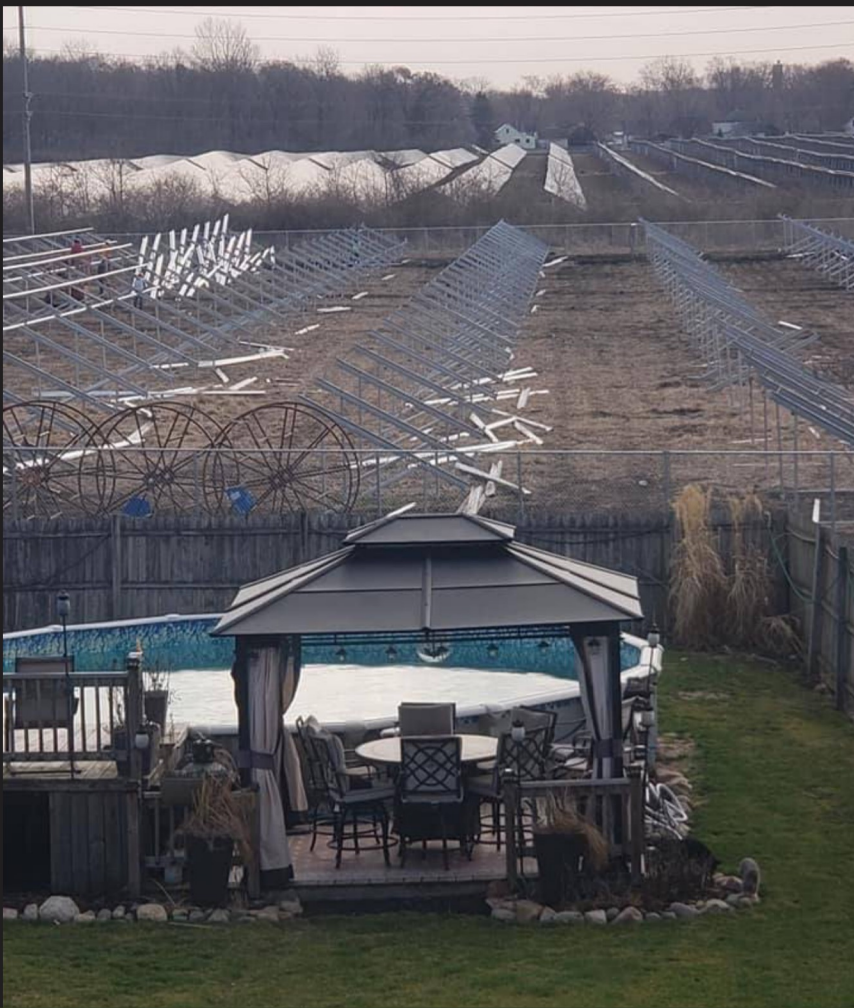
http://static.trinasolar.com/sites/default/files/PS-M-0474%20A%20Datasheet_Duomax_PEG5.XX_US_Feb_2017_A.pdf

Solar ...
eating
farmland
up in
Denmark



Hjolderup
6392 Hjolderup, Denm...
55.02°N, 9.25°E





Clean, green, low-impact, and
coming to your back yard



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MADDIE STONE

SCIENCE AUG 22, 2020 8:00 AM

Solar Panels Are Starting to Die, Leaving Behind Toxic Trash

Photovoltaic panels are a boon for clean energy but are tricky to recycle. As the oldest ones expire, get ready for a solar e-waste glut.



PHOTOGRAPH: RICHARD NEWSTEAD/GETTY IMAGES

By 2050 up to 78 million metric tons of solar panels will have reached the end of their life

World will generate 6 million metric tons of new solar e-waste annually

— International Renewable Energy Agency

All forms of energy have an impact

The New York Times

Chinese Solar Companies Tied to Use of Forced Labor

A new report shows some of the world's biggest solar companies work with the Chinese government to absorb workers from Xinjiang, programs that are often seen as a red flag for forced labor.



NUMBERS DON'T LIE_BY VACLAV SMIL



**WHAT I SEE WHEN I SEE
A WIND TURBINE**

Wind turbines are ... “the pure embodiments of fossil fuels.”

— Vaclav Smil

Require

- Trucks, cranes & earth moving equipment (diesel)
- Railways / cargo ships (diesel)
- 5 MW turbine uses 900 metric tons of cement, steel, & plastic
- Turbine blades made of
 - Balsa / foam core & outer laminations - fiber glass / epoxy
 - Water proofing - ethylene base
 - Lubricants - gear oil

“Fundamentally dependent on fossil fuels.”

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Source: VaclavSmil.com

All forms of energy have an impact





THE UNITED STATES
DEPARTMENT *of* JUSTICE

ESI further acknowledged that at least 150 bald and golden eagles have died in total since 2012, across 50 of its 154 wind energy facilities. 136 of those deaths have been affirmatively determined to be attributable to the eagle being struck by a wind turbine blade.

ESI also must over the next 36 months apply for permits for any unavoidable take of eagles at each of 50 of its facilities where take is documented or, in the case of four facilities not yet operational, predicted.

ESI Energy LLC, Wholly Owned Subsidiary of Nextera Energy Resources LLC, is Sentenced After Pleading Guilty to Killing and Wounding Eagles in Its Wind Energy Operations, in Violation of the Migratory Bird Treaty Act

U.S. ▸

Ninth whale death renews calls in New Jersey to halt offshore wind projects

BY CARA TABACHNICK

FEBRUARY 14, 2023 / 8:48 PM / CBS NEWS



“There are no solutions. There are only tradeoffs...

Thomas Sowell, “A Conflict of Visions”



THREE.

In energy production, scale is king.

Need >1,400 wind turbines to = capacity of
Palisades Nuclear Plant (811MW)

Michigan has just over 1,500 wind turbines



Source: Palisades Nuclear Power Plant - Entergy

Blades from a few hundred wind turbines buried in a Wyoming landfill.

USGS reports that we have built 3,000 annually since 2005



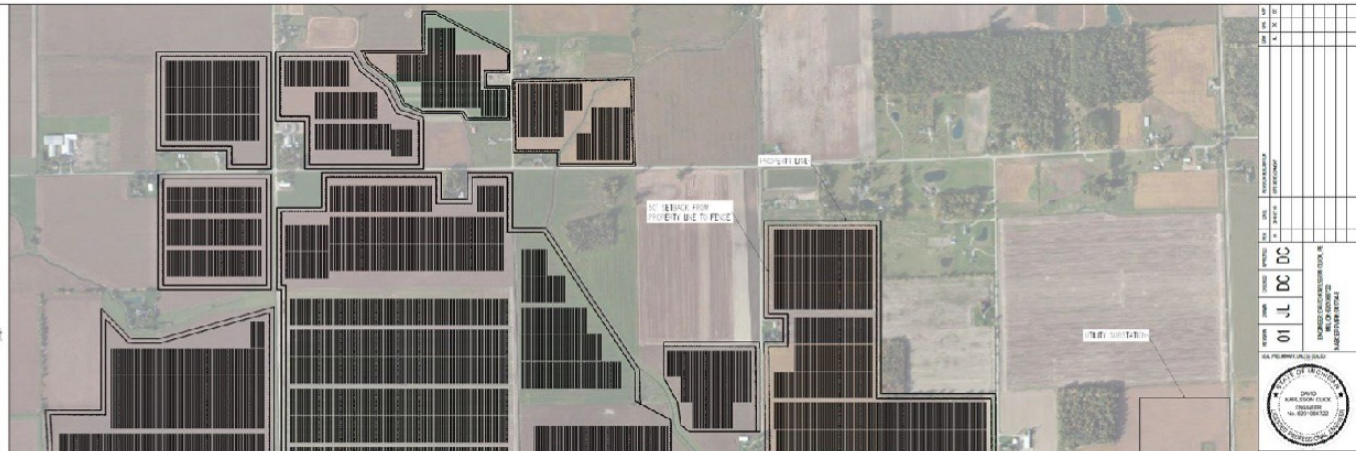
PV SYSTEM

PV Array

1. Number of PV Modules: 400,000+
2. Peak Power: 200+ MWdc
3. Solar Module Tilt: Single Axis Tracker
4. Solar Module Orientation: South (Az. 180°)
5. Proposed Leased Area: 1200-1600+ Acres

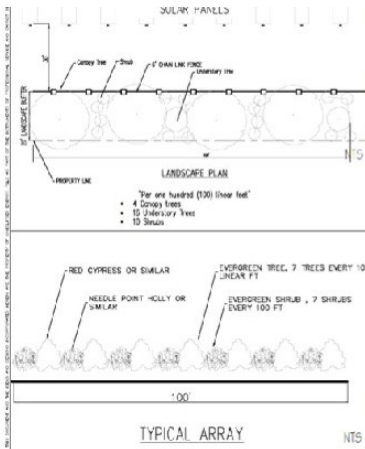
Project notes:

1. The site plan will incorporate reasonable and appropriate screening/ buffering / landscaping activities to shield the project from observation from adjoining and adjacent parcels. We would use strategically placed trees, vegetation, and other screening techniques / activities to meet this objective.
2. Setbacks from all property lines will be 50'



Plans for solar to cover some of Michigan's most productive farm land with solar panels

Source: IICC



| | |
|--------------|------------------------------|
| PROJECT NAME | Carroll Road Solar Farm, LLC |
| OWNER | Carroll Road Solar Farm, LLC |
| DESIGNER | ESS S |
| DATE | 12/15/2015 |
| SHEET NO. | G-202 |
| SHEET TITLE | SITE PLAN/MASTER |



FOUR.

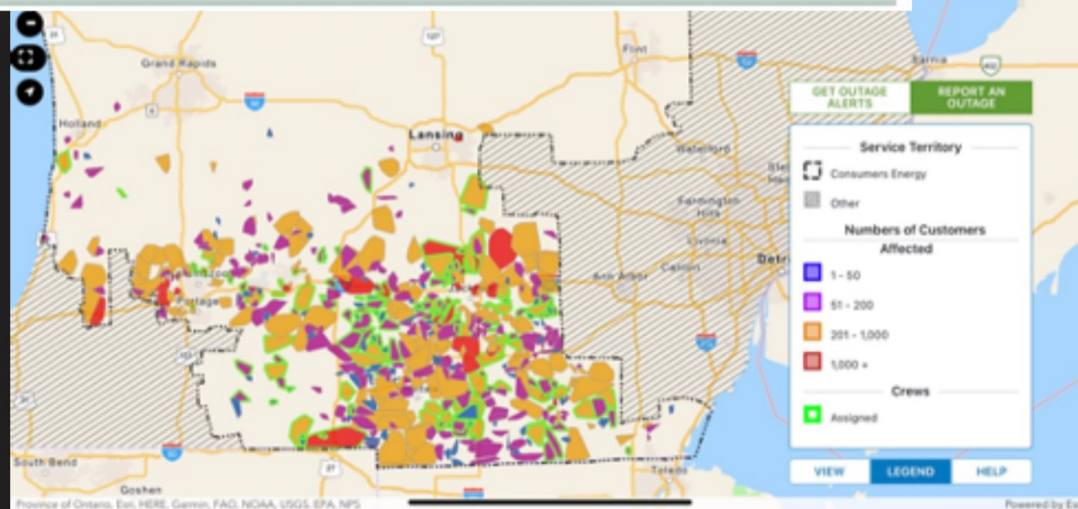
Energy must be reliable to be truly effective.

TRENDING: [Coronavirus Michigan](#) | [MSU shooting 2023](#) | [Gov. Gretchen Whitmer](#) | [Michigan colleges and universities](#) | [Michigan K-12 schools](#)

Quality of Life

Michigan has far more power outages this week than other Midwest states

>900,000 MI homes lost power during February ice storms.



OPINION | COMMENTARY | CROSS COUNTRY

Why Electricity Blackouts Are Coming to Michigan

The shutdown of a nuclear power plant makes the state vulnerable to cloudy, windless days.

By Jason Hayes

May 27, 2022 5:57 pm ET



SAVE



SHARE



TEXT

373



The Palisades nuclear power plant in Covert Township, Mich., June 24, 2010.

Palisades produced more electricity in 2021 than all of Michigan's wind & solar together



Source: Palisades Nuclear Power Plant - Entergy

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NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Announcement

Two-thirds of North America Faces Reliability Challenges
in the Event of Widespread Heatwaves

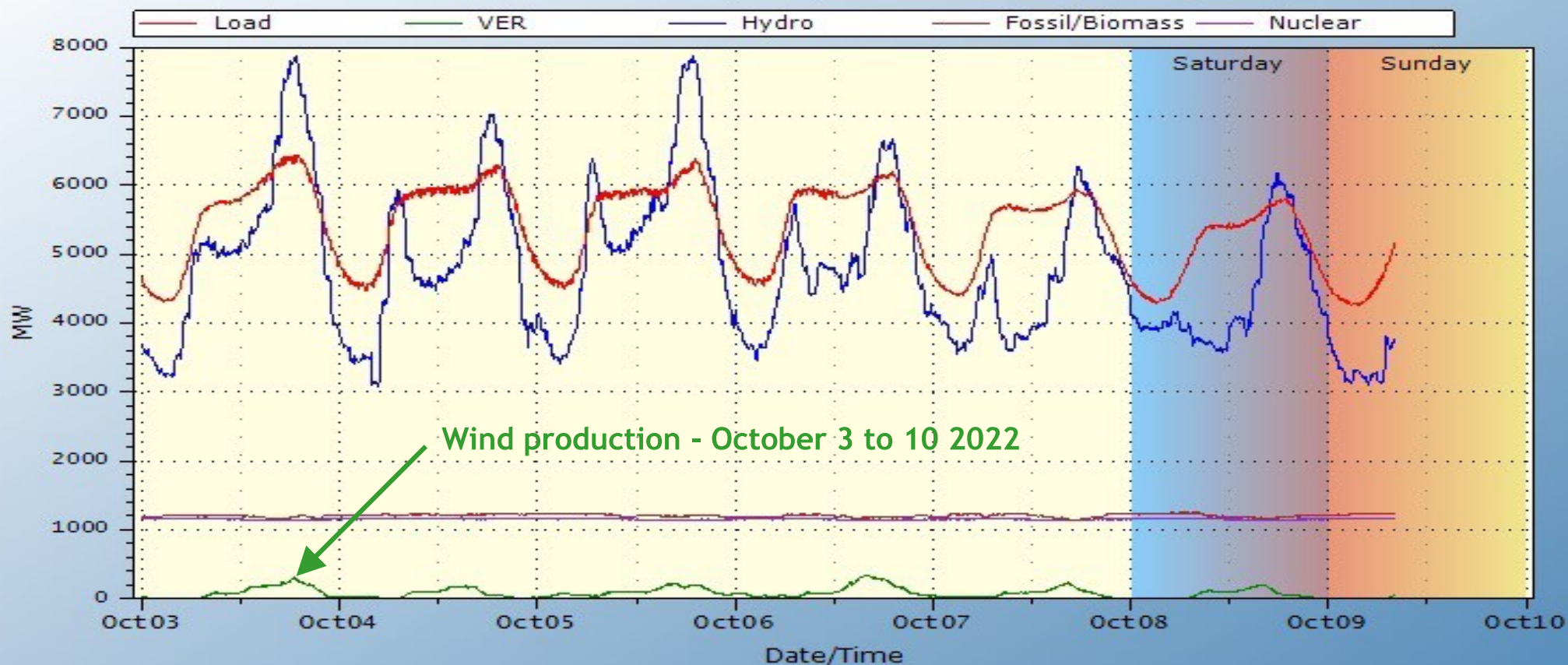
May 17, 2023



Source: NERC.org

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BPA Balancing Authority Load & Total VER, Hydro, Fossil/Biomass, and Nuclear Generation, Last 7 days
03Oct2022 - 10Oct2022 (last updated 9Oct2022 08:10:44)

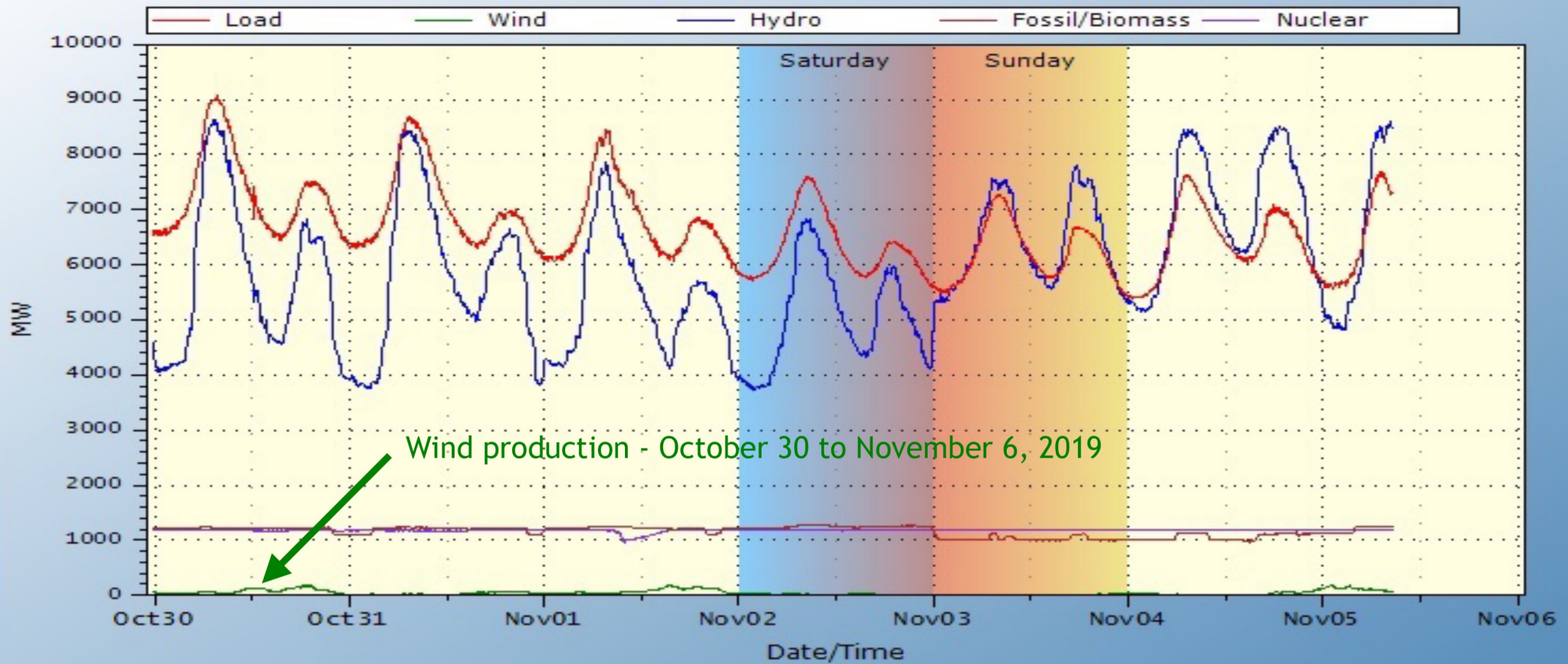


Based on 5-min readings from the BPA SCADA system for points 45583, 177167, 79682, 164377, and 70681
BA Load in Red, VER in Green, Hydro Gen. in Blue, Fossil/Biomass Gen.
in Brown, and Nuclear in Cobalt

Click chart for installed capacity info
BPA Technical Operations (TOT-OpInfo@bpa.gov)

Source: Washington Policy Center

BPA Balancing Authority Load & Total Wind, Hydro, Fossil/Biomass, and Nuclear Generation, Last 7 days
30Oct2019 - 06Nov2019 (last updated 5Nov2019 08:40:46)

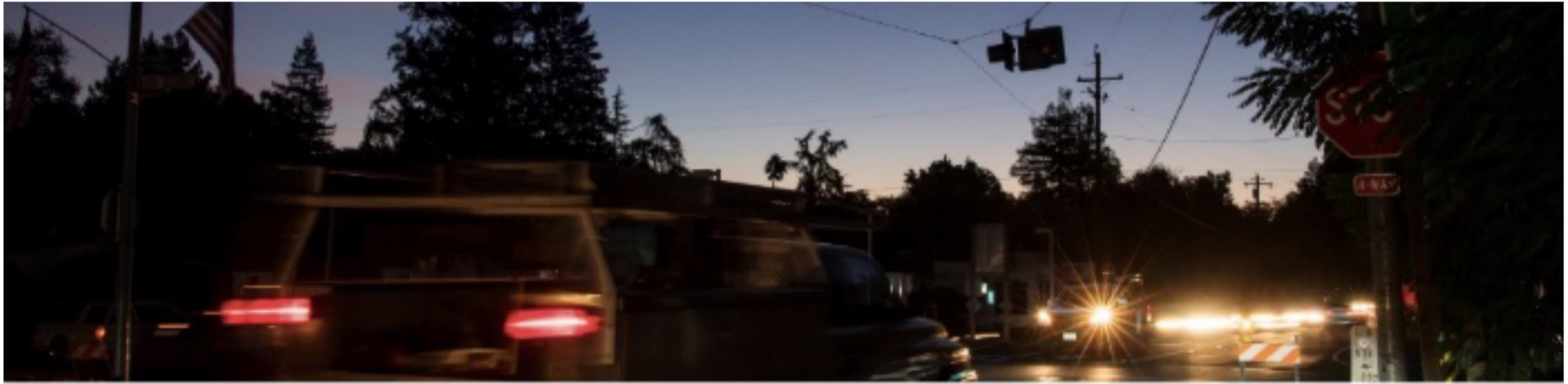


Based on 5-min readings from the BPA SCADA system for points 45583, 79687, 79682, 164377, and 70681
BA Load in Red, Wind Gen. in Green, Hydro Gen. in Blue, Fossil/Biomass Gen.

in Brown, and Nuclear in Cobalt
Click chart for installed capacity info
BPA Technical Operations (TOT-OpInfo@bpa.gov)

Source: Washington Policy Center

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Photographer: David Pau

Business

One Million Californians Go Dark in Second Night of Blackouts

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But so what if we're cold, or if we have to go without power for a few hours?

...No it certainly isn't.

For many, it's a matter of life and death.

Oxygen-dependent California man dies 12 minutes after PG&E cuts power to his home

Morgan Phillips | Fox News

Published on October 11, 2019



...isn't it?

Texas blackouts warning to Biden and all of us: Renewables do play a role in grid problems

Common-sense has already lost to political considerations — and people across Texas and the Great Plains are paying the price.

Jason Hayes Opinion contributor

Published 12:05 a.m. ET Feb. 22, 2021



It's not just a cold front. Over a decade of m
wreaking havoc in Texas and the lower Mid
claims to the contrary.

The immediate cause for the power outages
and insufficient winterization of the state's
escaping the fact that, for years, Texas regul
heavily subsidized renewable energy source
generation. These policies have pushed the
now millions in Texas and the Great Plains
exposed they are when extreme weather hits

Renewable's defenders retort that Texas' wi
Translation: It can't be counted on when it's needed most. The state has spent tens
of billions of dollars on wind turbines that don't work when millions of people
desperately need electricity. As the cold weather has gotten worse, half the state's



It's -20° , cloudy, & snowing,
which energy source do you trust?



Suomi NPP VIIRS True Color
1847 UTC, December 26, 2017
CIMSS, SSEC, UW-Madison



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Source: NOAA, Pexels.com

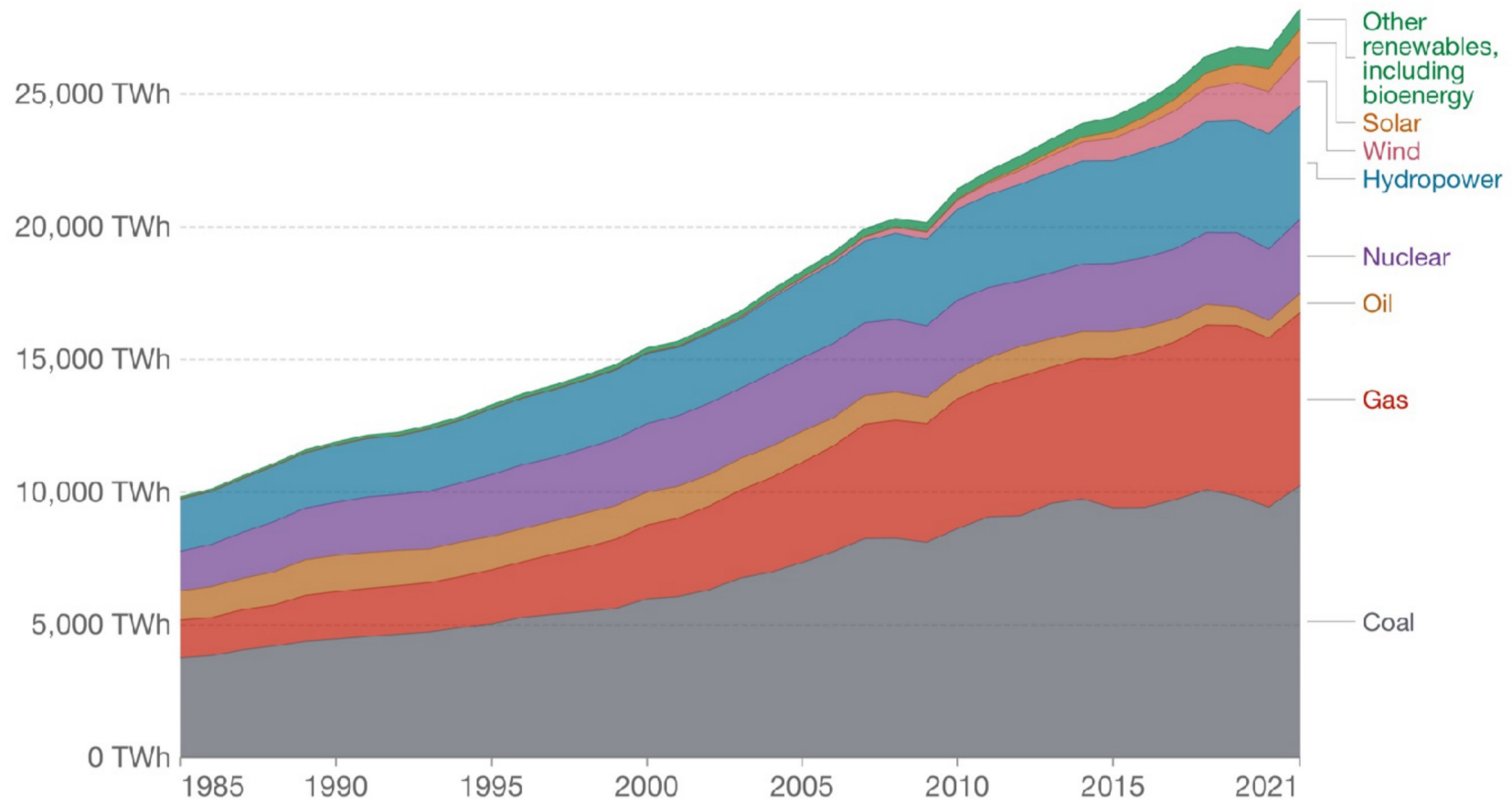


FIVE.

Changing our energy systems takes time.

Electricity production by source, World

Our World
in Data



Source: Our World in Data based on BP Statistical Review of World Energy (2022); Our World in Data based on Ember's Global Electricity Review (2022); Our World in Data based on Ember's European Electricity Review (2022)

Note: 'Other renewables' includes biomass and waste, geothermal, wave and tidal.

OurWorldInData.org/energy • CC BY

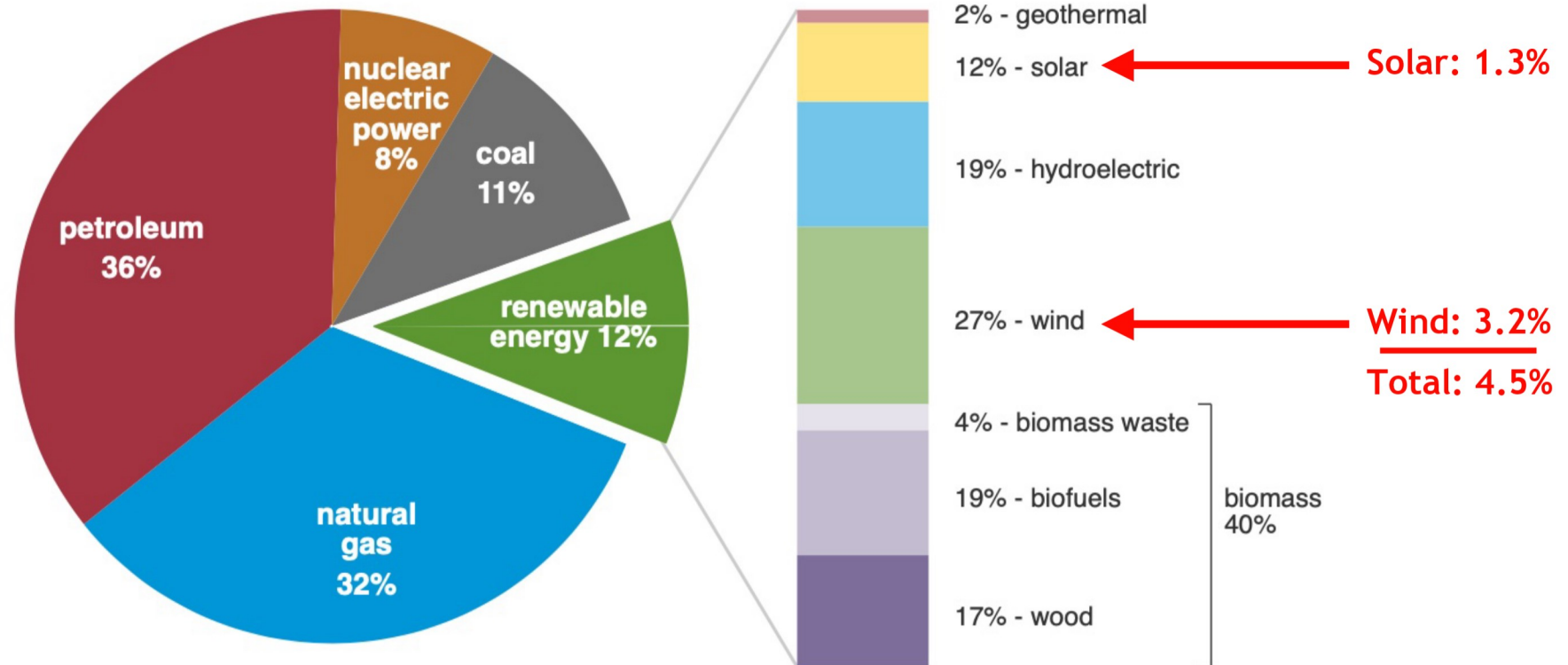
Source: OurWorldInData.org

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U.S. primary energy consumption by energy source, 2021

total = 97.33 quadrillion
British thermal units (Btu)

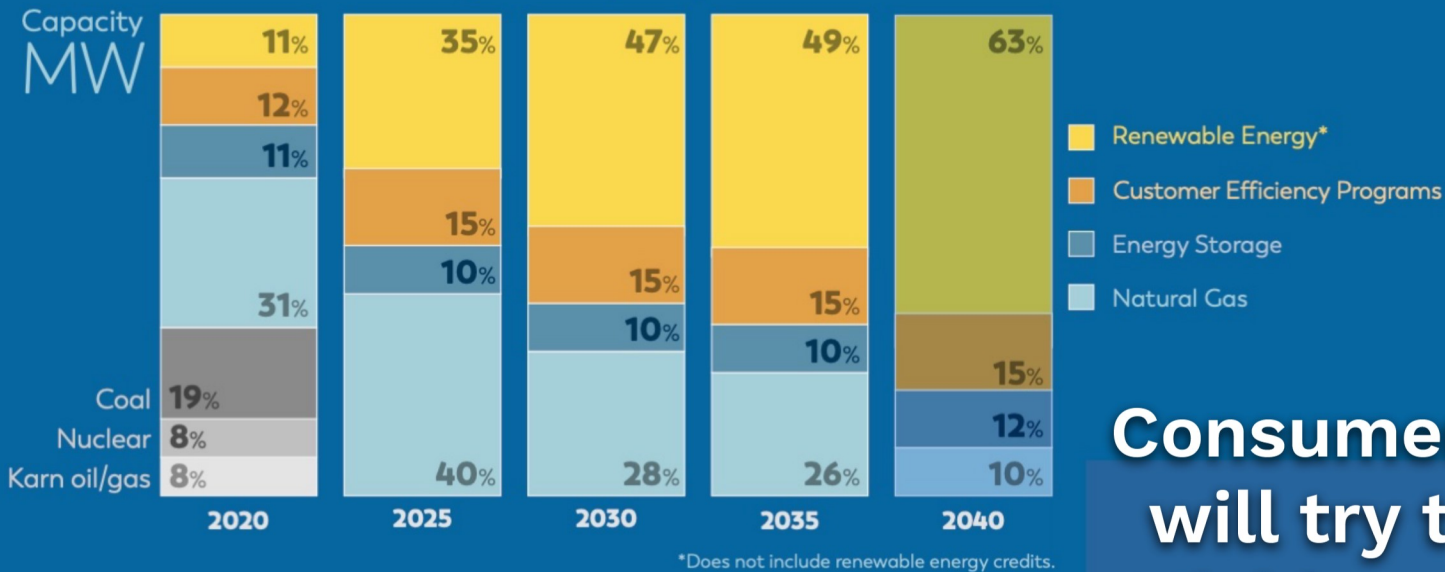
total = 12.16 quadrillion Btu



Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2022, preliminary data
Note: Sum of components may not equal 100% because of independent rounding.

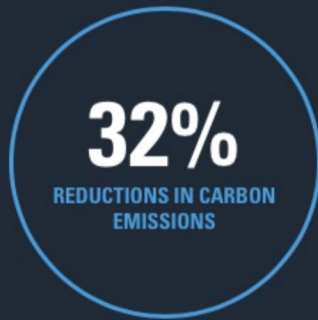


Electric Capacity by Fuel Source



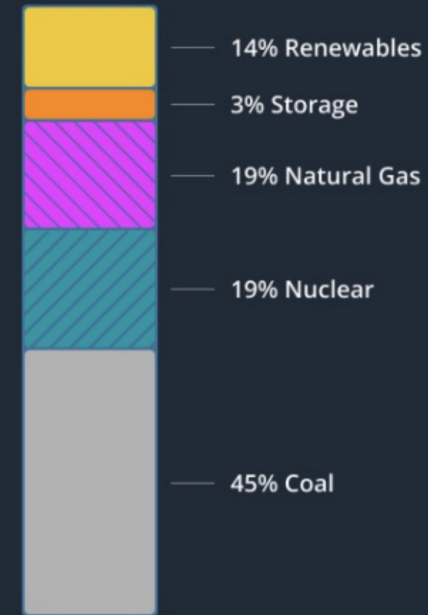
Consumers Energy's plan will try to meet 90% of Michigan's energy needs with renewable energy, energy efficiency, energy storage and demand response by 2040.

Source: Consumers Energy 2021 Clean Energy Plan



Proposed fuel mix

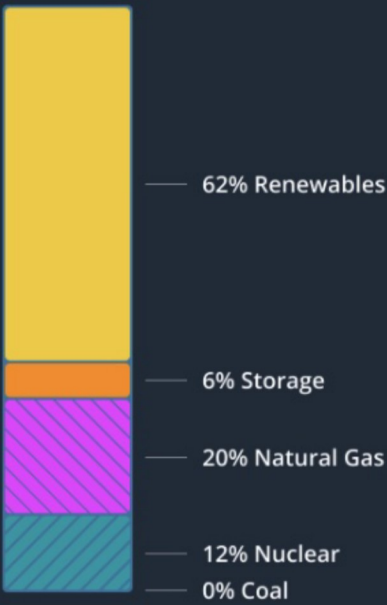
(2005-2042, MWh%)





Proposed fuel mix

(2005-2042, MWh%)





SIX.

Energy must be affordable to be useful.

Unreliable Nature Of Solar And Wind Makes Electricity Much More Expensive, Major New Study Finds



Michael Shellenberger Contributor

Energy *I write about energy and the environment*

It's true: solar and wind make electricity more expensive. EP

Source: Forbes Magazine

DTE's peak-hour rates in Michigan are on the cusp of California's

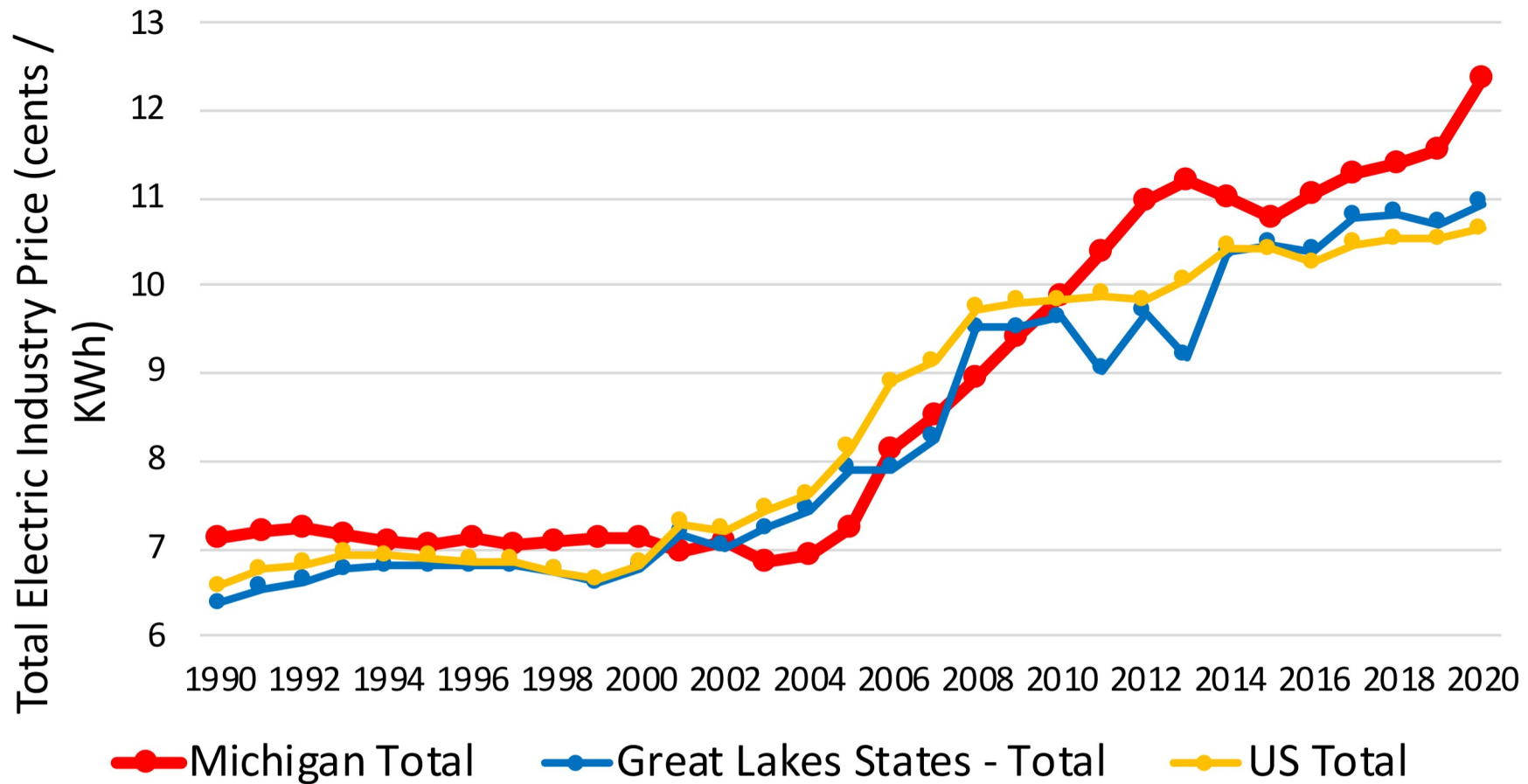
DTE peak-hour rate is about 2 cents less than California's average energy price in 2021

By James David Dickson | January 31, 2023



DTE's peak-hour rate, which takes effect in March, is only about 2 cents lower per kWh than average California costs in 2021. (Courtesy: DTE Energy)

Average Total Electric Industry Prices (Cents / kWh)



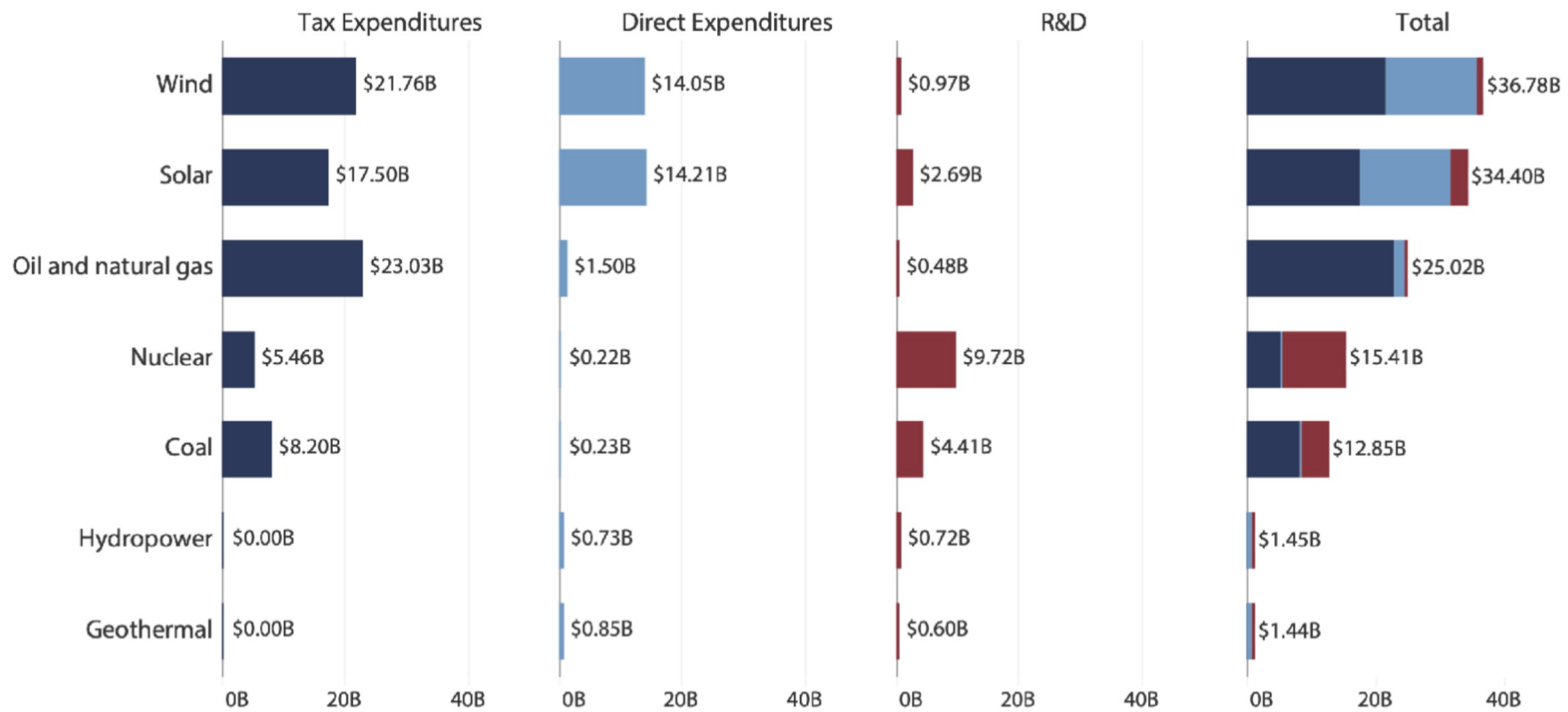
Source: U.S. Energy Information Form EIA-861 "Average Price (Cents/kilowatthour) by State by Provider, 1990-2020"



SEVEN.

Energy subsidies harm more than they help.

Figure 1. Total federal energy subsidies from 2010 to 2019 (billions of 2019 USD)



Source: See Appendix C.

MI HEALTHY CLIMATE PLAN



EGL MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

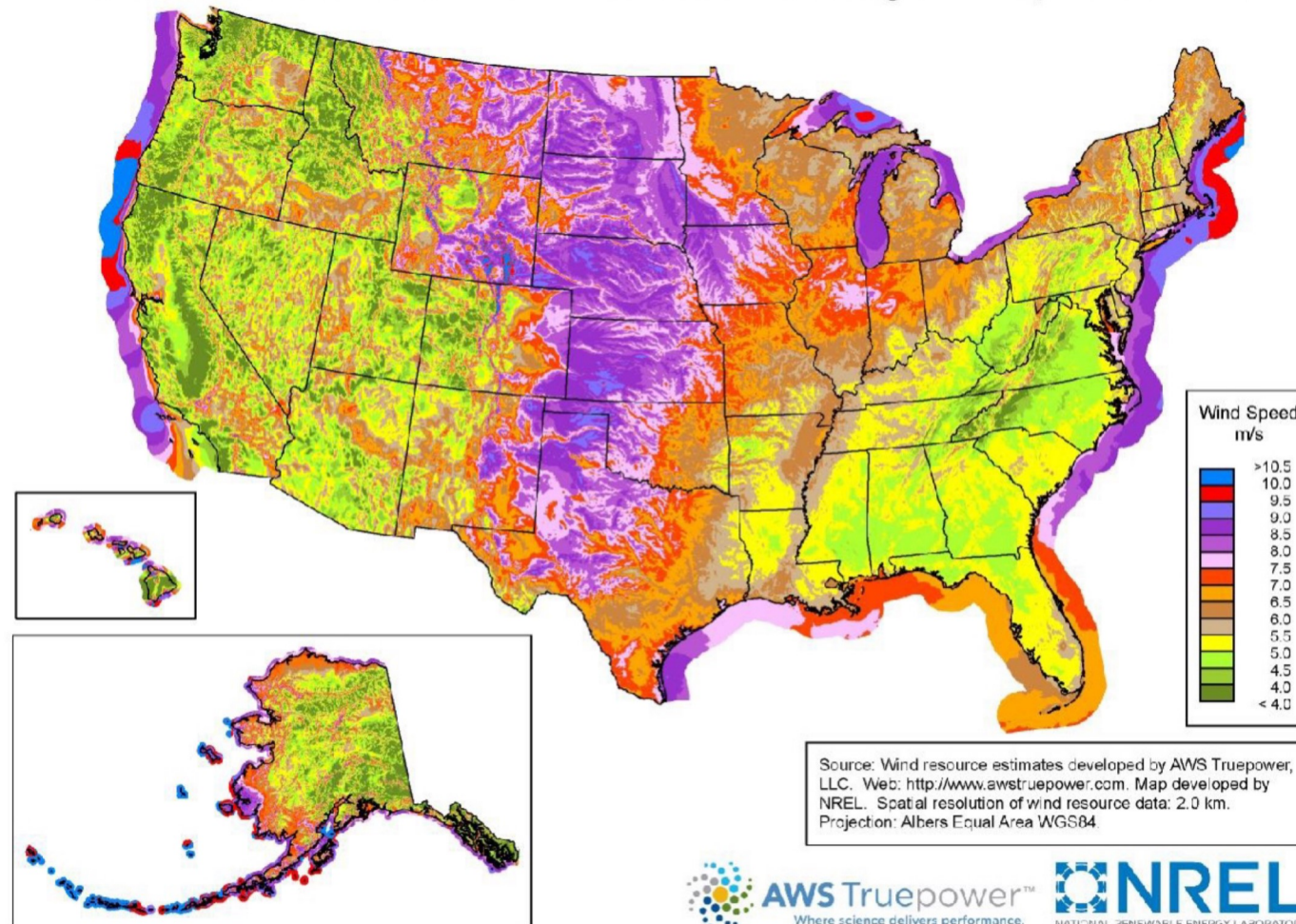
APRIL 2022

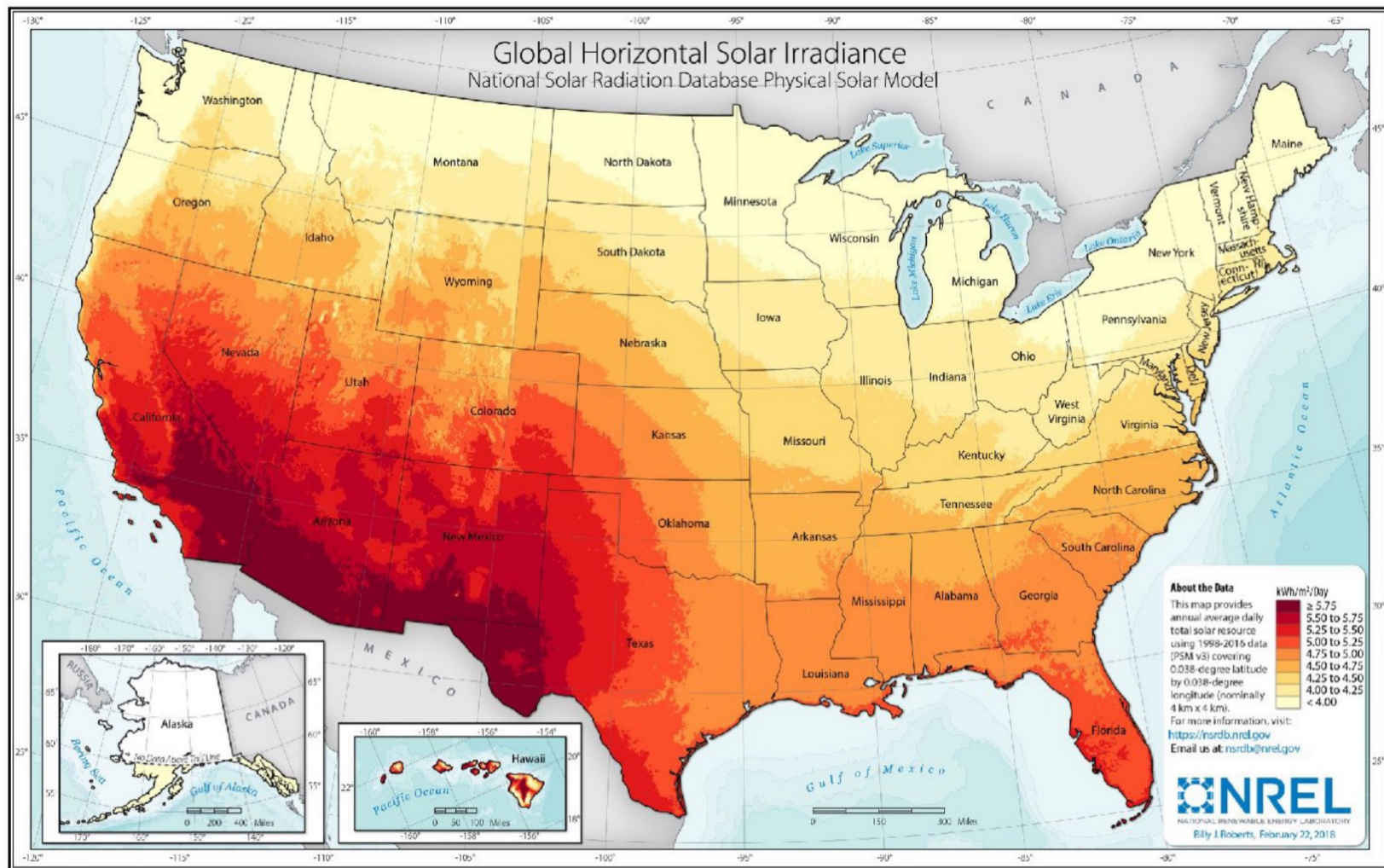
MI Healthy Climate Plan

- Net-zero by 2050
- Decarbonize
 - homes
 - businesses
 - transportation
- Push for more “direct state investment”

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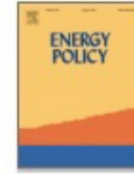
United States - Land-Based and Offshore Annual Average Wind Speed at 100 m







Energy Policy
Volume 107, August 2017, Pages 498-505



Further considerations to: Energy Return on Energy Invested (ERoEI) for photovoltaic solar systems in regions of moderate insolation

Ferruccio Ferroni ^a ✉, Alexandros Guekos ^b, Robert J. Hopkirk ^c

 [Show more](#)

<https://doi.org/10.1016/j.enpol.2017.05.007>

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Any attempt to adopt an Energy Transition strategy by substitution of intermittent for base load power generation in **countries like Switzerland or further north** will result in unavoidable net energy loss.



“Well that was depressing!”

— Previous comment from audience



Discussing the country's
approach to energy

“We have only two modes,
complacency and panic.”

James R. Schlesinger
U.S. Sec. of Energy 1977

ENERGY & ENVIRONMENT

POLITICS & GOV

Across the country, a big backlash to new renewables is mounting

Ohio is leading the way in the fight against renewable energy

BY: ROBERT ZULLO - FEBRUARY 15, 2023 4:50 AM



📷 Wind turbines in Hardin County, Ohio, on Feb. 3, 2023. (Photo by Robert Zullo/ States Newsroom.)



THE OVERTON WINDOW

MichiganVotes.org: Michigan Laws, Bills and Votes
using concise, plain and objective descriptions

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FRANK BECKMANN
CENTER FOR JOURNALISM

MICHIGAN'S WATCHDOG

CAPACON

IMPACT

JULY / AUGUST 2022

PAGE 12
Former Mackinac
Center President
Larry Reed
Interviewed by Poland





Our work should push policies that...

1. Stop subsidizing all forms of energy
2. Retain existing plants for full life cycle
3. Build natural gas and legalize nuclear
 - Continue research on small modular reactors and fusion



Jason Hayes

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The Mackinac Center for Public Policy

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E: hayes@mackinac.org



Download “Seven Principles of Sound Energy Policy”

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