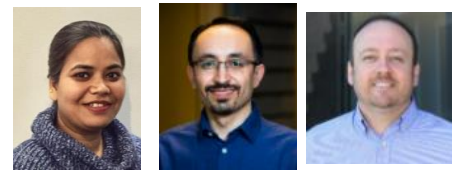
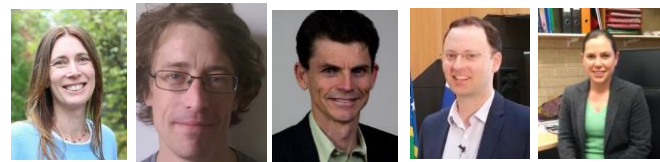


THE HYDROGEN PROJECT

PART OF THE ANU GRAND CHALLENGE:

ZERO-CARBON ENERGY FOR THE ASIA-PACIFIC



Our Team

ANU experts in:
 Economics
 Chemistry
 Engineering
 Governance
 Policy, Law



Net Zero by 2050

A Roadmap for the Global Energy Sector

‘Most of the reductions in CO2 emissions through **2030** come from **technologies already on the market today.**’

‘But **in 2050**, almost half the reductions come from technologies that are **currently at the demonstration or prototype phase.**’

Flagship report
May 2021

License
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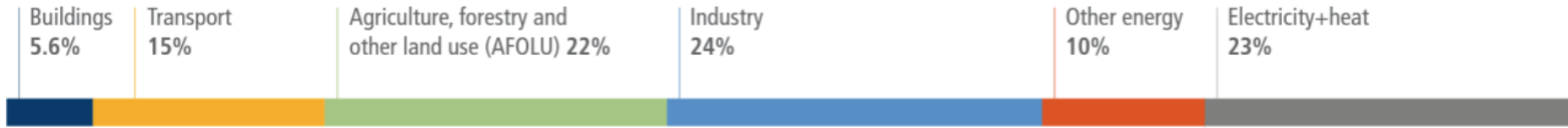


As the major source of global emissions, the energy sector holds the key to responding to the world's climate challenge.

<https://www.iea.org/topics/net-zero-emissions>

Emissions due to selected industries:

Direct emissions by sector (59 GtCO₂-eq)



<https://www.ipcc.ch/report/ar6/wg3/>

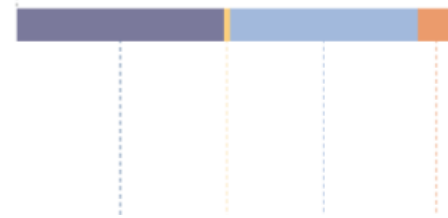
Ammonia (for fertilizers and other products) and iron and steel making account for ~5% of 24% from industry

Shipping, aviation, ~3% of 15% from transport

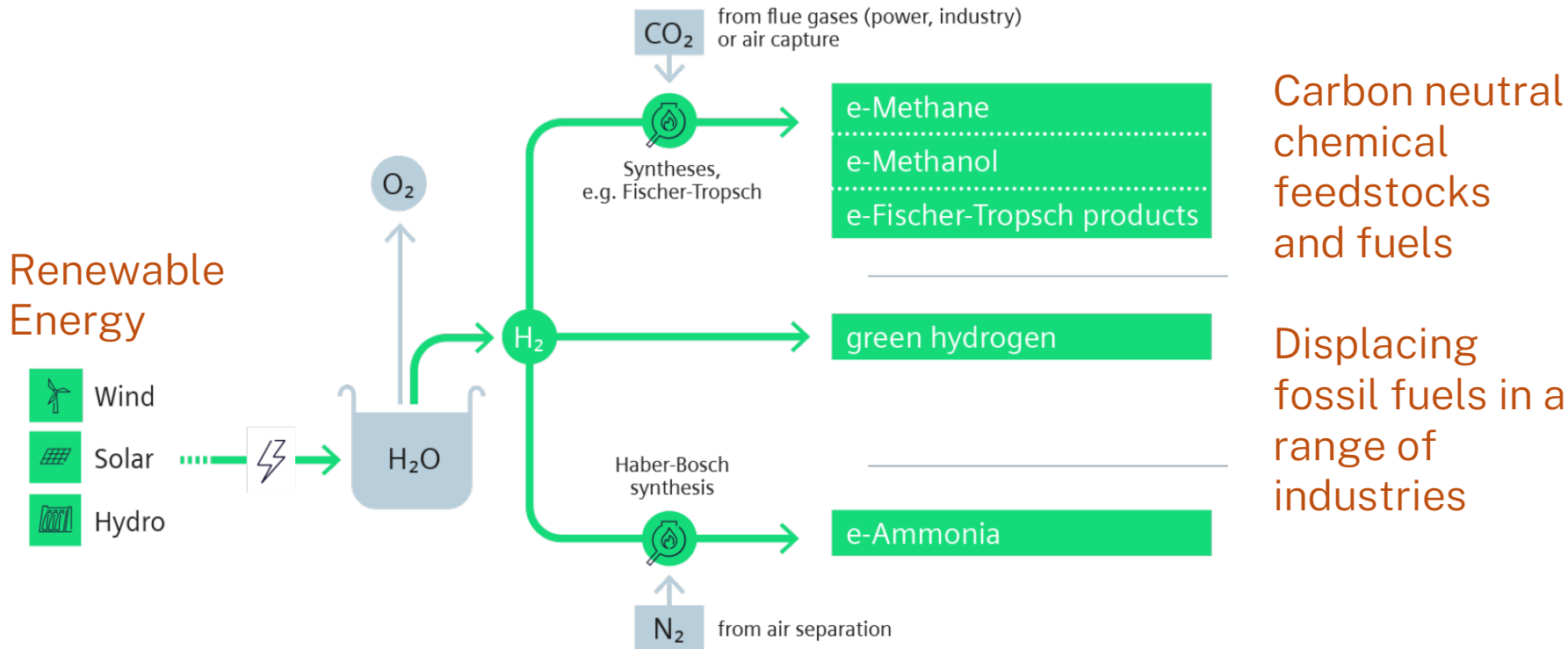
(own calcs from IEA numbers) <https://www.iea.org/topics/net-zero-emissions>

Electricity+heat by sector

- Energy systems 8.5%
- Industry 43.0%
- AFOLU 0.0%
- Transport 1.6%
- Buildings 46.9%



“Power to X” Linking renewable electricity with industrial fuels and feedstock



Power-to-X: The crucial business on the way to a carbon-free world © 2021 Siemens Energy



'Green' Metals: decarbonising metal processing

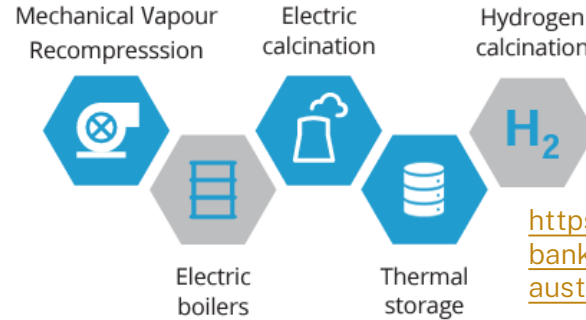
Iron and Steel



Using hydrogen instead of coal for the reduction of iron ore to iron and steel

<https://www.industrytransition.org/green-steel-tracker/>

Aluminium



<https://arena.gov.au/knowledge-bank/a-roadmap-for-decarbonising-australian-alumina-refining/>

Deloitte.



ARENA

In consultation with RioTinto Alcoa

A Roadmap for Decarbonising
Australian Alumina Refining

November 2022

Heavy Industry Low-carbon Transition Cooperative Research Centre

**DE-RISKING DECARBONISATION
FOR HEAVY INDUSTRY**



Value-added clean energy commodities

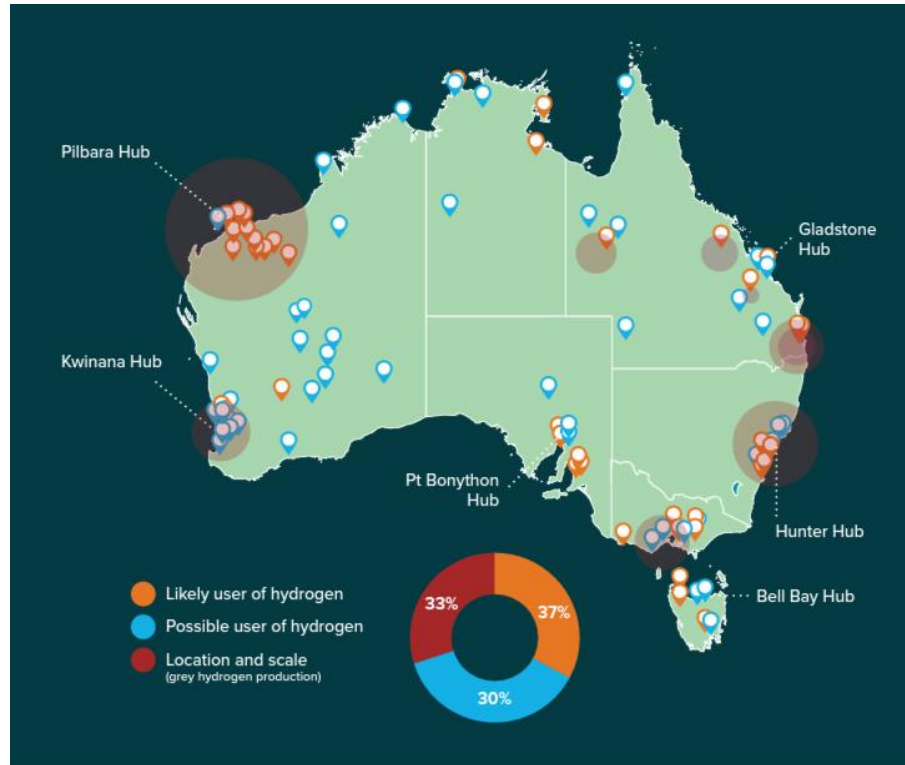


Figure 4: Location of Safeguard Facilities and potential to use hydrogen
(Source DCCEEW analysis)

Target the decarbonisation of export focused industries:

- ammonia – fertilizer, chemicals
- metals
- bunkering and aviation fuels
- chemicals
- mining



Competition: Global Solar Energy Potential

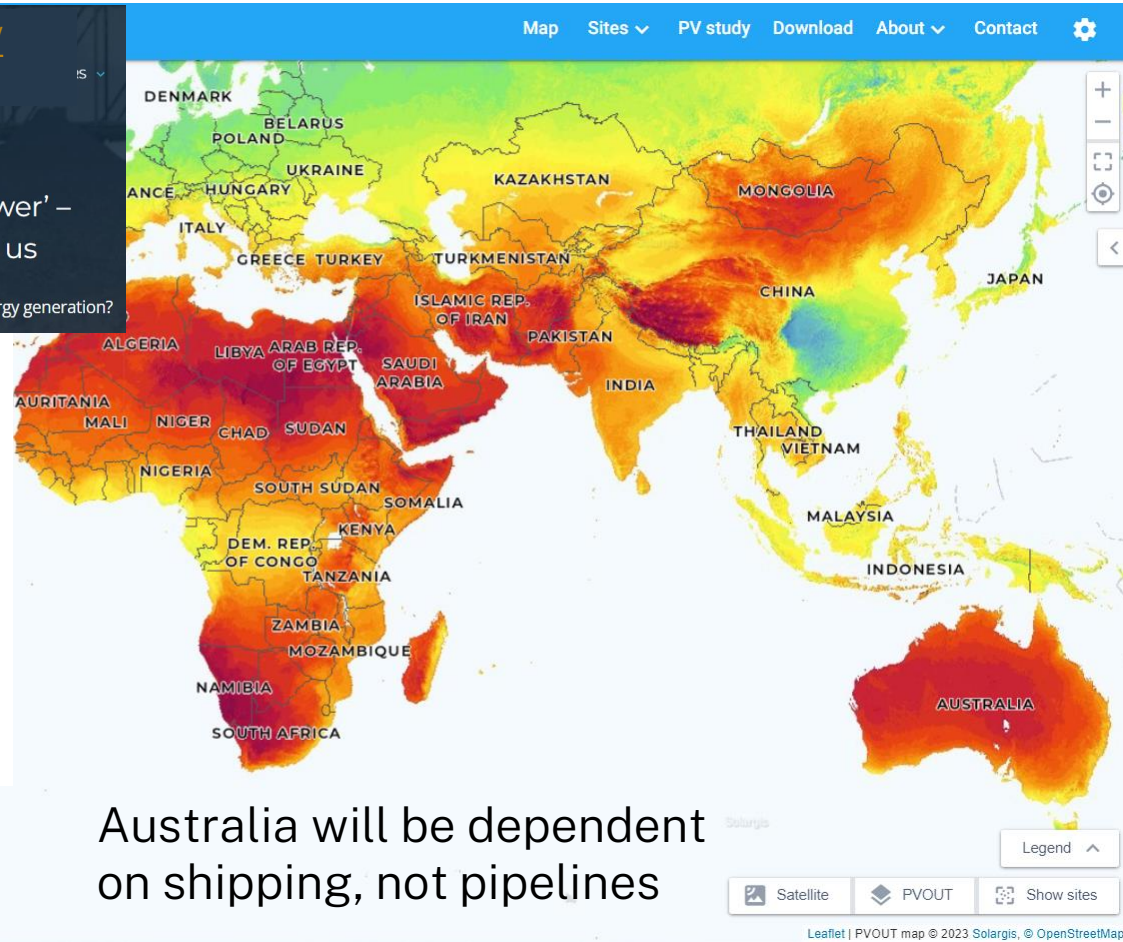


<https://www.csiro.au/en/news/All/Articles/2023/July/Australia-energy-future>

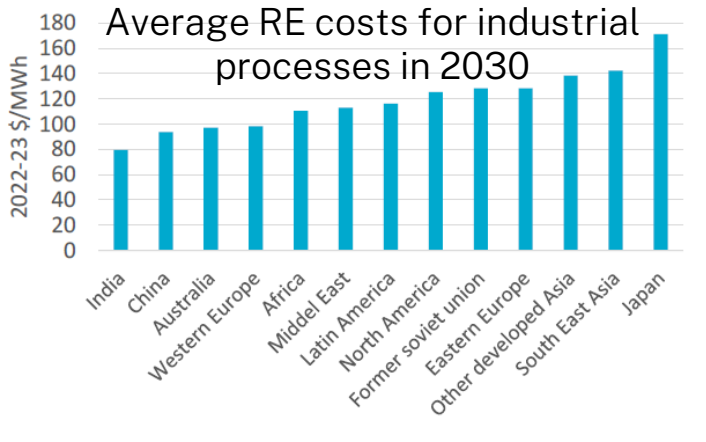
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Australia is touted as a future clean energy 'superpower' – but research suggests other nations will outperform us

Australia has a lot of wind and sun, but will we actually become a world leader in renewable energy generation?



Australia will be dependent on shipping, not pipelines



Distance



1000 km
1000 mi

26.596026°