

# Australia's opportunity as a renewable energy superpower

Energy Security and Community Economics

# The Super Power Opportunity

- Our fossil fuel export industry is in demise
- Australian decarbonised exports can replace them
  - Green metals
  - Green feedstock
  - Decarbonised products
  - etc
- Countries that don't have strong renewable sources need decarbonised products
- Australia could play a role in decarbonising 6-8% of global emissions through our exports to China (ref Ross Garnaut)

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June 2020



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## Why Aluminium Smelters Are a Critical Component in Australian Decarbonisation

### *A Case Study of Tomago Aluminium and the Hunter Region*

#### Executive Summary

*"The full emergence of Australia as an energy superpower of the low-carbon world economy would encompass large-scale early-stage processing of Australian iron, aluminium and other minerals."<sup>1</sup>*

As Ross Garnaut points out in *Superpower*, Australia has the potential to become a much more significant economic power in a decarbonised world. With abundant low-cost renewable energy sources, comparative advantage in the production of hydrogen, and huge deposits of minerals that form the basis of industrial production, Australia could lead the world in producing the components of low-carbon industrialisation: steel, aluminium, cement, silicon, lithium and rare earth minerals.

At about 35%<sup>2</sup> of total output, generation of electricity is Australia's largest source of carbon emissions.<sup>3</sup> But electricity is also key to rapid decarbonisation of other major emitters such as transport, industrial processing and manufacturing, that now account for 54%<sup>4</sup> of the country's emissions.

Green hydrogen, for example, could be a transformative element in the decarbonisation of polluting activity such as steel production, ammonia manufacture, alumina and silica refining, transport, and peaking electricity generation. But for that to occur, green hydrogen would have to be produced using clean, renewable electricity. And that puts the Australian industrial economy at a crossroads: embrace the clean energy transition or decline along with fossil fuels.





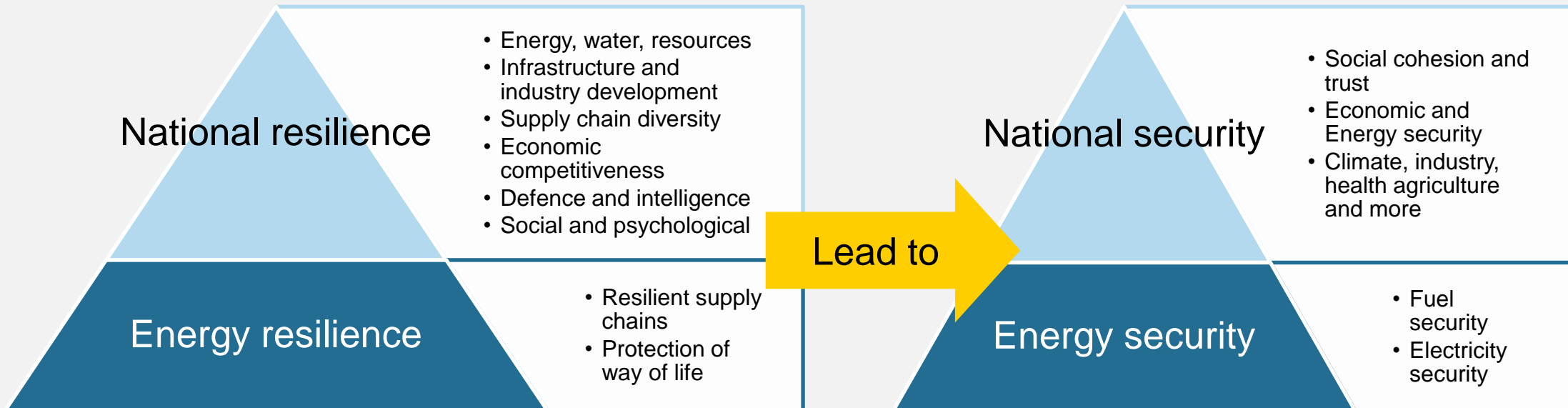
# Energy security influences national security

## National security is more than Defence and policing

- ✓ National resilience is more than climate and disaster risk. It can also include
  - Energy, water and resource security
  - Infrastructure and industry development
  - Diversity and economic competitiveness
  - Defence and intelligence
  - Social and psychological resilience
- ✓ National resilience as an aggregate of community and individual resilience

## Energy security has a social dimension

- ✓ It is more than “cheap” free market supply of electricity and fuels
- ✓ Requires investment in areas of sovereign risk
- ✓ Considers common societal challenges that the free market doesn’t address
- ✓ Seeks to protect our way of life



# Fossil fuel energy security challenges

- Approx 3-4 weeks liquid fuel stock holding at any given time
- 80-90% of liquid fuels are imported from Singapore and other countries
- Our fuel security could easily be threatened if conflict escalates in the South China Sea
- Europe's experience with the Russian invasion of Ukraine
  - Food security and prices
  - Energy supply and prices

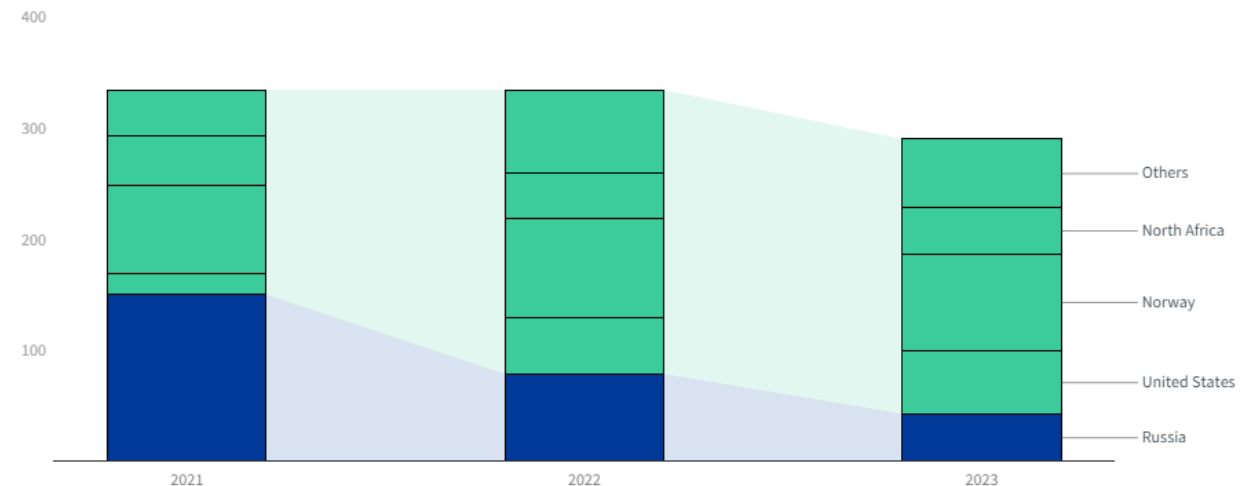
## Multiple types of crises are already here that impact our security

- ✓ Australia needs a good grasp on climate, social, economic, security and other sovereign risks
- ✓ Resilience, strategic self-sufficiency and preparedness are key

## Moving away from Russian gas

The share of Russia's pipeline gas in EU imports **dropped from over 40% in 2021 to about 8% in 2023**. For pipeline gas and LNG combined, Russia accounted for less than 15% of total EU gas imports.

The drop was possible mainly thanks to a sharp increase in LNG import and an overall reduction of gas consumption in the EU.



Source: European Commission based on ENTSO-G and Refinitiv

# Renewable energy is energy security

We can reduce our need for imported fuels/energy through energy produced “at home” such as:

- Biofuels/Sustainable Aviation Fuel
- Residential resilience through rooftop solar and battery/EV (bi-directional charging)
- Utility Scale Renewable energy and storage
- Decarbonisation of mining and agriculture
- Green Hydrogen as an industrial feedstock

vs Renewable, local resources

## Vulnerable Fuel Imports

Shipping choke points between the Middle East and Asia

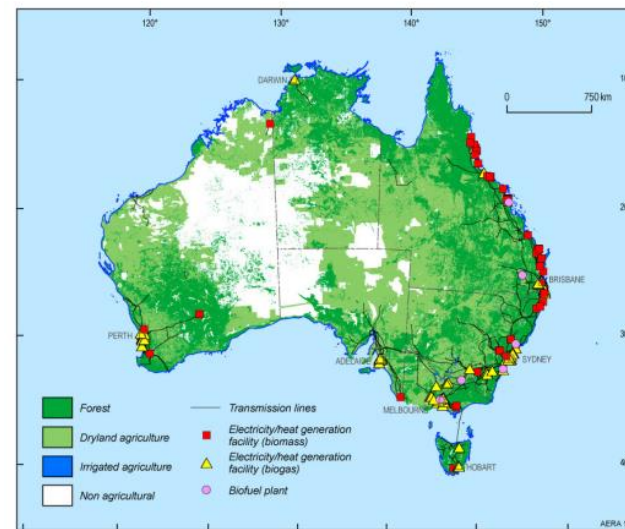


Figure 12.1 Land use and bioenergy facilities in Australia  
Note: Areas depicted as under irrigation are exaggerated for presentation  
Source: Geoscience Australia

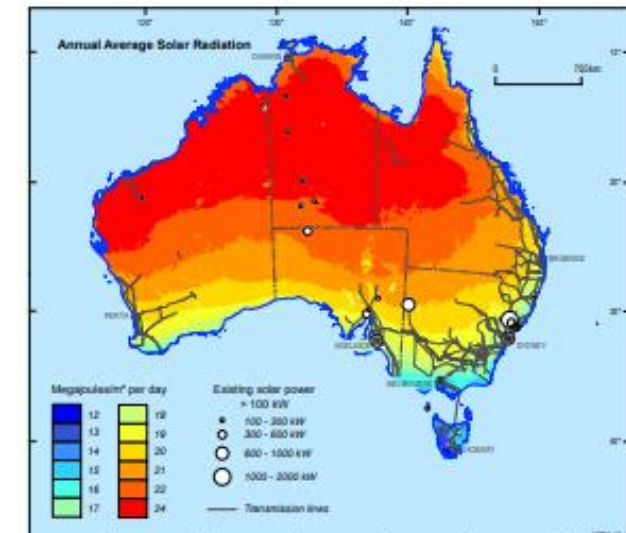
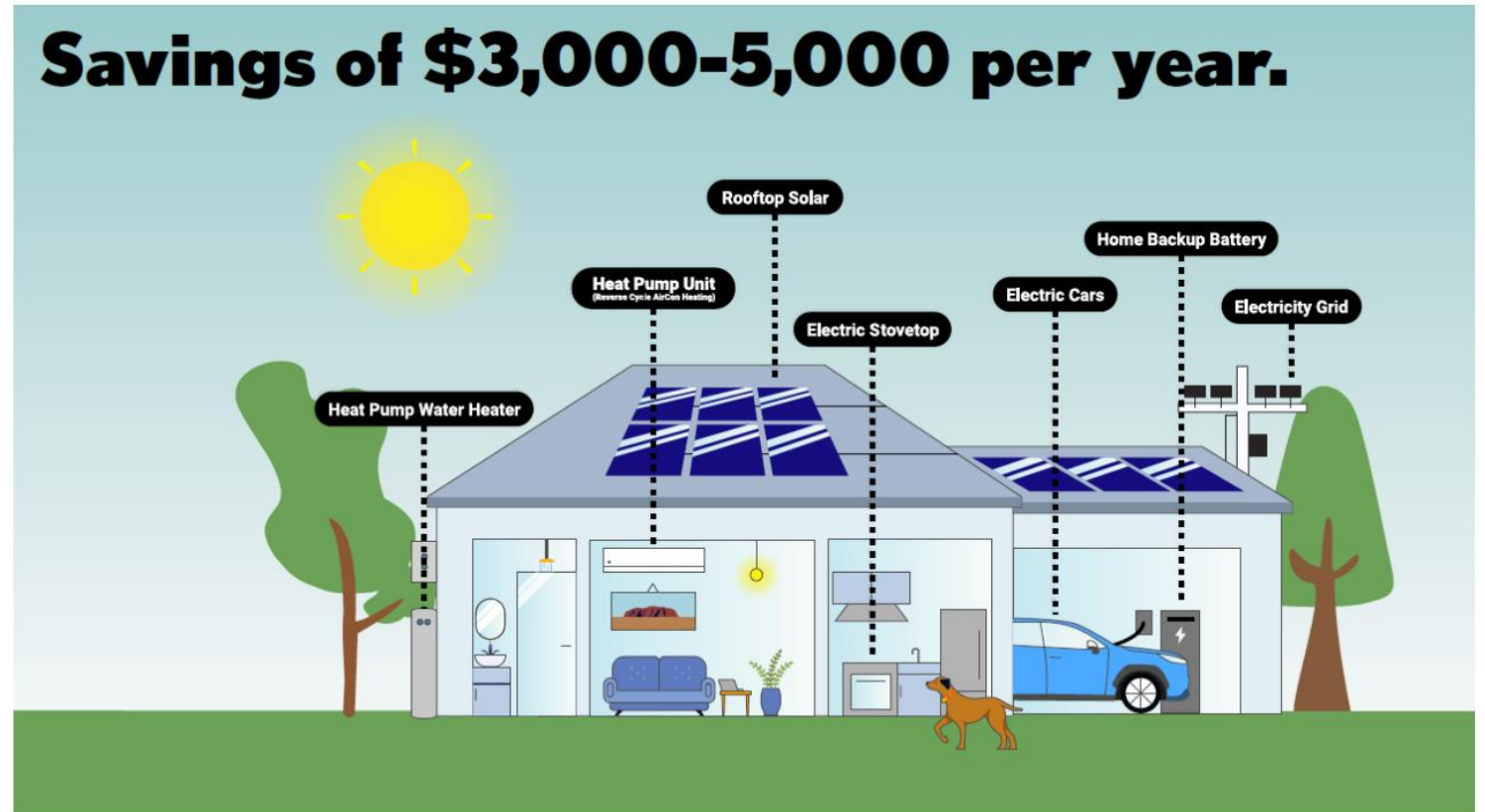


Figure 10.1 Annual average solar radiation (in MJ/m²) and currently installed solar power stations with a capacity of more than 10 kW  
Source: Bureau of Meteorology 2009; Geoscience Australia

# Decentralised renewable energy is economic security

Saul Griffiths post code analysis

- 11,000 people
- Sending \$15 million to foreign oil companies via the local petrol station each year
- Home electrification leads to savings of \$3000-\$5000 a year
- The more we electrify locally, the more jobs for local trades-people
- The more we spend inside the community, the more jobs stay in the community
- \$7-9 million stays in the community



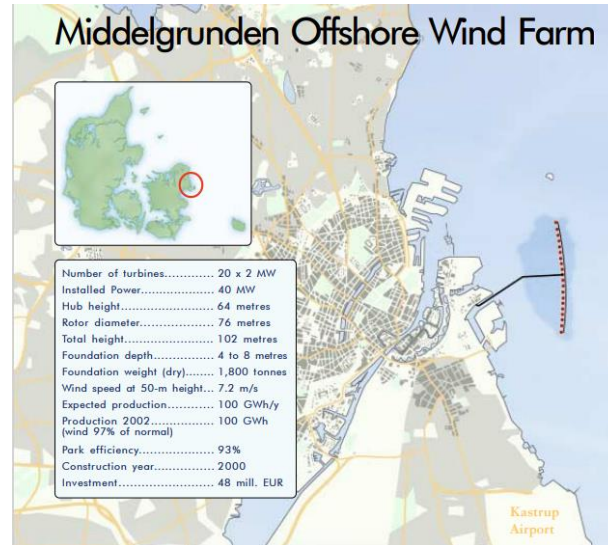
Source: Rewiring Australia

# Utility renewable energy is economic security

- In Denmark, local wind energy developers were unable to obtain “social license” unless they offered up shares in their projects
- Middelgrunden windfarm: locals and community groups were offered shares first at around EUR 600-700, coordinated through a cooperative structure
- Local financiers offered attractive loans
- A large financial backer and/or utility invested the remaining capital (50%)
- Farmers put in capital to onshore windfarms and earned more from the shares than they did from the land lease
- Partial ownership means money stays in the local community
- The more money is circulated locally, the healthier the local economy

Table VI Economy for a typical shareholder [5] and [8]

<b>Jensen family bought 1 share (1,000 kWh/year)</b>	
<b>Price of the share 4,250 DKK</b>	
<b>(172 mill DKK/40,500 shares = 4,250 DKK)</b>	
Selling price of electricity	330 DKK
RE certificate (max. see table 5)	270 DKK
Income/year	600 DKK
Maintenance cost	-70 DKK
Net income/year	530 DKK
Rate 530/4,250	12.5%
Simple pay back time	8 years
Calculated lifetime	20 years
5% yearly depreciation	212.50 DKK/year
Income after depreciation	317.50 DKK/yr
Rate after depreciation	7.5%



## 9 Good Reasons for Local Ownership

Local commitment to the Middelgrunden project has proven a key factor in carrying through this wind development. Without the involvement of local people the Middelgrunden project would have never succeeded. There are many good reasons for and advantages of local ownership.

- 1. Local ownership results in more installed wind capacity**  
In countries with a legal and financial environment that enables local wind developments, local investment has played a major role. In Denmark 86% of all turbines are owned by private, local investors and most early projects were local.
- 2. Local ownership creates local dialogue and acceptance**  
Through dialogues with different interest groups, Copenhagen Energy and Environment Office and the Middelgrunden Cooperative, with its 8,500 members, generated a widespread understanding for and social acceptance of the chosen location and layout of the farm. The Danish experience shows that there are more complaints when utilities install wind than when the local population does so.
- 3. Local ownership raises public awareness**  
During the establishment of the Middelgrunden project more than 50,000 people received information directly and more than 50,000 people visited the Middelgrunden homepage. For many people electricity suddenly was something that did not just come out of the socket.
- 4. Local ownership solves problems and conflicts**  
The Middelgrunden working group avoided or solved potential conflicts by taking direct contact to various local interest groups at an early stage in the development of the project. Contact was taken to The Middelgrunden Fort, The Association for Beautification of the Capital, and local fishermen. Also the contact to and involvement of the local branch of The Danish Society for the Conservation of Nature was important.
- 5. Private investment promotes cheaper and better technologies**  
A private wind cooperative often pays more attention to the details of the wind project than the utilities do, since the wind development is only a small part of their business. In the Middelgrunden project this resulted in a cheaper solution for the grid connection than the one originally proposed by Copenhagen Energy.
- 6. Local production demands less transmission lines and saves electricity**  
The grid loss is minimised by local electricity production. In Denmark the average grid loss is 9% of the electricity production, in some countries it goes as high as 17%. The loss inside the Middelgrunden wind farm is measured at 2.7%, including the cable to the shore and distribution the loss is less than 5%.
- 7. Local turbines are democratic**  
With local investment in power production, it is the local people, who take the decision on planning and implementation of power supply. It brings more responsibility to the local level, which is subject to both benefits and disadvantages.
- 8. Local production makes sustainable development understandable**  
The Middelgrunden project is a local and clear example on how people can contribute to a sustainable development. The wind turbines on Middelgrunden illustrate our use of resources and enable us to see the consequences of their use.
- 9. Local ownership gives people opportunity to act for sustainable development**  
The Middelgrunden project has been an outstanding possibility of engaging the entire population of the capital in a practical and sustainable action. Seen in the context of Agenda-21 and the plan of action of the UN environmental summit in Rio such initiatives are highly important.



# For more information (and innovative solutions)

## Satya Tanner

Director, CEO Australia

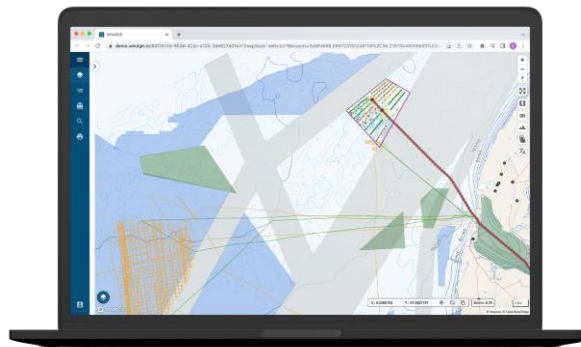
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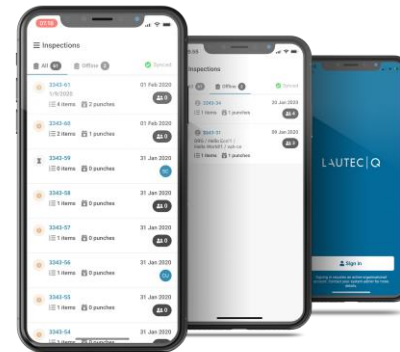
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