

The Future of Climate and Agriculture

Understanding change, using momentum

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How to be a better surfer

- What's happening globally with climate and clean tech?
- What do markets tell us about how quickly disruptive technologies will impact on everything?
- What does this mean for how we plan for infrastructure and regenerate rural Australia?
- What does this mean for future regional business growth?

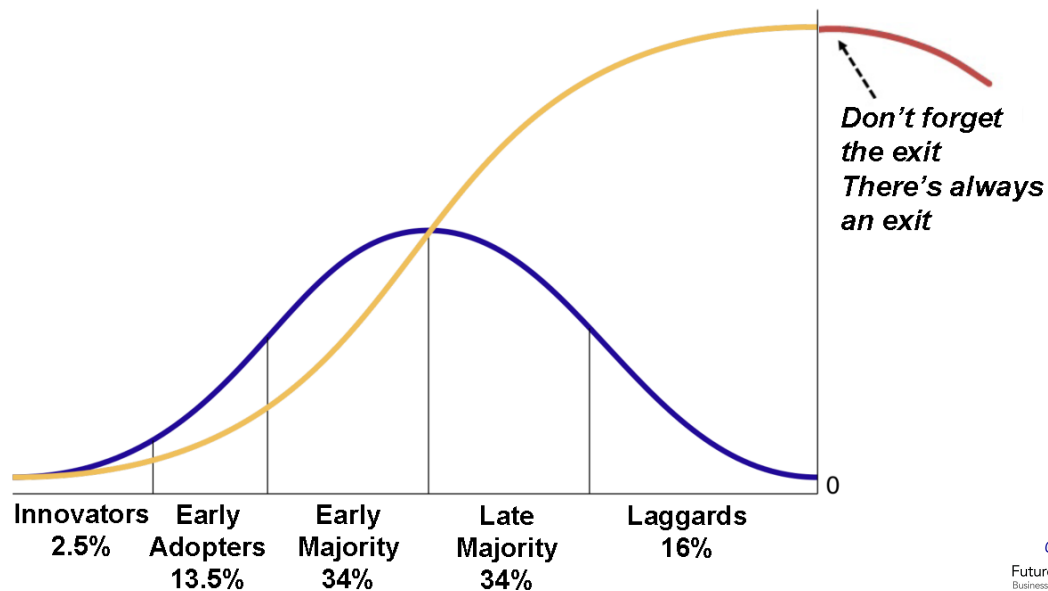


Prediction is very difficult, especially about the future. (Niels Bohr)

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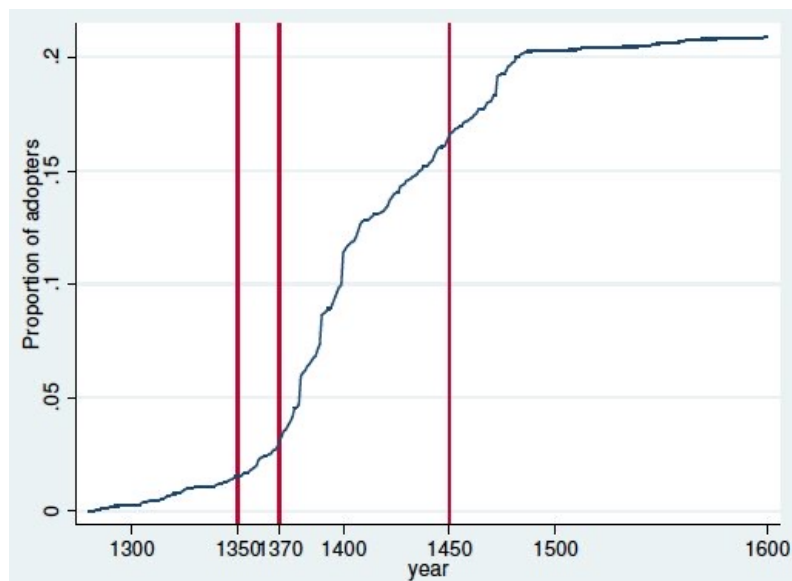
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Diffusion of ideas worth sharing



3

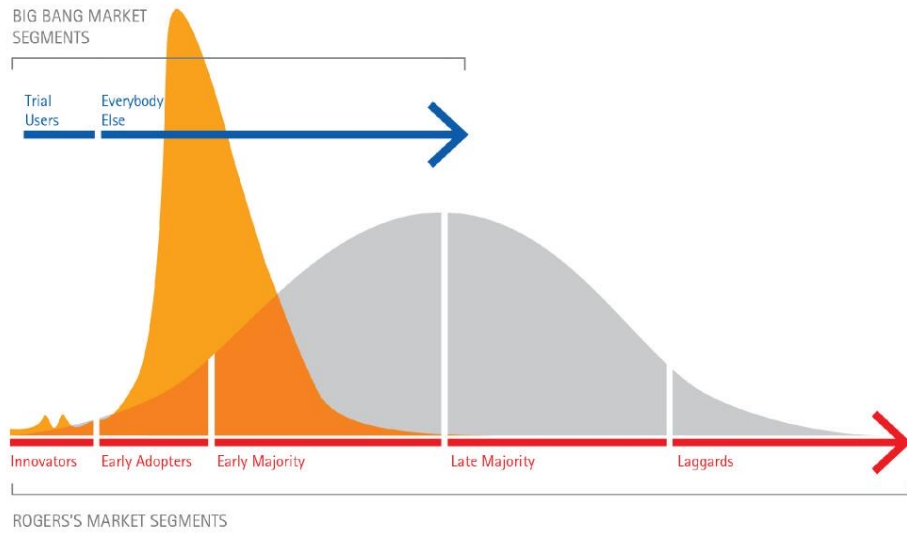
Technology adoption rates – words (language) important)



4

The Big Bang Theory

Big Bang Market Adoption

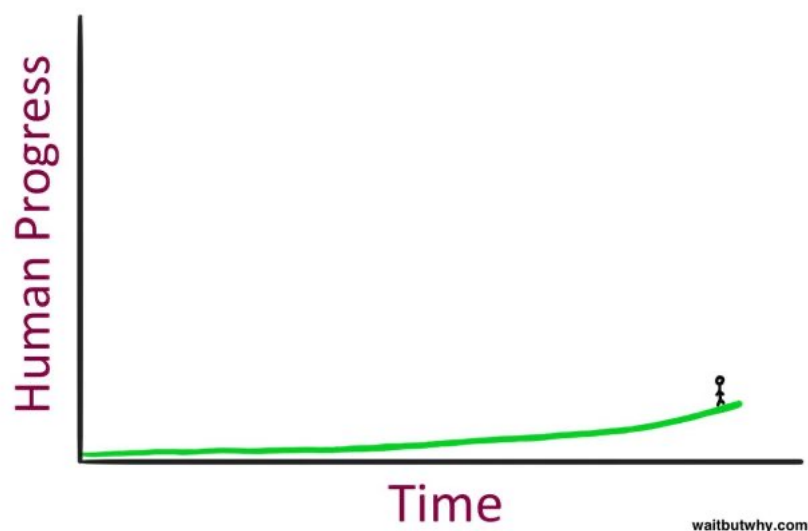


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A Brief Moment in Time



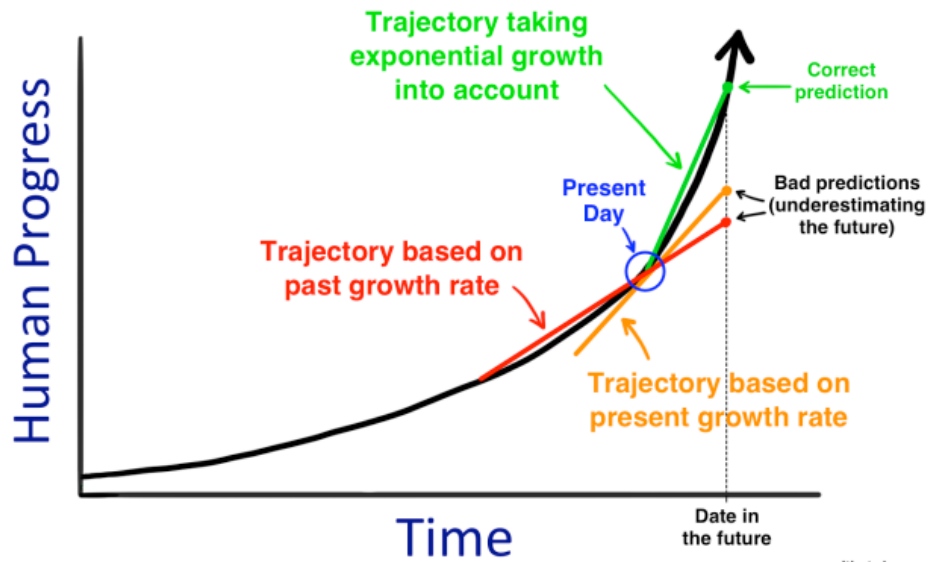
waitbutwhy.com

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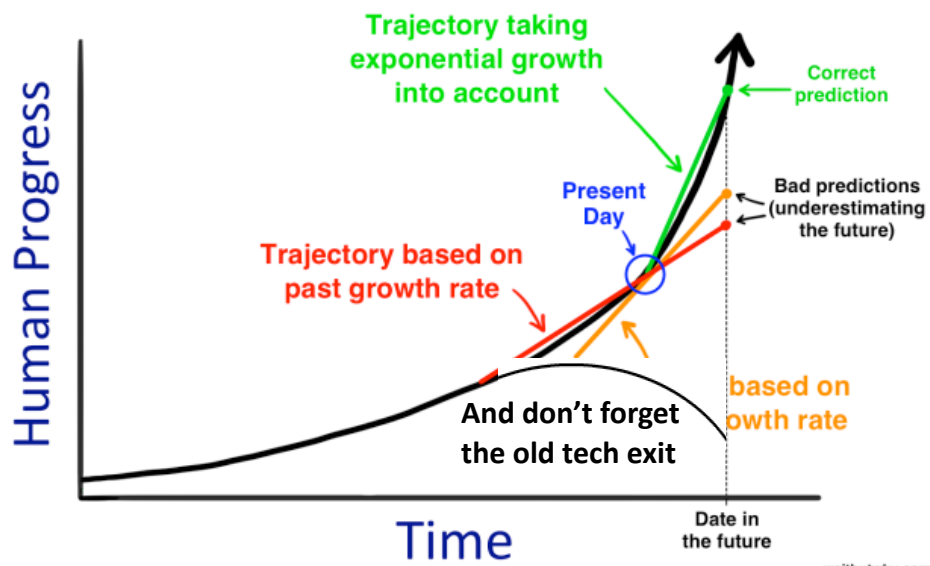
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Predicting anything is difficult – be least wrong!



7

Predicting anything is difficult – be least wrong!



8

A swarm, a cluster, a wave, a tsunami

20th Century: **Command and Control**

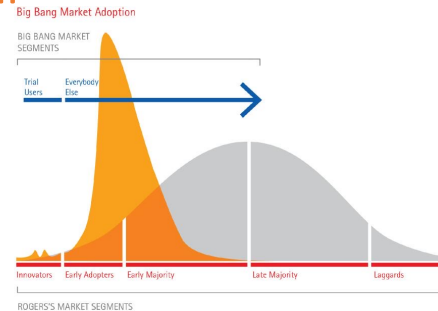
21st Century: **Suggest & Choose**

- local, distributed, democratic
- cleaner, cheaper, faster, smarter
- open source, exponential innovation

- Renewable energy, EVs, batteries
- eRetail and market-led marketing
- iEverything – Internet of Things (IoT) + sensors
- Automation, hybrids, AI & CI, robotics, robility
- 3D printing, additive manufacturing, construction
- Finance, banking, insurance – and crowd-funding

> 21st Century very much about convergence

Suggest & Choose driving supply chain from bottom

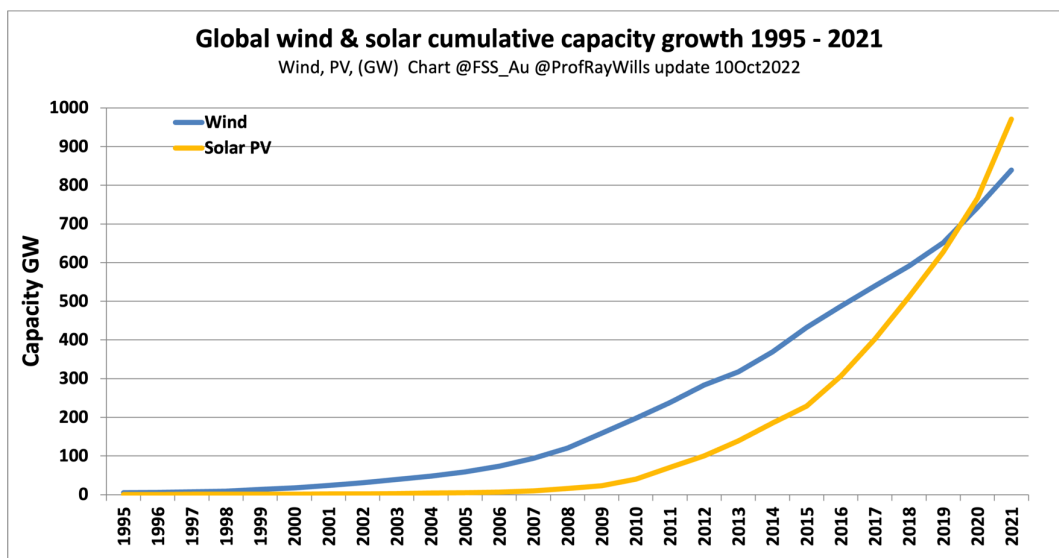


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Global renewables growth to 2021

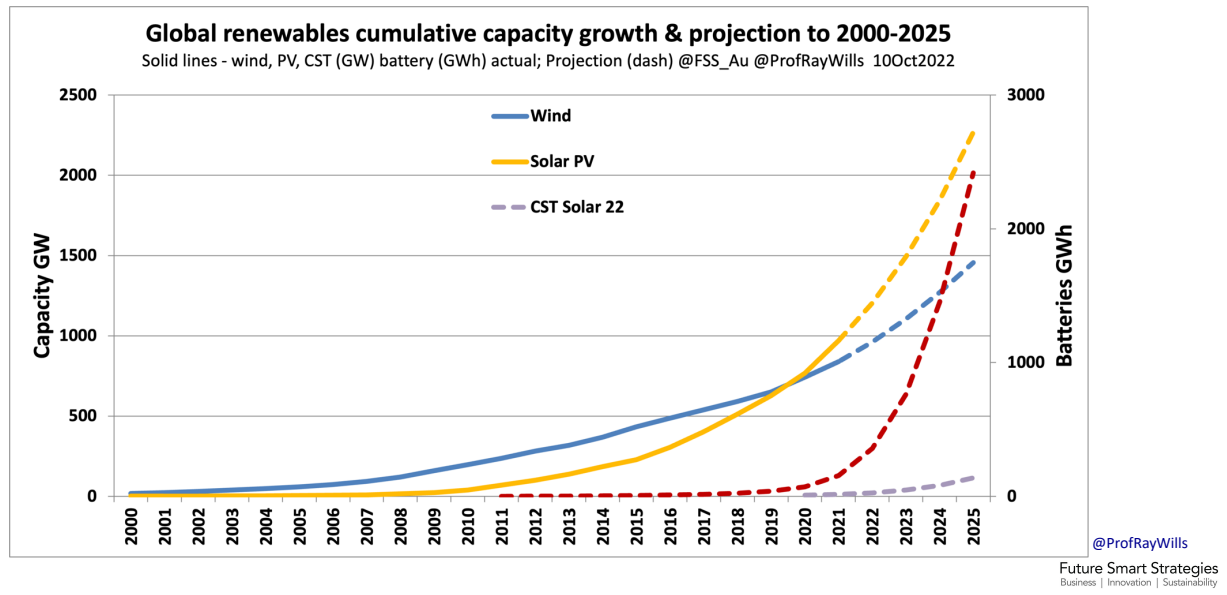


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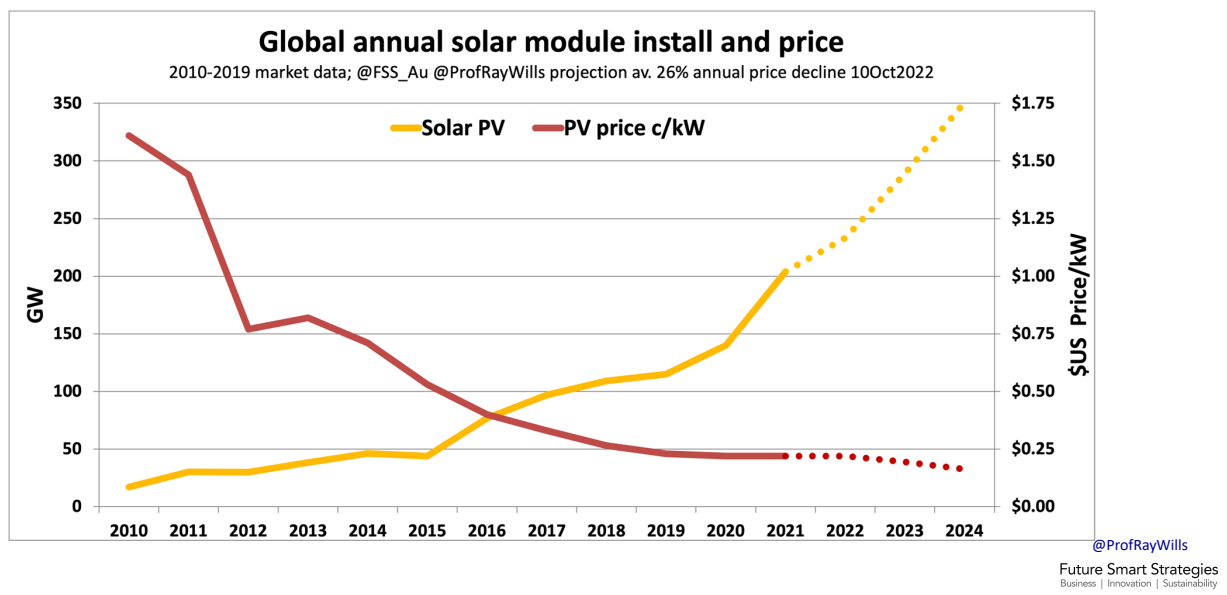
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Global renewables growth and forecast to 2025



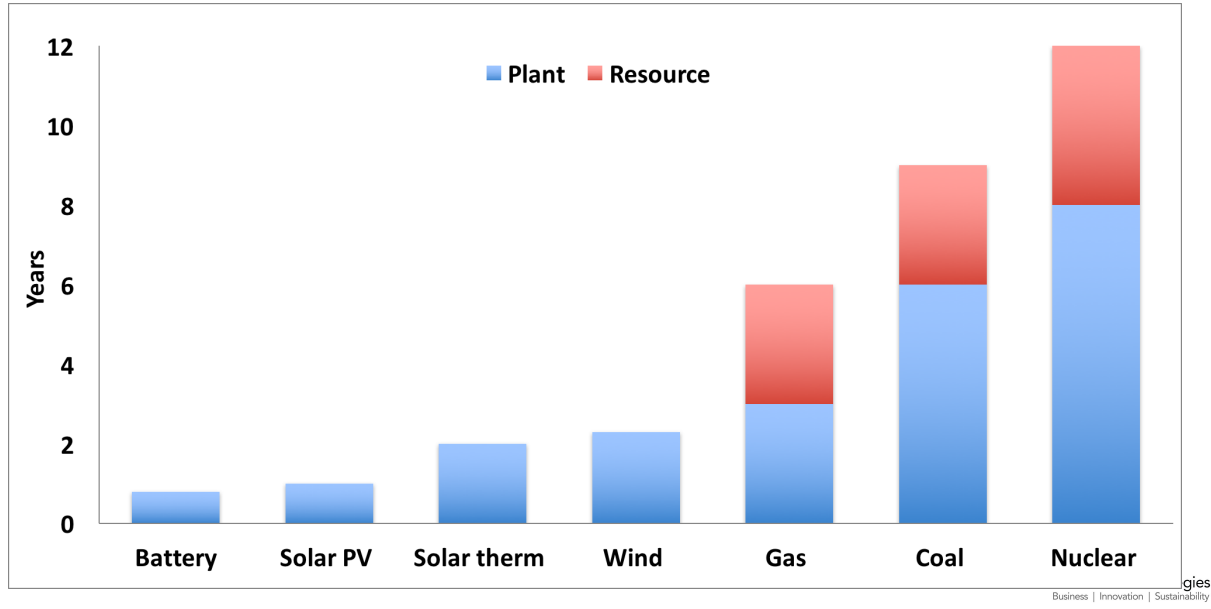
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More volume brings lower cost



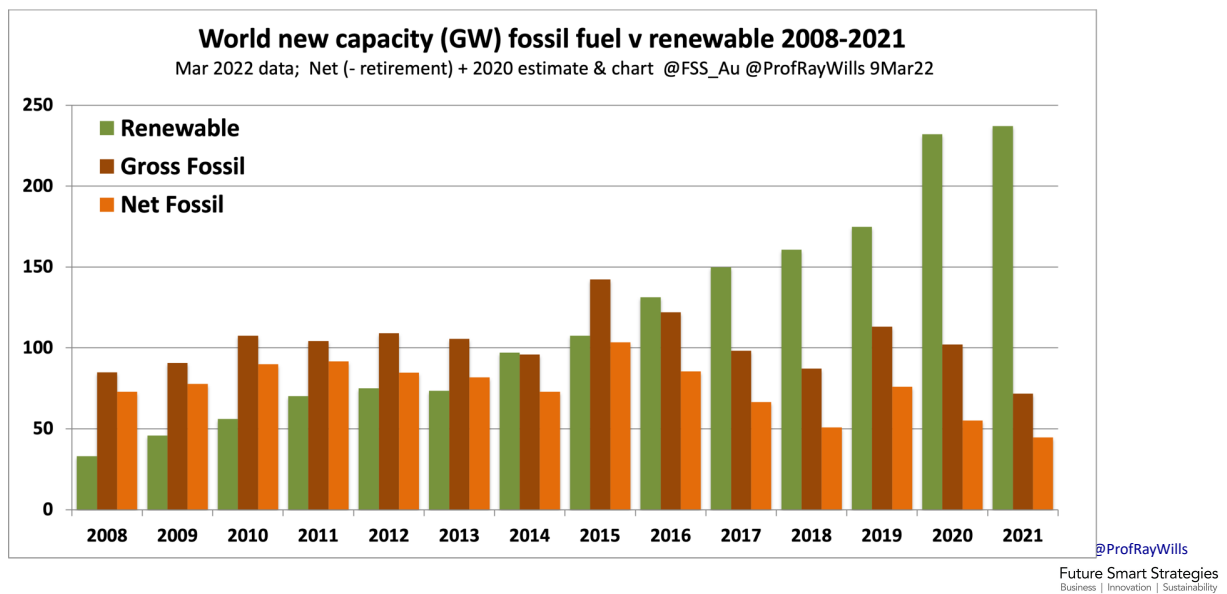
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Build it faster



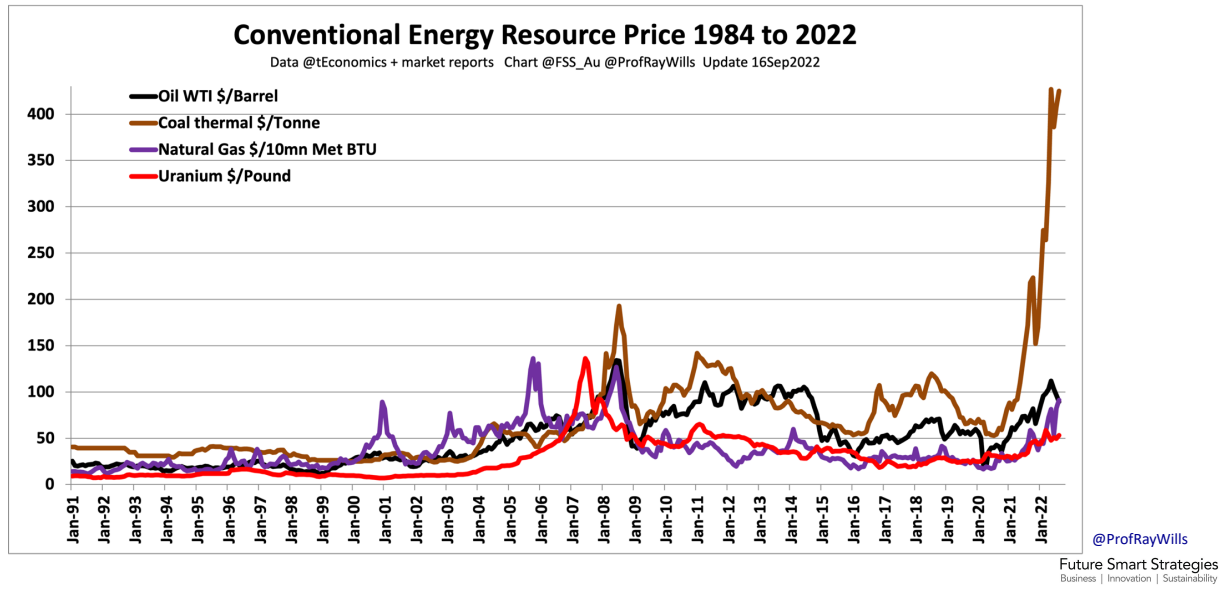
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Build less of the old, more of the new



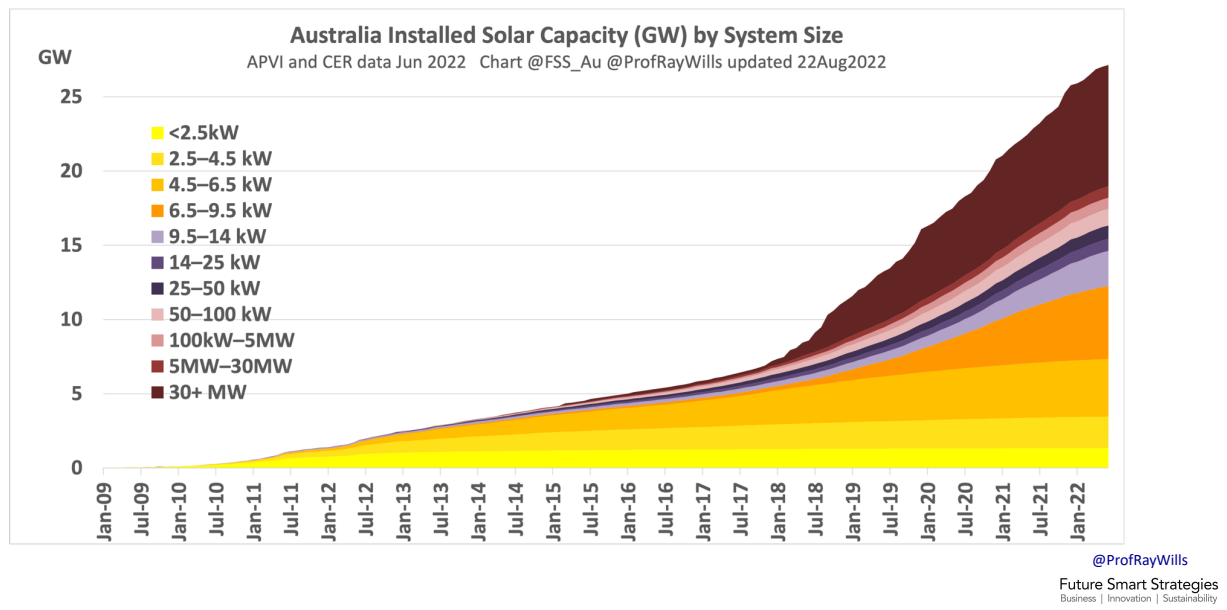
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Global Energy



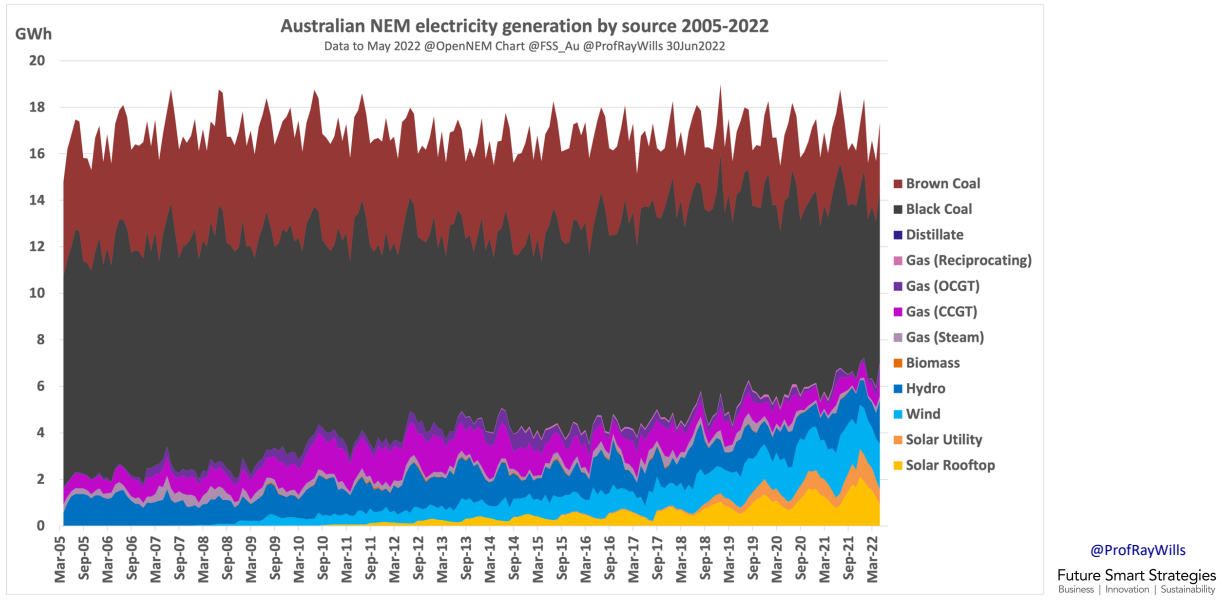
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Solar key to Australia's change



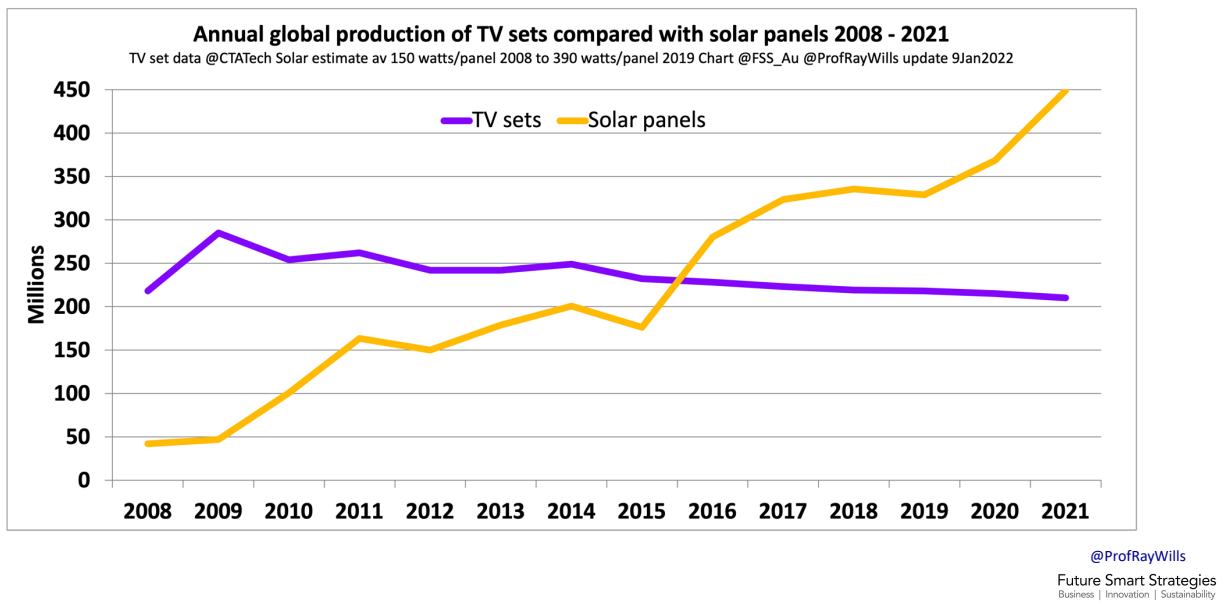
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Australia is changing



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Solar as just another consumer product



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Solar as the cheapest form of power for you

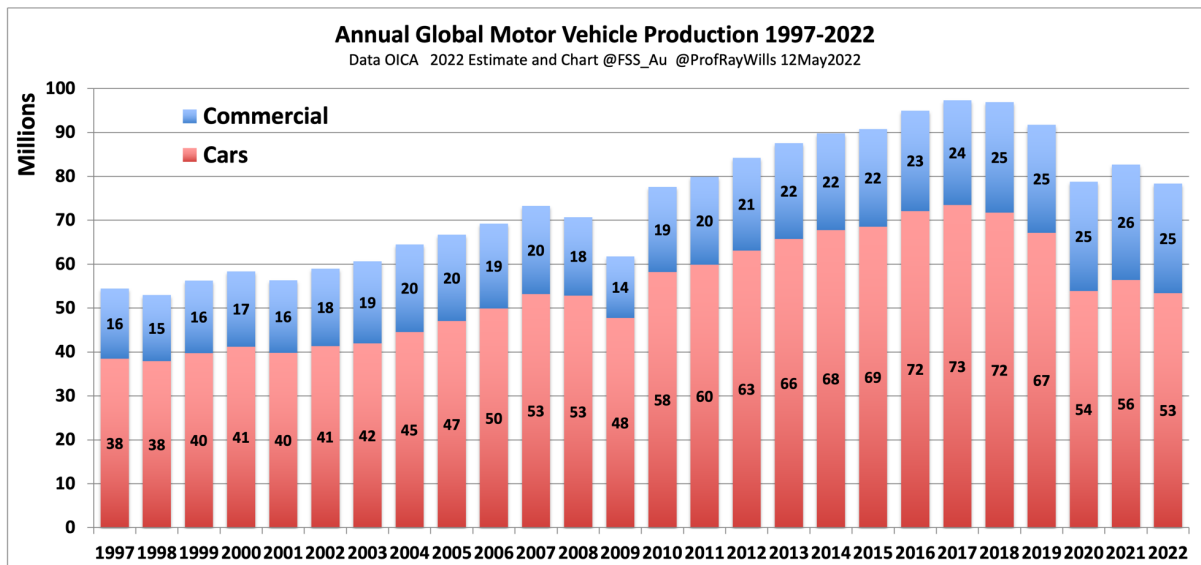


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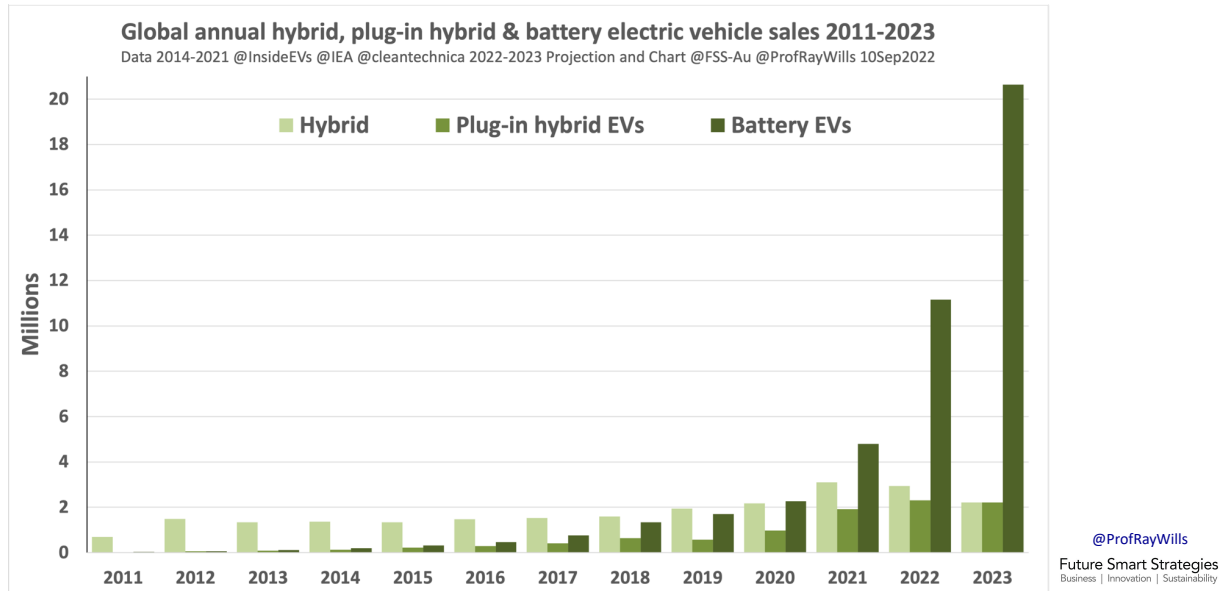
Why the decline?



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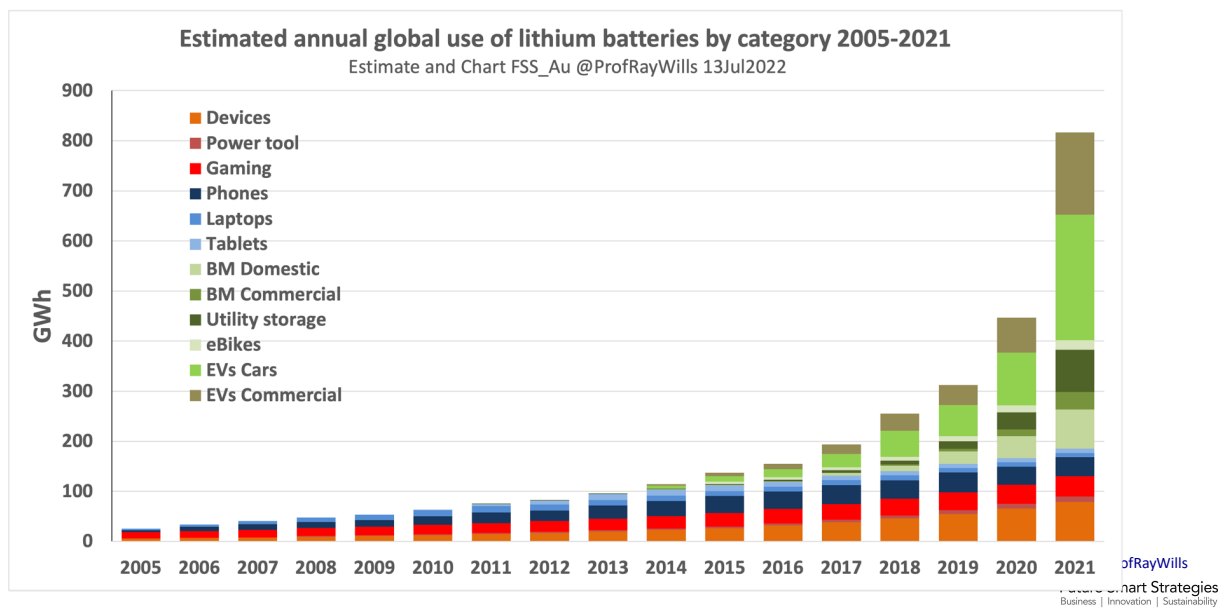
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Here come the batteries in cars



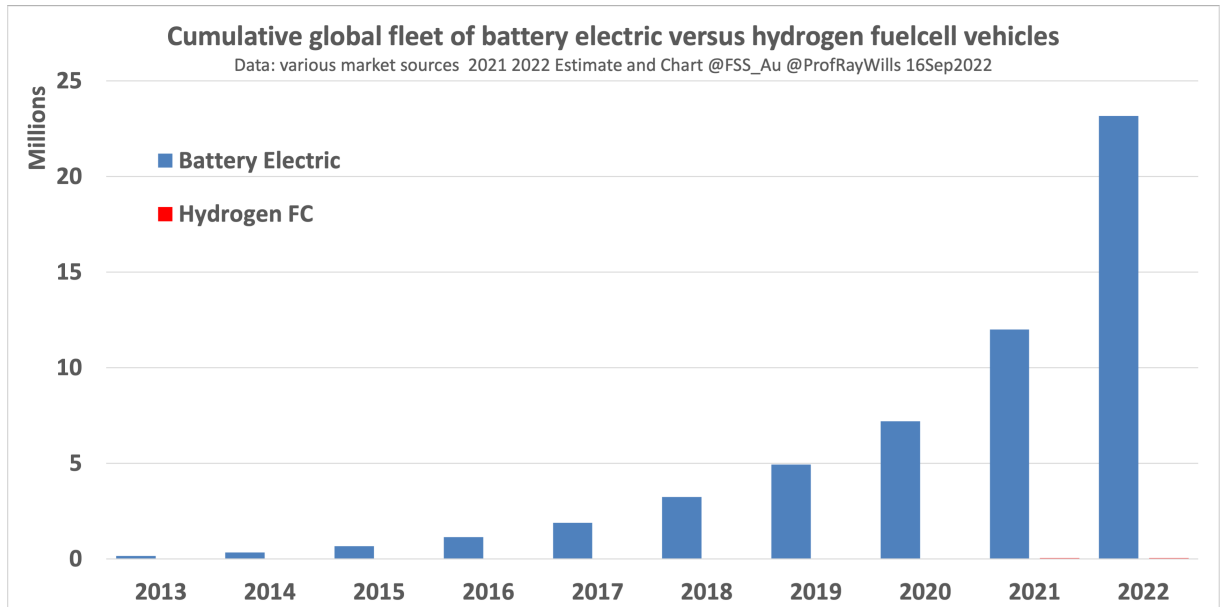
21

Here come the batteries



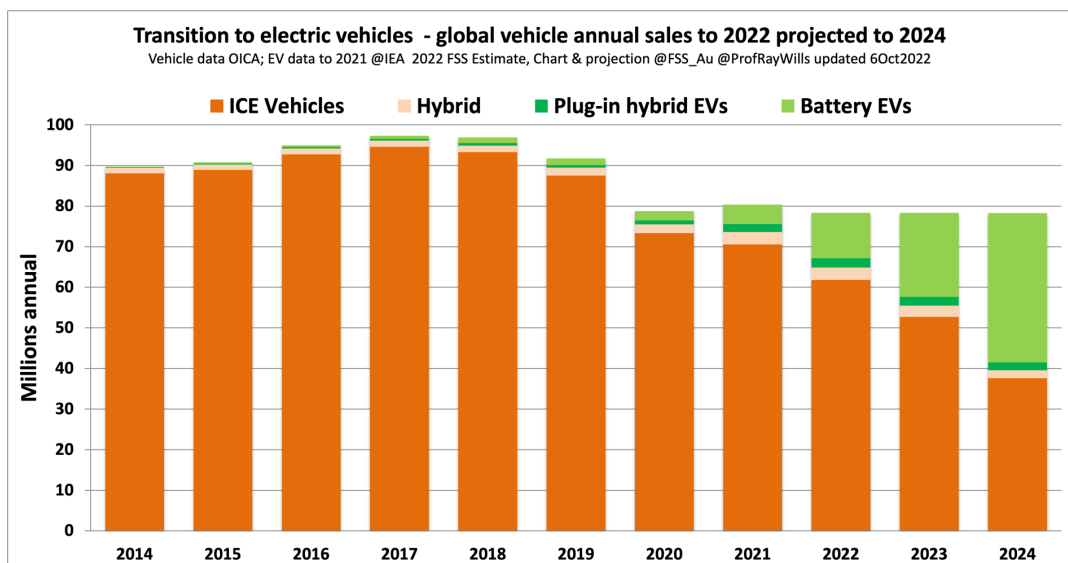
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Here come the batteries in cars – not hydrogen



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Here come the batteries in cars

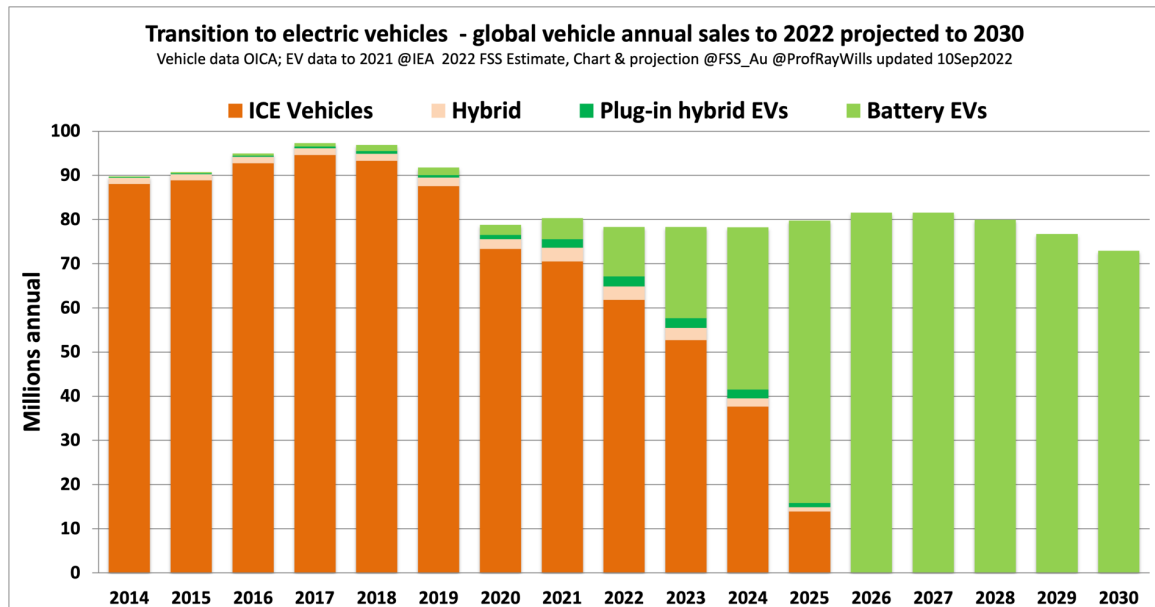


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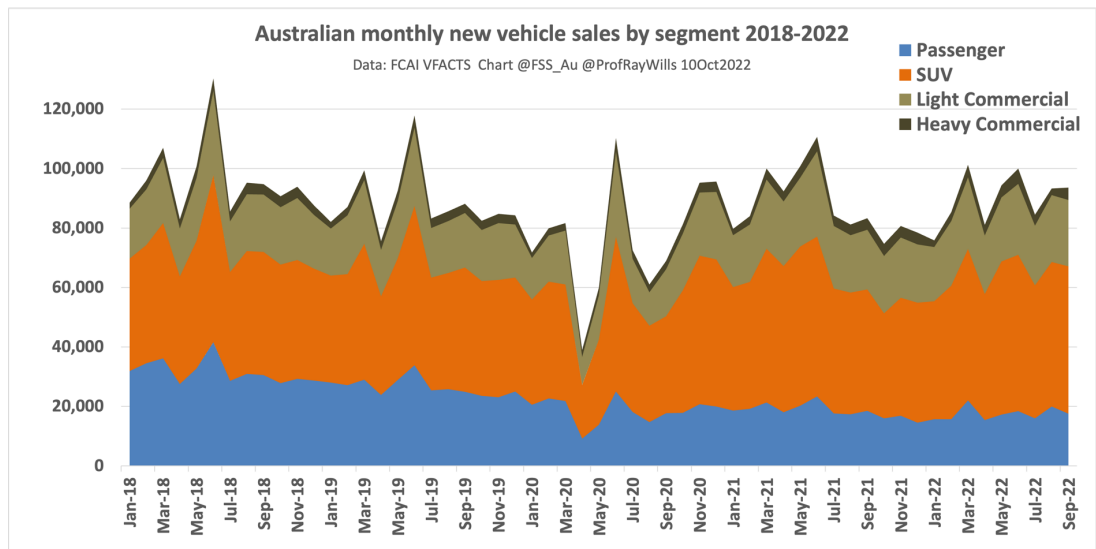
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Here come the batteries in cars



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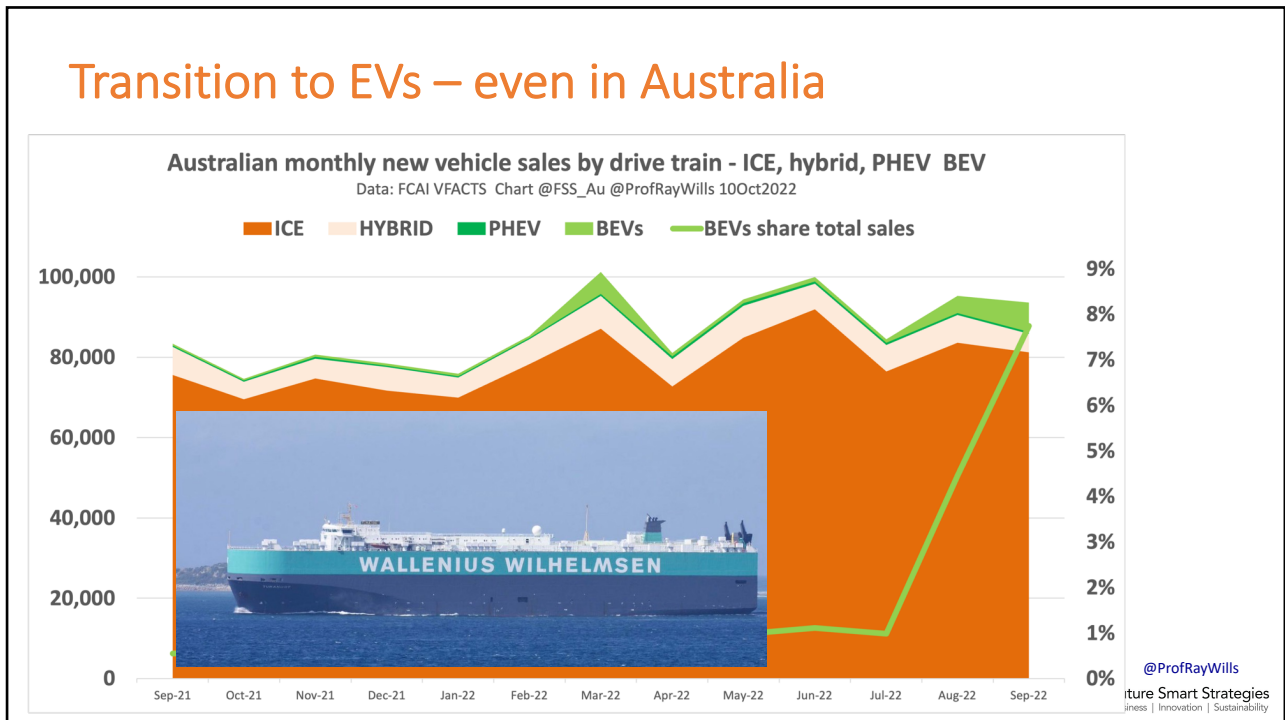
Australian car sales by segment



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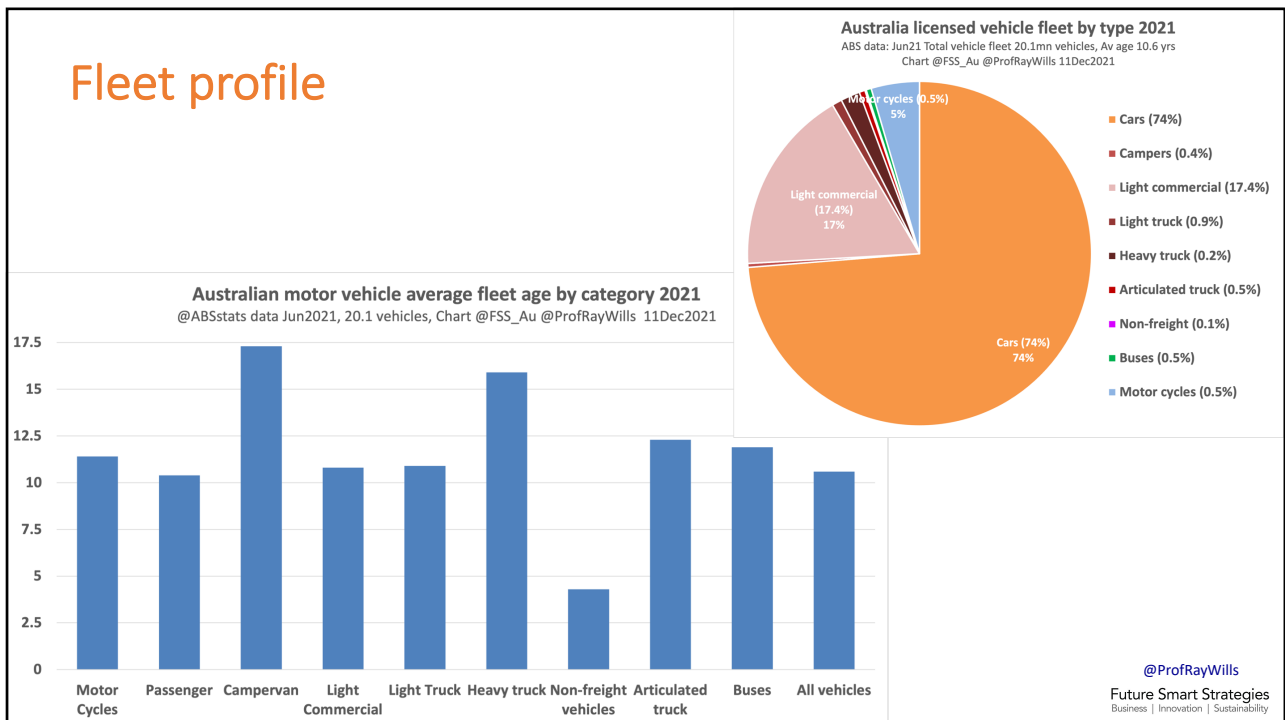
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Transition to EVs – even in Australia



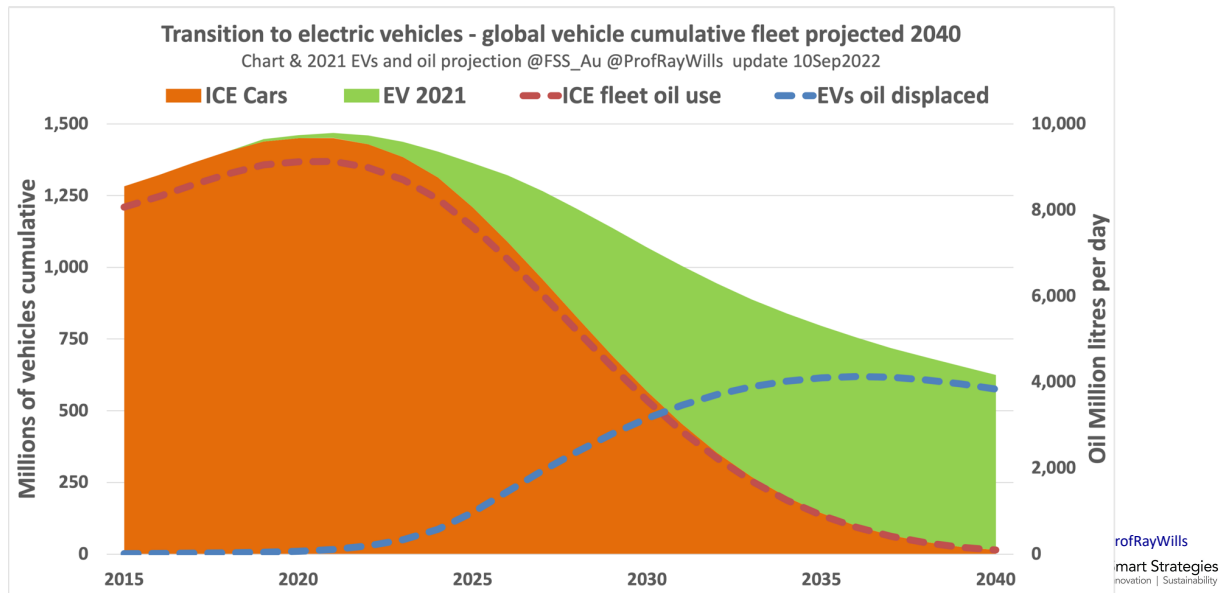
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Fleet profile



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It's just the data – future is electric



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Corporate players

- > 35% of world's 2000 largest corporations have net-zero plans
- > 70% ASX200's market capitalisation net-zero plans

Latest News

Woolworths Group to be powered by 100% green energy by 2025 in move set to help grow renewable sector



OVER THE LONG TERM

Sustainability at Wesfarmers

Bunnings and Officeworks commit to 100% renewable energy by 2025

Bunnings and Officeworks have announced plans to source 100 per cent renewable energy by 2025.

A renewable energy revolution is powering Australia's \$720bn mining and resources industry

ABC Rural / By Daniel Mercer and Tom Edwards

Posted Mon 15 Nov 2021 at 4:24am, updated Thu 18 Nov 2021 at 8:33am

ASX surges on higher commodity prices, BHP investors back climate plan and Woolworths' renewables pledge

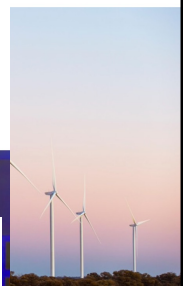
by business reporters Sue Lannin and Rhiana Whitson, wires
 Posted Fri 12 Nov 2021 at 4:40am, updated Fri 12 Nov 2021 at 2:04pm



Carbon neutral from this year, enabling 100% renewable energy by 2025, and reducing absolute emissions 50% by 2030 – we're acting on climate change

By Andrew Penn March 4, 2020

Telstra is one of the largest consumers of power in the country. Powering networks to cover a continent this big so that millions of Australians stay connected requires something in the order of 5.9 petajoules of energy each year and last year that resulted in nearly 1.3m tonnes of greenhouse gas emissions.



Powered by wind. (Supplied: Christian Sprenger)

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Carbon footprint, New Zealand



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Carbon footprint, Australia

Whole of life cycle greenhouse gas emissions for a range of food products
(kg CO₂-e/kg product on supermarket shelf) - CSIRO

Food product	Carbon footprint
Bread	0.9
Tinned lentils	1.0
Beef, fresh boned meat	25.2
Lamb, fresh boned meat	19.4
Pork, fresh boned meat	6.3
Chicken, whole fresh	2.9
Whiskas Ocean Fish [®]	1.3
Pedigree Meaty Bites [®]	0.9

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Vegetarian trends

EU population 14% vegetarian

US shift in meat consumption resulting from people eating more chicken and less beef, and an increase in the number of people trying plant-based alternatives.

2020 Gallup poll: 41% US adults reported having tried plant-based meats. Women (43%) more likely to have tried a plant-based meat alternative than men (39%).

Those 65 and older (26%) least likely to have tried an alternative.

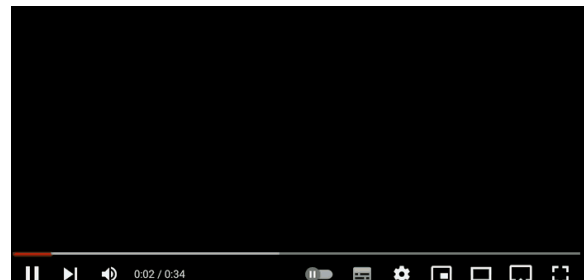


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Electric vehicles will reduce (regional) transport costs



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Electric vehicles will bring new (regional) utility

Electric Bushmaster
Electric Protected Mobility Vehicle
#ePMV
Going electric better for defence
EVs:
- no engine startup
- minimal heat signature
- more reliable, simpler to maintain
- more capable
- accelerate faster
- more torque
- export power to ops
abc.net.au/news/2022-08-1...
[Show this thread](#)



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Electric flight will reduce regional transport costs

Oh, Canada

@AirCanada invests in @heartaerospace and orders 30 new 30 pax electric aircraft with with 400-km range

The future is electric

Land, air and sea



Prof Ray Wills @ProfRayWills · Sep 18

St Baker Energy Innovation Fund tips \$5 million into AMSL Aero, Australian company developing 'Vertiia' world's most efficient, long-range **electric** vertical take-off & landing (eVTOL) aircraft

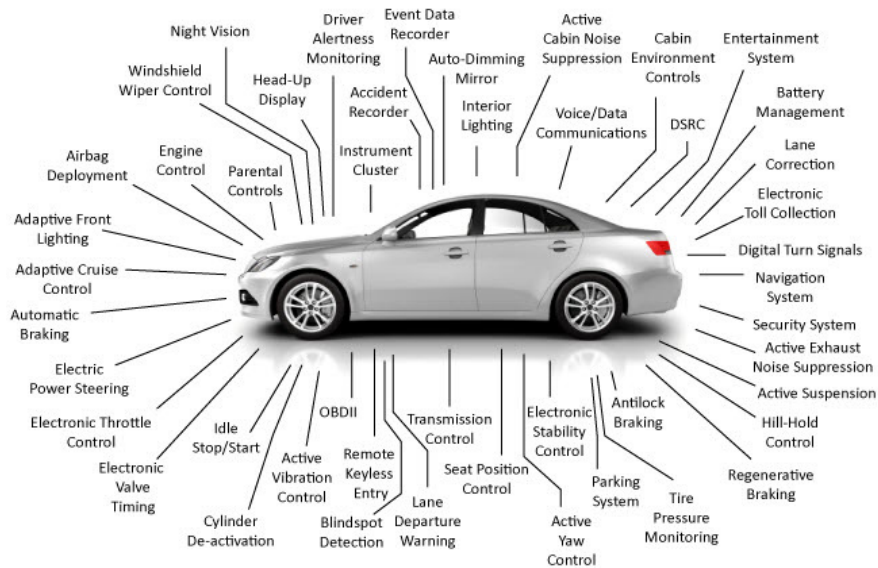
AMSL also has partnership @MyCareFlight for air ambulance



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Robotics and autonomy will aid every one



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Robotics will aid every one - but put us out of work



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Agbots, swarms – and vertical farming

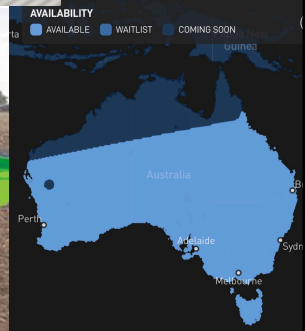
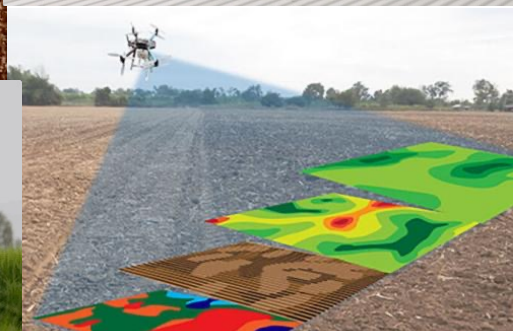
- Smart farms
- IoT sensors going beyond current precision agriculture to automation, through robotics, drones - and swarms
- Predictive data analytics and farm management software
- Vertical farming



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Robotics will also make work smarter and safer – and will rain data



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Robotics will aid every one – but erode every labor market



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Disruption will bring change

RethinkX
Disruption, Implications, and Choices

Rethinking Food and Agriculture 2020-2030

Break-down

Starting point: Grow macro-organism (e.g. a cow)
Production model: Break down into simpler products
Output variety: Limited by biology and economics
Cost: Little remaining room for improvement
Feedstock efficiency: 4%

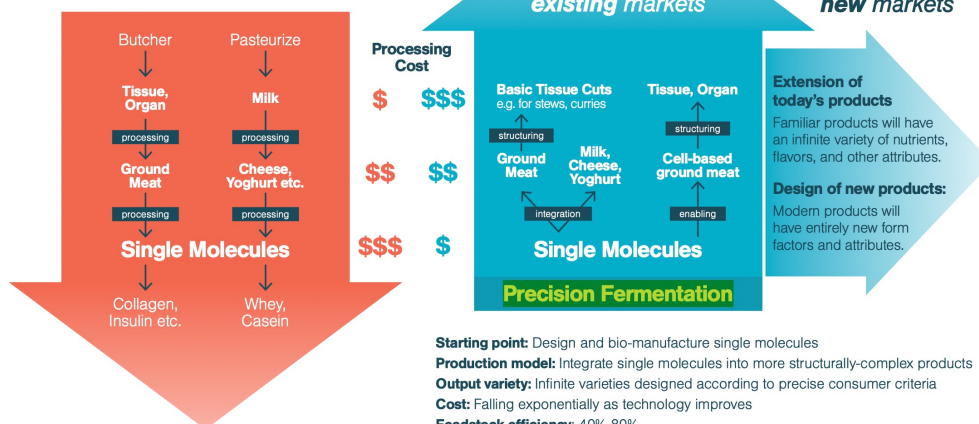
2-3 years



Build-up

Weeks

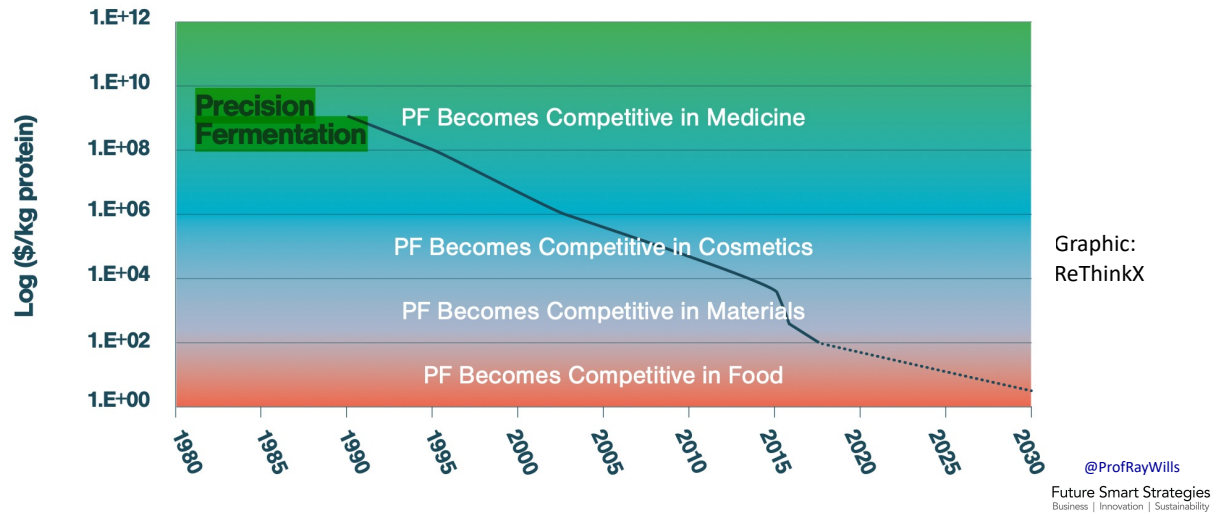

 Disruption of
existing markets

 Creation of
new markets


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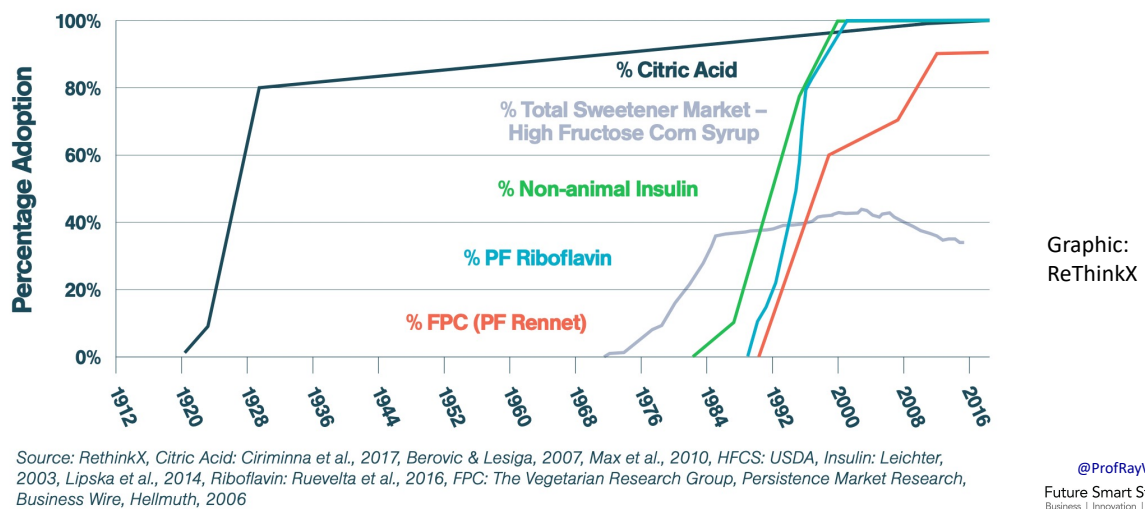
Disruption will bring change at lower cost

Precision Fermentation



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Disruption in the food industry just disruption



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Food as software

Food As Software

THE POSSIBILITIES ARE ENDLESS

12 plants &
5 animals
account for
75% of food

- The proteins we consume today come from a few plants & animals we domesticated thousands of years ago.
- The **number of possible proteins is infinite**
 - We did the math. 20²⁰ = Infinity
- With **Precision Fermentation** we will be able to create **ANY PROTEIN in nature (millions) at speed and scale.**
- We will be also be able to design proteins "not in nature" for specific requirements – materials, medicine, cosmetics, food...like we design Apps.

Graphic:
ReThinkX

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Images Source: Rethinking Food and Agriculture (Tubb & Seba)

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Software as software - apps will bring us workers

<https://swaggie.co>

find casual and seasonal work

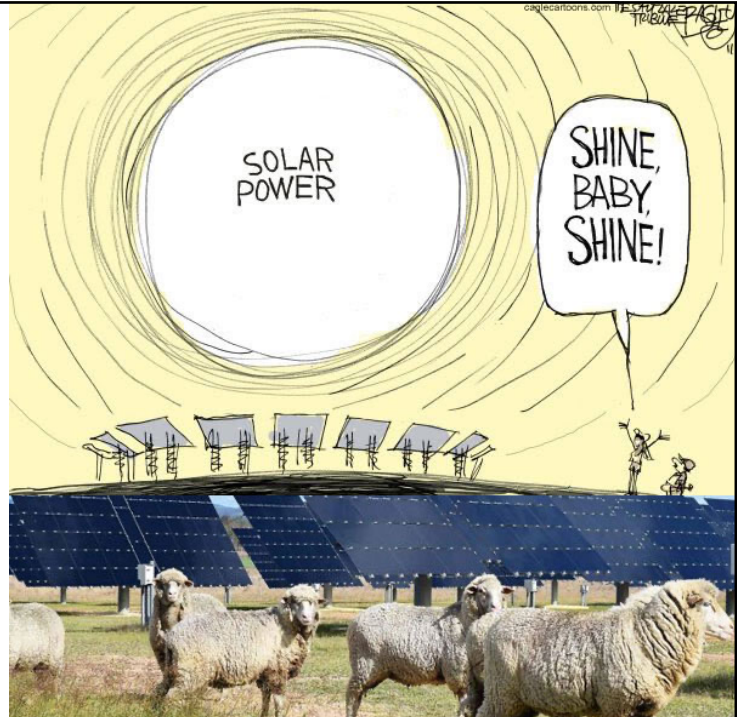
Go to platform

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Shine baby, shine

1 hectare solar farm
yields 500kW
~100x more energy in
driving distance, via an EV,
than yield of 1ha of biofuels



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WAARC

Western Australian Agriculture Research Collaboration

<https://waagresearch.org.au>



**WA Agricultural
Research
Collaboration**
Innovation • Transformation • Growth



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The truth about a city's
or government's
or enterprise's

aspirations and actions

is not found in
its vision statement

It's found in its budget
and reflected in its
infrastructure

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Disruptive action on global warming



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No point fighting action on global warming



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Saving the fish is not action on global warming



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Global technology growth and forecast

- New technology iterating faster - rapid, exponential (non-linear) growth.
- Planners in traditional technology seem unprepared for change, not based on observations in past perturbations in markets.
- Rapid emergence + convergence of complementary technologies: energy storage, electrification of transport, self-driving vehicles, robotics, AI – and integrated in the emergence of 'smart cities' – all delivering additionality to momentum for change.
- Sophistication of developing control systems changing paradigm of what is possible in 21stC in every sector
- What once made a company valuable has changed dramatically
- Diversity!! Multiple agents of change, not just government, but also business, consumer, and community drivers add much political pressure – especially through social media channels.

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Take home

- The world is being disrupted by many changes - changing climate, changing technology, changing markets
- Commonly traditional market participants resist change, but change is inevitable, and examples in clean tech and new tech were presented
- Those embracing change won't necessarily profit more (though some can), but rather avoid profiting (much) less!
- Many of the new tech changes will bring new opportunities including products and services not previously available in regions and remote areas.
- Clients and customers generally embrace change across the supply chain and across multiple markets if it brings convenience or benefit.
- Agriculture and the food supply chain is not exempt - clients are demanding cleaner, cheaper, faster, smarter, local – and also net-zero.

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Business Innovation Sustainability

Assess business opportunities

Build business partnerships

Manage business risk

Engage stakeholders

Utilise strategic experience

Understand policy and regulation

Take evidence-based approaches

Get expert sustainability advice

Embrace cutting-edge technologies

www.futuresmart.com.au