Why New York's Climate and Energy Plan Won't Work And What to Do About It

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Outline of Talk

1. Why the 2020s are not the 1970s
2. Why the State's energy plan won't work
3. Why a plan with nuclear will work
4. Is nuclear power safe to use?

Solar Energy in the 1970s: Supplementary power connected to the grid

Solar Energy in the 2020s: Attempting to power the whole society

"Wind, water, and sunlight will power most of New York's economy in 2050"

– Climate Action Council Scoping Plan, p. 123

Nuclear power was excluded, though it supplies 20% of our power today.

SOLAR: 55,000 MW (Currently 4,300 MW)

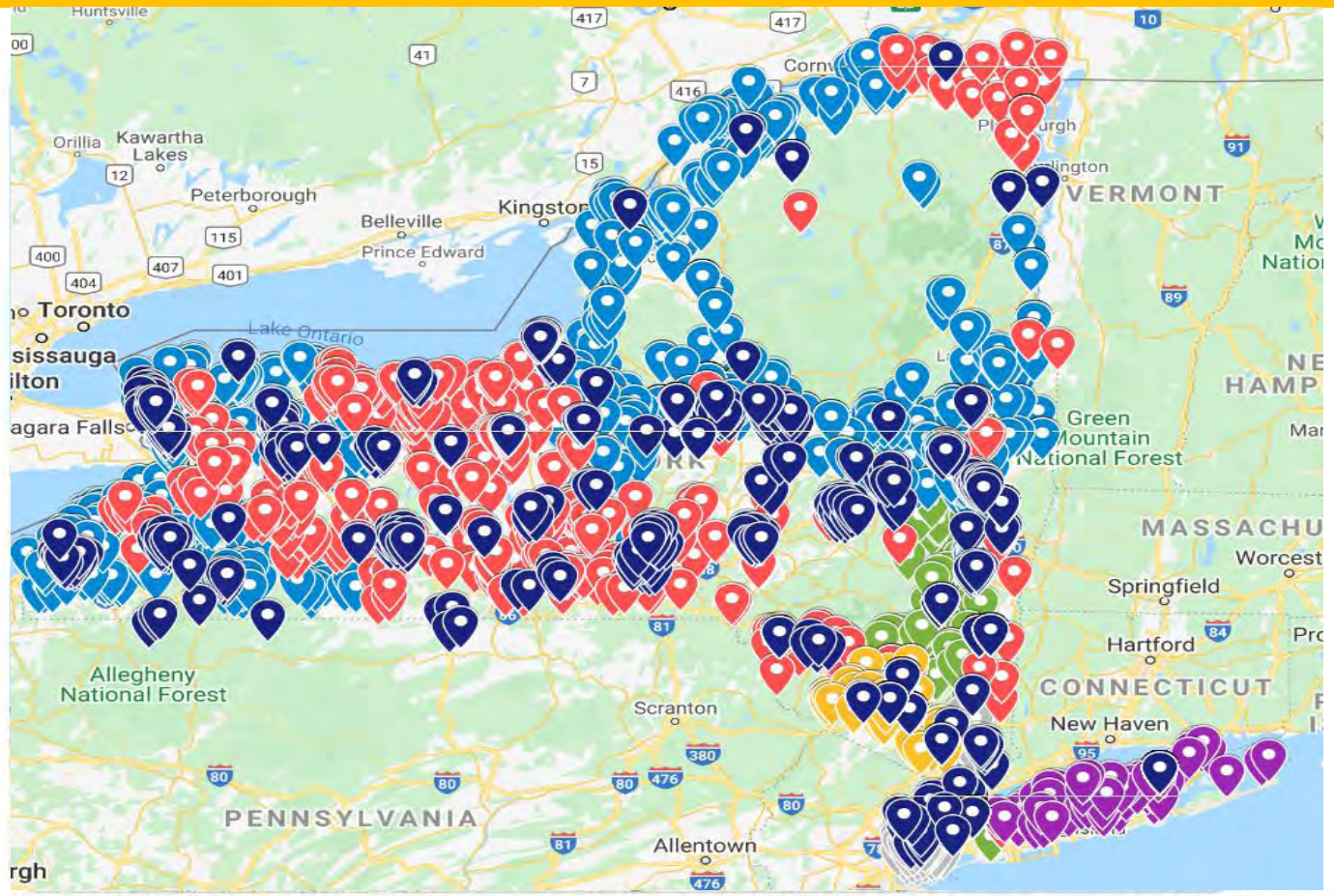
140,000,000 solar panels

1,700 of these (Long Island Solar Farm, Brookhaven)

LAND-BASED WIND: 9,300 MW (Currently 1,800 MW)

1,500 of these by 2050

Cover much of NYS with solar and wind installations. What will be the environmental impact?



Note: Solar, wind and battery energy resources 1-MW and larger proposed for New York State. Locations from the January 2021 NYSIR and NYISO queue data sets imported into Google Maps. Original data sets on New York State Department of Public Service webpage:
https://www3.dps.ny.gov/W/PSCWeb.nsf/All/286D2C179E9A5A8385257FBF003F1F7E
Compiled and posted March 3, 2021. Comments to lynnebruning@gmail.com

OFFSHORE WIND: 17,600 MW (Currently none)

1,760 of these by 2050

STORAGE: 19,200 MW (Currently none)

64 of these by 2050 (Moss Landing, CA)

But “wind, water, and sunlight” are not enough.

“…the 100x40 goal [100% emission-free electricity by 2040] requires 15 gigawatts (GW) to 45 GW* of electricity from *zero-emission, dispatchable resources* in 2040 to meet demand and maintain reliability… Addressing this gap will require identifying and developing solutions for dispatchable technologies, like storage or nuclear power…”

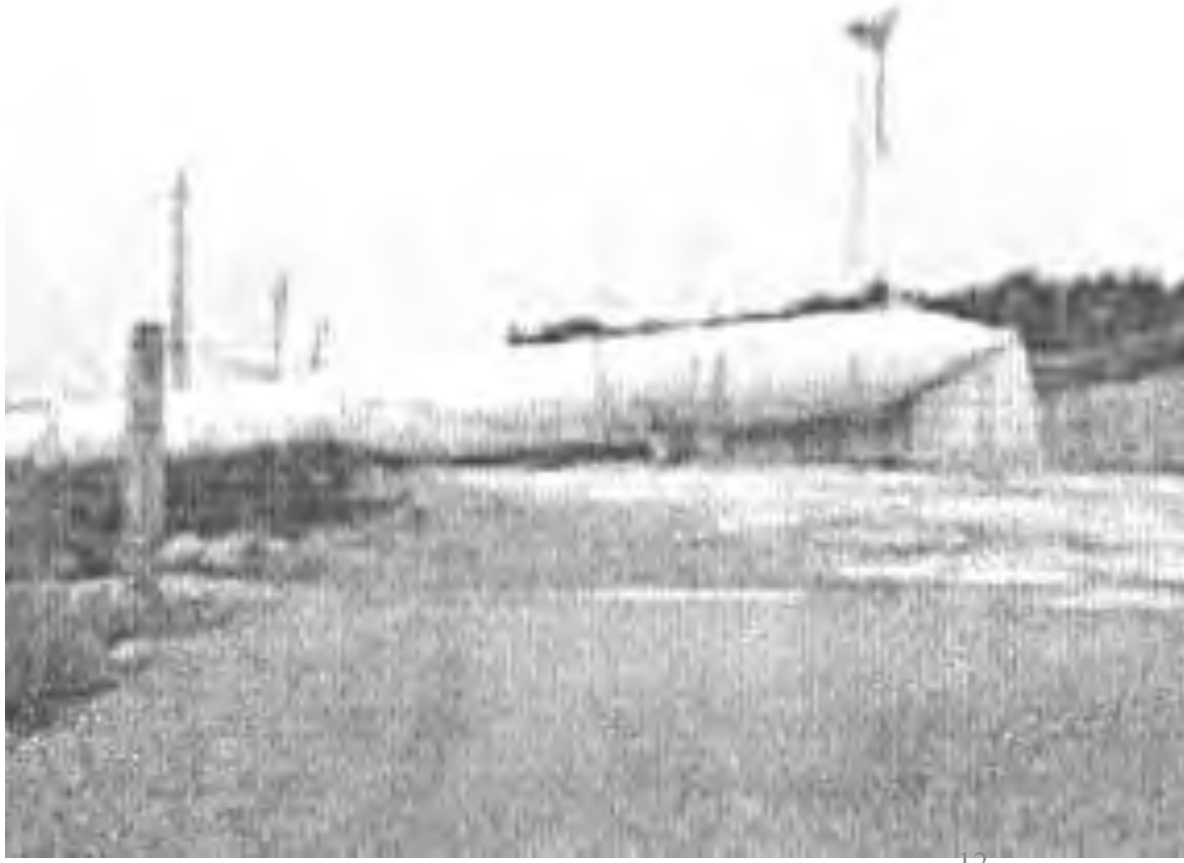
This zero-emission, dispatchable resource supplies just 2% of total electric generation.

– Climate Action Council Scoping Plan, Exec Summary, p. 13-14 & App G

*** Note: 26 GW of fossil fuel capacity is now installed in NYS.**

NYC would be relying on offshore wind – but storms will shut it down

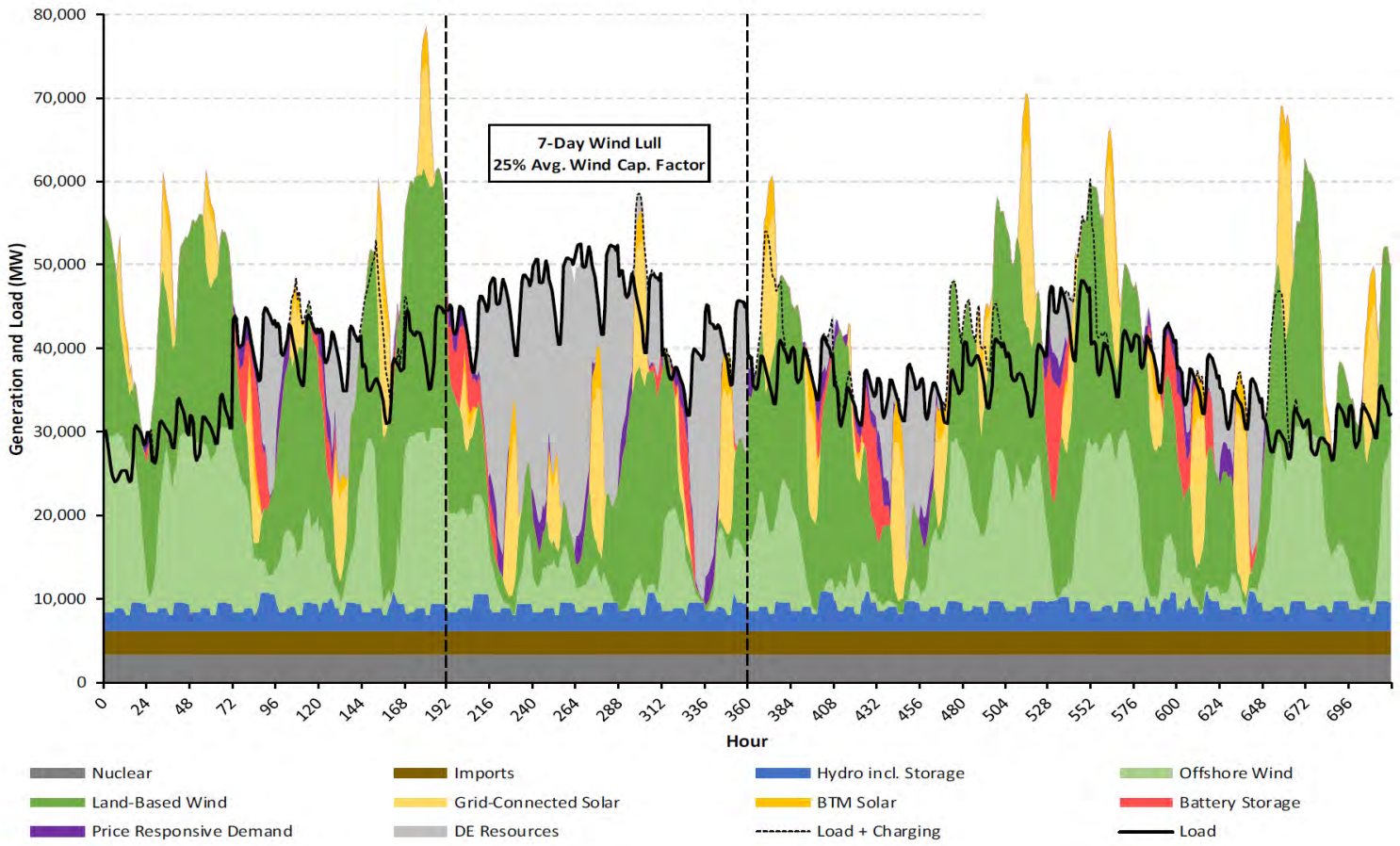
Figure 1. Damaged wind turbines in the Punta Lima wind farm after Hurricane Maria in Naguabo, Puerto Rico on October 2, 2017. Image credit: Ricardo Arduengo/AFP/Getty Images.



Achilles' Heel of Solar and Wind:
Dunkelflaute = dark doldrum (overcast, wind lulls)

Dispatchable Energy Resources

- Large quantity of installed dispatchable resources needed in a small number of hours
- Dispatchable resources must be able to come on quickly and be flexible enough to meet rapid, steep ramping needs

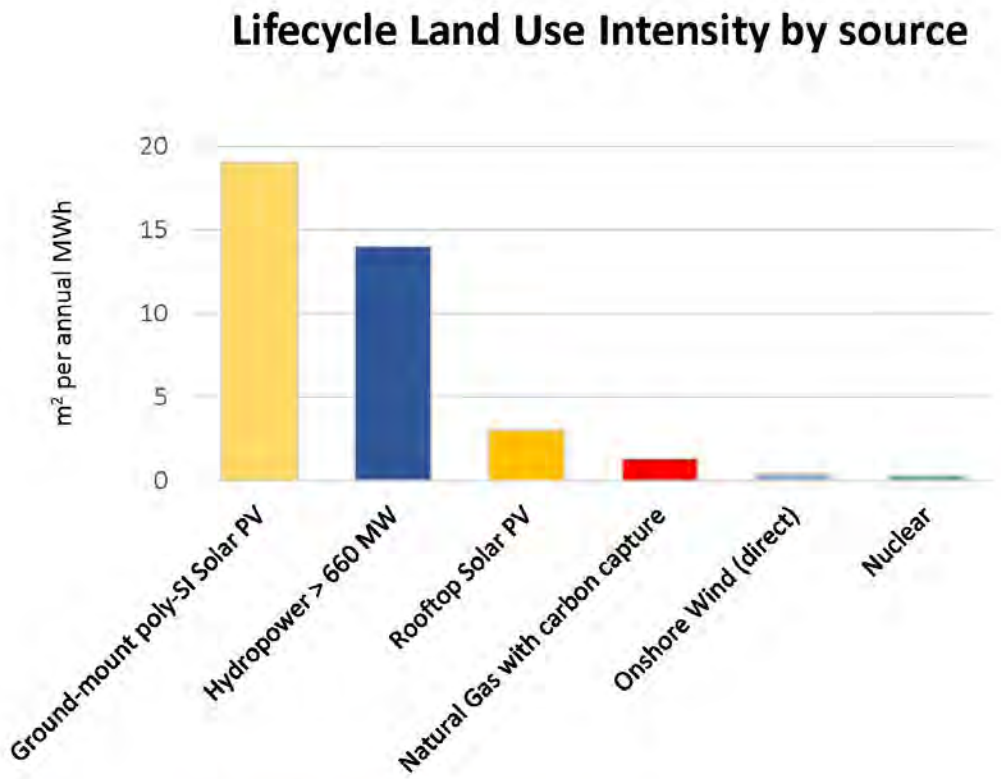


Source: NYISO presentation to Climate Action Council, Oct. 8, 2020. https://climate.ny.gov/-/media/Project/Climate/Files/planning-grid-in-transition-presentation.ashx

The Answer to Dunkelflaute : Dispatchable Emission-Free Resource (DEFR)

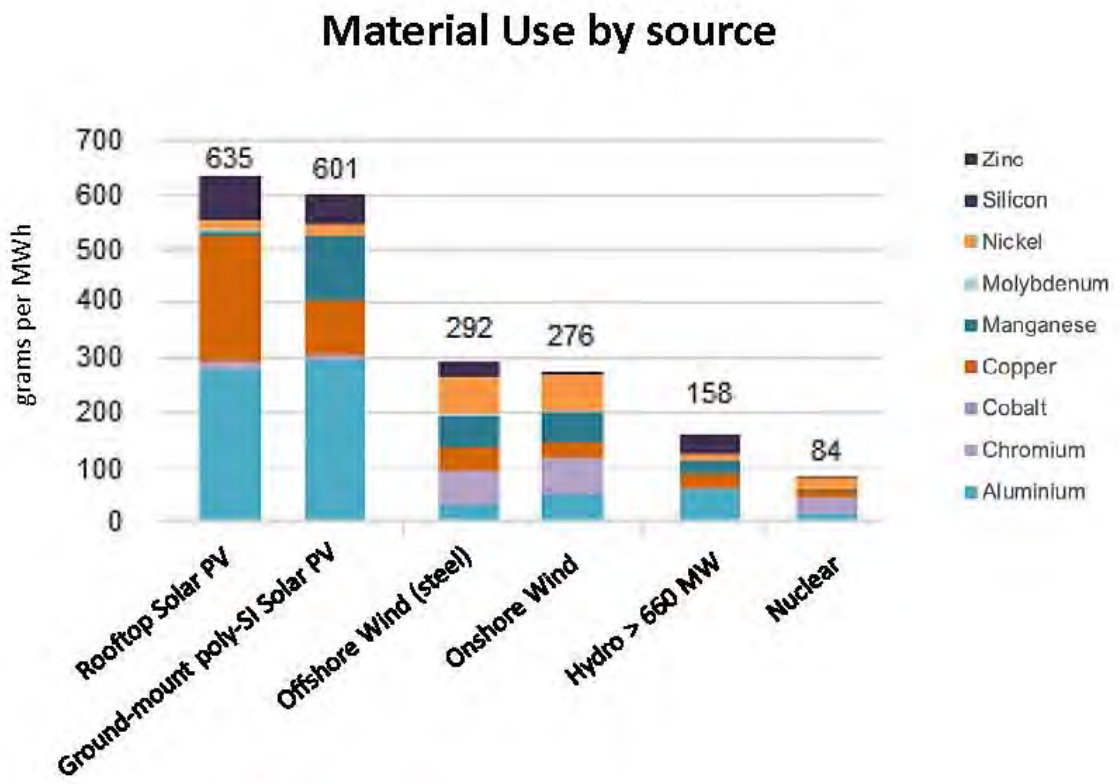
- **Hydrogen-power electric generation (CAC/NYSERDA)**
  - **None produced in New York today**
  - **Needs additional solar and wind to produce it**
  - **Difficult to transport (leakage, low density)**
  - **Difficult to store (leakage, low density)**
  - **No power plants can run it today**
- **Nuclear-powered electric generation**
  - **Provides over 20% of our power today**
  - **Reliable**
  - **New advanced plants can be dispatchable**

Nuclear is best for the environment



UNECE SUSTAINABLE DEVELOPMENT GOALS Our World in Data

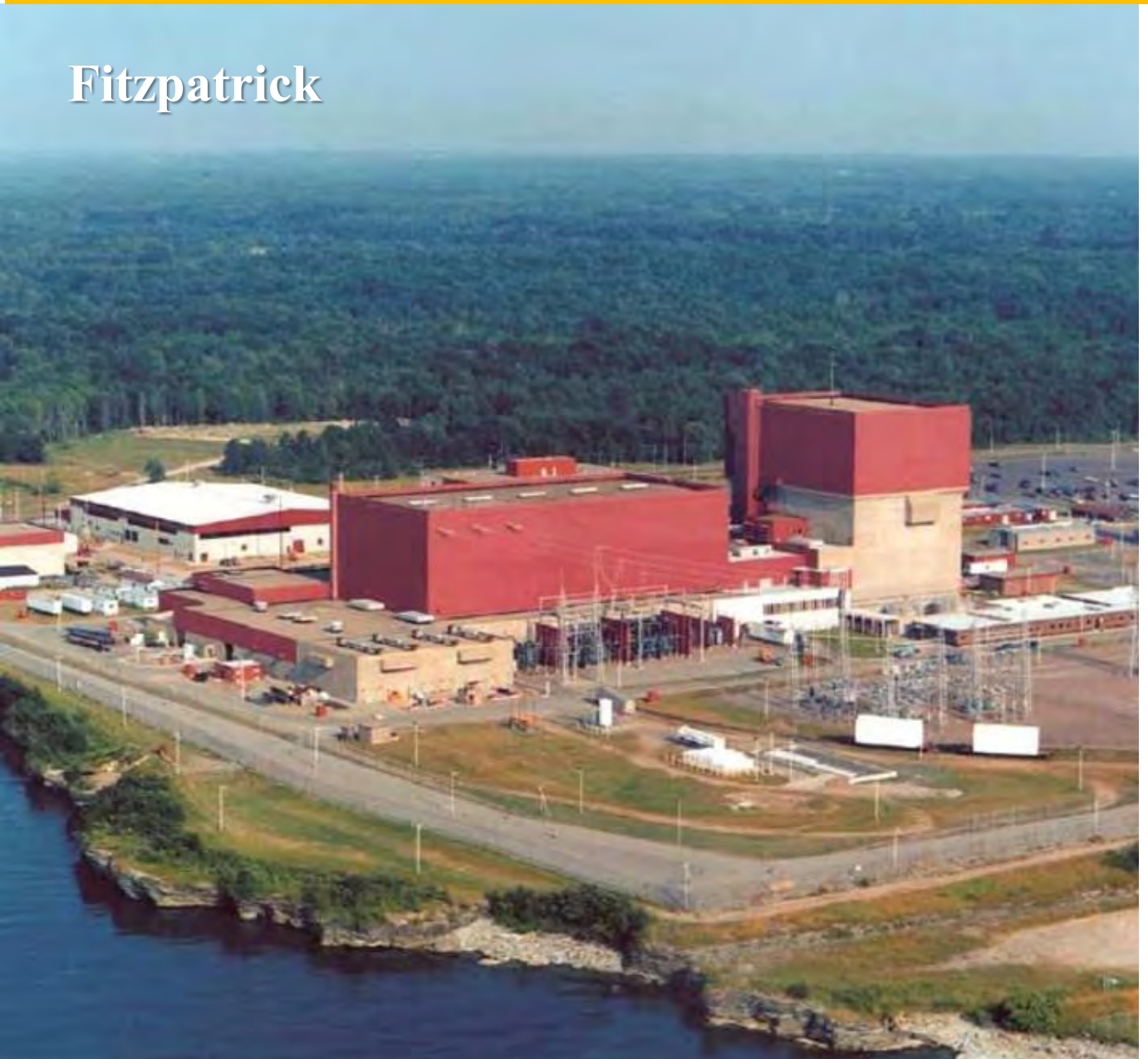
https://ourworldindata.org/land-use-per-energy-source



UNECE SUSTAINABLE DEVELOPMENT GOALS

https://unece.org/sites/default/files/2022-04/LCA_3_FINAL%20March%202022.pdf

New York's Operating Nuclear Plants

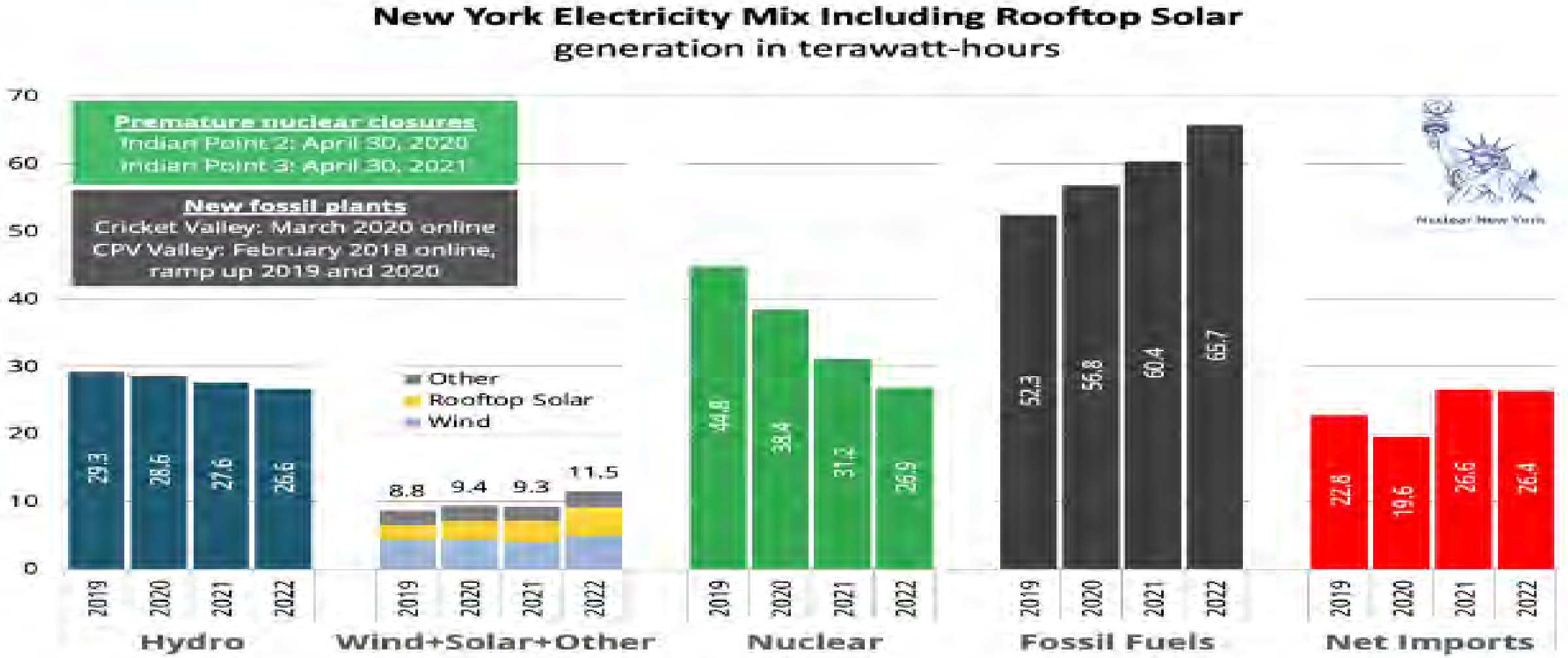


Indian Point Energy Center

Supplied 25% of NYC's power – now shut down

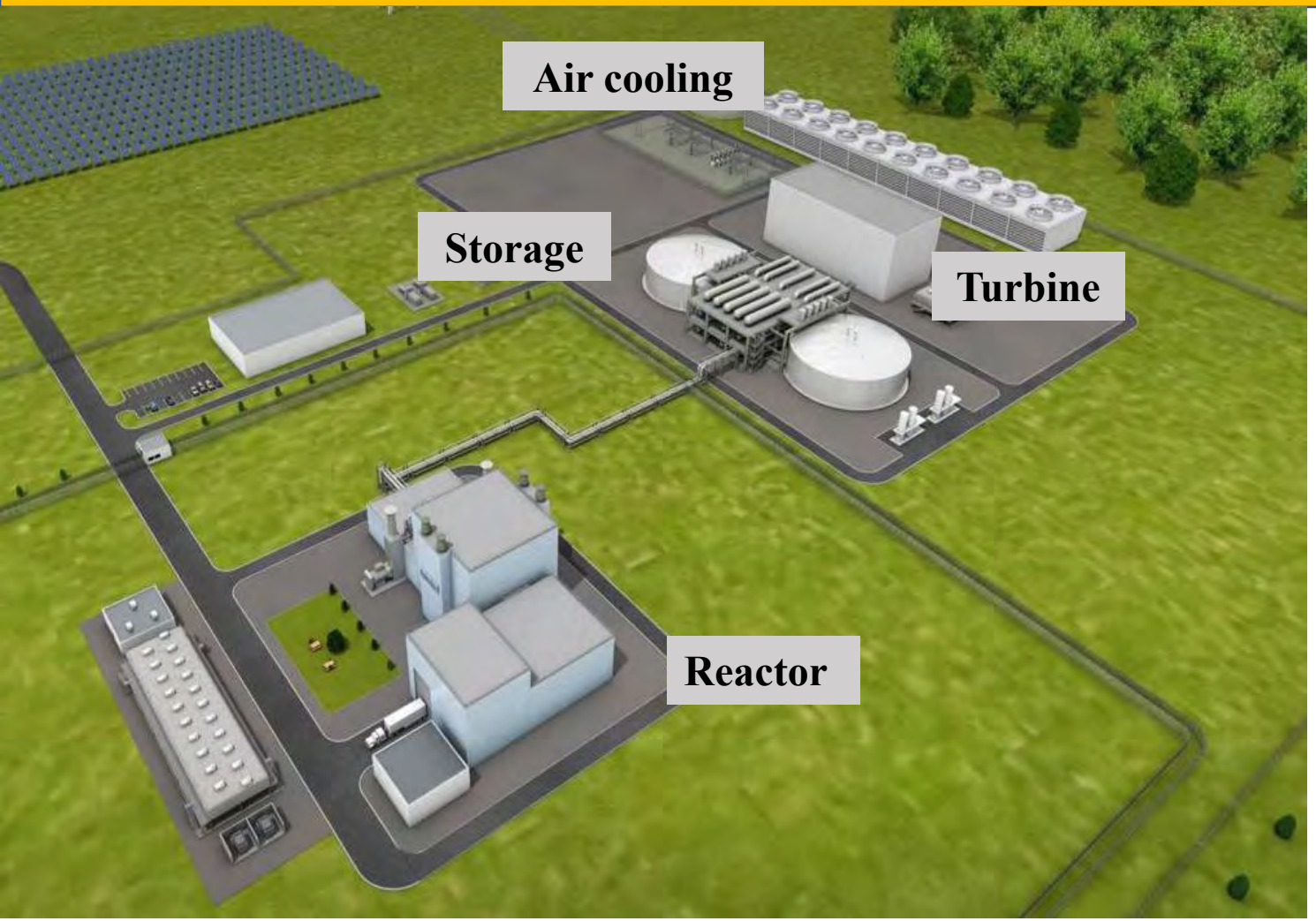
One of its reactors supplied more energy than all the solar and wind currently in the state.

When Indian Point was shut down, it was replaced by fossil fuels.



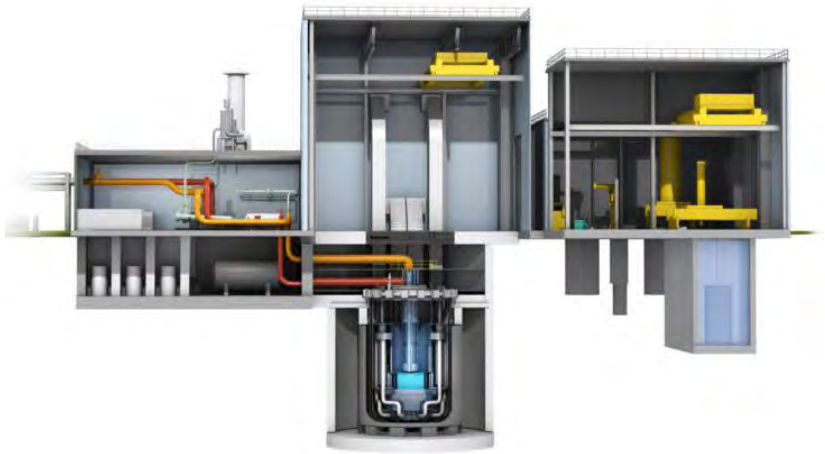
Just 20 Indian Points could power New York State.
Little else would be needed.

We'd actually use something like the Natrium.



Developed by TerraPower/GE-Hitachi/Bill Gates

- **Dispatchable**
- **Thermal storage**
- **1st installation in Wyoming, 2028**



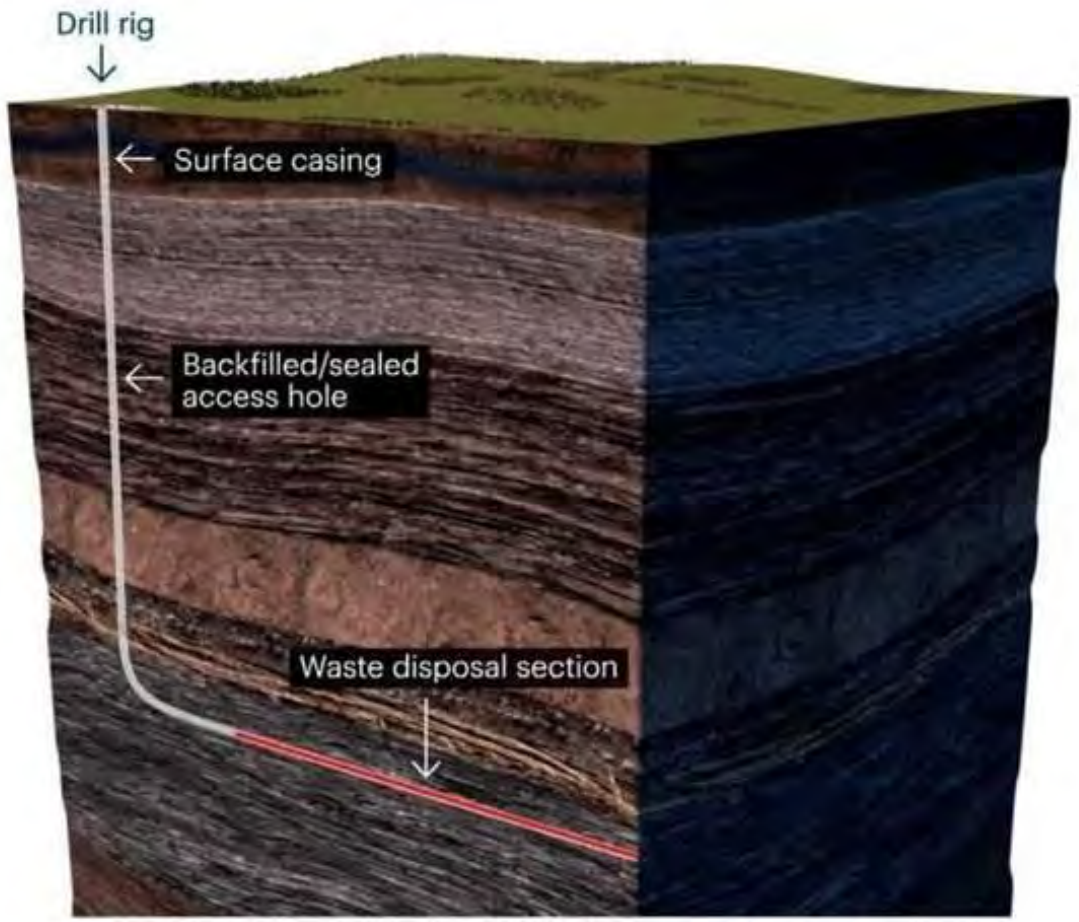
www.natriumpower.com

What About the Waste?
Here's 46 years of waste at Indian Point

Stored safely behind a chain link fence, harming no one

And here's how to dispose of it: Store it in deep wells.

- Use fracking technology
- Costs much less than a geologic depository like Yucca Mountain.
- Can take place where the waste is
- "Waste" can be recovered later for use as fuel in breeder reactors.



Source: www.deepisolation.com

Note: Solar and wind produce vast amounts of long-lasting waste – and they do so every twenty years or so.

Nuclear accidents are evidence that nuclear is safe.

- **TMI**: No deaths. "… negligible effect on the physical health of individuals. "

  *-- Report of the President's Commission on the Accident at **Three Mile Isla**nd*

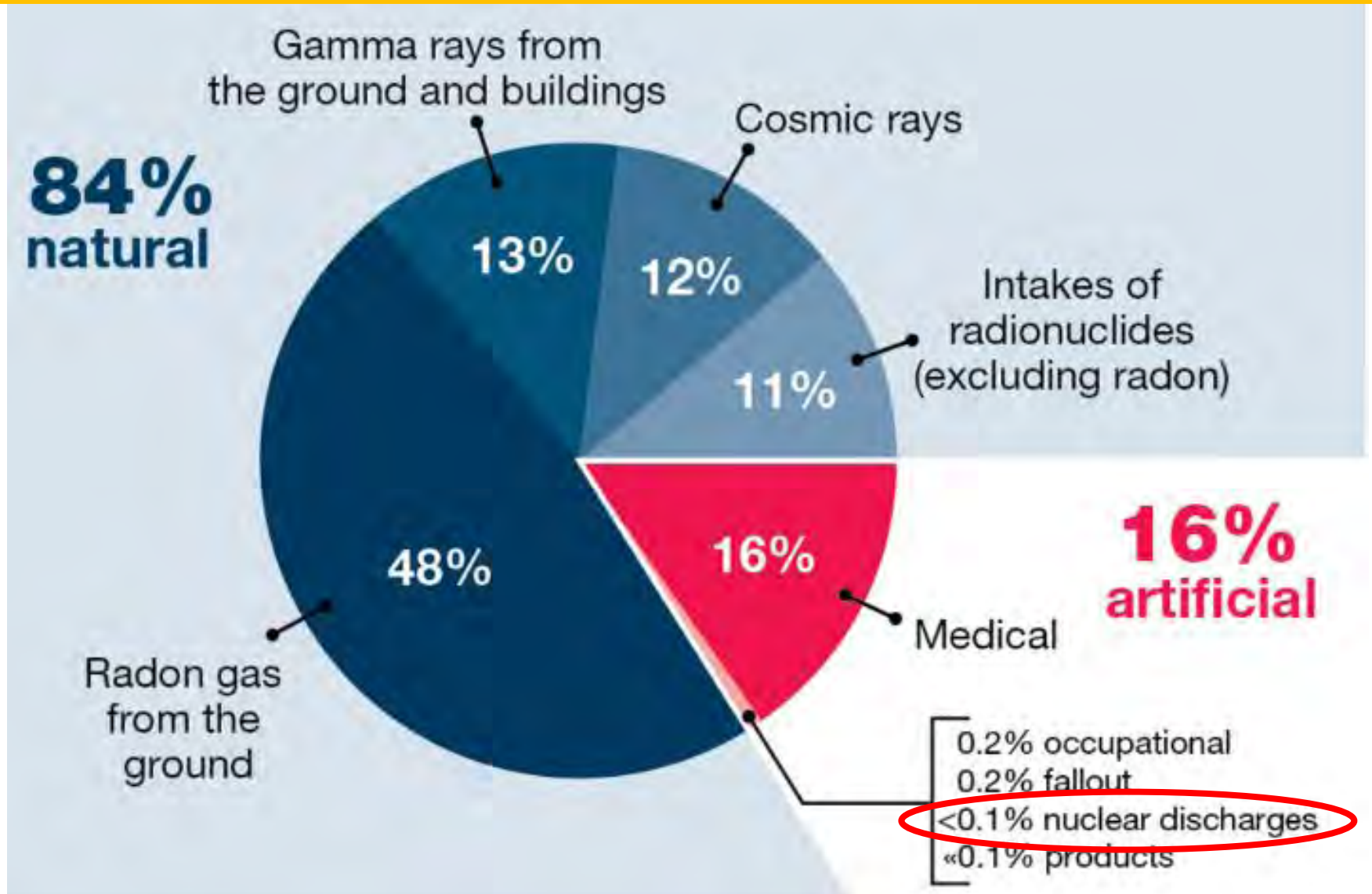
- **Chernobyl**: Twenty-eight first-responders died from radiation sickness. "…no persuasive evidence of any other health effect."

  -- Health Effects due to Radiation from the Chernobyl Accident, UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)

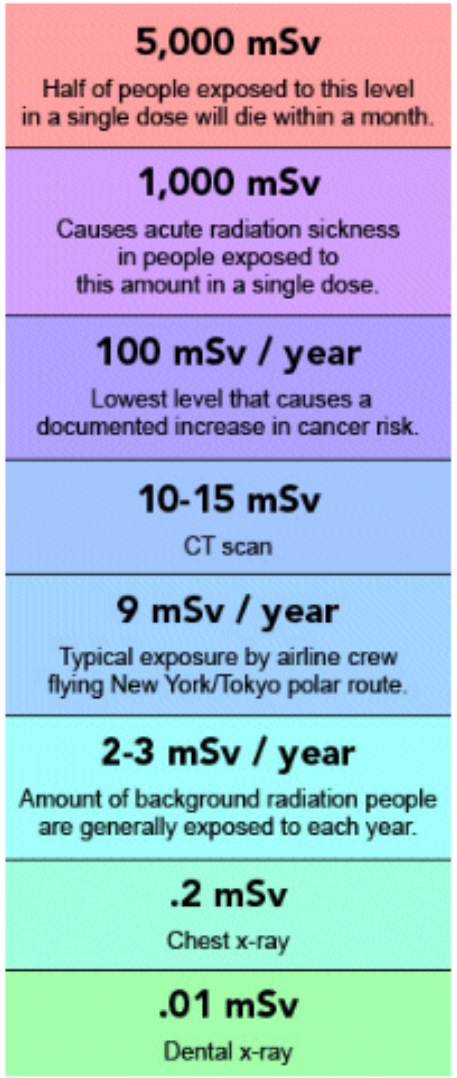
- **Fukushima:** Three reactors melted down. No deaths from the accident. "A discernible difference from pre-existing levels [of cancer] due to radiation exposure is unlikely."

  -- Levels and effects of radiation exposure due to the nuclear accident after the 2011 Great East Japan Earthquake and Tsunami, UNSCEAR

Nuclear-related radiation is a tiny fraction of all the radiation we are exposed to.



"The dose makes the poison" (toxicology principle)
High levels can kill you; low levels can cure you.



→ **Chernobyl emergency workers receiving this dose died**

→ **Smallest dose that produces a documented increase in cancer risk**

← **Medical**

→ **AVERAGE BACKGROUND RADIATION**
Average level of radiation after Fukushima accident

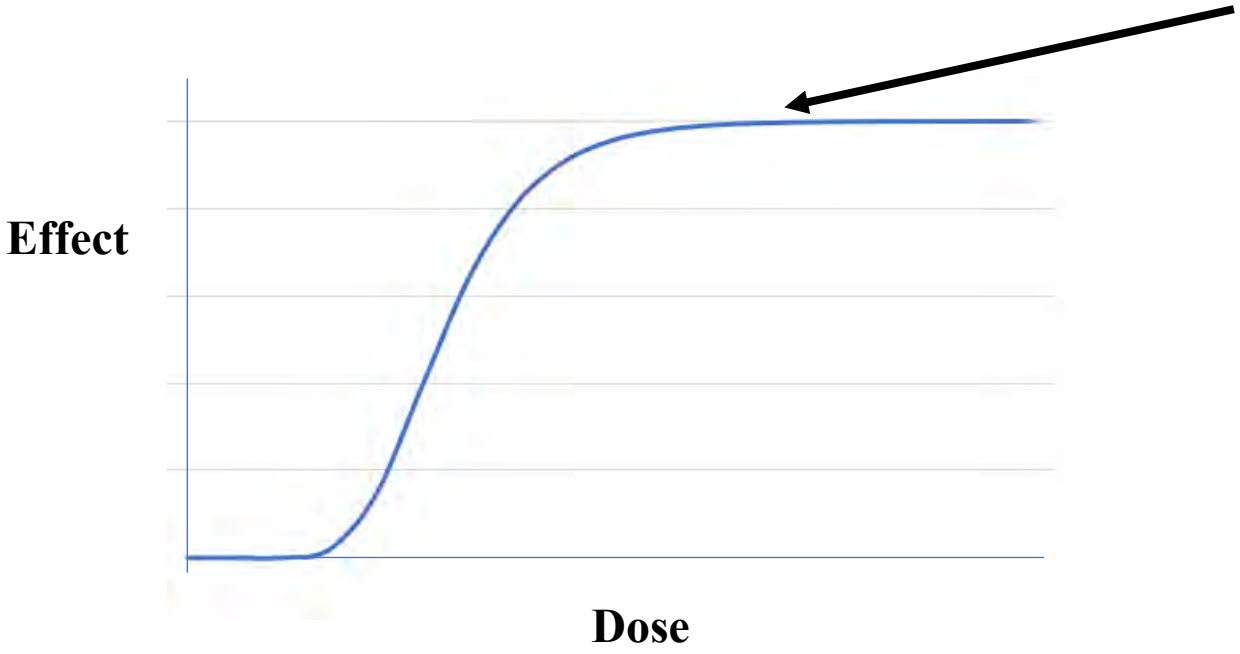
← **Medical**

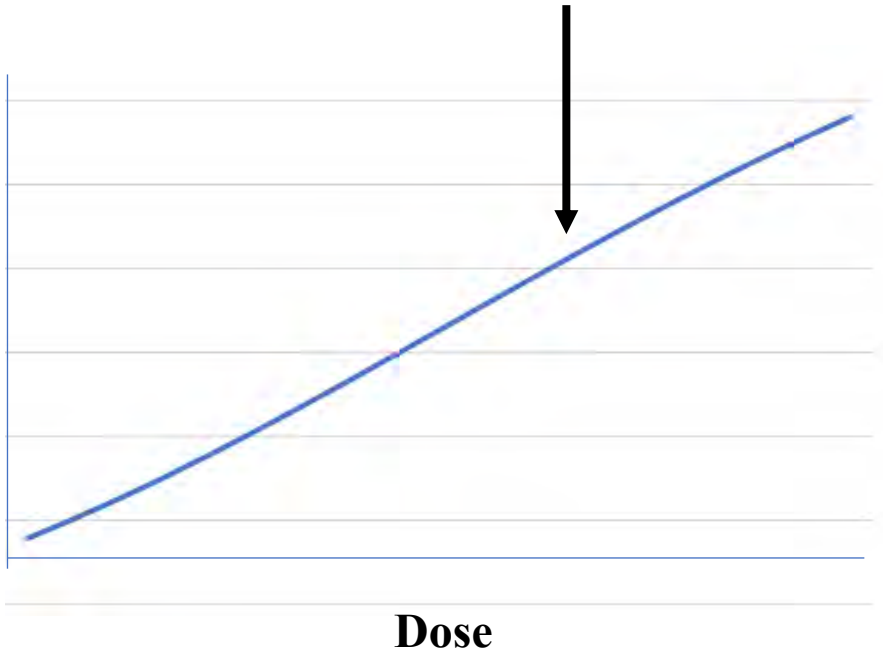
← **Medical**

mSv = milli-Sievert= 100 mrem

The best (unscientific) evidence that low-level radiation is not harmful: Though millions of particles go through us every day, our children (and even our grandchildren) look like us!

- Life developed on earth surrounded by radioactivity.
- Mechanisms evolved to protect our DNA from radiation.
- The dose-effect curve looks like this -- rather than this.





- Low doses have little or no effect.

Conclusion

1. Solar and wind are too unreliable and environmentally disruptive to power a modern society.
2. Nuclear power is the only carbon-free source that we have today that can expand to power this society.
3. Nuclear reactors are safe and leave minor amounts of waste which can be readily disposed of.

To read more…

www.nuclearny.org/bright-future

Potential Workshop Series

1. **The state's energy plan**
2. **Using nuclear energy**
3. **Is nuclear power safe?**

If you're interested, write to lrodberg@gmail.com