GULF Companies

Energy Transition: Physics & Economics Ultimately Prevail

Bill Olson, Sr. VP Operations

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Contents

What does "Energy Transition" Mean?

That depends…

Hey, ChatGPT, "Describe the narrative surrounding "energy transition" from the OPEC Oil embargo to the present day."

"The energy transition narrative since the OPEC Oil Embargo has evolved from a **crisis-driven quest for energy independence** toward a multifaceted, global **effort focused on addressing climate change**. It is **marked by a shift from the dominance of fossil fuels to the integration of low-carbon alternatives**, though this change has been non-linear and uneven."

With that synopsis in mind, let's summarize "energy transition" history and examine a few dominant trends shaping this conversation today.

A Brief History of Energy Transition Policies (and notable “crises” that influenced policies)

Somewhere in the US: ~ Spring 1974

1970s: The genesis of energy independence

The shock: The OPEC embargo led to gasoline rationing, skyrocketing prices, and long lines at gas stations in the U.S. and other Western nations. This exposed the geopolitical vulnerability of relying heavily on foreign oil, particularly from the Middle East.

The narrative: The primary narrative became "energy independence". In the U.S., **Project Independence** was announced to increase domestic energy production and explore alternative sources.

The response "recipe": Governments backed research and development in nuclear, plant-based ethanol, "king coal", coal gasification, solar heating, wind, and "green building codes". There was also a significant push for energy conservation and improved efficiency, leading to stricter fuel efficiency standards for vehicles. ☹

Forecasts of Peak Oil Production!

Season to taste with the anxiety of...

Historical Peak Oil Predictions

Year	Forecaster	Prediction
1880	Early Experts	Exhaustion of Pennsylvania oil fields
1920	USGS Geologists	Peak oil by 1920–1921
1956	M. King Hubbert	US peak oil between 1965–1971
2000	M. King Hubbert	Global peak oil around 2000
2005	Kenneth Deffeyes	Global peak oil by end of 2005
2006	Energy Watch Group	Peak oil occurred in 2006
2006	Matthew Simmons	Peak oil in December 2005
2010	ASPO	Peak oil around 2010
2020	BP Energy Outlook	Peak oil scenario modeling
2030	IEA	Peak oil expected by 2030

1980s & 1990s: A period of retreat and market dominance

Market liberalization: Governments began deregulating energy markets for oil, natural gas, and coal, shifting away from the interventionist policies of the 1970s.

Big oil's retrenchment: Many major oil companies, which had initially invested in **alternative energy research**, largely abandoned these projects to double down on fossil fuel exploration and production.

Climate "science" emerges: Despite an increasing chorus of future global warming during this period, climate issues were not a central driver of the energy narrative. The focus remained on market efficiency and deregulation rather than decarbonization.

To make matters worse….

Three Mile Island – 1979: Nuclear power development in the US came to a halt

Chernobyl – 1986: Europe responded similarly to the US – Nuclear became “BAD”

The 2000s: The rise of the climate imperative

The early 21st century saw a convergence of new geopolitical anxieties and growing climate awareness, pushing the narrative toward decarbonization.

- **Renewed security concerns**: Events like the September 11th attacks renewed concerns over energy security, reinforcing the desire to reduce reliance on volatile foreign oil suppliers.

- **The dawn of climate action**: The Kyoto Protocol and other international efforts brought climate change to the forefront of the global energy discussion. The narrative broadened from simple energy independence to a more complex challenge of securing a reliable, affordable, and clean energy supply.

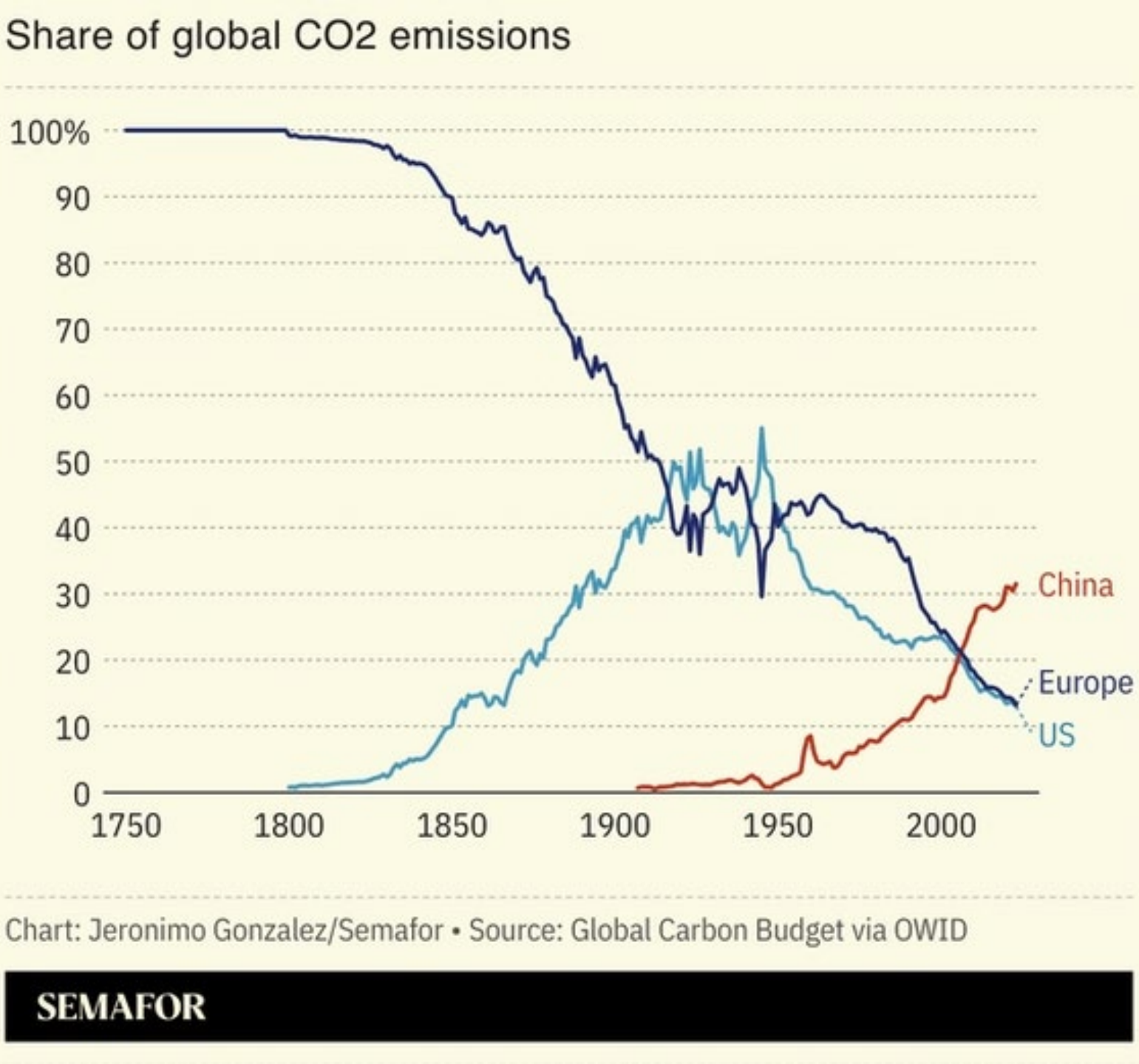
- **The renewable boom**: Supportive policies and falling technology costs drove significant growth in renewable energy capacity, especially in wind and solar.

2010 to the present: The dual realities of transition

The narrative has become increasingly complex, marked by a rapid expansion of renewables alongside persistent fossil fuel use and new geopolitical tensions.

- **The shale revolution**: In the U.S., the shale boom dramatically increased domestic oil and gas production, making the country a net energy exporter and complicating the "energy independence" narrative. **Still room to run.**
- **Decarbonization accelerates**: Global commitments, such as the Paris Agreement, have formalized net-zero targets and amplified the decarbonization imperative. Global investment in the energy transition has reached unprecedented levels.
- **The dual energy system**: Despite record growth in renewables, **fossil fuels continue to dominate the global energy mix, accounting for over 80% of primary energy use.** This reflects the immense challenge of transitioning the global economy and addressing rising energy demand in emerging economies.
- **The current geopolitics**: Russia's invasion of Ukraine created new energy supply shocks, triggering price volatility similar to the 1970s. This highlighted that **energy security remains a critical, and often volatile, dimension of the transition**.

“So, what’s the status of the “energy transition” today?”



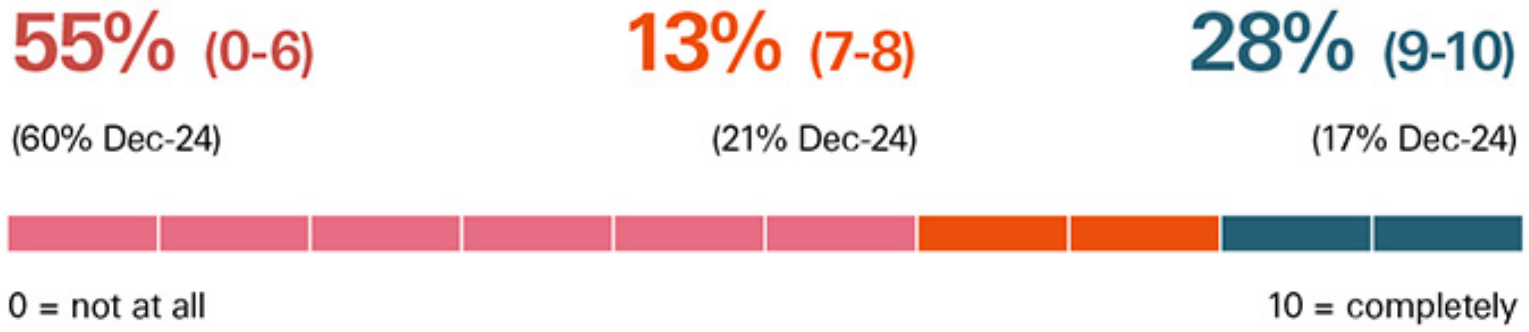
Where did emissions go?

- US and Europe import ~50% of their “stuff” from China.
- Therefore, the US and Europe have “exported” most of their emissions to China.
- But…it’s still one earth and one atmosphere!
- And India is approaching a “China” trajectory in terms of emissions.

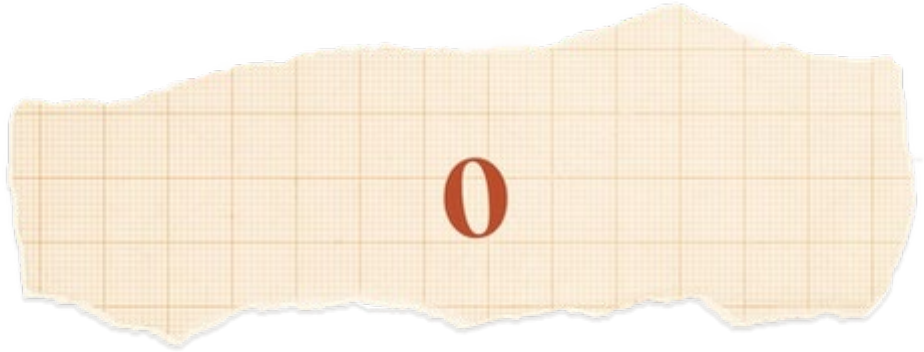
Follow the money…

Incorporating sustainability into investment decision-making

On a scale of 0 to 10, where 0 is not at all and 10 is completely, how much is sustainability incorporated into your investment decision-making?



Source: HSBC-Survation Sustainability Sentiment Survey. The survey was conducted by Survation from 21 May to 4 June 2025, with a sample size of 144 professionals working in the financial services industry across the globe in roles related to sustainability decision-making. Not every question was asked of every participant, as certain follow-up questions depended on the responses to previously asked questions



- **The number of environmental shareholder resolutions that passed at US companies this year, the lowest level in six years.** One hundred and ten such resolutions were on the table at listed members of the Russell 3000 stock index, a broad representation of the US economy, asking companies to do things like report their progress on decarbonization. But the biggest asset managers are more reluctant than ever to appear “woke,” and even **environmental groups are becoming more reluctant to use proxy voting battles** as a venue for corporate climate action, after ExxonMobil sued activist shareholders last year.

More Companies “Self-Price” Carbon

- **A growing number of large companies are putting their own price on carbon emissions.** According to a report published today (4 Sept 25) by the University of Oxford, the Boston Consulting Group, and the carbon trading platform Patch, **1,753 companies globally report using an internal carbon price, an increase of 89% compared to 2021**. That includes about half of the world’s largest 500 companies.

- Internal carbon pricing can range from a purely hypothetical accounting exercise to actual spending on in-house carbon credits, the proceeds from which go into a fund tapped for carbon-cutting activities like energy efficiency upgrades or building onsite renewables. The report concludes that it can be one of the most effective ways for a company to incentivize lower-emission choices by employees, from conference travel to industrial manufacturing. **But in practice, the report found, many companies settle on a price that is too low to drive Paris Agreement-aligned reductions.**

Net-Zero Financing Pull-Back

- **Wall Street's climate coalition is drawing its last breaths, and that may be a good thing.** The Net-Zero Banking Alliance will suspend its activities, the group said on Wednesday, pending a vote next month by its few remaining members on whether it should continue to exist. What started in 2021 as a venue for green virtue signaling quickly ran into trouble as shareholders and Republican politicians balked at the notion of banks making choices based on climate aspirations rather than profit demands. Most of the big US members bailed this year, and European members were rumored to be next out the door.

Financial Times, Aug '25

“What about hydrogen?”

We must not forget that…

physics does matter!

As gas at 1 atm, methane contains 2.6 times the energy of hydrogen

In liquid state, methane contains 2.5 times the energy of hydrogen

This significant difference in volumetric energy density has major implications for infrastructure:

- **Storage**: To store the same amount of energy, hydrogen requires much larger and more complex storage systems than methane. This is a major hurdle for vehicle fueling and grid-scale energy storage.
- **Infrastructure**: Transporting hydrogen through pipelines also faces challenges, as its lower energy density means more volume needs to be moved to deliver the same amount of energy, requiring more energy for compression.

- **“Spain’s ambition to become a green hydrogen hub has suffered a setback, as Repsol confirmed it will not move forward with the 130MW Hydric project in Puertollano, declaring it “technically and economically unfeasible.”**
- **“India’s push to establish itself as a global green hydrogen leader has encountered a setback. The Solar Energy Corporation of India (SECI) has withdrawn a high-profile tender to establish at least two large-scale green hydrogen hubs, citing challenges likely tied to technical feasibility, capacity demands, and possibly lukewarm private sector interest.**
- **“Germany’s federal budget proposal for 2025 signals a major retreat from previously committed financial support for industrial green hydrogen, with funding expected to drop from €3.7 billion to just €1.2 billion through 2030—a 67.5% reduction.”**

Energy News, Aug. 2025

Abu Dhabi Green H2 Investment Diverted to Power

Abu Dhabi's main renewables company has diverted billions of dollars to AI projects instead of green hydrogen, due to a lack of buyers for the fuel once seen as key to the energy transition.

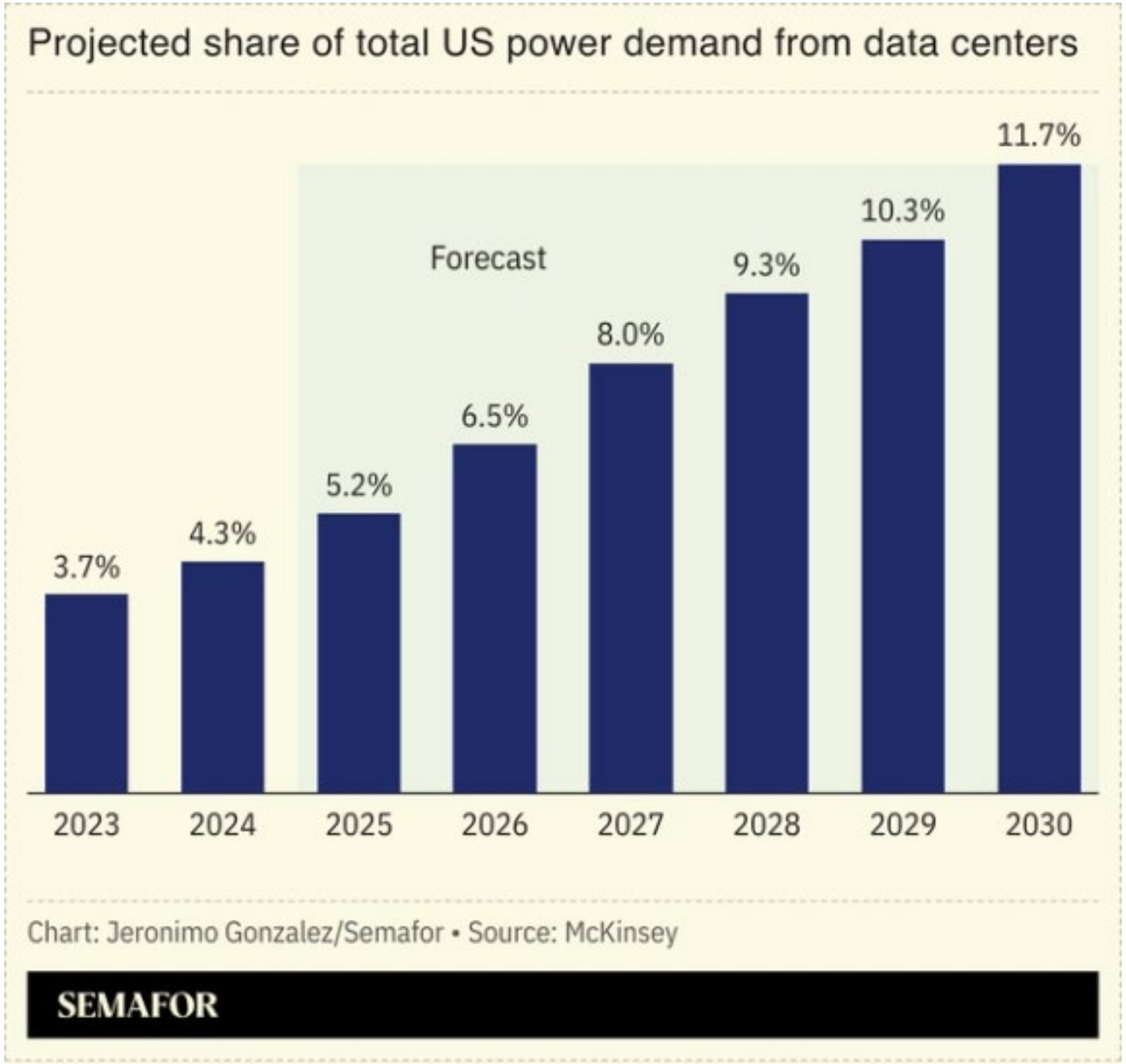
Global demand for clean hydrogen products has fallen short of expectations while power needs from data centers have been surging, prompting Masdar to adjust course, CEO Mohamed Jameel Al Ramahi said in an interview.

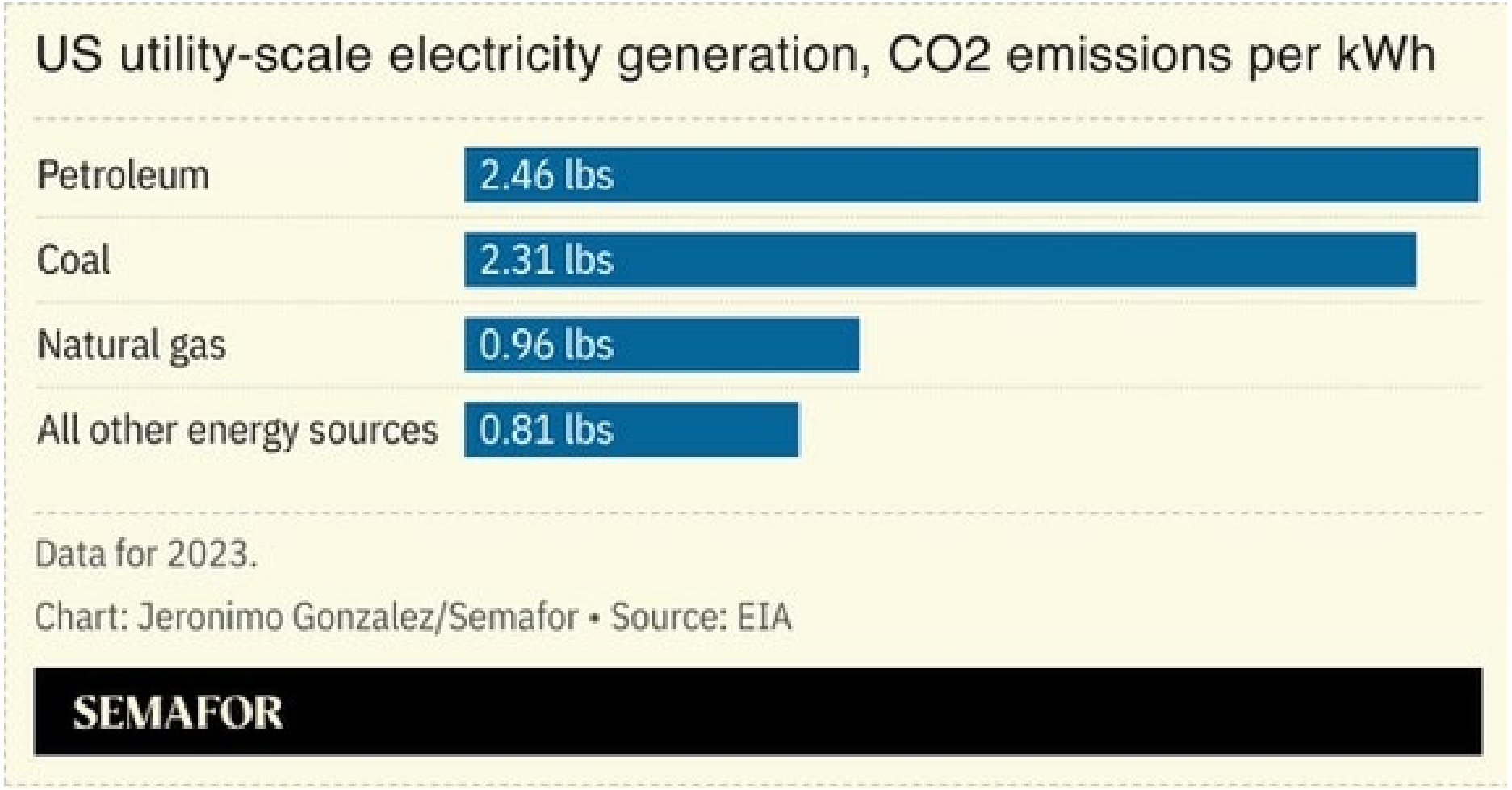
"... I was supposed to generate 6 gigawatts of renewables to produce around 350,000 tons of green ammonia," said Al Ramahi. But the power capacity was repurposed for a $6 billion solar and battery project...which will serve data centers.

Masdar's decision reflects the dilemma faced by developers that made a big push for green hydrogen when excitement around the fuel was at its peak. But weak demand resulting from high costs has forced companies to pull out of projects around the world, casting doubt over the future of the industry.

Bloomberg Aug 20, 2025

Projected AI Power Share in USA





Energy ~~Transition~~ Addition Requires Natural Gas

Concluding (unpopular) Thoughts

- 90% of our world lives in “energy poverty”
- Electric power demand is rising across all sectors
- Renewable power remains a key, but geographically constrained resource needing enormous storage to meet base load demand
- Renewables are facing significant ROI headwinds in the absence of government subsidies and tax credits
- Investment is shifting away from “green” to oil & gas
- Gas is the only widely adaptable fuel to generate power at scale
- Nuclear is poised to replace gas, but this is decades away

Discussion?