



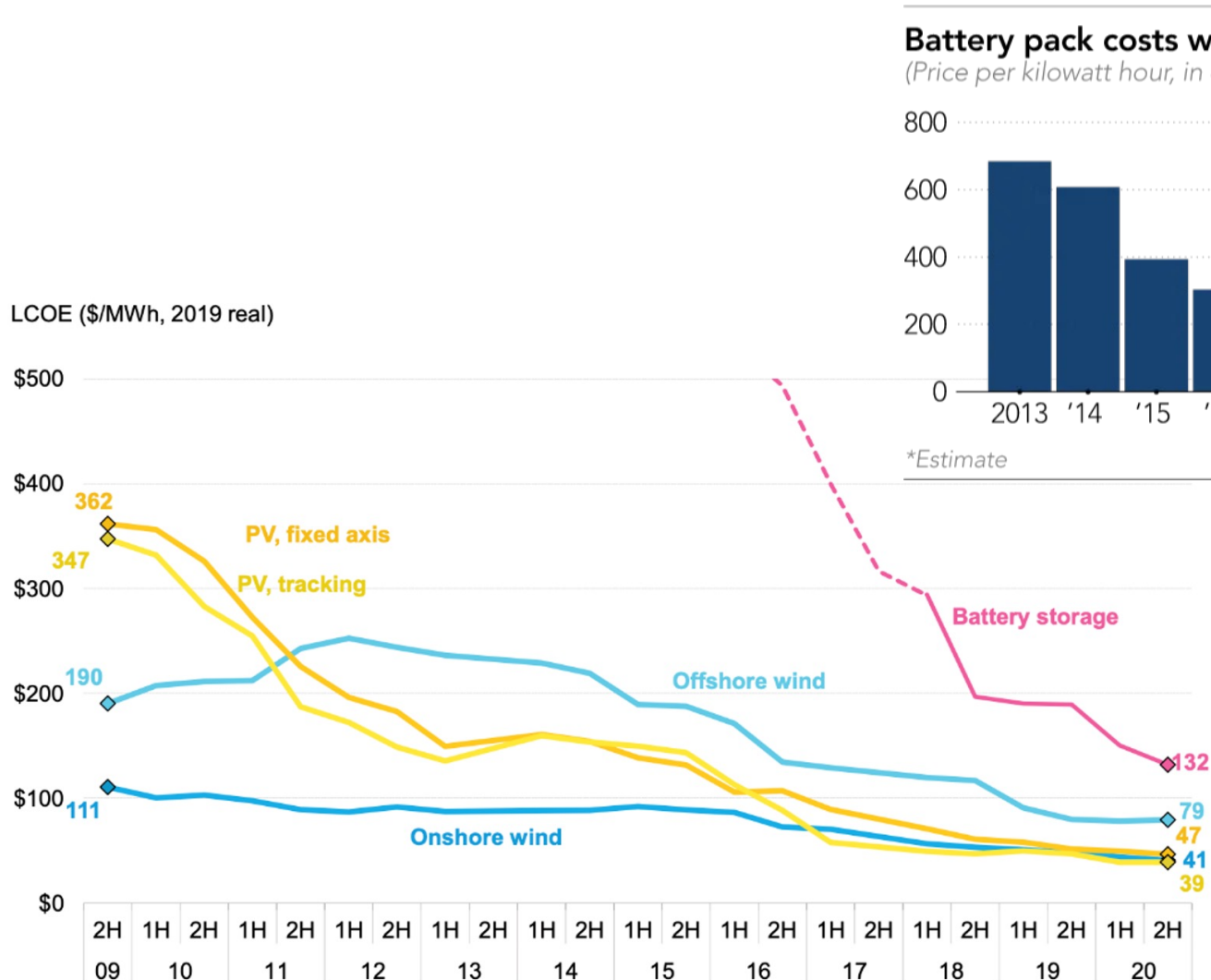
Tim Buckley, Director,
Climate Energy Finance
tim@climateenergyfinance.org

12 May 2022

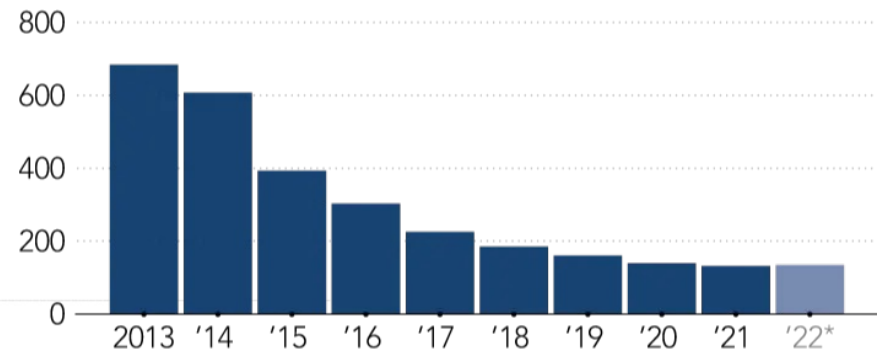
Energy Transition Summit

Financing the Transition
in 2022, the year of “Peak
Volatility”

2010-2020: Technology-Driven Deflation



Battery pack costs were falling over the past decade
(Price per kilowatt hour, in dollars)



*Estimate

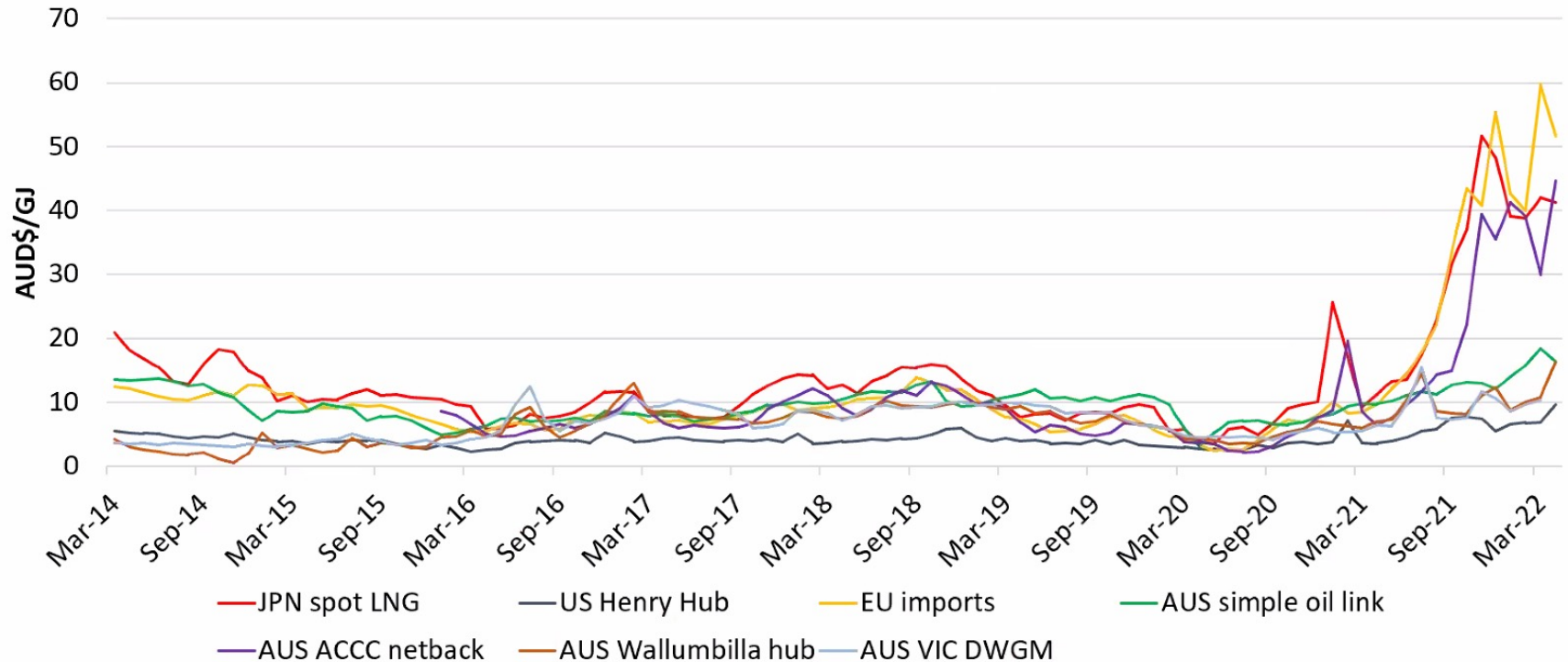
Source: Bloomberg NEF

November 2020 saw a 1,070MW solar tender awarded in India at just Rs2.00/kWh (an LCOE <US\$20/MWh) down 18% yoy.

August 2020 saw a 700MW solar tender awarded in Portugal at US\$13.15/MWh (down 24% yoy).

2021-22: Extreme Fossil Fuel Inflation

Gas – expect high international prices for years; local rises, lags



Australia Has Energy Export Price Parity

Electricity – futures prices have surged



Renewables Infrastructure & Batteries: A Financial Construct

\$100 billion of investment potential for Hunter-Central Coast Renewable Energy Zone

Published: 16 Feb 2022

Released by: Treasurer, Minister for Small Business

Business and Economy

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Commercial interest in renewable generation and storage projects representing almost 40 gigawatts and more than \$100 billion of potential investment have been received in the registration of interest for the Hunter-Central Coast Renewable Energy Zone (REZ).

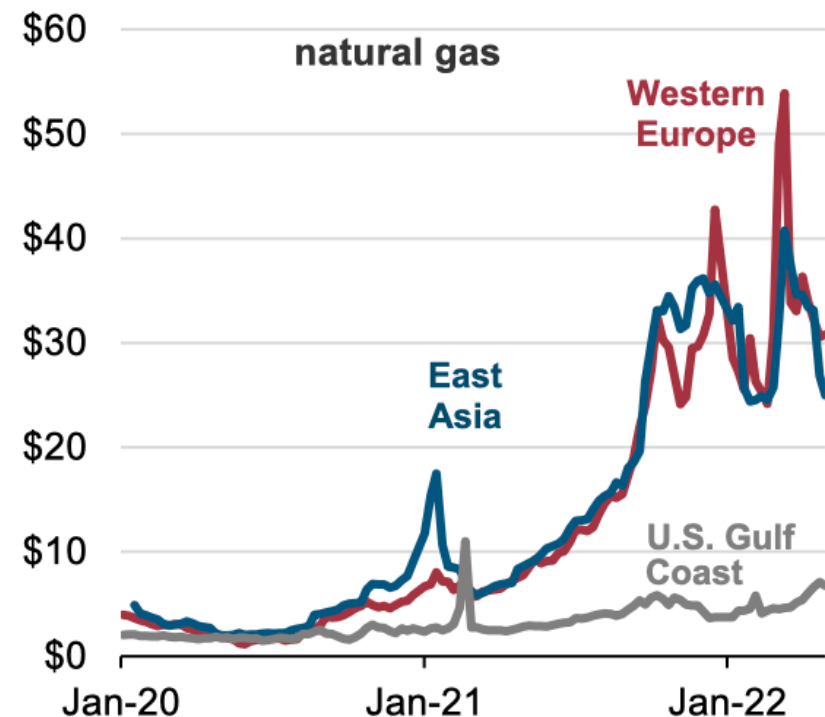
Treasurer and Energy Minister Matt Kean said the overwhelming result shows that the Hunter and Central Coast will continue to be the energy powerhouse of NSW long into the future.

2021-22: Extreme Fossil Fuel Inflation

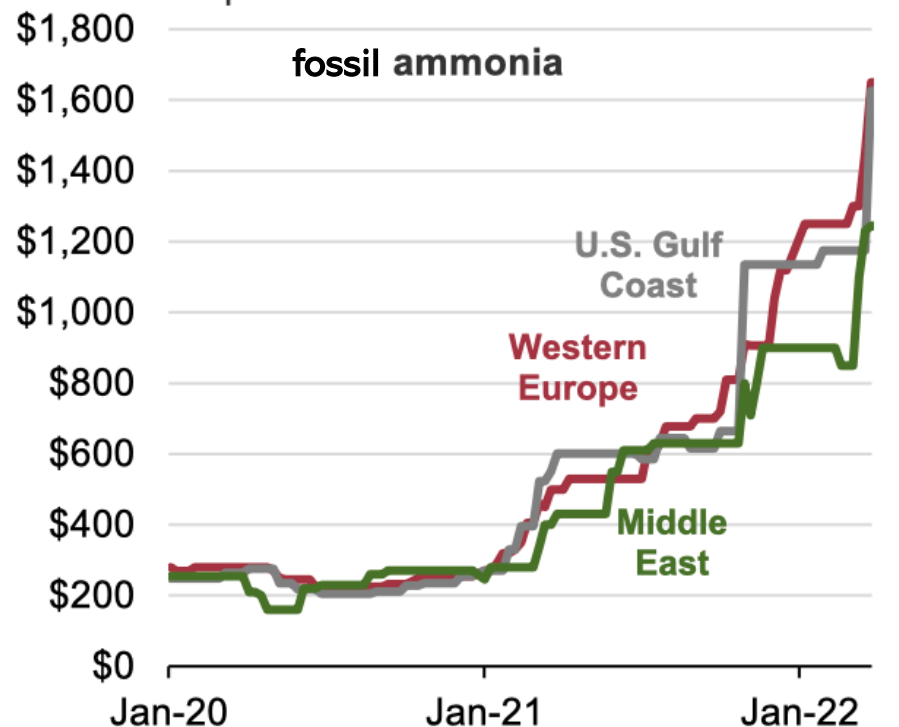
U.S. ammonia prices rise in response to higher international natural gas prices

Weekly natural gas and ammonia prices (Jan 1, 2020–Apr 29, 2022)

U.S. dollars per million British thermal units



U.S. dollars per metric ton



Germany/Oz: A Landmark MoU Energy Security

‘Freedom energy’: Forrest offers hydrogen to Russia-dependent Germany

[Hans van Leeuwen](#) Mar 30, 2022 – Australian Financial Review



[E.ON](#) COO Patrick Lammers signs the H2 deal with Fortescue's Andrew Forrest

5Mtpa GH2 is 28Mtpa
of ammonia worth
A\$30bn annually.

Mining magnate Andrew Forrest has offered a major slice of Fortescue's planned future supply of GH2 to Germany, branding it "freedom energy" that will help Europe's largest economy cut its dependency on Russian gas. Mr Forrest signed a memo with Germany-based [E.ON](#), one of Europe's largest energy network operators, to underpin a potential future supply of up to 5 Mtpa of hydrogen from renewable sources by 2030.

"We all know there is so much which we cannot yet fully answer. But as people of honour, we will be able to solve it simply through the agreement of our word. We trust each other, the corporations trust each other, and emphatically and most importantly, our two countries trust each other. They're based on the principle of democracy – the absolute, unadulterated necessity of human freedom." "On both sides, it will be like a duck swimming," he said. The two firms' executives would be "really calm", but "underneath, our organisations will be going like crazy because for us it's a \$50bn expenditure".

According to Fortescue, a 5-Mtpa supply of green hydrogen by 2030 would account for one-third of Germany's calorific energy imports from Russia.

India: A Doubling to 10GW H₂ by 2030

Energy Minister RK Singh considering a mandatory purchase obligation for 10% GH₂ on fertiliser, refineries & steel in initial years

Mukesh Ambani sees green hydrogen costs coming down to \$1 per kg in 10 yrs

Ambani noted that the PM had set a goal to reach 450GW of renewable energy capacity by 2030

Topics

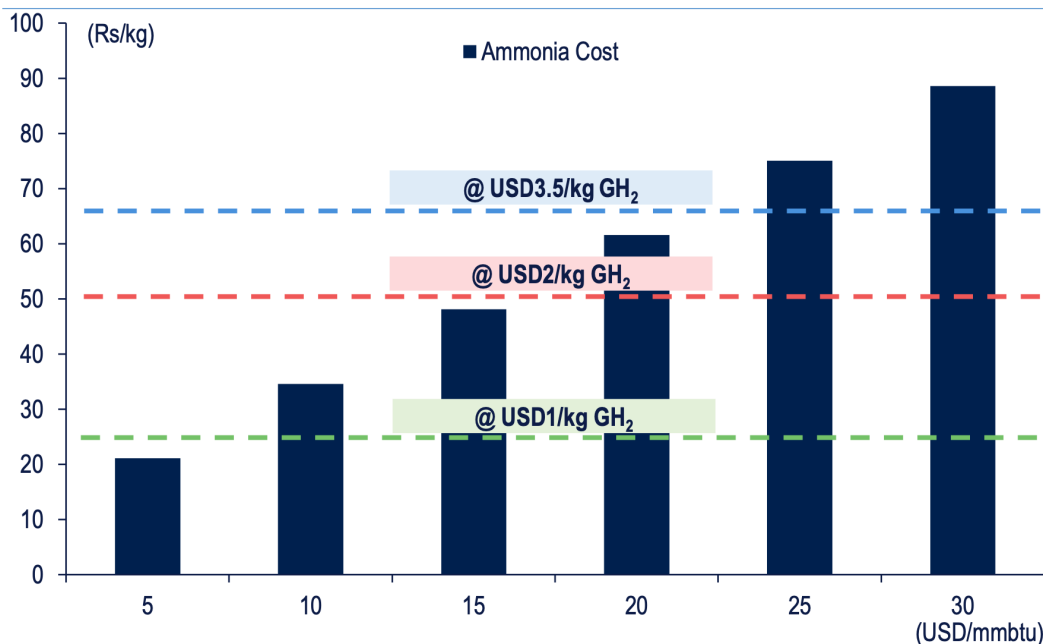
Reliance Industries | Climate Change | Mukesh Ambani

BS Reporter | New Delhi

Last Updated at September 4, 2021 02:20 IST

Mukesh Ambani, Chairman and Managing Director of [Reliance Industries](#) (RIL), on Friday said India can be the first country to bring down the cost of green [hydrogen](#) to \$1 per kg within a decade, reiterating the company's push towards alternate energy.

Figure 17: Green Ammonia viable at currently elevated global gas prices



Source: Yara, Investec Securities estimates

Global Financial Alliance for Zero Emissions

A pledge to invest in alignment with 1.5°C

New Financial Alliance for Net Zero Emissions Launches



PRESS RELEASE ISSUED ON BEHALF OF THE COP25 and COP26 CLIMATE CHAMPIONS

Industry-led and UN-convened Net Zero Banking Alliance also announced today, co-launched by the UNEP Finance Initiative and the Financial Services Taskforce of the Sustainable Markets Initiative

- The Glasgow Financial Alliance for Net Zero (GFANZ), chaired by Mark Carney, UN Special Envoy on Climate Action and Finance, brings together over 160 firms (together responsible for assets in excess of \$70 trillion¹) from the leading net zero initiatives across the financial system to accelerate the transition to net zero emissions by 2050 at the latest.
- All GFANZ member alliances must be accredited by the UN Race to Zero campaign. They must use science-based guidelines to reach net zero emissions, cover all emission scopes, include 2030 interim target setting, and commit to transparent reporting and accounting in line with the UN Race to Zero criteria.
- 43 banks from 23 countries (with assets of \$28.5 trillion) form the Net-Zero Banking Alliance (NZBA) today – which joins GFANZ – with its members committing to align operational and attributable emissions from their portfolios with pathways to net-zero by 2050 or sooner.

**US\$130 trillion by Nov 2021
(+90% in 6 months)**

A Tectonic Shift Accelerates

In January of last year, I wrote that climate risk is investment risk. I said then that as markets started to price climate risk into the value of securities, it would spark a fundamental reallocation of capital. Then the pandemic took hold – and in March, the conventional wisdom was the crisis would divert attention from climate. **But just the opposite took place, and the reallocation of capital accelerated even faster than I anticipated.**

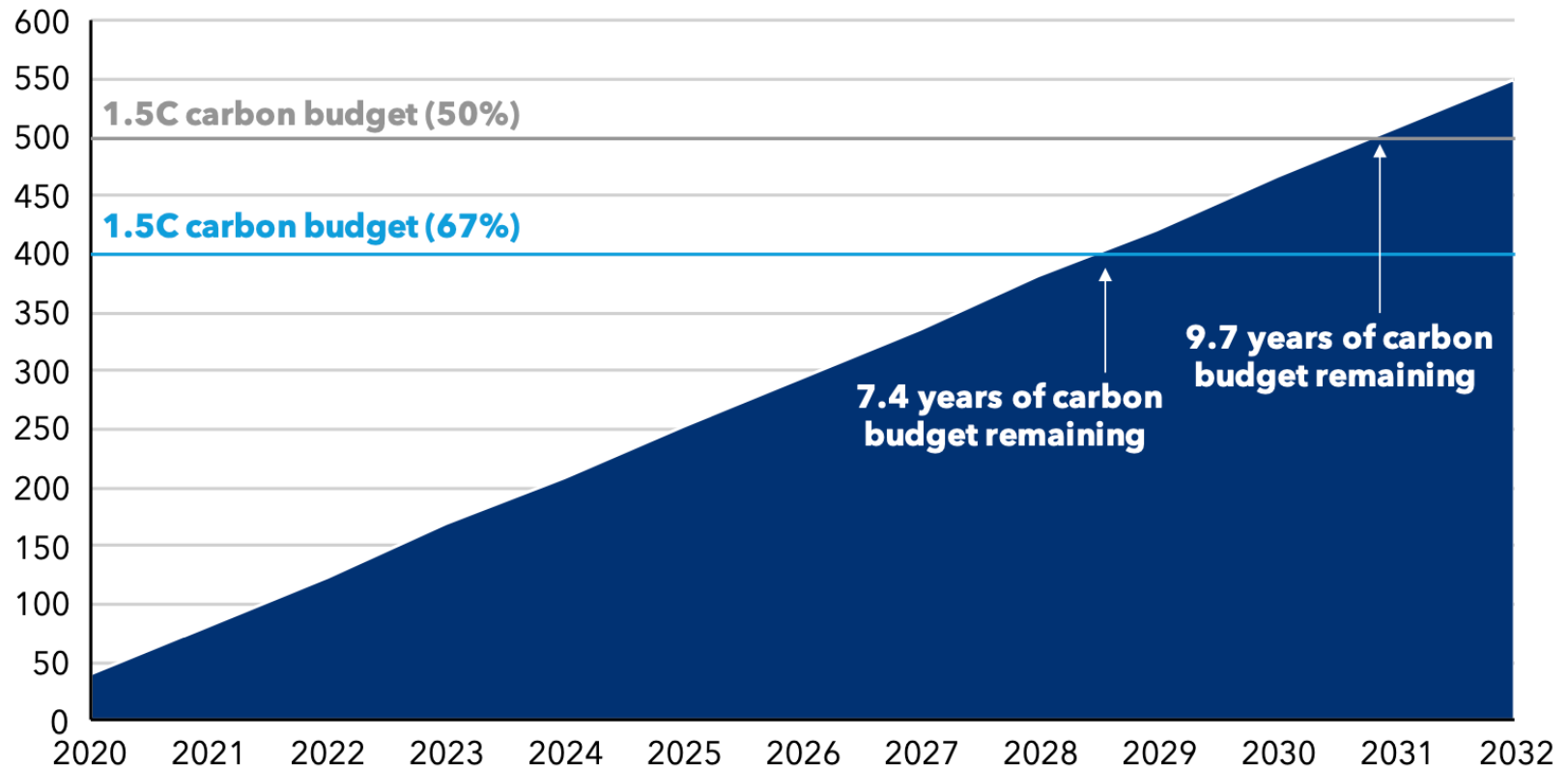
From January through November 2020, investors in mutual funds and ETFs invested \$288 billion globally in sustainable assets, a 96% increase over the whole of 2019.¹ I believe that this is the beginning of a **long but rapidly accelerating transition** – one that will unfold over many years and reshape asset prices of every type. **We know that climate risk is investment risk. But we also believe the climate transition presents a historic investment opportunity.**

BlackRock (AuM US\$10 trillion)
[Larry Fink 2021 CEO Letter](#)

The Climate Science

GFANZ has committed to 1.5°C ?!

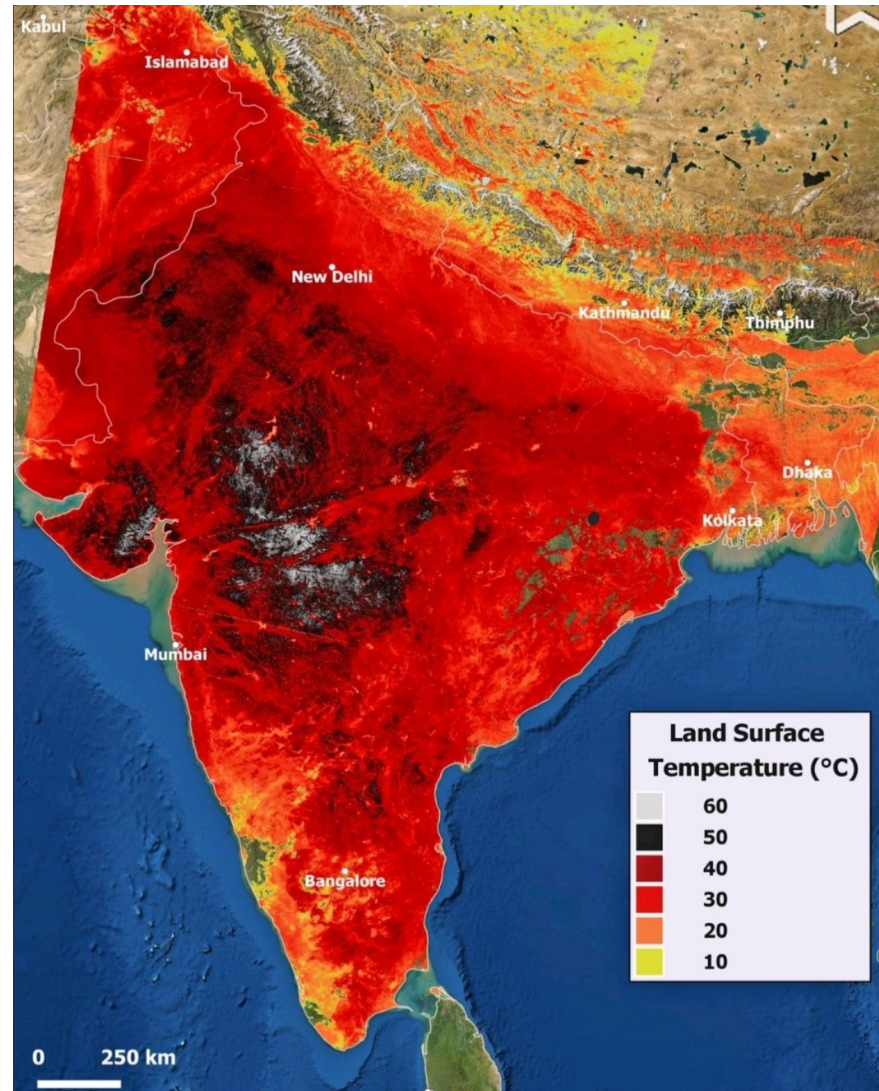
Carbon budget (GtCO₂)



Source: IPCC

The Climate Science

There is no economy on an unliveable planet



Global Financial Alliance for Zero Emissions



Building a net-zero financial system

Financial Institution Net Zero Transition Plans

To finance climate solutions, align non-aligned companies to net-zero, finance already-aligned companies, and phase out stranded assets early

**Sectoral
Pathways**

**Real Economy
Transition
Plans**

**Managed
Phaseout of
Stranded
Assets**

Portfolio Alignment Measurement

Mobilizing Capital

Facilitating the Net-Zero Transition in Emerging Markets & Developing Economies (EM&DEs)

- Influence International Finance Architecture
- Scale Market-Making Initiatives
- Drive Country-Targeted Solutions

Net-zero Public Policy

Embedding GFANZ deliverables within the financial and regulatory systems and communicating wider reforms needed to align the financial system to net zero, ensuring an orderly and just transition

*Building blocks
of the net-zero
financial system*

Standard-setting and disclosure requirements (e.g., TCFD, ISSB, SEC)

Net-zero accounting and measurement (e.g., PCAF, GHG Protocol)

Science-based pathway development (e.g., SBTi, IEA, IPCC)

Taxonomies and classification systems

Nationally Determined Contributions (NDCs) and country climate plans

Carbon markets and undergirding infrastructure (e.g., CCPs)

Data availability and comparability

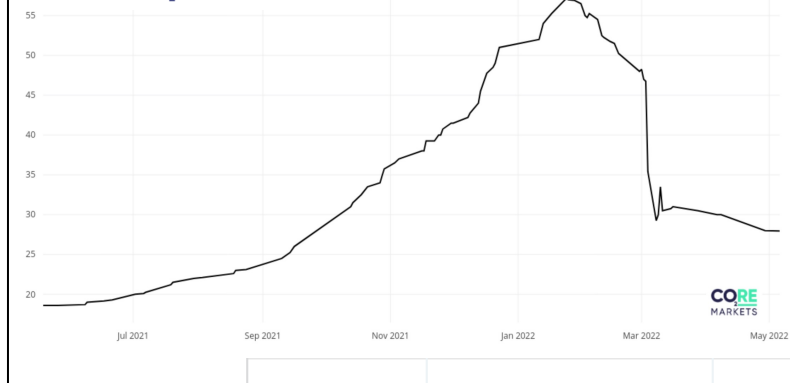
Other climate-aligned policy and regulation

The Five-Year EU ETS Pricing (€/t)

And Australian ACCU (A\$/t)

EU Carbon Permits (EUR) **83.65** -3.69 (-4.22%)

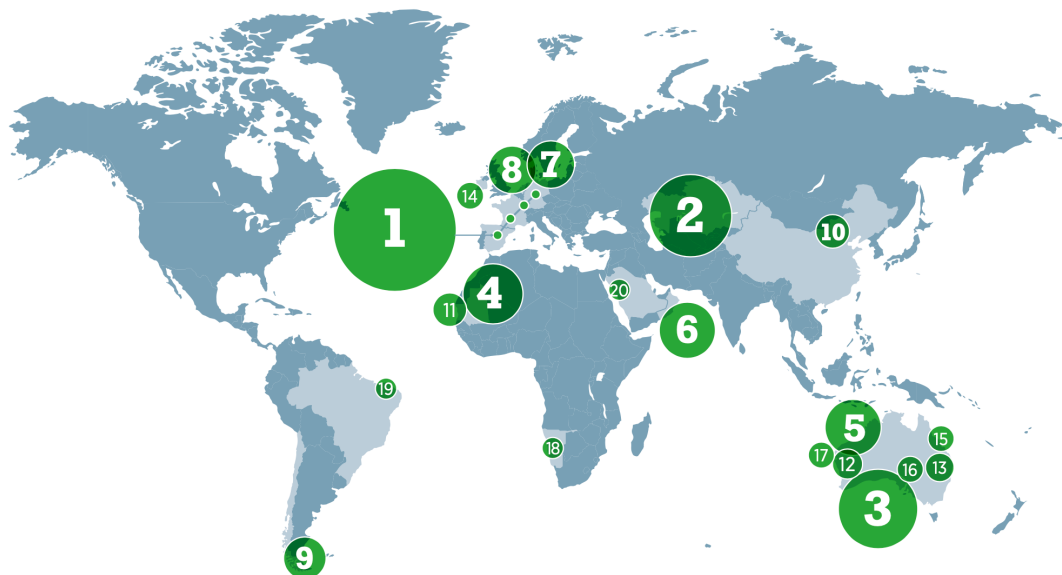
ACCU Spot Price



The Scaling Up of Hydrogen

Australia could be a World Leader

Figure 4.6 The world's 20 largest announced giga-scale green hydrogen projects



- | | | |
|----|---|----------------|
| 1 | HyDeal Ambition (67GW) | Western Europe |
| 2 | Unnamed (30GW) | Kazakhstan |
| 3 | Western Green Energy Hub (28GW) | Australia |
| 4 | AMAN (16GW)^a | Mauritania |
| 5 | Asian Renewable Energy Hub (14GW) | Australia |
| 6 | Oman Green Energy Hub (14GW)^a | Oman |
| 7 | AquaVentus (10GW) | Germany |
| 8 | NorthH2 (10GW) | Netherlands |
| 9 | H2 Magallanes (8GW) | Chile |
| 10 | Beijing Jingneng (5GW) | China |
| 11 | Project Nour (5GW)^a | Mauritania |
| 12 | HyEnergy Zero Carbon Hydrogen (4GW)^a | Australia |
| 13 | Pacific solar Hydrogen (3.6GW) | Australia |
| 14 | Green Marlin (3.2GW) | Ireland |
| 15 | H2-Hub Gladstone (3GW) | Australia |
| 16 | Moolawatana Renewable Hydrogen Project (3GW)^a | Australia |
| 17 | Murchison Renewable Hydrogen Project (3GW) | Australia |
| 18 | Unnamed (3GW) | Namibia |
| 19 | Base One (2GW)^a | Brazil |
| 20 | Helios green Fuels Project (2GW) | Saudi Arabia |

Note: Size refers to electrolyser capacity. Information based on announced plans.

Source: IRENA, Hydrogen Economy Hints at New Global Power Dynamics, 15 January 2022:

<https://www.irena.org/newsroom/pressreleases/2022/Jan/Hydrogen-Economy-Hints-at-New-Global-Power-Dynamics>

Lithium (Chinese Yuan/t)

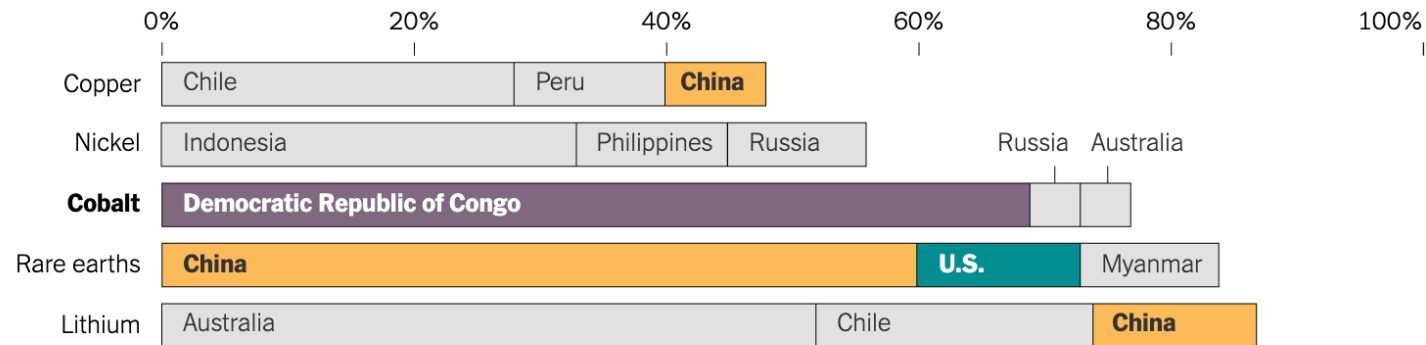


Source: [Trading Economics](#), Accessed 11 May 2022

Supply Chain Security

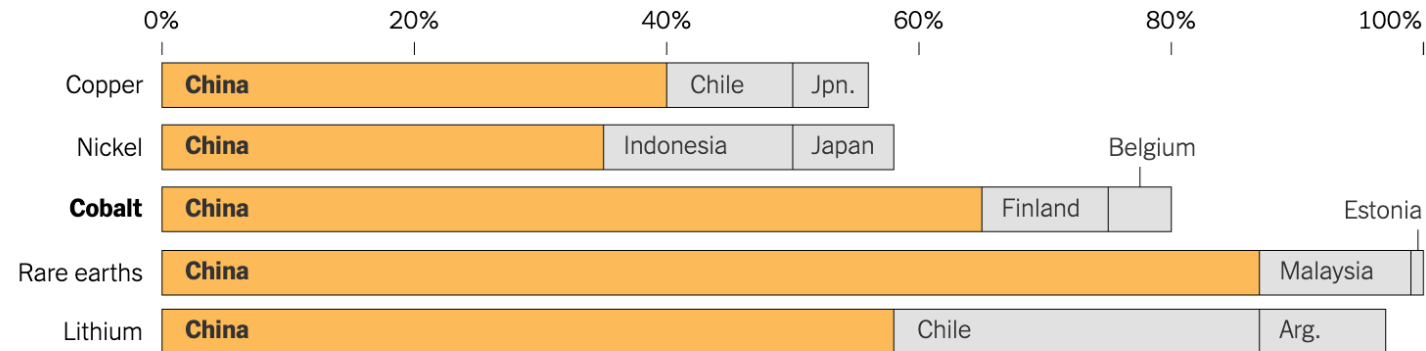
Where Clean Energy Metals Are Produced

Production of key resources is highly concentrated today. Charts show the top three producers.



And Where They Are Processed

China dominates the refining and processing of key metals.



Source: International Energy Agency • By The New York Times

Industry-Energy Convergence: Green Steel

SSAB / Vattenfall / LKAB HYBRIT £3.56bn Investment plan



Regulatory press releases

SSAB plans a new Nordic production system and to bring forward the green transition

JANUARY 28, 2022 7:15 CET

5 MIN RE/

SSAB's Board has taken a policy decision to fundamentally transform Nordic strip production and accelerate the company's green transition. The decision was taken against the background of strongly growing demand for fossil-free steel. The plan is to replace the existing system with new mini-mill technology, which will result in a broader product program and improved cost position. The ambition is to largely eliminate carbon dioxide emissions around 2030, 15 years earlier than previously announced. However, to achieve this ambition, the necessary infrastructure, access to fossil-free electricity in particular, must be in place in time.

Source: SSAB Sweden, 28 January 2022:

<https://www.ssab.com/en/news/2022/01/ssab-plans-a-new-nordic-production-system-and-to-bring-forward-the-green-transition>

Utilities Leaning into the Transition

Nextera Energy US – an integrated utility has been the worlds largest zero emissions infrastructure investor for nearly a decade and is a serial outperformer. AGL’s issue is governance and leadership, not structure.

Ten-year performance: Duke Energy (+69%) vs S&P500 US (Purple, +186%) vs NextEra Energy (Green, +335%)

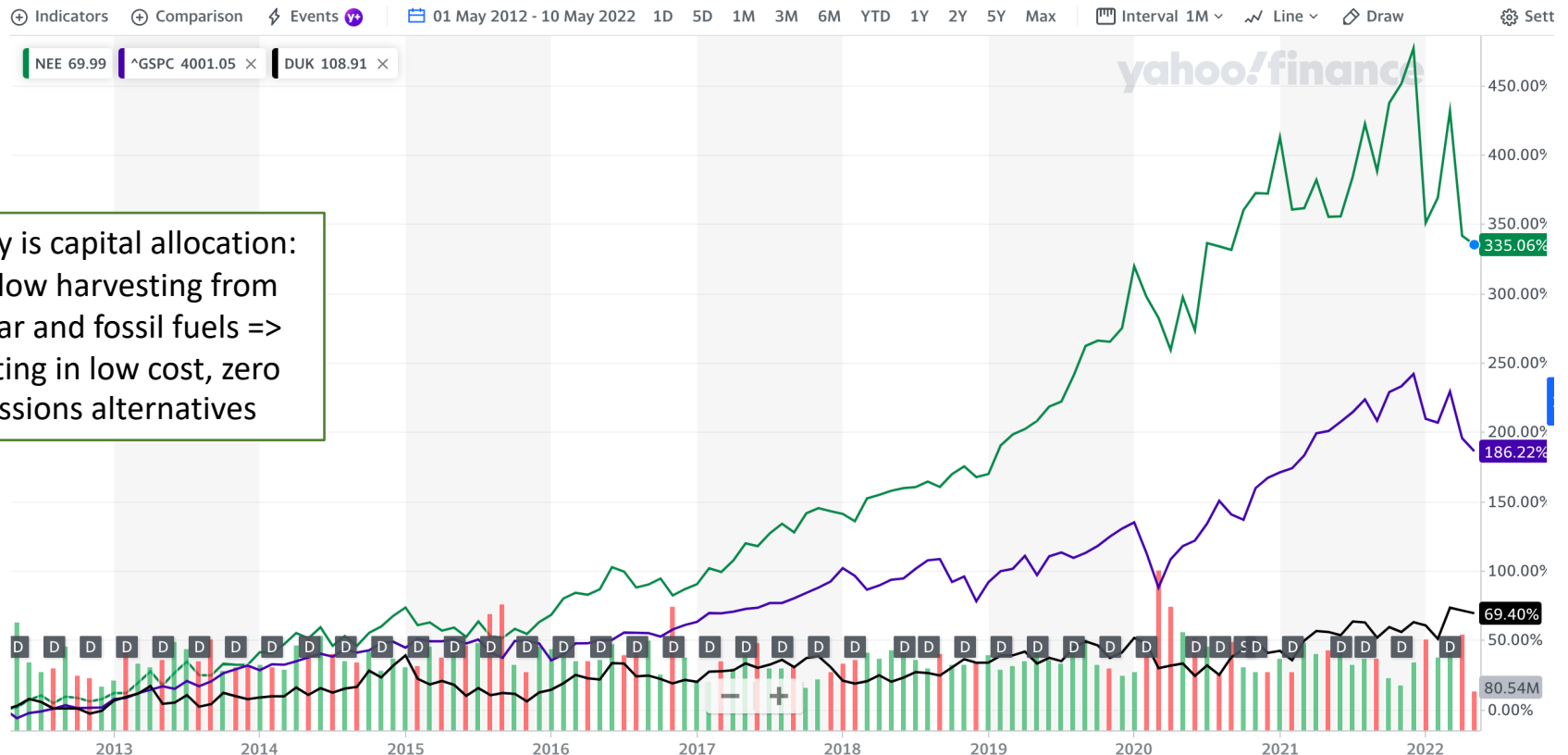
NextEra Energy, Inc. (NEE) ☆

NYSE - Nasdaq Real-time price. Currency in USD

69.99 -0.72 (-1.02%) **70.00** +0.01 (+0.01%)

At close: 04:00PM EDT

After hours: 07:58PM EDT



The key is capital allocation:
cashflow harvesting from
nuclear and fossil fuels =>
investing in low cost, zero
emissions alternatives