

CONVEGNO 2025

# Hydrogen and Alternative Fuels

Nuovi vettori energetici e  
combustibili innovativi: la sfida  
per accaparrarsi un ruolo nella  
transizione energetica

**POLIMI** SCHOOL OF **MANAGEMENT**

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# Hydrogen and Alternative Fuels

## R E P O R T 2 0 2 5

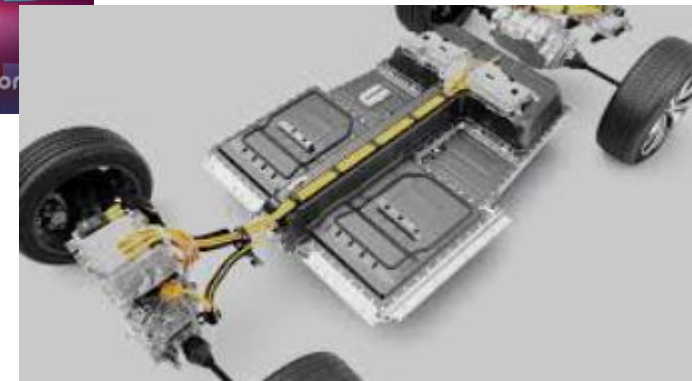
Nuovi vettori energetici e combustibili innovativi:  
la sfida per accaparrarsi un ruolo nella transizione  
energetica

Umberto Bertelè - School of Management, Politecnico di Milano

# **LA TRANSIZIONE ENERGETICA: A CHE PUNTO SIAMO?**

- **GLI SQUILIBRI NEI COMPARTI OVE SI SONO AVUTI I MASSIMI SUCCESSI**
- **I PROBLEMI NEI SETTORI IN CUI L'INNOVAZIONE TECNOLOGICA NON HA FATTO ANCORA ABBASTANZA E LA TRANSIZIONE SI PRESENTA ARDUA**
  - **LONTANA L'«ERA DI GRETA». SONO LE LOGICHE ECONOMICHE E GEOPOLITICHE CHE SPESSO DETERMINANO LE SCELTE, MA HANNO ANCHE UN FORTE PESO I DISASTRI AMBIENTALI**

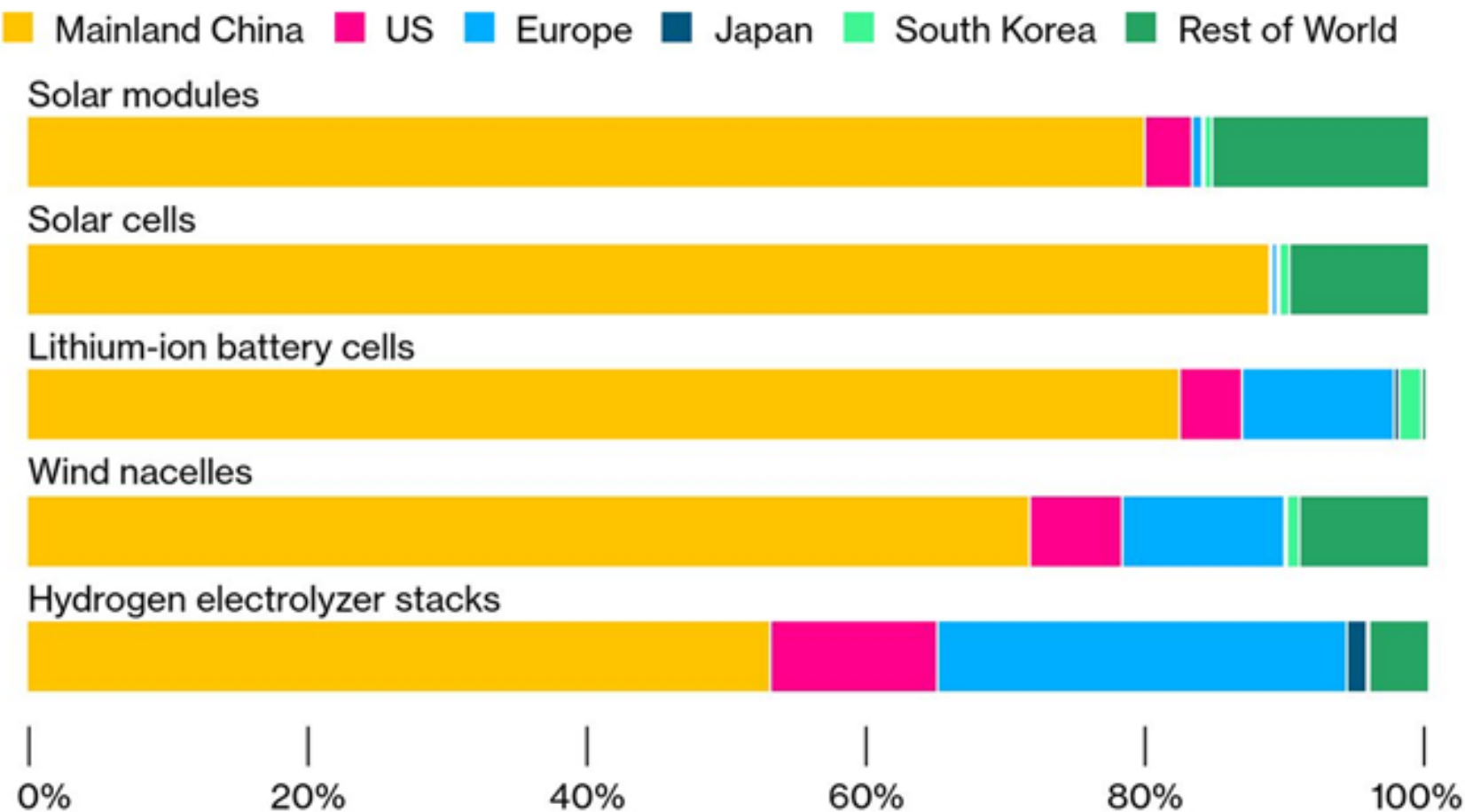
# **1 GLI SQUILIBRI NEI COMPARTI OVE SI SONO AVUTI I MASSIMI SUCCESSI**



# LO SQUILIBRIO GEOPOLITICO IN PRIMO LUOGO, MA NON SOLO

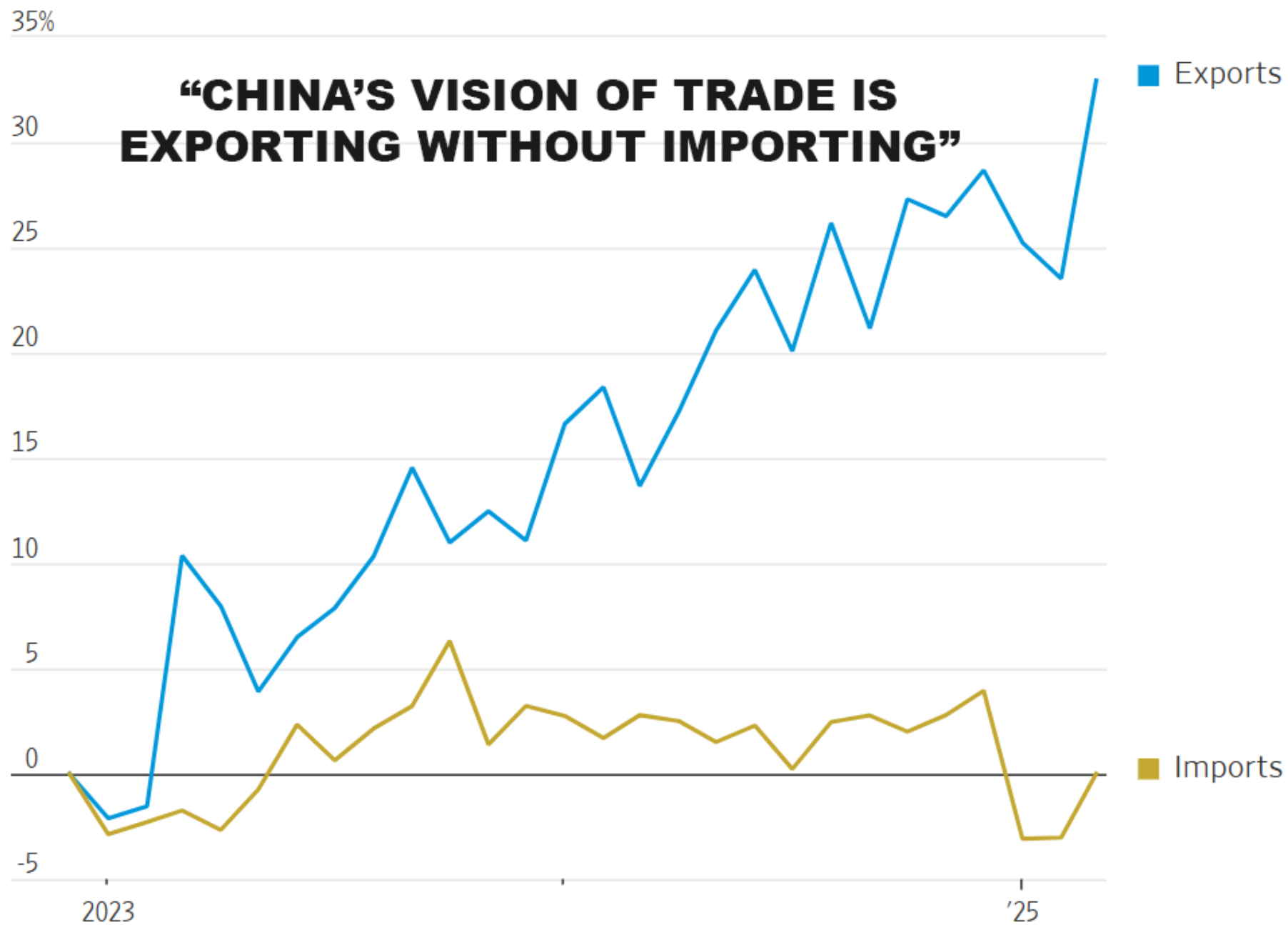
## China Dominates Clean Energy Manufacturing

Clean energy manufacturing capacity by location in 2024



Source: BloombergNEF  
Note: Bars show average shares across selected value chain segments

## China's trade volumes, change since end of 2022





# Solar companies are showing cracks

(10 giugno 2025) Il **paradosso**: nel settore ove forse è stato massimo il successo della transizione energetico-ambientale, con una **quadruplicazione delle installazioni solari nel giro di 5 anni nel mondo (dai 150 GW del 2020 ai 600GW del 2024)**, vi è una **profonda crisi nelle imprese produttrici di pannelli solari** – per ragioni diverse – **sia in Cina sia negli US.**

## In Cina

- è l'**eccesso di capacità produttiva sia nei pannelli solari sia nelle pale eoliche** il problema, che ha ad esempio portato **cinque delle maggiori imprese** - JA Solar Technology, Jinko Solar, Longi Green Energy Technology, Tongwei e Trina Solar – a una **perdita combinata di 1,1 miliardi di \$ nel solo primo trimestre**
- almeno parte delle colpe è dovuta ...





## In Cina

- è l'eccesso di capacità produttiva ...
- almeno parte delle colpe è dovuta alla **sottostima** da parte dell'amministrazione dell'**impatto sulla rete elettrica** dell'**immissione** – a posteriori verificatasi non sostenibile – di una quantità troppo elevata di **energia elettrica da fonti rinnovabili** (un problema che già negli scorsi aveva bloccato la realizzazione di grandi progetti già autorizzati e finanziati negli US e che spinge ora le big tech a collocare i nuovi «data center» focalizzati sull'AI in stretta vicinanza alle centrali elettriche a gas o anche nucleari).





# Solar companies are showing cracks

## Negli US

- ha dichiarato **bancarotta** pochi giorni fa **Sunnova Energy International**, che probabilmente ha risentito dei **tagli di Trump** alla «clean energy industry», degli alti **costi di indebitamento** e delle «**tariffe**»
- si stima che la cancellazione degli incentivi introdotti da Biden, ora in discussione al Senato, porterebbe alla **eliminazione** di **almeno** la **metà** del **mercato** dell'**energia solare residenziale**
- si stima che da gennaio a oggi ammontino a **14 miliardi di \$** **gli investimenti** delle imprese in «clean energy» ed EV **cancellati o rinviati al futuro**.

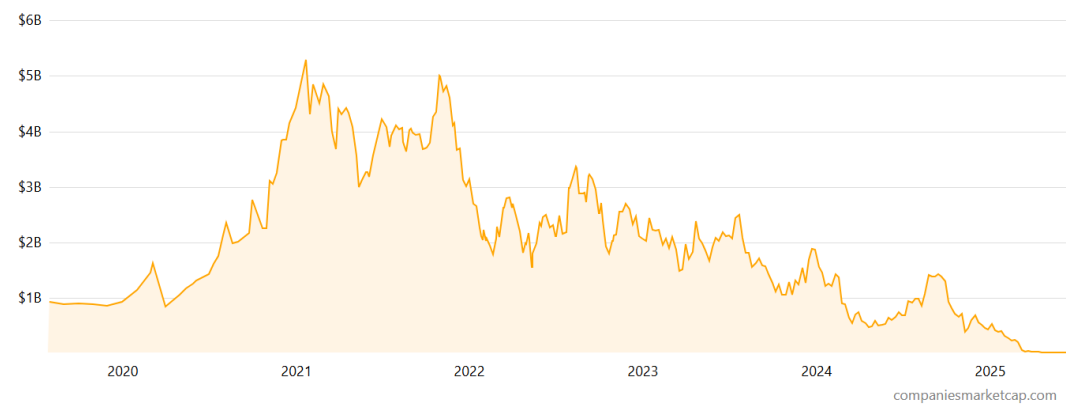
# Sunnova files for bankruptcy on residential solar woes

By Tanay Dhumal

June 10, 2025 3:43 AM GMT+2 · Updated a day ago



Market cap history of Sunnova from 2019 to 2025



June 9 - Sunnova Energy said on Sunday it had filed for Chapter 11 bankruptcy protection in the United States, as the residential solar panel installer buckled under the pressure of mounting debt and weakening demand.

**Sunnova's total debt was \$10.67 billion** as of December 31.

Sunnova is the second residential solar company to file for bankruptcy this month, reflecting the challenges faced by the industry as it struggles to cope with higher interest rates, an incentive cut in top market California and fears of subsidy rollbacks.

# Clean Energy Is Under Attack Even Where It's Booming

Federal tax credits for wind and solar power are on the chopping block, and states are weighing tougher rules

By [Jennifer Hiller](#) [Follow](#)

May 19, 2025 5:30 am ET



387



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Wind and large-scale solar output comprised about 16% of U.S. electricity generation last year. PHOTO:

- GOP lawmakers are targeting clean-energy tax credits to fund President Trump's tax-and-spending bill.
- States such as Texas and Arizona consider tougher rules for renewable projects, which might deter investment in the sector.
- Proposed changes could significantly raise electricity prices for homes and businesses in several states between 2026 and 2032.

Climate startups are feeling the impact of President Trump's attacks on the energy-transition sector, as funding and job cuts, operational halts and bankruptcies rack up.

**From carbon capture to solar power, companies across the clean-tech spectrum are reeling from funding withdrawals, policy changes and import restrictions brought in by the Trump administration as it has set about dismantling the climate goals of its predecessor.**

The Energy Department announced **\$3.7 billion worth of funding cuts for clean-energy and climate projects, with a large portion of the canceled grants focused on carbon capture and sequestration.** Of 24 projects terminated in the move, 16 were signed between election day and Trump's inauguration, the DOE said in a statement.

WSJ PRO

# Sustainable Business

SUSTAINABLE BUSINESS

## Climate Startups Are Pausing Operations, Cutting Staff and Entering Bankruptcy as Trump Policies Bite

Energy Department announced \$3.7 billion worth of funding cuts for clean-energy and climate projects on Friday—in latest blow to green sector

By Yusuf Khan and Clara Hudson

June 2, 2025 5:30 am ET | WSJ PRO

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The policy changes have pummeled stock prices of some clean-energy companies that went public in recent years. **First Solar** said in its earnings report that Trump's tariffs would significantly raise costs for imports. Its stock is **down 15%** since the inauguration

fondata nel 1990, fattura meno di 1 miliardo di \$ ed è in attivo

market cap - 40% rispetto al massimo di 29,3 miliardi di \$ raggiunto esattamente un anno fa

**Hydrogen startup Plug Power's** shares are **down nearly 60%** in the same time period and have fallen into penny stock territory, with the company announcing job cuts amid revenue struggles. It now **faces being delisted from the Nasdaq.**

fondata nel 1997, ha raggiunto la massima market cap - 33,8 miliardi – nel febbraio 2021, per poi scendere a 2 miliardi un anno fa e a 1,4 ora – ha perdite superiori al fatturato

Likewise, **Sunrun, a solar power provider**, is **down 25%.**

fondata nel 2007 fattura mezzo miliardo di \$ ed è in attivo;

ha raggiunto nel 2021 i 19 miliardi di market cap, scesi ora a 2

All companies were hit by news that tax credits for businesses working in the renewables field could be rescinded. Plug said it was continuing to “monitor the evolving landscape,” while First Solar declined to comment.

# Now China's ultra-cheap EVs are scaring China

They highlight many of the economy's current problems

The  
Economist



Xi's electric PHOTOGRAPH: RAUL ARIANO/REDUX/EYEVINE

Jun 5th 2025 | BEIJING

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Share

There are 115 Chinese EV brands.

Only a few, including BYD, make any money and are expected to survive in the long run.

Brutal price wars are a common affliction across Chinese industries.

By the end of last year's third quarter, nearly 25% of China's listed firms were in the red, more than double the proportion five years ago.

## Chinese EV shares tumble as BYD sparks 'rat race' price war fears

Electric vehicle leader announces fresh round of price cuts for its models





BYD

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# BYD brings EV price wars to small cars in Europe

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EU tariffs may limit discounting but Chinese carmakers will appeal to consumers with advanced technology





BYD's shares fell after the price cuts and the official pronouncements, amid **concerns that the price war will be unsustainable. But to cling to market share, other carmakers cut their own prices.** The chairman of Great Wall Motor, one of the largest, **called the industry unhealthy and invoked the collapse of the property market as a cautionary tale.** "Now, **the Evergrande of the automobile industry already exists**, but it just hasn't exploded yet."

## Chinese business & finance

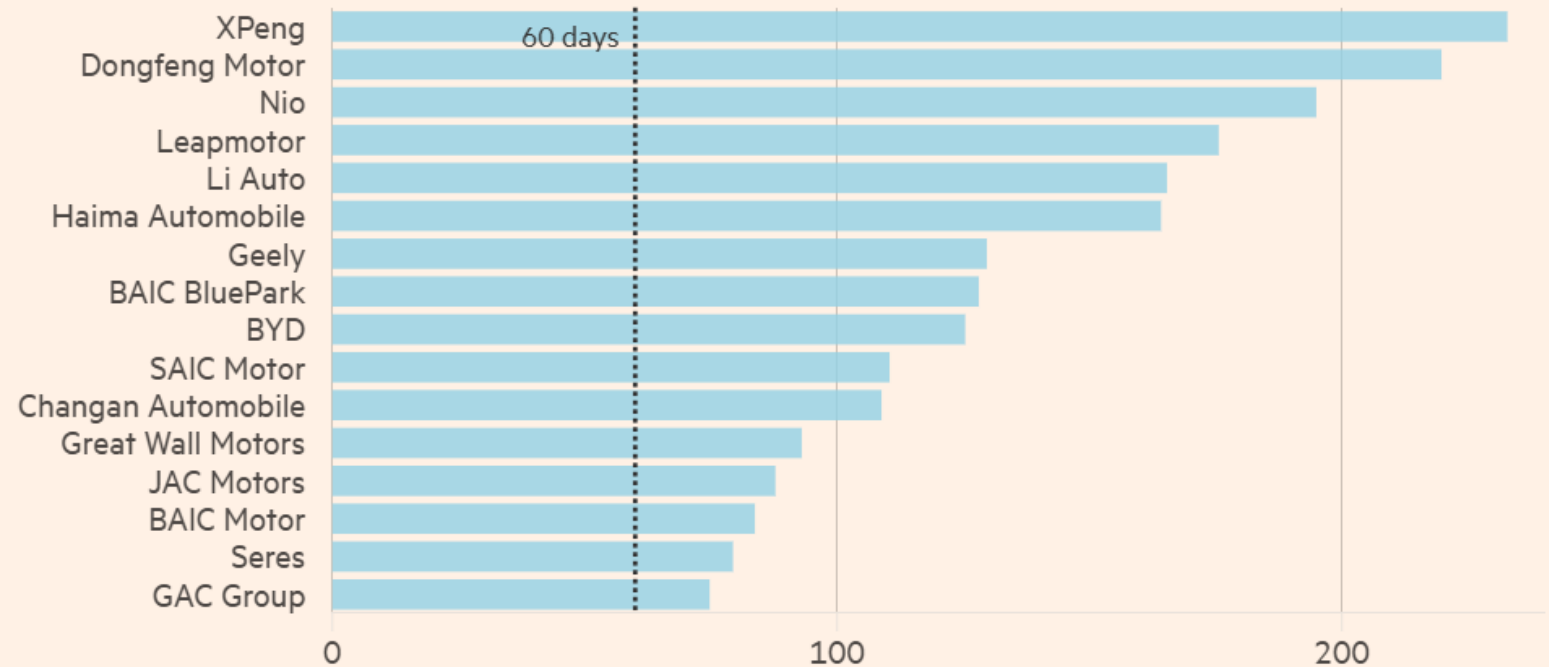
# China's car industry runs on empty as supply chain bills go unpaid

Beijing has acted to ease stresses of a damaging price war with carmakers pressed to settle invoices within 60 days



China's carmakers are required to pay suppliers within 60 days under new rules

\*Average number of days for company to pay suppliers in 2024





## **2 I PROBLEMI NEI SETTORI IN CUI L'INNOVAZIONE NON HA FATTO ABBASTANZA E LA TRANSIZIONE SI PRESENTA ARDUA**



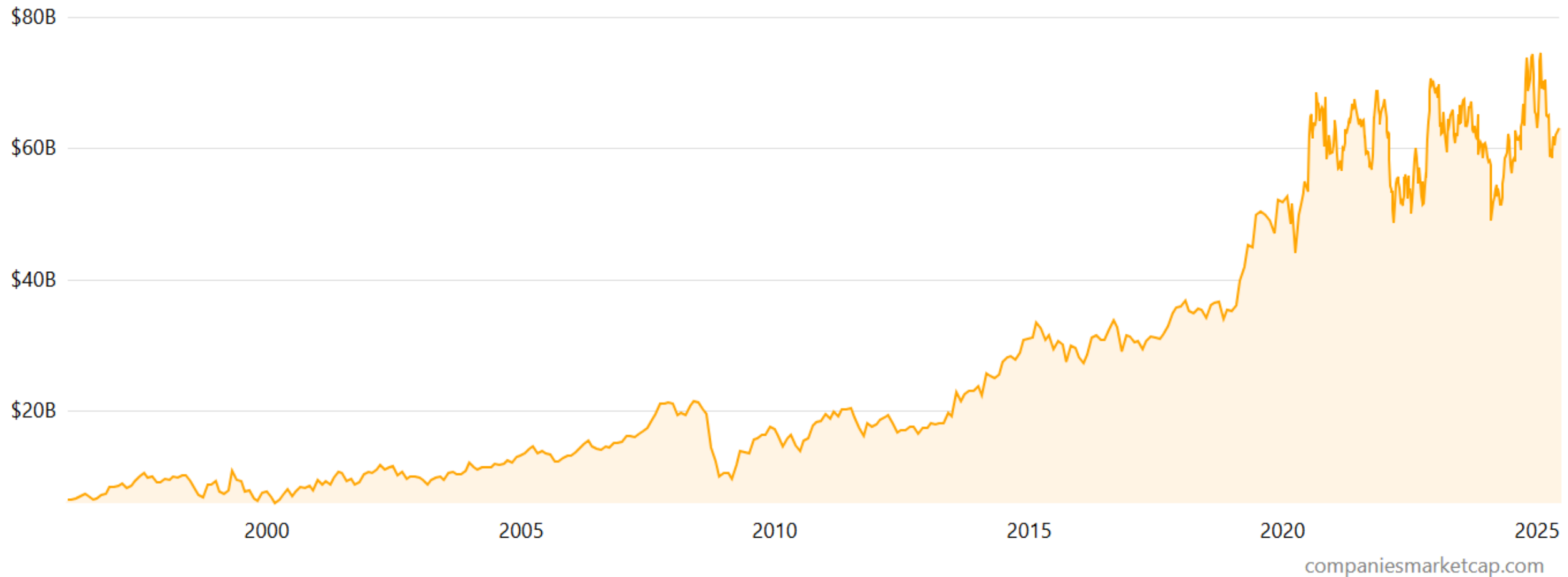
# How Hydrogen, the Fuel of the Future, Got Bogged Down in the Bayou

Air Products bet big on the element, but sentiment has soured, costs are snowballing and customers remain elusive

Air Products plans for carbon dioxide to be sequestered below scenic Lake Maurepas in Louisiana

- Air Products' Louisiana hydrogen plant faces delays, cost increases and customer uncertainty.
- Hydrogen's potential as an alternative fuel is challenged by high costs, limited government support and delayed adoption by key industries.

Market cap history of Air Products and Chemicals from 1996 to 2025







The CEO of Air Products & Chemicals visited the Louisiana governor's mansion in 2021 to unveil the **industrial-gases supplier's biggest-ever investment: a \$4.5bn facility that would make the fuel of the future by the Mississippi River.**

**Seifi Ghasemi's plan was to produce hydrogen from natural gas, capture the carbon dioxide, pipe it through wildlife-rich wetland and sequester it below picturesque Lake Maurepas.**

Ghasemi had a grand vision. **Beyond its regular uses in oil refining and ammonia for fertilizers, hydrogen would power buses, trucks, trains, ships, planes and steel mills after the plant opened in 2026.**

**Nearly five years after his visit, the project's price tag has swelled to \$8bn, the construction timeline has slipped and the company is still seeking customers.** Ghasemi has been ousted as CEO, and his successor is reining in spending.

The idea that low-carbon hydrogen could replace oil and gas in many applications was taking off when Ghasemi visited Baton Rouge, La., as politicians and executives were vowing to slash emissions.

**But sentiment has since soured. This fossil-fuel alternative remains stubbornly expensive, and governments in the U.S. and elsewhere have shied away from putting their weight behind it.**

**The tax bill approved by House Republicans would cut off hydrogen production tax credits**, part of an effort to undo many Biden-era climate programs and reduce funding for wind and solar power. President Trump, meanwhile, has cast himself as the savior of U.S. oil and gas.

**Companies that once looked like early movers—such as the steel producer ArcelorMittal and Airbus—have delayed plans to use hydrogen.**

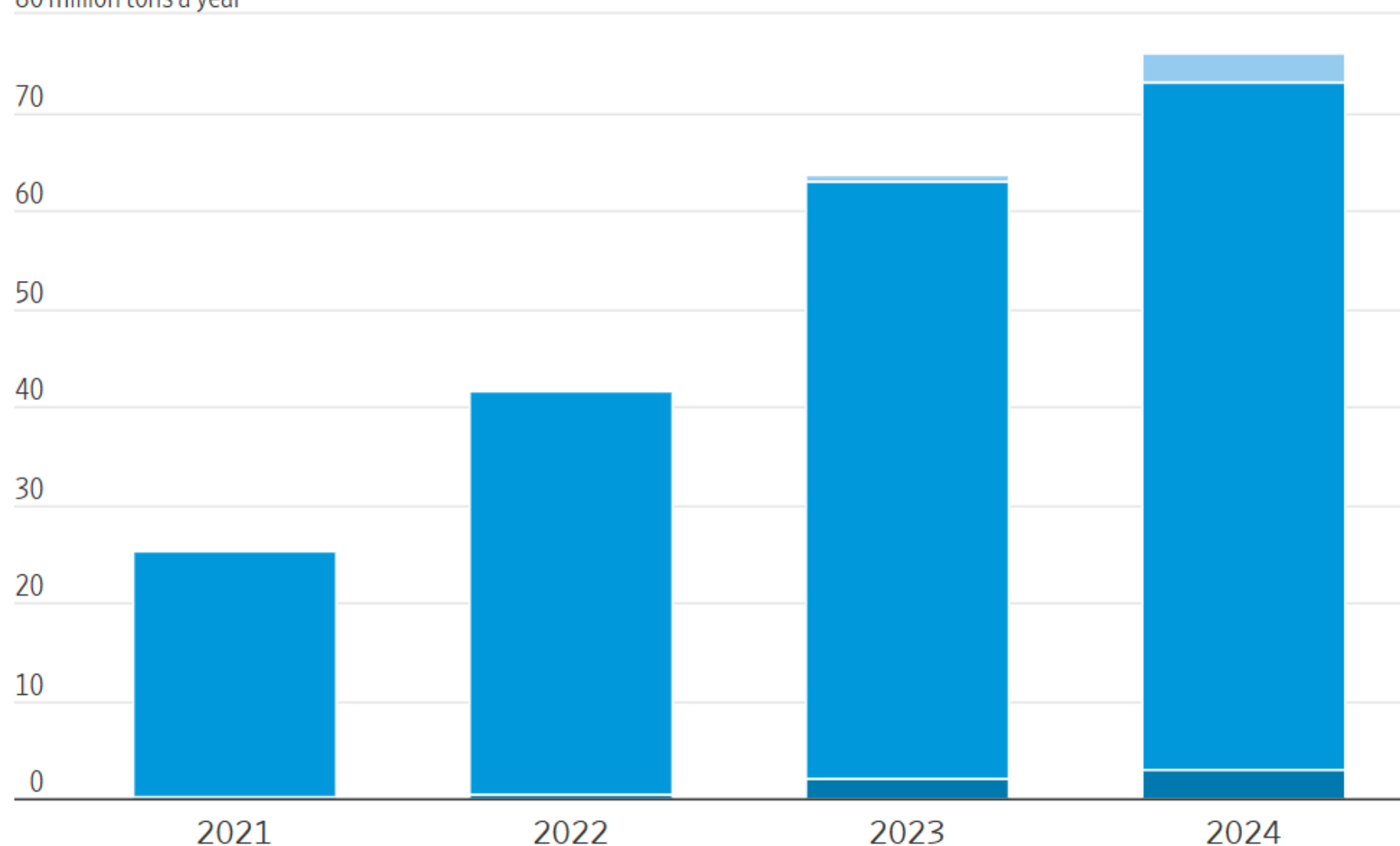
“The main challenge right now is finding buyers,” said Martin Tengler, a BloombergNEF analyst who estimates that **just 4% of the announced low-carbon hydrogen production capacity had secured funding as of 2024.**



## Clean-hydrogen production capacity, by status of announced projects

■ Committed capacity ■ Planned ■ Canceled or on hold

80 million tons a year



Note: "Committed" covers plants that were financed, started construction or were commissioned.

Source: BloombergNEF



At Neom, Saudi Arabia's under-construction desert metropolis, **Air Products has an unusual double role in the largest green-hydrogen project being built.** As well as being a shareholder, **the company committed to buy the hydrogen from the plant in the form of ammonia, which is easier to export.** That puts the company on the hook to find customers.

**Air Products has announced just one: TotalEnergies, which plans to use green hydrogen in European refineries.** Eduardo Menezes, who became Air Products' CEO in February, said he is talking to other potential buyers.

**Saudi Arabia has the abundant sunshine, wind, space and labor needed to make relatively low-cost green hydrogen, but "it's still a premium product,"** he said.

The plant is on course to **start production in 2027, but Air Products now plans to delay its investment in facilities in Europe designed to handle hydrogen from Neom.**





## **Uncertain demand is slowing down a plan to turn the dutch Port of Rotterdam into Europe's hydrogen hub.**

Three years ago, **Air Products** and the trading group **Gunvor** said they would build a terminal to import ammonia and convert it back into **hydrogen**. It was one of several planned at the port, which also **set aside space for green-hydrogen factories**.

**Most of those projects, including Air Products', still await investors' go-ahead.**

**A hydrogen pipeline network has been delayed.**

**Shell is building a green-hydrogen factory, but BP recently pulled out of a similar effort and has been scaling back its low-carbon spending.**

"We have to be realistic about the time frame," said the CEO of the Port of Rotterdam Authority.

**Progress is being slowed by Europe's high electricity prices, which increase the cost of producing green hydrogen, and regulatory uncertainty.**

**The EU has set mandates that will require the use of green hydrogen in refining and other sectors. But BloombergNEF said they aren't nearly stringent enough to fulfill the bloc's target of consuming 20 million tons of green hydrogen a year by 2030.**

# HYDROGEN IS THE FUEL OF THE FUTURE AT THE PORT OF KLAIPEDA



## GREEN PORT: HYDROGEN PRODUCTION AND REFUELLING STATIONS





# 2024 European Biomethane Map shows 37% increase in EU RNG capacity

5 July 2024 by Bioenergy International

Europe has reached an installed capacity of 6.4 billion cubic meters (bcm) of biomethane per year, according to figures in the 2024 European Biomethane Map. Of this capacity, 81 percent corresponds to plants located in the European Union (5.2 bcm). **The EU-27 countries' growth has reached 37 percent**, while the capacity of the non-EU countries analyzed grew by 20 percent compared to the 2022-2023 dataset.

**The 2024 European Biomethane Map features 1,548 biomethane (RNG) plants.** This represents a **32 percent growth** in the number of plants in Europe compared to the previous edition, which featured 1,174 units.

**France is one of the countries leading the biomethane scaleup** pathway and has nearly doubled its capacity compared to the previous edition of this map.

**Italy has also shown significant growth, increasing its number of plants fourfold and its total plant capacity more than threefold,**

whereas the **United Kingdom and Denmark maintain their positions among the top five biomethane producers in Europe.**

**Germany remains the biggest biomethane producer** but has paused the construction of new plants.

# Eni to sell 25% stake in biofuel unit to KKR

Italian group will use investment to help fund diversification from oil and gas to renewable energy



OCT 24 2024



# Future of Scottish oil refinery linked to biofuels investment

Ministers under pressure to secure future of imperilled Grangemouth facility



DEC 29 2024

The Grangemouth oil refinery in Falkirk. A project, scheduled for completion at the end of January, aims to deliver a business plan for low-carbon industrial processes, including green hydrogen © Jane Barlow/PA Wire



**THE TRUMP ADMINISTRATION IS PROPOSING OIL REFINERS BLEND  
MORE BIOFUELS INTO GASOLINE AND DIESEL NEXT YEAR.**

The plan would require refiners to mix a record 24.02 billion gallons of biofuels into conventional diesel and gasoline — nearly 8% higher than the 2025 target.





**3 LONTANA L'«ERA DI GRETA». SONO LE LOGICHE ECONOMICHE E GEOPOLITICHE CHE SPESSO DETERMINANO LE SCELTE, MA HANNO ANCHE UN FORTE PESO I DISASTRI AMBIENTALI**



# DI TRANSIZIONE ENERGETICA SI PARLA SEMPRE MENO



di Lucrezia Reichlin | 8 giugno 2025

**Di transizione energetica si parla sempre meno. L'attenzione della politica italiana e europea si è diretta altrove.**

**Bruxelles**, in risposta alle pressioni degli Stati membri dell'Unione, sta considerando opzioni per diluire le politiche verdi.

**Darsi regole troppo strette** non risolve il problema del cambiamento climatico e allo stesso tempo **indebolisce la competitività dell'industria europea**.

Tanto più che **gli Stati Uniti stanno smantellando tutte le politiche verdi** e conducendo una battaglia culturale all'insegna del «drill, baby drill».





di Lucrezia Reichlin | 8 giugno 2025

Il problema con questa logica è che, **per l'Europa, che dipende dalle importazioni di gas e petrolio, la strategia verde è fondamentale per raggiungere l'indipendenza energetica.** Per questo, la pressione su Bruxelles non dovrebbe essere volta ad ottenere un rilassamento di obiettivi e regole, ma dovrebbe invece esercitare **pressione affinché si sviluppino strumenti collettivi per promuovere investimenti in rinnovabili**, che sostengano la innovazione e la produzione e commercializzazione a scala delle tecnologie verdi. Se nel breve e medio periodo la transizione da tecnologie tradizionali alle rinnovabili comporterà costi, **nel lungo periodo il cambiamento del nostro sistema energetico è condizione della resilienza del nostro sistema economico e della nostra autonomia strategica.**

### L'attacco di Israele all'Iran



GILLIAN TETT

For while Iran “only” produces about 3.3mn barrels of oil a day, according to S&P — about 3 per cent of the global total — **the real threat is that if further conflict shuts the Strait of Hormuz it will undermine shipping.** Indeed, ING Barings expects that **in an extreme, worst-case scenario** — ie a long blockage of the strait — **oil prices could double to a record high of \$150 later this year.**

# Banks boosted fossil fuel finance by more than a fifth in 2024, report says

US banks and Barclays each increased sector lending and underwriting by more than \$10bn



Merger and acquisition finance was a key driver after deals between US gas producers, particularly in the Permian Basin © Reuters

(June 17 2025) **Global banks led by JPMorgan Chase, Citigroup and Bank of America boosted fossil fuel financing by more than one-fifth in 2024, in a major reversal of the trend of recent years, an annual report by climate campaigners found.**

**Coal, oil and gas finance provided by the world's 65 largest banks by assets rose by \$162bn to \$869bn,** according to the 16th report produced by a coalition of groups co-ordinated by the Rainforest Action Network, based on lending and underwriting data from more than 2,800 companies.



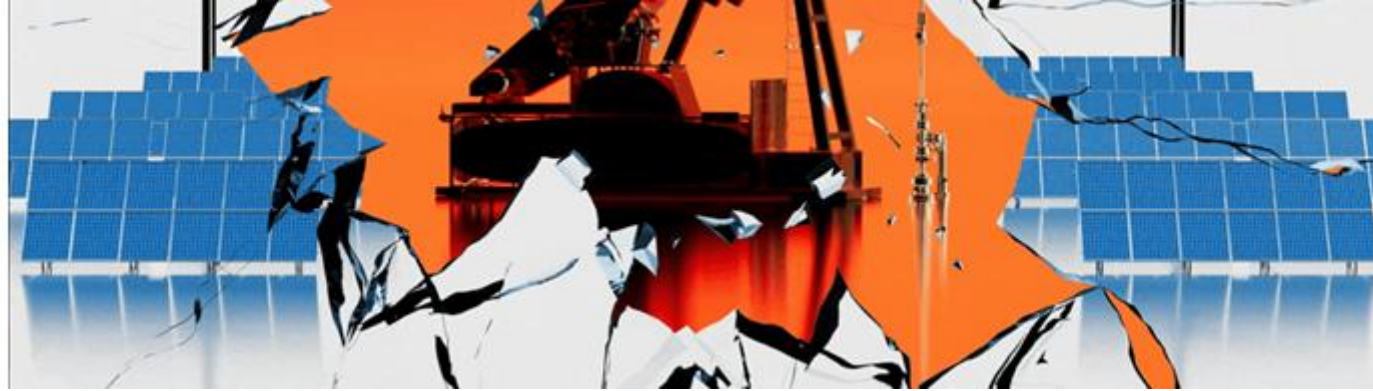
# COMPANIES ABANDON CLIMATE PLEDGES

*Today's [June 12] newsletter looks at how Coca-Cola, BP, HSBC and countless other companies are dropping environmental goals.*

**IN THE PAST YEAR COMPANIES AROUND THE WORLD HAVE BEEN CANCELING THEIR CLIMATE COMMITMENTS** (some only a few years old)

- **BP** is pulling back on renewables and drilling more oil
- **Coca-Cola** and **PepsiCo** abandoned or weakened promises they made in 2021 to slash their use of new plastics
- Banks such as **Wells Fargo** and **HSBC** walked back various plans to reduce their emissions
- **Walmart** admits it's behind on its climate targets
- **FedEx** says it will likely miss its goal to go electric on half of its delivery truck purchases by 2025

**FOR YEARS COMPANIES HAVE SUGGESTED THEIR PURSUIT OF SUSTAINABILITY  
WOULD NATURALLY FOLLOW THEIR QUEST FOR PROFITS.**



There's an element of truth to this:

**Some climate-friendly endeavors, including swapping out lightbulbs and putting up solar panels, quickly pay for themselves and enhance the bottom line.**

**But most projects required to achieve deep decarbonization, such as decommissioning coal boilers or using cleaner fuels, cost gobs of money, and no one knows when or if they'll ever be cheaper than their dirtier alternatives.**

**AS LONG AS THESE MEASURES REMAIN VOLUNTARY, THEY WON'T HAPPEN AT  
ANYWHERE NEAR THE SCALE OR PACE THAT'S NEEDED. AND COMPANIES WILL BE  
FREE TO RENEGE ON THEIR PROMISES.**



# Ten Forces Reshaping Global Business



☰ **BCG**

**KEY TAKEAWAYS**

From trade wars and geopolitical shifts to regional wars and climate change, business leaders must manage through unprecedented complexity in the global landscape.

- **Businesses must navigate an increasingly multipolar world as the US turns inward, China shifts its economic focus, a confident Global South gains influence, and Europe seeks to forge a new path.**
- **Geopolitical rivalries are driving tectonic shifts in world trade, intensifying competition for technological dominance, and fueling a rise in economic nationalism.**
- **Enduring global shocks, including ongoing armed conflicts, climate threats, and deepening societal polarization, continue to exert pressure on business strategies and supply chains.**

## 9. Climate Refuses to Be Ignored

**The need to adapt to and mitigate the impact of extreme weather events and rising sea levels driven by climate change continues to reshape global business.** Many nations, particularly several emerging markets, remain vulnerable to extreme climate events, which are projected to have a significant impact on GDP. And because the business case is clear, we believe that economically viable and competitive low-carbon energy, technologies, and supply chains technologies will continue to thrive.

Green investment is still accelerating around the world. **The EU leads the charge in deploying carbon-pricing mechanisms and maintaining subsidies for renewable energy. China continues to invest heavily in order to lead in the manufacture of green energy systems.** In the US, support for renewable energy and manufacturing plants producing green products remains strong in certain states.

More importantly, the business case for low-carbon solutions remains strong. **Solar and onshore wind power are now very cost competitive in the US with gas, geothermal, coal, and nuclear.**



**What's more, extreme weather events and the scarcity of resources such as water are risks that companies cannot ignore, particularly in industries such as agriculture, real estate, and logistics that are highly exposed to environmental disruption.**

Over the longer term, companies will remain under pressure to adopt more resilient business models.



"Mitigation still remains much, much cheaper than adaptation, and investing in resilience upfront remains much cheaper than disaster recovery. "

**Jaakko Kooroshy**

*Global head of sustainable investment research at London Stock Exchange Group Plc.*

"Weather events now have a more direct and significant impact on the market."

**Marco Saalfrank**

*Head of continental Europe merchant trading at Swiss utility Axpo Holding AG*

He was commenting on Europe's increasing reliance on renewable energy, which has amplified the role of shifts in the weather.





## Prepare for the worst

"There is some sense until now that we've got away with it, [but] a severe and prolonged drought could materialize at any time."

**Jim Hall**

*Professor of climate and environmental risk at Oxford University*

Hall spoke with *Bloomberg Green* in 2023 about Britain's race to fix its broken water system.

## Every little bit hurts

"An increase in heat extremes is the most obvious symptom of climate change. Even seemingly small changes in temperatures of a few degrees can make summers feel substantially more extreme."

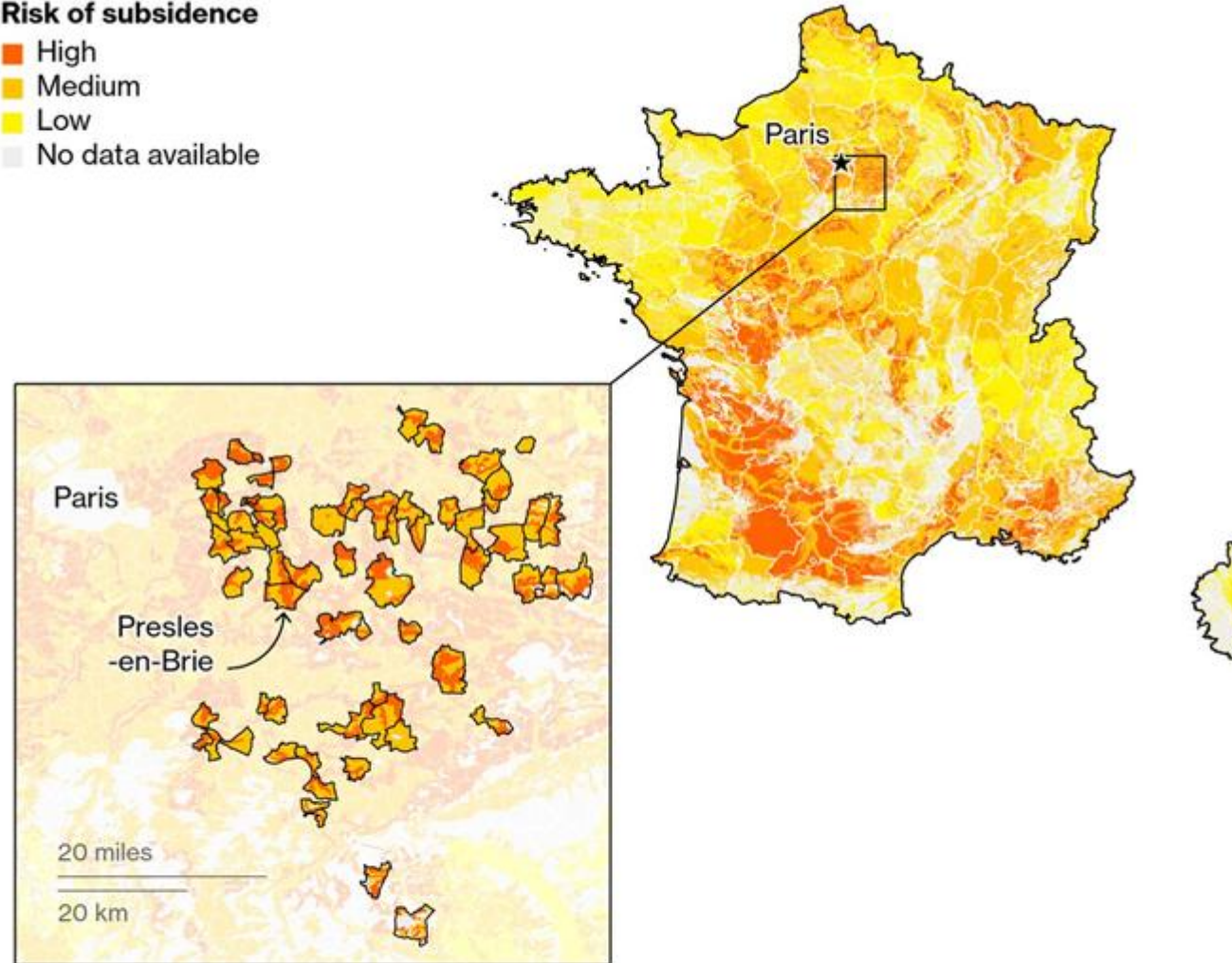
**Karen McKinnon**

*Professor at University of California, Los Angeles*

# Climate change is breaking homes

## Risk of subsidence

- High
- Medium
- Low
- No data available



Sources: GeoRisques (French Ministry of Ecological Transition); municipality and department boundaries from the French National Geographic Institute (IGN)

**Climate Change Insurance Crisis:**
[Catastrophe Bonds](#)
[Lightly Regulated Insurance](#)
[\\$1 Trillion Liability](#)
[How the Ultra-Rich Defy Risk](#)
[Risky Prediction Bus](#)
[◀](#)
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Presles-en-Brie homeowner Bernard Weisse looks at cracks in a bedroom wall of his village home on the outskirts of Paris on June 2. *Photographer: Cyril Marcilhacy/Bloomberg*

[Green](#) | [Greener Living](#)

# Homeowners Battle Insurers Over \$2.9 Trillion Climate Risk

Subsidence is a worsening risk and insurers don't want to pick up the tab.

By [Claudia Cohen](#), [Gautam Naik](#), and [Tom Fevrier](#)

June 13, 2025 at 6:00 AM GMT+2



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