Those Who Fail to Learn From History Are Condemned to Repeat It

Winston Churchill – Address To The House of Commons - 1948

New York's Plan Is Not Something New And Revolutionary

There is a Historical Record

It has been tried In

- Germany since 1990
- California since 2002
- Europe and the United Kingdom for over a decade

They are having issues with
LOWER THAN EXPECTED CARBON REDUCTIONS and
HIGHER THAN EXPECTED RELIABILITY ISSUES.

NEW YORK DOES NOT HAVE A MAGIC PILL

GERMANY

- Despite spending **ENORMOUS SUMS** on **WIND TURBINES** and **SOLAR ARRAYS,** they are **FALLING WELL SHORT** of their **CARBON REDUCTION GOALS**

- Their **ELECTRIC RATES** are **NEARLY DOUBLE** those of **NEIGHBORING FRANCE**

- **GERMANY** will now **HAVE TO BUILD 20 – 30 GW** of **GAS FIRED GENERATION** to **ENSURE** their **ENERGY SECURITY**

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- The **GRAPHS AND TABLES** on the following pages **SHOW GERMANY'S LESS THAN SUCCESSFUL ENERGY TRANSITION AFTER 30 YEARS**

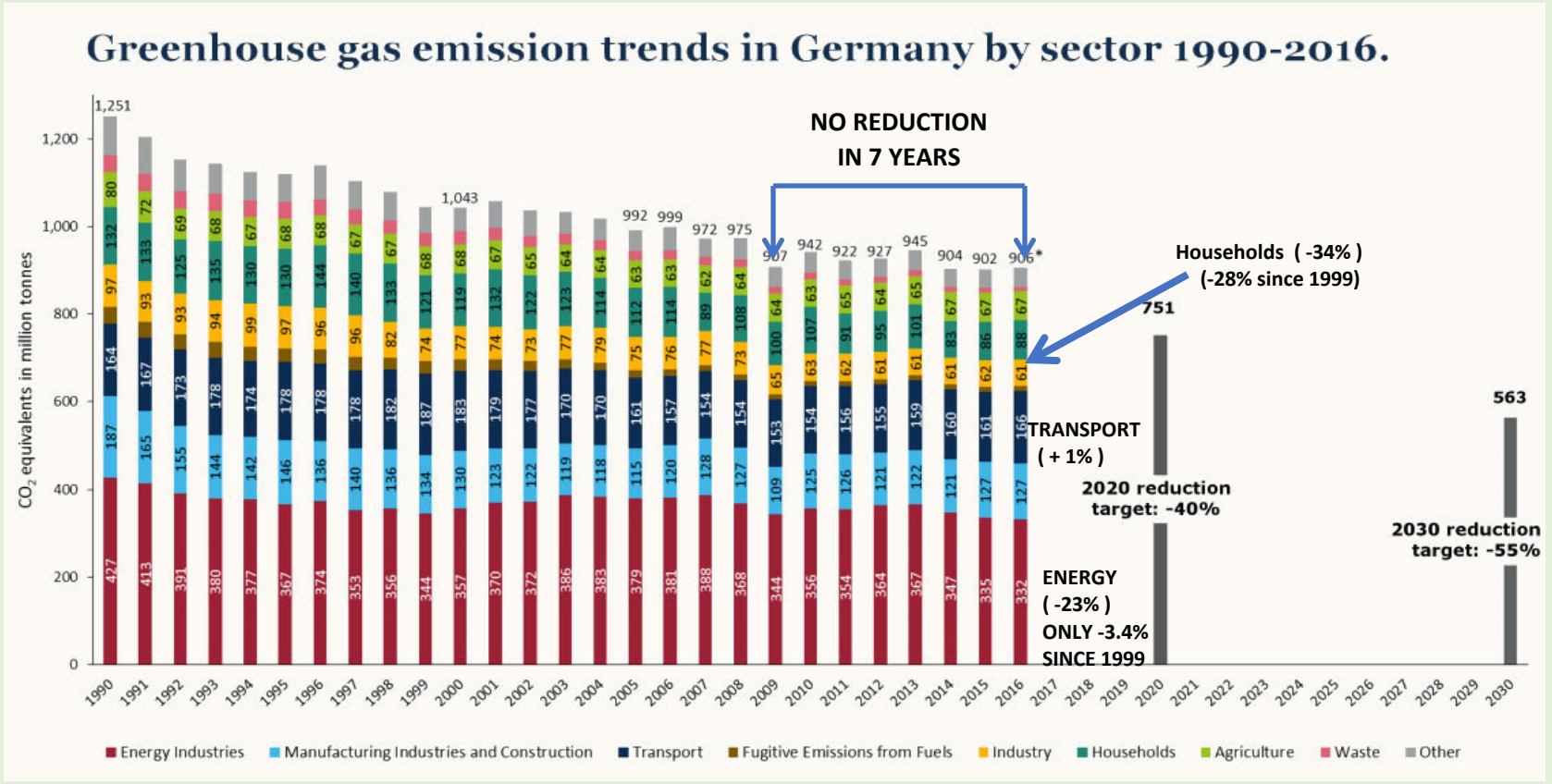
GERMANY – A CAUTIONARY EXAMPLE

After 30 years, 30,000 WIND TURBINES INSTALLED, and SOARING ENERGY COSTS, GERMANY is MISSING it's GHG TARGETS. WHY ?

Not enough resources were devoted to reducing the carbon footprint of TRANSPORTATION and the ENERGY INDUSTRY and TOO MUCH ELECTRIC LOAD WAS ADDED WITHOUT SUFFICIENT RENEWABLE GENERATION TO COMPENSATE FOR THE ADDITIONAL LOAD.

(Those Accounted for 47% of GHG in 1990 - Reduced by only 16% in 27 years - 1% since 1999 - They Account for 66% of GHG now)

with the current NY plan, GERMANY'S PAST 30 YEAR HISTORY IS NEW YORK'S FUTURE



[View Article: Yale EDU - Carbon Crossroads: Can Germany Revive Its Stalled Energy Transition?]

German Energy Mix 2016-2017

	TWh									Total CO2 (Millions of Tons)	TWh		
Year	Nuclear	Wind	Solar	Hydro	Coal	Gas	Biofuels/ Waste	Oil	TOTAL		Renewables /Nuclear	Fossil/ Other	% Renewable
2016	85	79	38	26	273	82	58	8	649	906	228	421	35.1%
2017	76	107 *	40 *	26	252	87	59	8	655	903.5	249	406	38.0%
Change	-9	28	2	0	-21	5	1	0	6		21	-15	

*** In New York , 107 TWh would correspond to 27 GW of installed offshore wind capacity (46% DC**) and 40 TWh would correspond to 320 GW of Installed Solar (12.5% DC)**

Despite the net addition of 21 Terawatt Hours of Non-CO2 Producing Generation, corresponding to approximately 8 GW of additional Wind Turbines and 80 Megawatts of additional Solar, and a reduction of 21 Terawatt hours of coal production, CO2 Production barely went down year over year as Electric usage went up due to on site electrification of heating.

Without the added utility load, the improvement could have been more than twice as much.

***New York removed 16 Terawatt hours of Non-CO2 Producing Generation when Indian Point closed in 2021.**

[View online at World Nuclear.org: Nuclear Power in Germany]

* *DC: Duty Cycle or Capacity Factor

CALIFORNIA

Despite having a BETTER CLIMATE AND SUPERIOR CONDITIONS TO SUPPORT RENEWABLES WHEN COMPARED TO NEW YORK, CALIFORNIA EXPERIENCED ROLLING BLACKOUTS DURING HOT DAYS IN THE SUMMER OF 2021.

- California has an average winter climate 30 degrees warmer than NY resulting in their peak electric load occurring in summer. Conversion to electric onsite heating will result in winter loads that are smaller than the summer loads. Heat pumps will be far more efficient during a California winter than in New York. Also, the transmission system already exists to support the winter load. That is not the case in NY.

- California's solar profile is superior to New York's.

- California has less shading from trees and a dryer climate during the long days of summer improving the output of rooftop solar.

CALIFORNIA

- California has the largest geothermal field in the world, “THE GEYSERS”, and 5% of California's electricity is from geothermal generation. It has been in operation for 50 years and additional plants are being added. They continuously produce 835 megawatts.
  View on USGS.gov - The Geysers Geothermal Field

- California has an 840 mile long coast with proportionally greater wind opportunities with 6 6 GW of land based wind already installed – 6th nationally.

- California has twice the population but three times the land area resulting in a 33% lower population density, reducing NIMBY issues.

- California is 25% desert and has the largest solar thermal plant in the world located in the Mojave Desert.
  View on BrightSourceEnergy.com - IVANPAH Solar Project

CALIFORNIA

- **DESPITE THOSE FACTS, A RECENT OP-ED BY A FORMER CALIFORNIA GOVERNOR STATED THE FOLLOWING**
  - California is already so far behind on meeting its 2030 climate goals that **the state isn't projected to hit them** until 2063. And our 2050 goals? We are on track to reach them by 2111.

    View on The New York Times: Schwarzenegger: We Put Solar Panels on 1 Million Roofs in California. That Win Is Now Under Threat

- California imports 30% of its power from out of state

- California Scrambles to Find Electricity to Offset Plant Closures
  - State contends with coming loss of gas-fired power plants and its last remaining nuclear facility in transition to renewable energy

    View on WSJ.com: California Scrambles to Find Electricity to Offset Plant Closures

- California is looking for additional fossil fuel generation capacity to support its utility system

  View on GVWire.com: California Desperate for Fossil Fuel to Keep Lights On

CALIFORNIA

- California is upgrading their natural gas generation.
  The Orange County Register: Coastal power plants get dramatic upgrades but how do they fit with Californias Renewable Energy Future?

- California is having rolling blackouts on hot days when the wind speeds drop with energy shortages so severe that residents are being asked not to run their home appliances. On very hot days, solar array output can be reduced by as much as 15%.
  Bloomberg.com: California Warns of Power Shortage as Heat, Fires Arrive Early

- California failing is less of a problem when the average winter temperatures are 60 degrees. If NY fails, it will be a major issue when the winter temperatures are frequently below 10 degrees.

EUROPE

- Europe is facing the same NIMBY issues as NY STATE. It is causing project delays and raising the costs of renewable installation.

  PDF: WSJ.com **Clean Energy Faces The Same Problem as Fossil Fuels**

- Energy prices are soaring – in part because of low wind speeds, in part because of high natural gas prices. The industrialized northwest of Europe has lower wind speeds in the summer that greatly reduce green energy production. **The Atlantic Coast of NY has similar issues that will occur during the summer energy peak demand.** Closing gas fields is increasing demand for coal. ***HOW IS THAT GOOD FOR THE ENVIRONMENT?***

  PDF: OilPrice.com **Record Breaking Energy Prices Could Soar Even Higher in Europe**

- Protests broke out across Europe in September 2021. Europe has been traveling down the renewable road for years and a gas shortage is wreaking havoc as they are still dependent on it. It is not easy to run a utility system without fossil fuel generation. Adding additional wind turbines when there is little to no wind will not increase generation.

  PDF: OilPrice.com **Protests Broke Out Across Europe**
  PDF: Bloomberg.com **Europe Faces Energy Price Shock**

CONTINUED

EUROPE

- UK power prices set a record during gas shortages and extremely low wind speeds. They started burning coal. Adding additional wind turbines when there is little to no wind will not increase generation.

  PDF: Bloomberg.com **UK Power Issues**

- The U.K. said Tuesday that nuclear power would play an important role in underpinning its plan to **cut greenhouse-gas emissions**, joining a growing group of countries turning back to atomic energy as they consider how to wean themselves off fossil fuels.
  View on WSJ.com: U.K., Joining Trend, Sees Nuclear as Key to Cut Carbon Emissions

OHIO

- Rural areas are resistant to large energy installations that will primarily serve population centers hundreds of miles away.
  - Opinions | Solar energy's luster dims in rural southern Ohio
  - Once welcomed as an economic opportunity, sprawling solar arrays run into local resistance.
    PDF: The Washington Post Solar Arrays Meet Rural Resistance

- Large industrial solar arrays occupy enormous swaths of land. Residents moved to rural areas because they were rural and are resistant to large industrial arrays.

NEW YORK

- New York is having the same issues as Ohio regarding the siting of large solar arrays. Despite the New York State law making solar arrays easier to site, they are facing lawsuits that will delay the projects and raise costs.

  PDF NY Times: **NY Solar Arrays**

- The same issues that have plagued this process everywhere in the world are either already occurring in New York or will be occurring in New York.

NEW YORK

- Unless some sanity is injected into this process, New Yorkers can expect the same energy shortages and radical price spikes that are occurring elsewhere.

- Keep in mind that by 2040, New York states remaining nuclear plants on Lake Ontario will range in age from 65 years to 75 years old with the age limit generally considered to be 80 years.

NEW YORK

- In 2019, the upstate nuclear plants generated 26,670 GWh of carbon free electricity. It would require 6.6 GW of offshore wind, 10 GW of land based wind, or 25 GW of solar arrays to replace that capacity. 25 GW of solar arrays would occupy approximately 137,500 acres or 214 square miles. That is in addition to the 300 – 400 square miles already in the plan.

- That doesn't include the additional batteries that would be needed to shift the load to times of low generation.

NEW YORK

- **New York's plan is not revolutionary.** It has been tried elsewhere with the result being major energy shortages, high energy prices, and economic and social disruption.

- Why are New York officials insisting on pursing policies that aren't working elsewhere?

- They won't answer that question but there are better, more effective ways to reduce carbon output.