

# PROSPER !

## Interdisciplinary Solutions for Prosperous Regions (Land use planning focus)

LEGATUS - 31 March 2023

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*Calmy Planning & Design*



The growth of the economy is a key sign of **Prosperity**.  
The most important indicator of that prosperity is the growth of **Productivity**, or the **Output per Worker**.

We are entering the *Age of Diminished Expectations* says Nobel prize-winning Economist **Paul Krugman**:  
*“Productivity isn’t everything but in the long term, it’s almost everything”* (**wages, profits & tax revenue**)

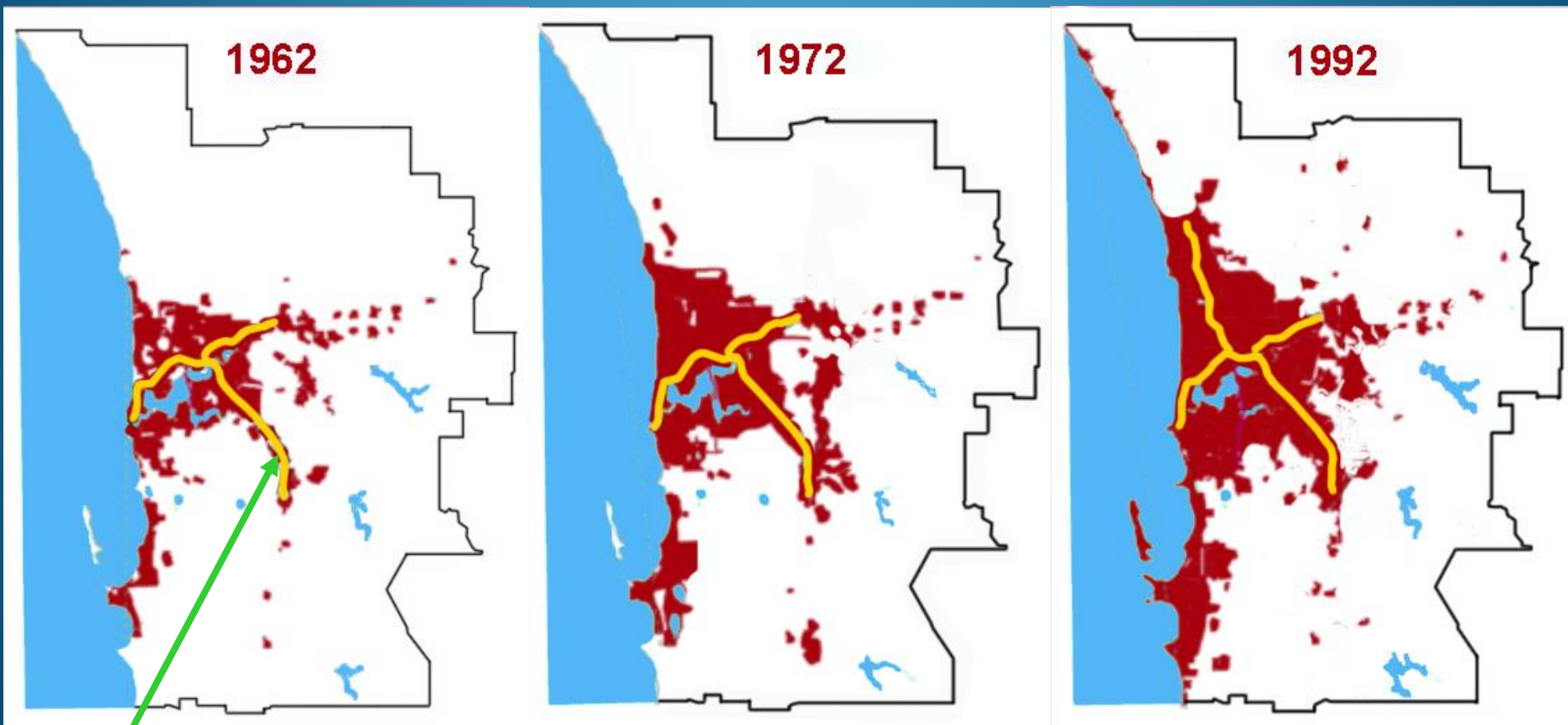




## Fundamental **Solutions** for **Productivity** beyond slogans & soundbites

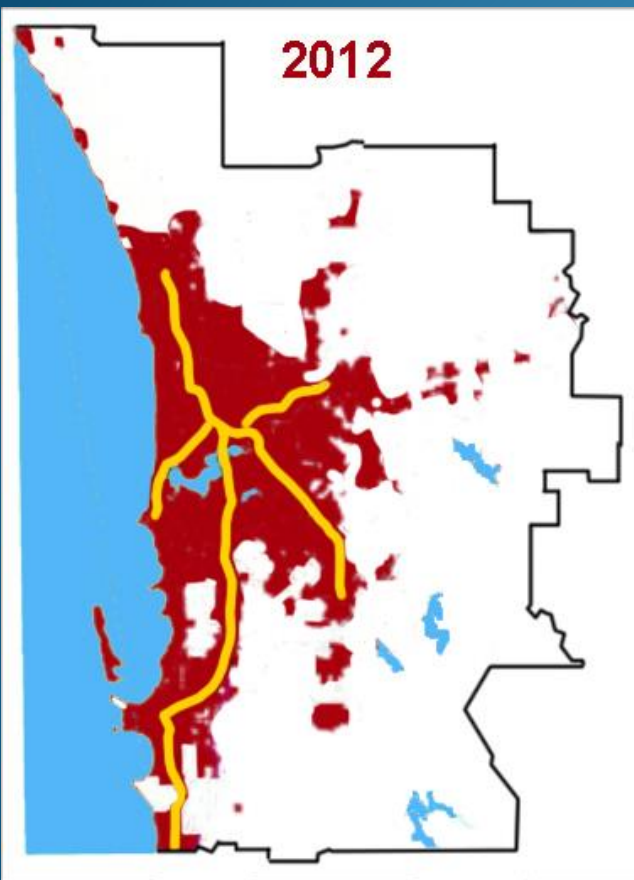
1. Investment in **physical capital** (infrastructure, land, structures, machinery, equipment that can produce goods & services)
2. Investment in innovation, technology and **human capital** (education & training)
3. Institutional support (State, Legatus or Shire) that foster growth and development (**vision**, strategy, **land use planning**, facilitation, advocacy, policy, grants sourcing, partnership making...)

**Prosperity** = Economic Growth = Perth Urban  
Growth = increased **Productivity**

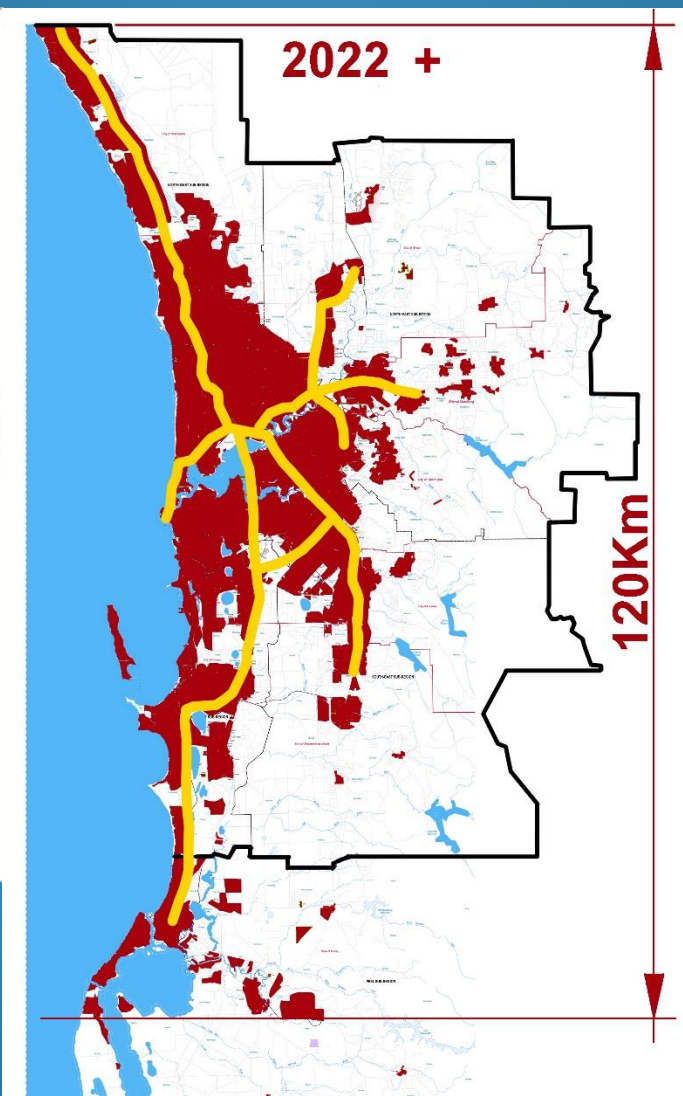


Passenger  
Rail Service

# What are the key catalysts of Urban Growth?



2012



2022 +

120Km

New Infrastructure Projects like Roads; Passenger Rail lines; Energy & Water grids

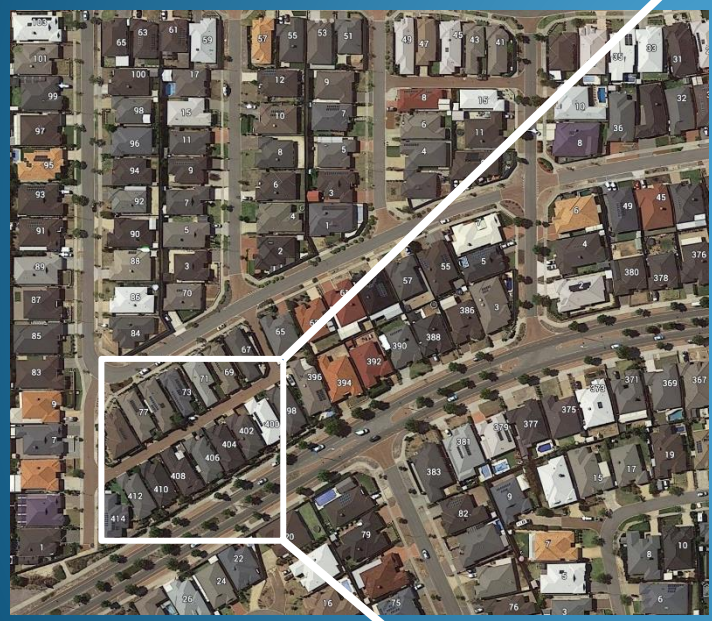
Urban Creep and skin cancer have similar characteristics...

Long commuting time  
Impact on Productivity

The 60mn Perth/Mandurah travel time is beyond commuting Sustainability

# Can Urban Growth be limitless?

## Are the sprawl's outcomes sustainable in themselves?



**Liveable product**  
**Energy efficiency**  
**Environmental balance**  
**Land use controls**  
**No longer adequate**

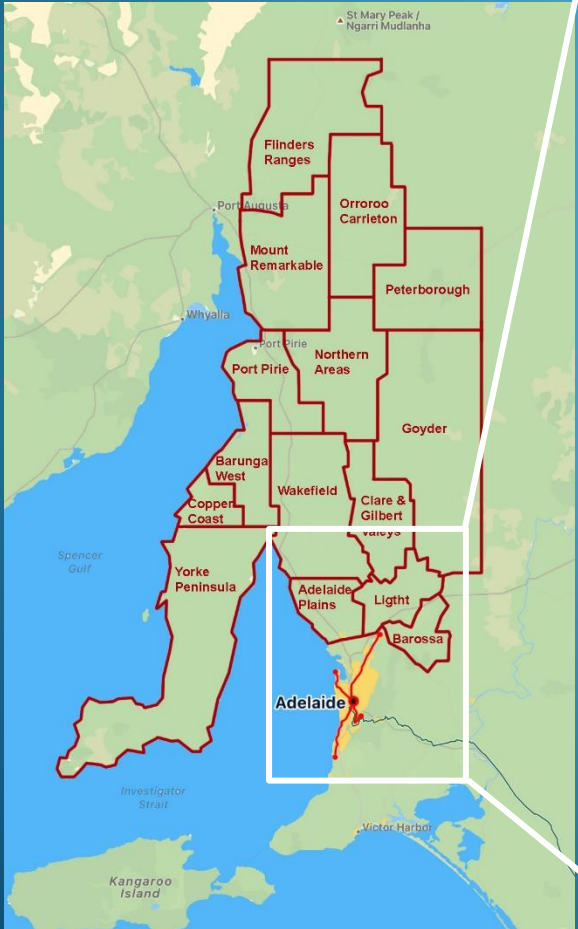
The SA Govt. commitment to develop the Metro and Tram infrastructure will, like in Perth, induce local economic growth but the urban creep could challenge **productivity**



**Land use Intensification around stations slows the creep**

# ADELAIDE PLAINS LIGHT & BAROSSA

are the front line **Legatus** regions to expect localised economic prosperity associated with **Adelaide's Urban Growth**





# Power infrastructure

## As key activator of Economic growth

### ElectraNet:

- 5591Km HV lines
- 53.44% Aust. Utilities Pty. Ltd.
- 46.56% State Grid Corp of China

The **SA Financing Authority** says:

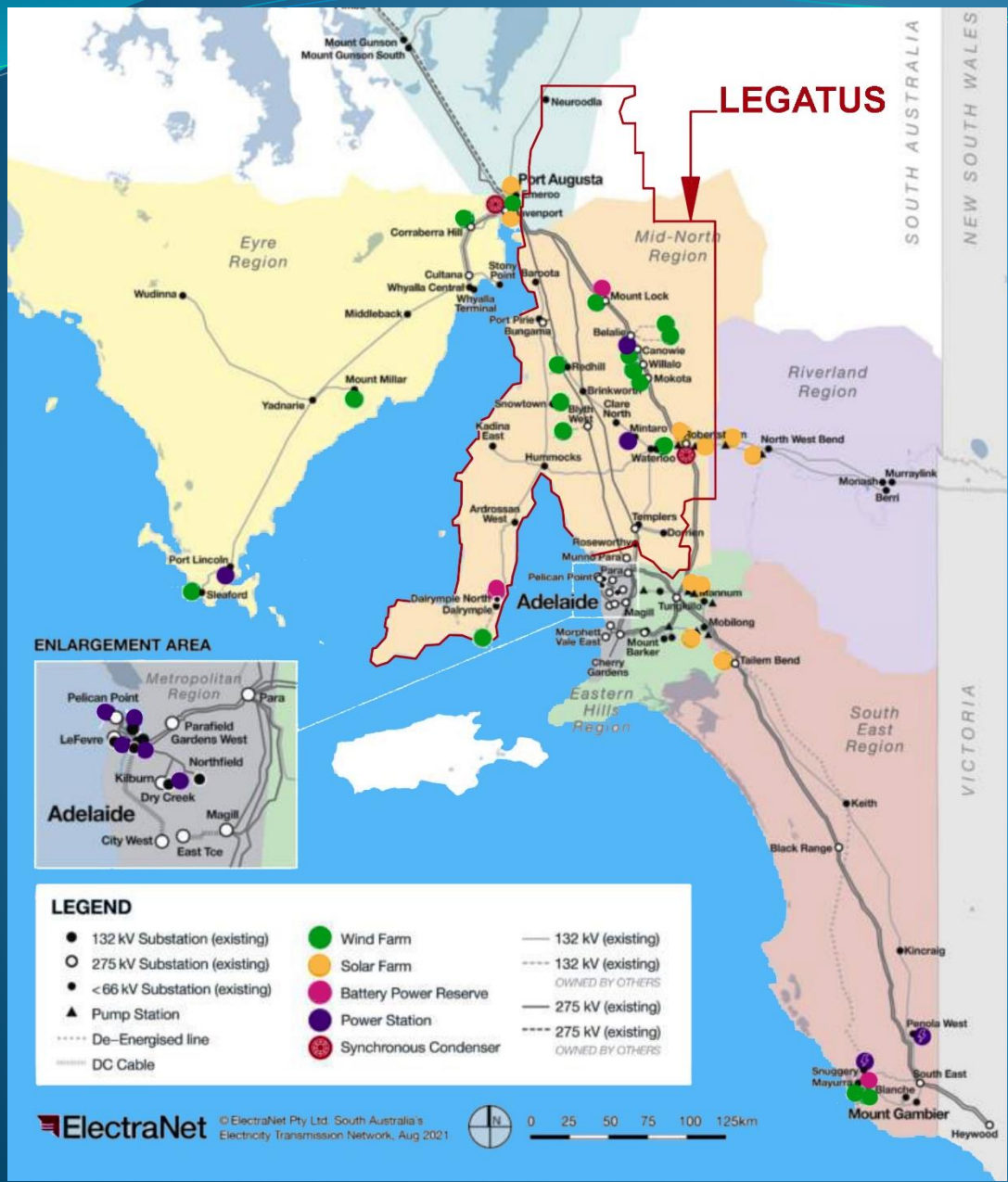
“70% wind & solar electricity supported by innovative battery storage technologies and **gas**” ?

**Nation wide** in 2021:

- Solar: 12%
- Wind: 10%
- Hydro: 6%

**Within LEGATUS:**

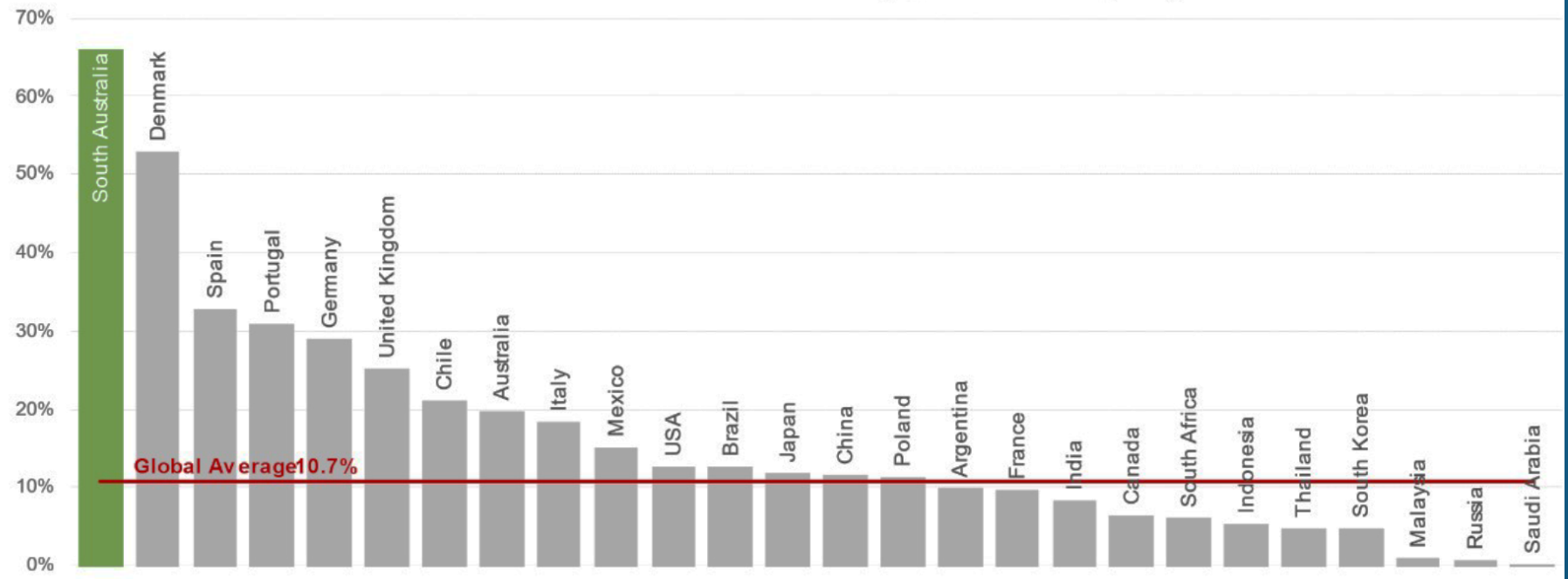
- 11 Wind Farms
- 2 Solar Farms



# A clear conscience with carbon emissions reduction

## South Australia leads the world in renewables

2021 share of wind and solar electricity production by region



Source: Enerdata2021, DTI analysis

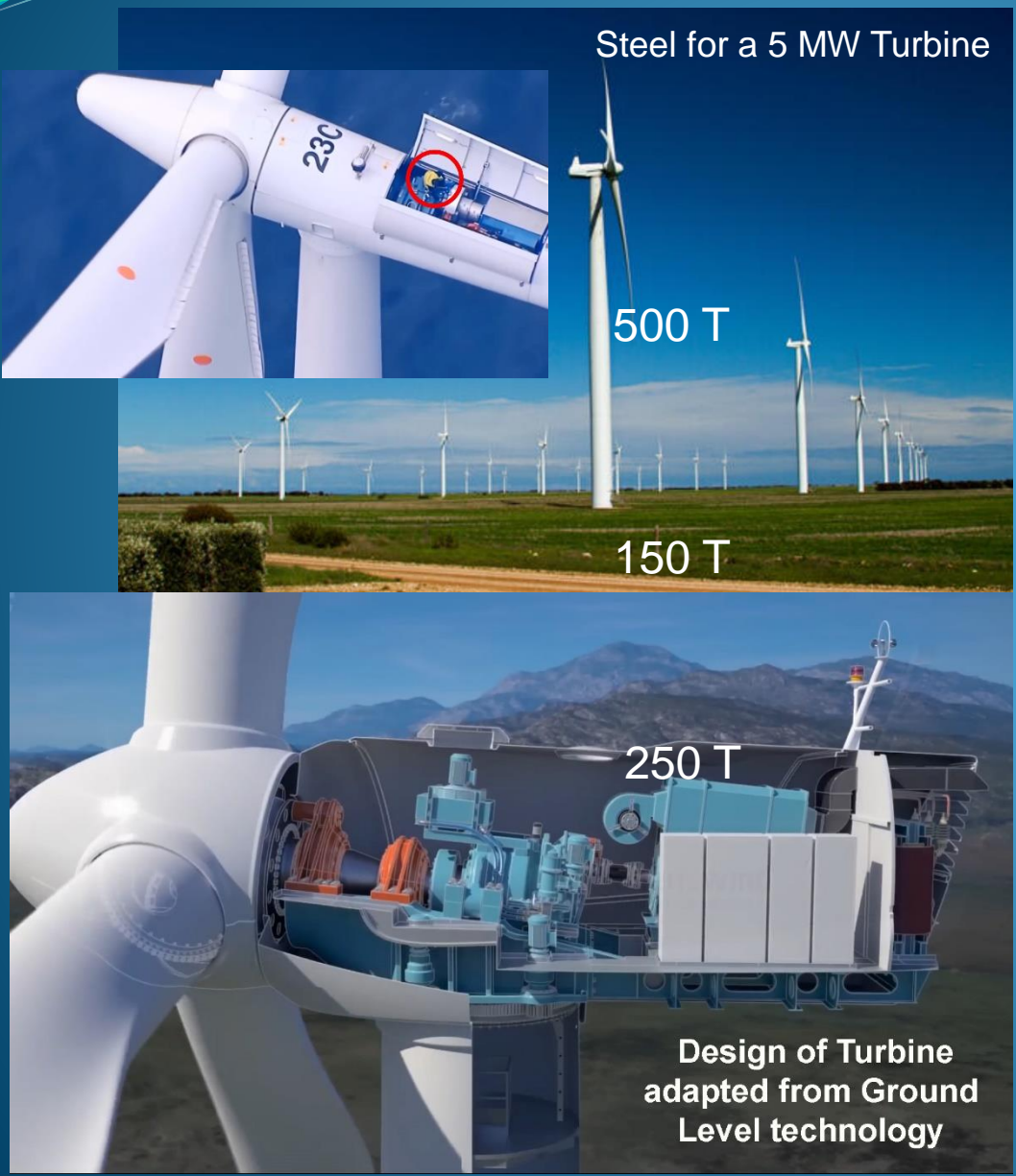
# Are we done here, can we go and sit under a tree ?

## Looking for solutions through a foreseeable energy challenge

- SA current power output is 11.6 GWh made of 70% (**8.12 GWh**) renewable energy
- The 2021 ABS Census for SA shows 1,477,899 vehicles.
- The average Electric Vehicle (EV) uses around 10 kwh/day
- SA would need 14.77 GWh to cover a 2021 EV fleet, pushing the total production to 26.37 GWh
- In this 2021 zero growth scenario, **18.25 GWh** of additional non carbon emitting electricity would be required to stay on par with the SA Government 100% carbon neutrality target by **2030**

**Better forget sitting under a tree !!...**

# Gridded Wind Power



## Favourable case

- Day/Night output
- **Low impact on fertile land**
- Long infrastructure life
- Single large contract & liability transfer

## Not so favourable

- Low output in light wind
- Zero output in very strong wind
- **High energy footprint** (steel, concrete, magnets & synthetic fibres)
- **High maintenance cost**
- Variable efficiency

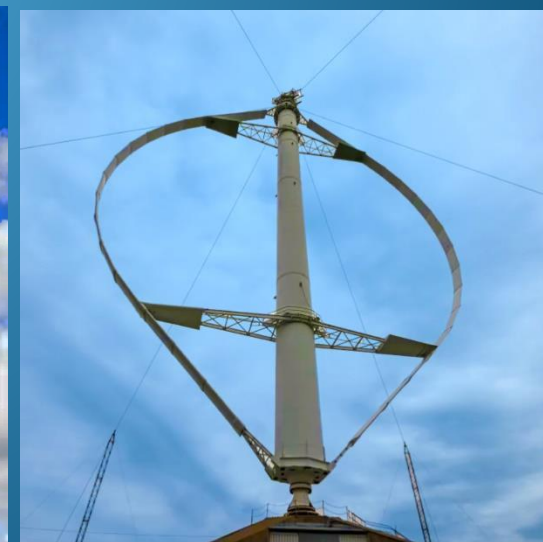
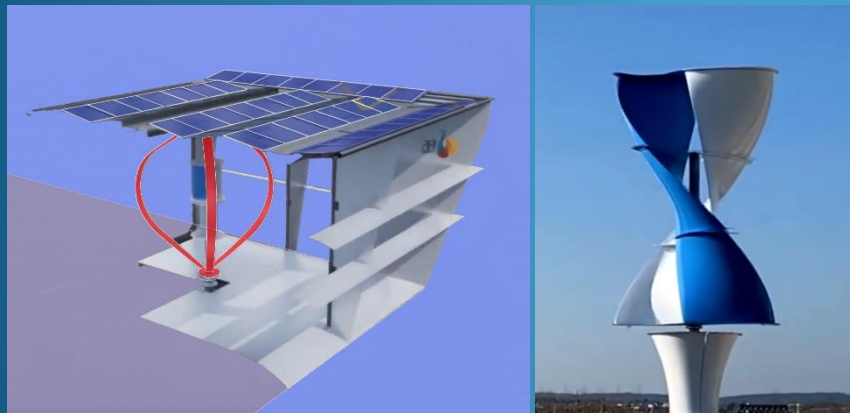


# Off-grid Wind Power

## Vertical Axis Wind Turbines (VAWT)

- Extremely low or nil noise
- Efficient under turbulences
- Handle extreme winds
- Residential & commercial scales
- Ideal supplement to solar

**VAWT should be referenced & supported within the Planning Instruments**

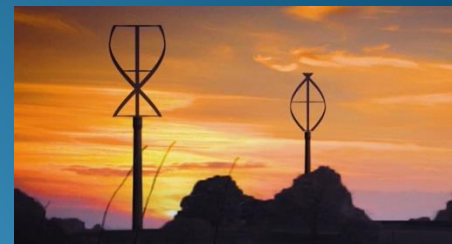




# Transformative Vortex Technology

## Innovation

- Off-grid applications
- 2 bladed air foil technology
- Testing & Certification for 6 kw & 80 kw prototypes with Flinders University
- **Quantum leap in VAWT efficiency**



# Gridded Solar Power

## Favourable case

- Relatively low capital cost
- Fast deployment
- Low maintenance
- **Reduces land heat load**
- Single large contract

## Not so favourable

- 25 years infrastructure life
- Zero output at Night
- Low input under cloud
- **Large scale mono land use**



# Off-Grid Solar in buildings



- Integrated solar roof
- Integrated solar façade
- Commercial scale
- Iconic design

**Potential to require green energy output in planning instruments**





# Off-Grid Agrivoltaics

- **Farming & energy Integration**
- Maintaining stock
- LED hydroponics
- Floating solar arrays on dams
- Robotics potential
- **Family scale operations**



## Looking for solutions through niche food export

The world population will grow by 0.6 billion in 2030 to 8.6 billion and reach 11.2 billion by 2050. (increased food demand)

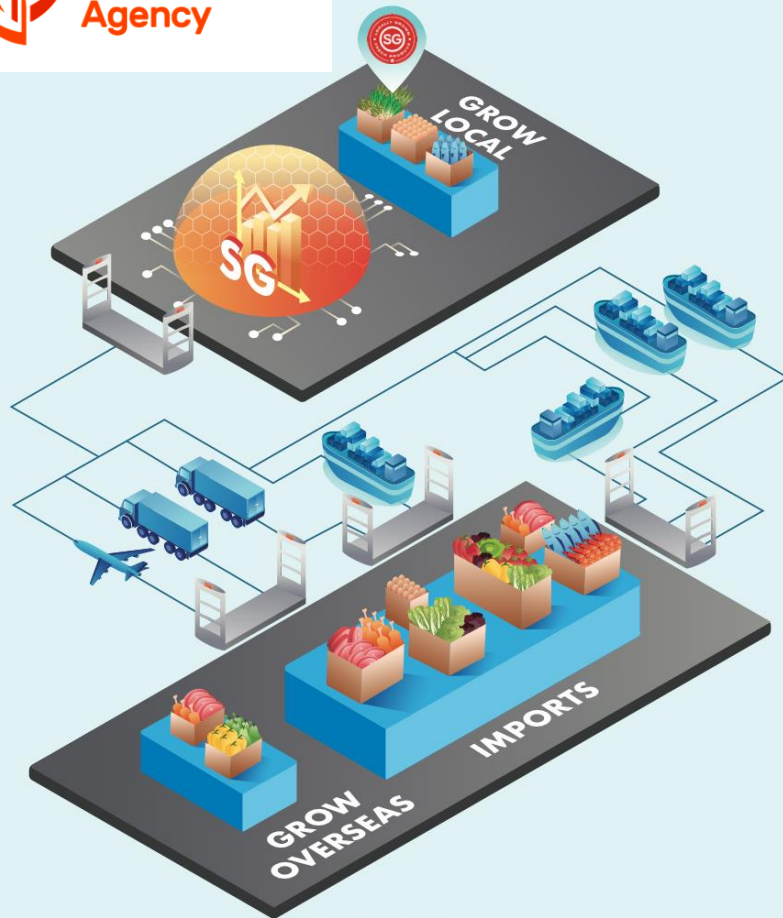
The most affluent society closest to Australia is Singapore with a population of 5.45 million.

Food security is an existential issue for the City State who import 90% of its food from 40 countries.

With the appropriate vision, capital investment in Agrivoltaics and robots and investment in human capital through innovation & training, the Legatus regions has a unique opportunity to be a **sustainable exporter of niche food products to Singapore**



# Australia-Singapore Comprehensive Strategic Partnership



## CHAPTER 1

# SAFEGUARDING SINGAPORE'S FOOD SECURITY: OUR MULTI-PRONGED APPROACH

CHAPTER 1 - SAFEGUARDING SINGAPORE'S FOOD SECURITY: OUR MULTI-PRONGED APPROACH

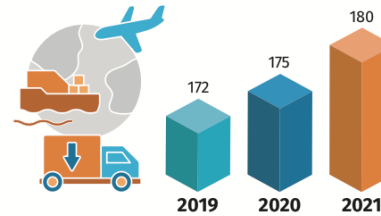
## HIGHLIGHTS

Singapore's food supply sources were further diversified between 2019 and 2021.



With more than 90% of food imported, diversification is a key strategy to ensure Singapore's food security. SFA continuously works to diversify Singapore's import sources so that Singaporeans can enjoy a stable supply of safe food.

In 2021, the number of imported food supply sources by countries and regions **increased**.



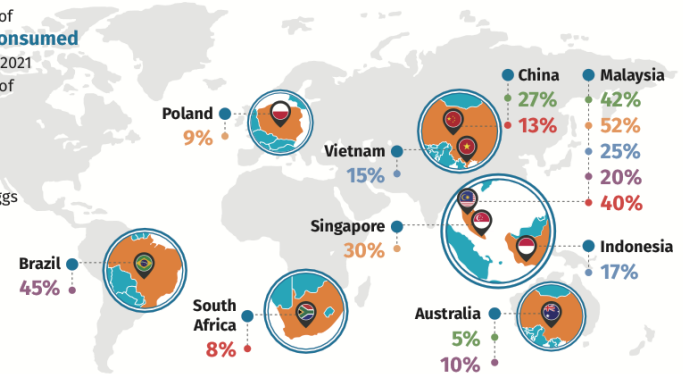
**40** countries are allowed to export high-risk food items to Singapore, having met our requirements on food safety and public health.

Note: High-risk food items refer to those which are more susceptible to contamination which can lead to foodborne diseases in consumers and include livestock, meat and egg items.

Major sources of commonly consumed food items in 2021 (in terms of % of total tonnage)

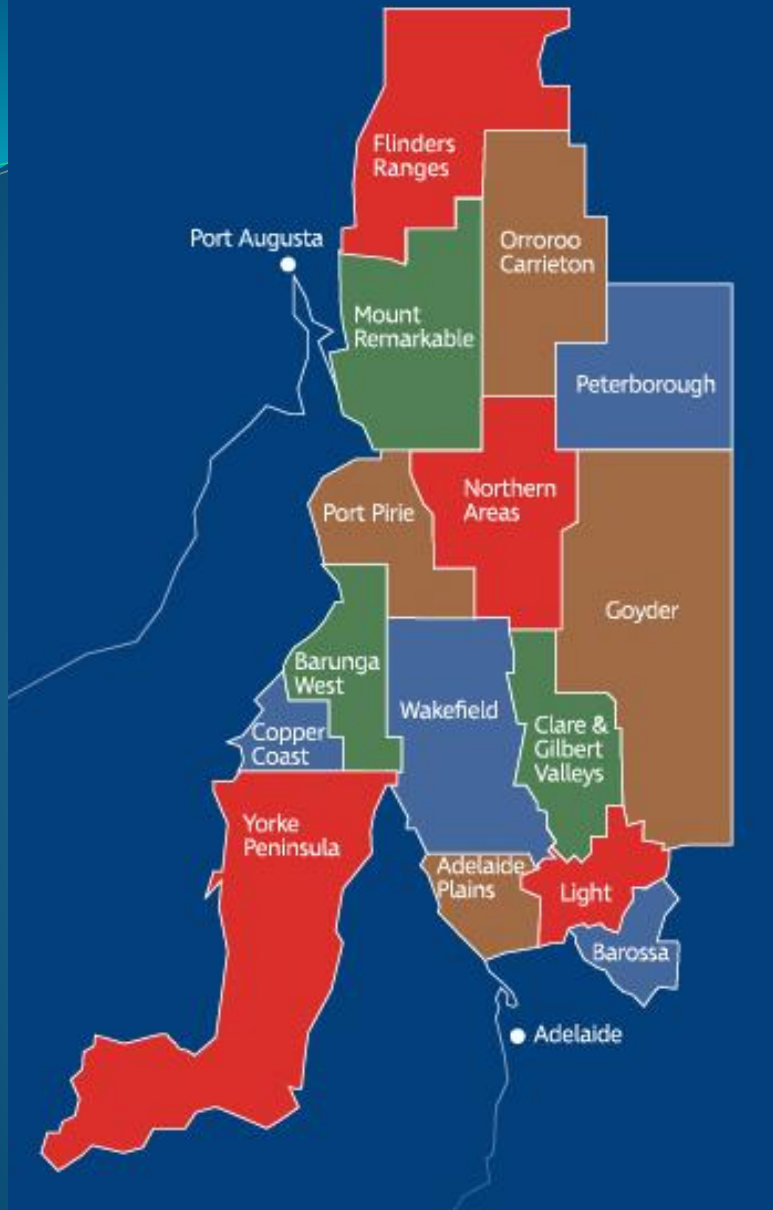
- Vegetables
- Hen shell eggs
- Seafood
- Meat
- Fruits

Note: Meat refers to Chicken, Pork, Beef and Mutton.

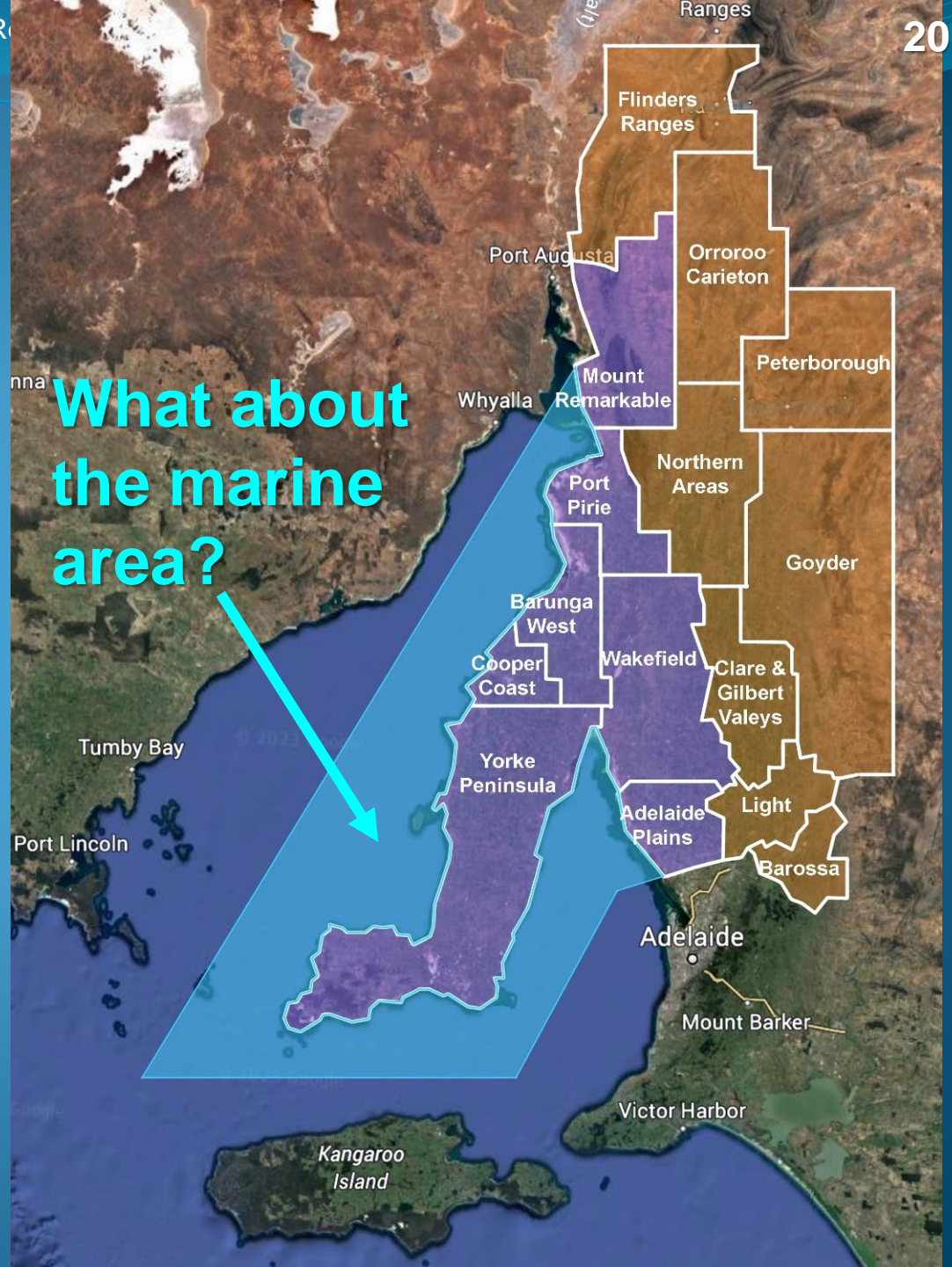


Our commonly consumed food items arrive from different channels.





There is a tangible nexus between coastal access & prosperity



What about the marine area?

# Offshore Energy at the VAWT cross road

- Norway
- Iceland
- **South Australia ?**



VAWT-ENERGY



- **Infrastructure lifespan 50y.**
- **Payback 50y.**
- **Lifespan of the turbine 25y.**
- **Routine maintenance 6 Mths.**
- **Helicopters**



**Building  
on what  
has been  
achieved  
successfully**

**Marine aquaculture make up half of the world's seafood supply already thus significantly reducing pressure on wild stock**

**The increased collaboration between marine scientists, farmers & fisheries authority has established the most stringent health and environmental controls of seafood for human consumption**

**Established economic driver with innovation potential**

## Spacial Distribution of Marine Aquaculture

### LEGEND

-  Barramundi
-  Tuna & Finfish
-  Abalone
-  Mussel
-  Oyster
-  Yabby/Marron
-  Algae



# Google Cases

## T-PORTS =

- Innovative transshipment (4m draft)
- \$200M invest. (\$70M for Wallaroo)
- Support from 300 growers
- Construction 04/21 1<sup>st</sup> Ship 12/22

## Pacific Estate Oysters =

- Family scale business
- Hands on Sustainable farming
- Tourist attractor
- High quality fresh natural product

## Wallaroo

Unique boating oriented lifestyle



### Opportunities:

- Potential to expand canal living.
- Use quality lifestyle to attract foreign investors in new marine aquaculture ventures

Rural Land adjacent to sea

## Stansbury



### Opportunities:

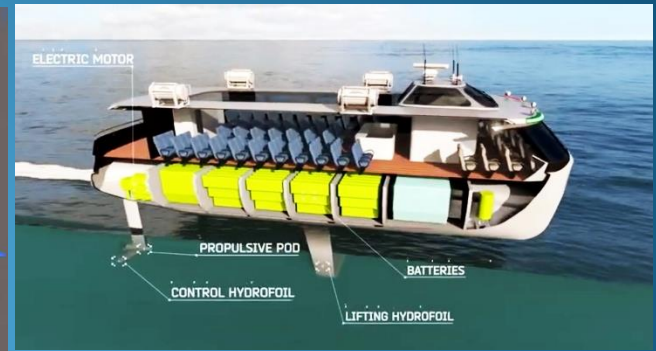
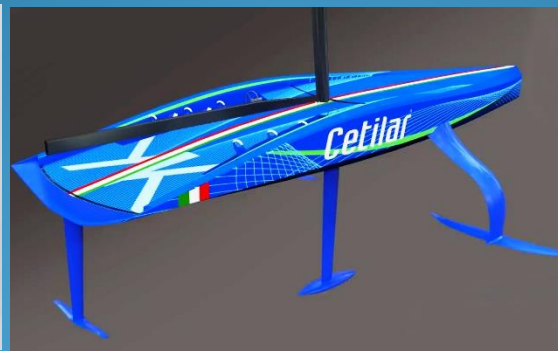
- Direct Hydrofoil link to Adelaide.
- Growing organic prawns in inland saline water in partnership with small local wheat grower.



# Transport & Sailing

## The irresistible “ascension” of lifting foils

**ELECTRA** - Electric Hydrofoil ferry  
Cruising speed 40 knots – 74 km/h  
Range 100 NM – 185 km  
150 passengers



**Hydroptere**

4/09/2009 World Record 52.86 knots – 97.9 km/h



Green Hydrogen

# TRANSFORMATIVE INNOVATIONS

## Green Hydrogen Air Transport & Urban Air Mobility



## SA and the politics of Economic Prosperity in the National Interest

The AUKUS nuclear submarines is the biggest investment in South Australia in the nation's history and will transform the state for decades. (5000 construction workers for...years)

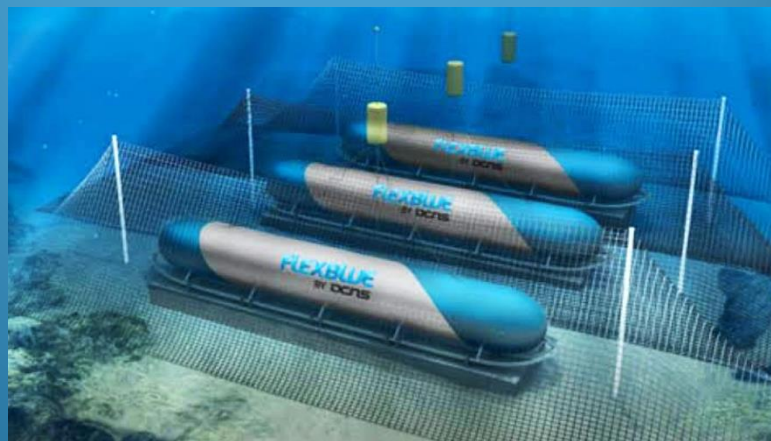
It has de-facto introduced the inevitability of developing a nuclear industry in Australia to service the **National Interest** without generating the traditional anti nuclear response.

More than 1000 engineers, designers and technicians will need to acquire (for a good part in Adelaide) specific knowledge and training in **Nuclear Physics** and **Nuclear Reactor Science.**

# Could the Australian nuclear expertise ultimately reach out to generate civilian nuclear power ?



Land – NUSCALE (USA)

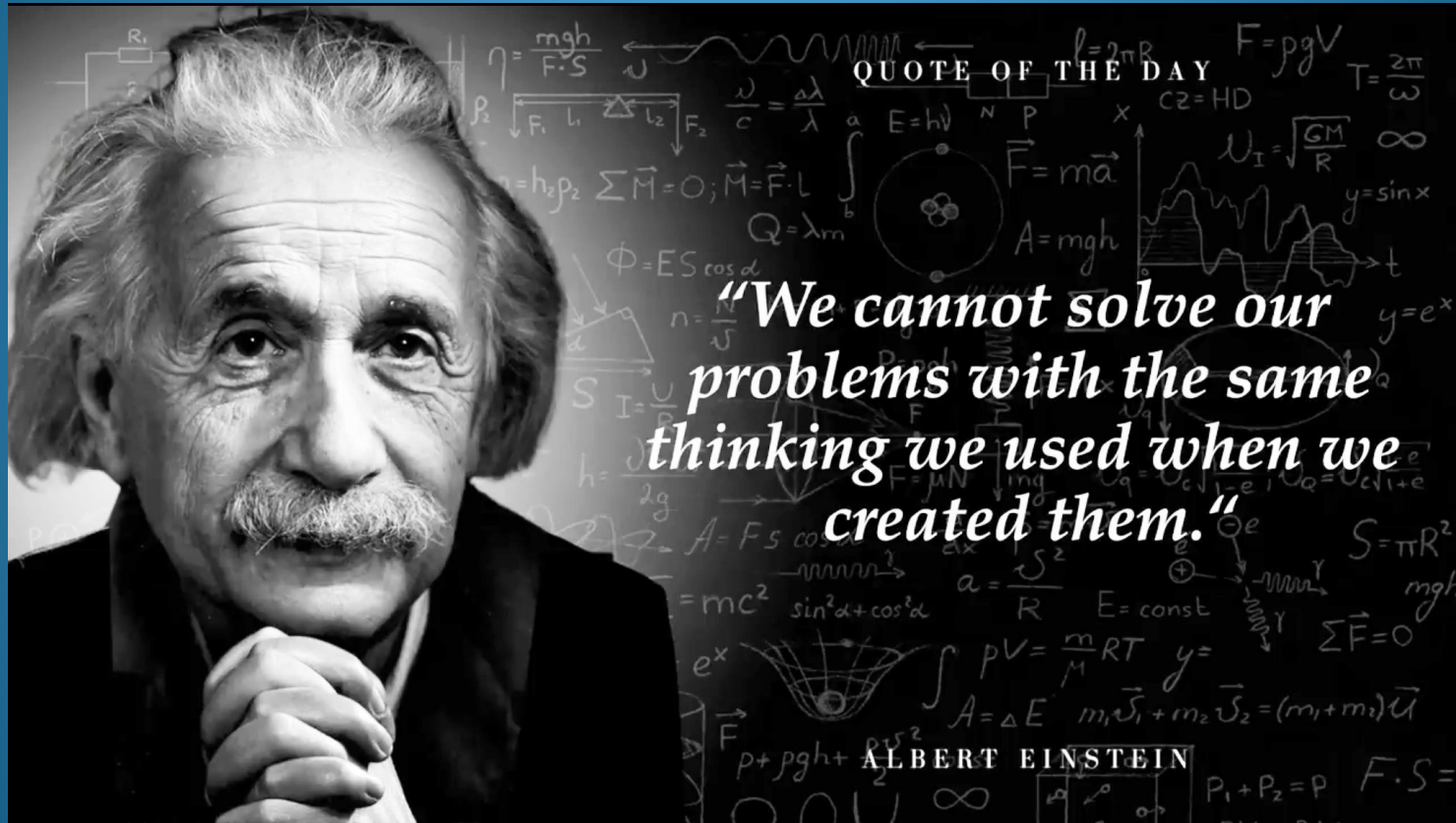


Submarine – FLEXBLUE (France)



1. Civil engineering eliminated
2. Miniaturised scale
3. Achievable containment
4. No personnel within
5. Transport back to plant for robotics recharge in sealed enclosure

# Could the villains of Prosperity be FEAR, IGNORANCE & GREED?



# Thank you