Planning for Post-Carbon Mobility: How to successfully manage coming transport revolutions

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Why will we see major change in transport systems within 10 years?
Because we have reached the end of the ‘Beverly Hillbillies’ oil story

Conventional oil was the ideal fuel for moving people and goods in the 20th century
Conventional wisdom: the mid-point of the world’s petroleum endowment gives plenty of time to plan adjustments.
Geological reality: the second half of the earth’s oil endowment is *physically different*

Currently one of the largest construction projects on the planet, the Athabasca Oil Sands Project is the first new fully integrated oil sands project in 25 years.

We can either double down on new oil production infrastructure or invest in technology that changes our consumption.
We’ll have to take risks in places that are remote, fragile and costly to work in to access the remaining oil.
Costly new infrastructure will be needed to extract and refine this oil.

Enbridge pipeline preparations

Heavy oil upgrader
Carbon sequestration would add billions to infrastructure costs

\[ \text{CO}_2 \text{ capture consumes at least } \frac{1}{4} \text{ of the energy} \]
How much money and energy will be available to maintain global oil production levels?
Transport revolutions will lead, not lag, the post-carbon energy shift because:

Oil products power ~95% of global mobility
Transport has the world’s biggest appetite for oil

Could Australia cope with a major reduction in carbon-fueled mobility?

Only if you invest in transport systems that can perform without oil.
Moving people and freight without oil will require transport revolutions.

This is not a transport revolution.
What is a transport revolution?

- **A substantial change** in a society’s transport activity—moving people or moving freight, or both—that occurs in less than 25 years.

- Substantial change means a **50% increase or decrease** in transport activity or use of a new means of transport becomes part of the lives of 10% of the society’s population.
The most promising transport revolutions would follow three paths to a post-carbon future:

- GREATER use of electric motors, replacing internal combustion engines
- GREATER use of rail and water, replacing road and air
- GREATER use of collectively managed travel, replacing personally managed travel
Electric mobility is the key to energy transition because it can blend multiple renewable sources ...
To incrementally replace nonrenewable energy sources
Transportation modes that can only run using large amounts of oil will face the most challenging adjustment.
Best case scenario: new technology can cut aviation fuel use by 50% above 787.

That won’t be enough to keep flying cheap.
What will it cost to fly overseas in the future?
Aviation as a ‘mass transportation’ mode is running on borrowed time

‘If we can’t find ways to introduce electric cars, buses and trains for most trips under 1,000 kilometres . . .
We could be in for some challenging transport revolutions
Wind power can boost the world’s most energy efficient transport mode

- 90% of global trade moves by water
- Marine transport is already the most carbon-efficient way of moving
- ‘SkySails’ technology can reduce marine transport’s oil use by another 50%
Electric railways offer proven technology for moving freight without oil
Long-haul trucking is on the sharp edge of post-carbon adjustment pressures. Truckers can be expected to fight hard to sustain the unsustainable.
High-speed rail is running late in Australia, but could keep eastern cities well connected without oil.

A mature technology, running since 1964 with ZERO fatalities in Japan!
China’s high-speed rail revolution could be a game changer

This decade, China is doubling the world’s HSR capacity.
China’s HSR manufacturing capacity could cut bullet train costs by 50% or more.
What would it take to re-energise Aussie railways?
Implementing electric rail corridors could unlock a barrier to EV usage

- One of the EV’s biggest limitations is the lack of infrastructure for charging batteries.
- Railroad electrification is a mature propulsion infrastructure that could be profitable from day one.
There are many kinds of mature grid-connected electric vehicles.
Batteries are the EV's 'Achilles heel'

What if cars didn’t need a battery that could power 200 miles on a charge?
Station cars can recharge at electric transit hubs
Electric mobility corridors could support multiple modes of electric propulsion
How can Australia gear up for deploying these electric mobility corridors?

- New priorities
- New skills
- New policy
Step 1: Set aside plans for a future that will never arrive

Will Rogers once advised Americans that to get out of a hole, the first thing one has to do is:

STOP DIGGING!
Why is this so hard to do?

For every 1,000 engineers who can design highways and airports in the Australia, there might be one who can electrify a railroad.
This imbalance skews the vision of transport alternatives – i.e., seeking new fuels to keep existing infrastructure going.
Australia needs a Transportation Redevelopment Agency
TRA should develop an energy-first planning framework

1. Set the key parameter - how much to reduce liquid petroleum fuel use in transport between start and end of the plan.

2. Estimate current transport activity and energy use.

3. Anticipate future available modes and energy use.

4. Develop a plausible strategy for deploying future modes that meet desired activity and energy use.

5. Continually refine and improve energy use estimates and proposals for transport activity.
TRA would also take over stranded assets from carbon dependent mobility and wind down or repurpose these facilities.
Step 3: Deploy the policy tools that can fast-track post-carbon mobility

- Introduce fiscal options that move beyond ‘road socialism’
- Enable public-private partnerships through infrastructure condominiums
- Encourage carbon sunsets through acquiring and repurposing ‘stranded assets’
Pricing road use creates a sustainable infrastructure support model.
Electric mobility corridors would thrive with an ‘Infrastructure Condominium’
What about stranded assets?

Airports designed to only serve planes, cars and trucks will not be hold their value.
Lyon St. Exupery is not just an airport; it is a Travelport.

Many European airports are prepared to shift from air to rail. Australia should be investing in such a transition.
Leadership has revolutionized transportation before.
Donald Nelson appointed Chair of the War Production Board on January 16, 1942

WPB Production Order #1 canceled civilian auto production on February 10, 1942
America’s Great Pause in Motorization
Followed in 1942 – 43

- 3.8 million autos produced in 1941
- 143 autos produced in 1943

Gas and tire rationing yielded 40% vkt drop in two years
Transport revolutions will arrive – whether we are ready or not.

The sooner we trade in obsolete plans and outdated priorities for electric mobility, the greater the chance of a happy ending.
To find out more:

For further information on post-carbon mobility options, visit:

www.transportrevolutions.info