

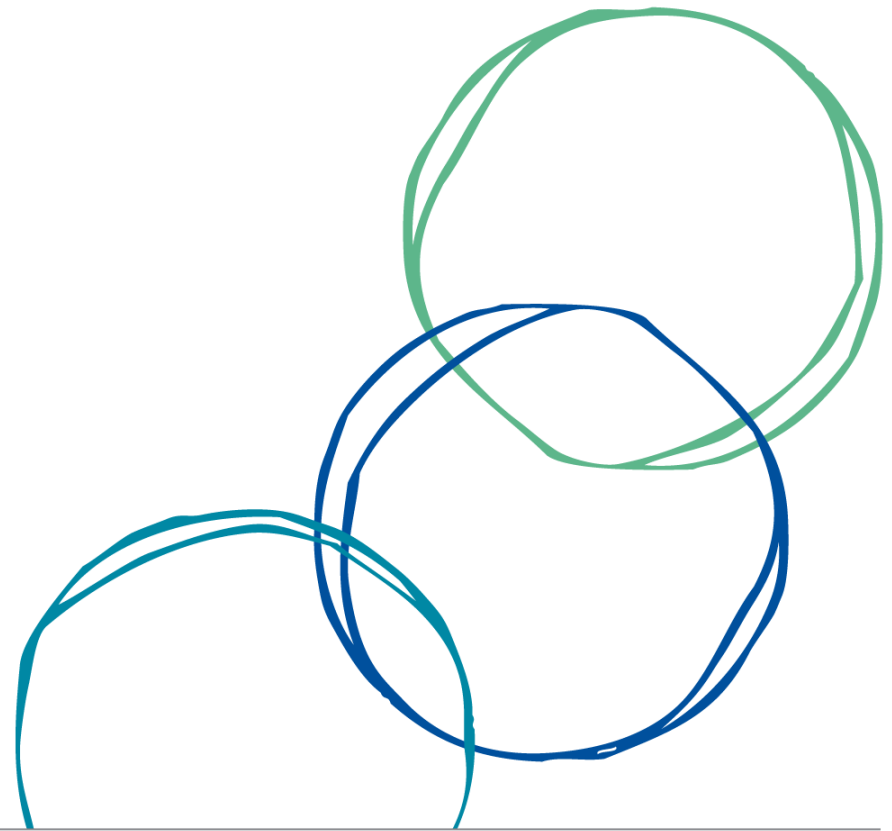


LOW CARBON LIVING
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Disruptive Innovation and Energy

Professor Peter Newman
Professor of Sustainability
Curtin University Sustainability
Policy Institute

Tuesday, 23 February 2016



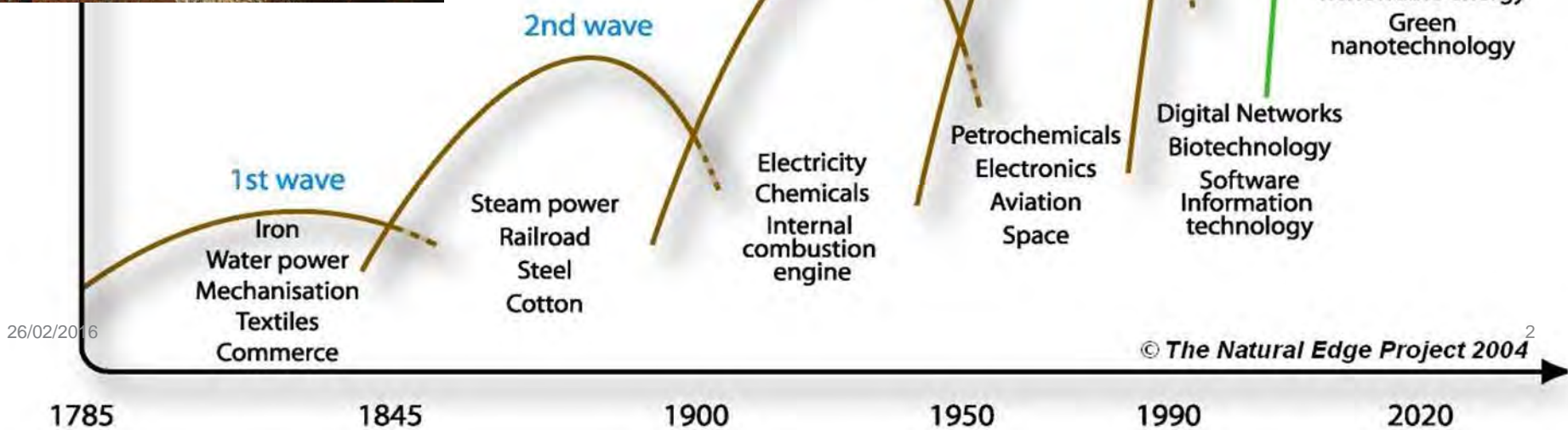
RESILIENT CITIES

Responding to Peak Oil
and Climate Change

Peter Newman, Timothy Beatley, and Heather Boyer



Waves of Innovation



New understanding of innovation...

DISRUPTIVE INNOVATION

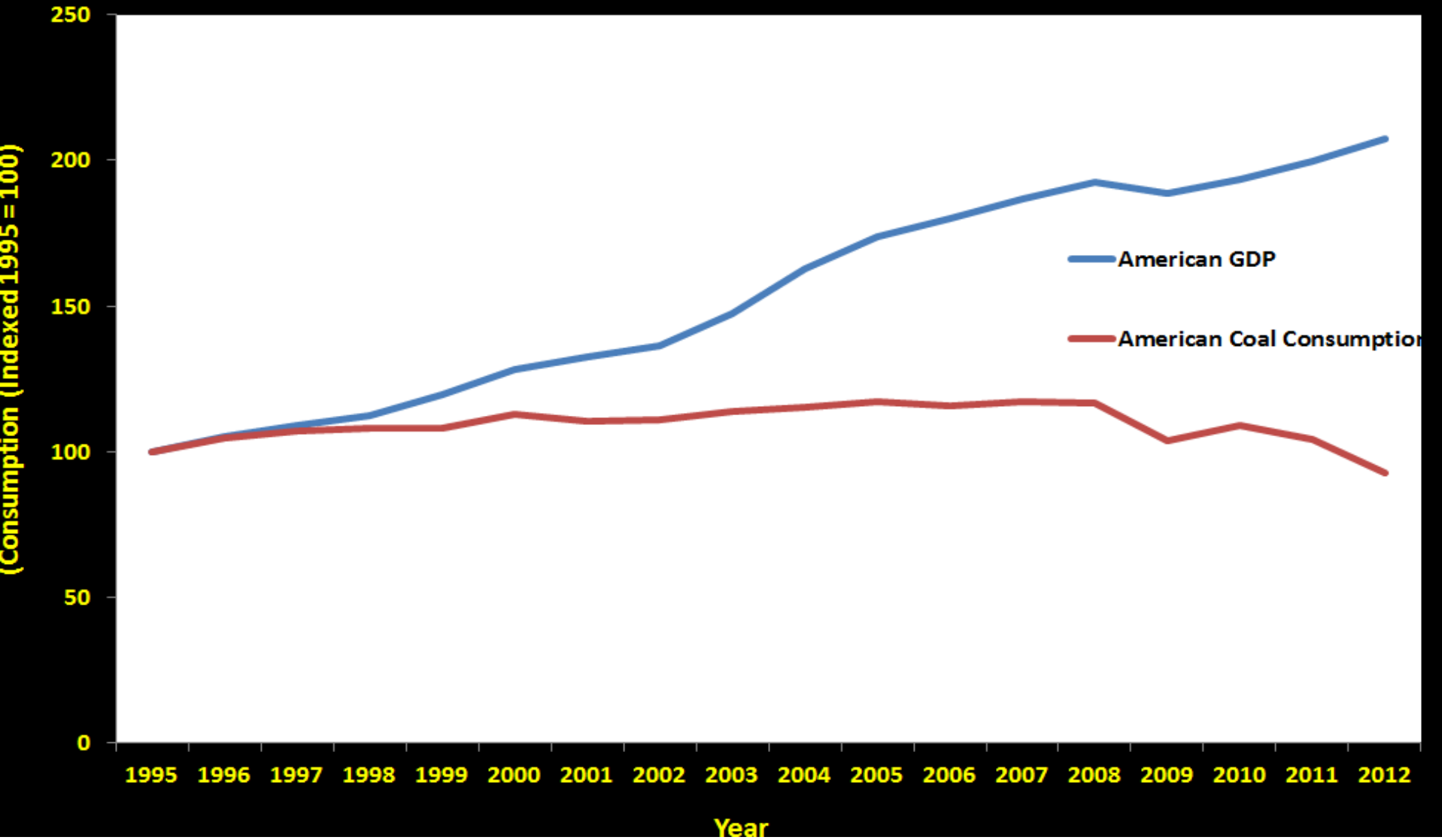
- Came from Clayton Christensen at Harvard.
- Innovation came from demand, often before it was cheaper than mainstream options. But it 'felt cheaper'...it performed for them.
- Eg 3.5 inch discs cf 5.5 inch discs.....Notebooks!
- Exponential growth and system disruption
- Mainstream finds it hard to see innovation as they are looking at supply price...so they ignore it. The 'Kodak effect'

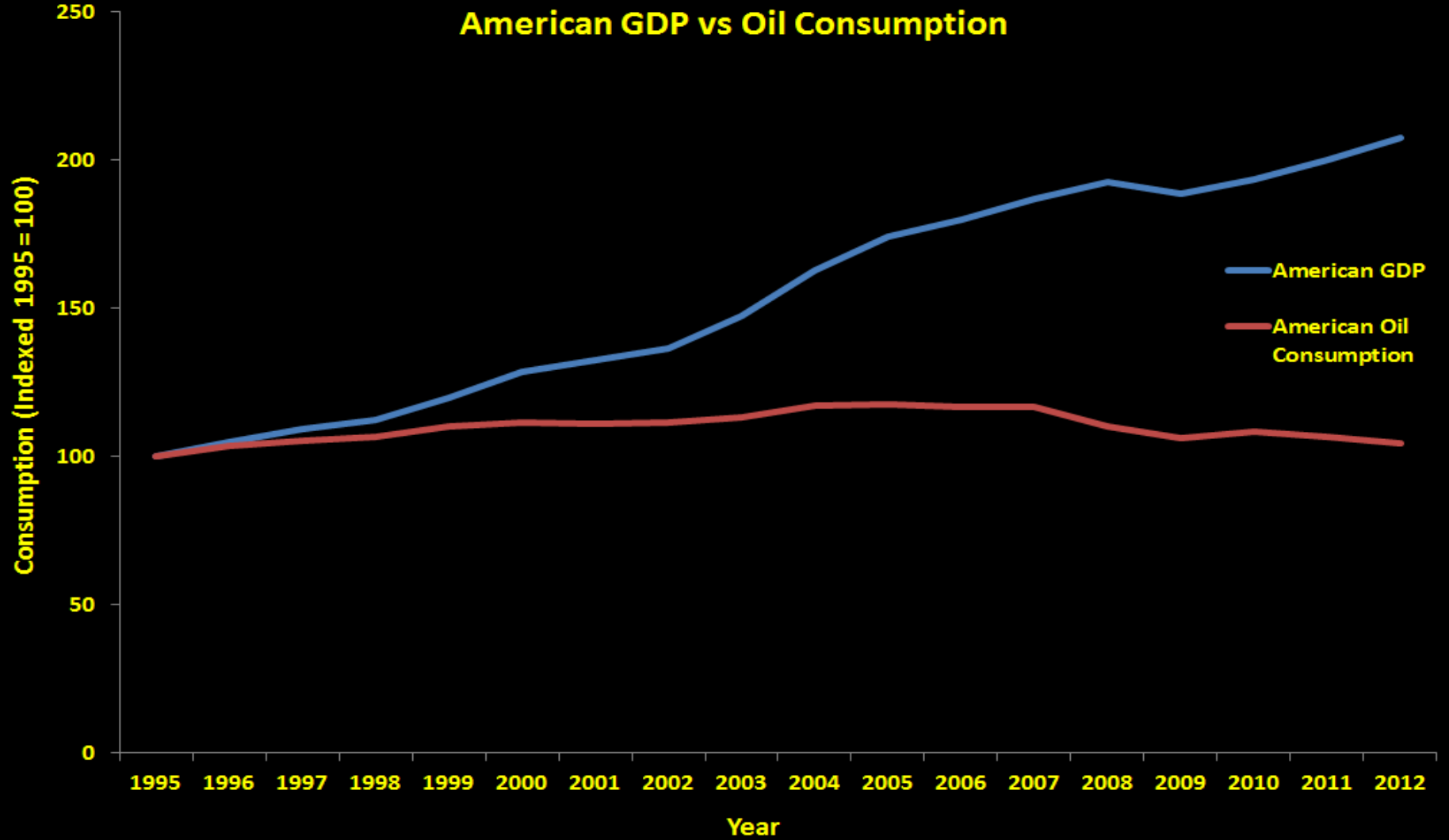
Disruptive innovation and energy...

- Phase out of fossil fuels is happening without disrupting GDP
- Solar energy is happening much quicker than most utilities expected.
- Next phase will be solar/batteries/electric transport
- City transport systems are disrupting

Decoupling GDP and fossil fuels...

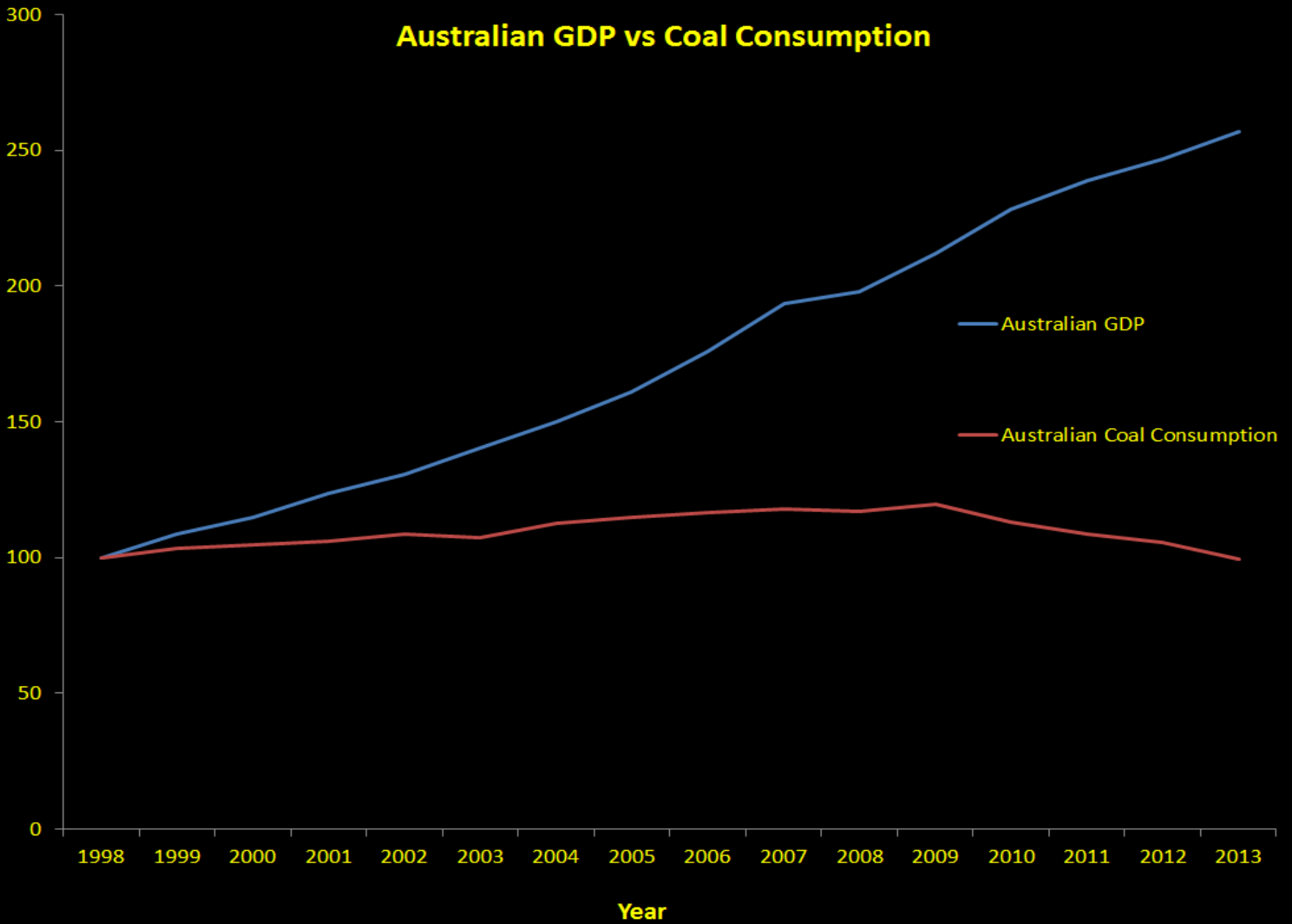
American GDP vs Coal Consumption





Australian GDP vs Coal Consumption

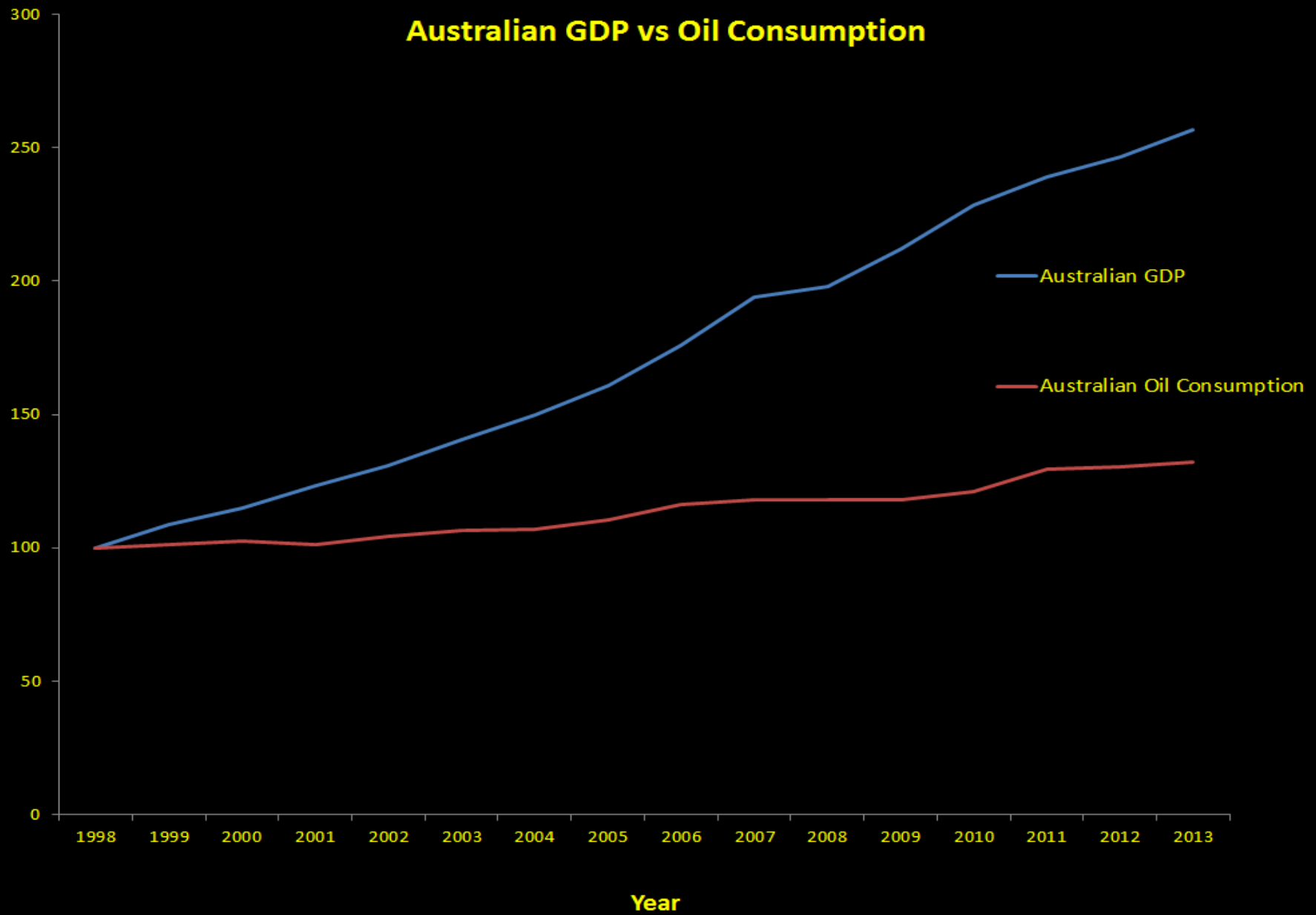
GDP vs Consumption (Indexed 1998 = 100)



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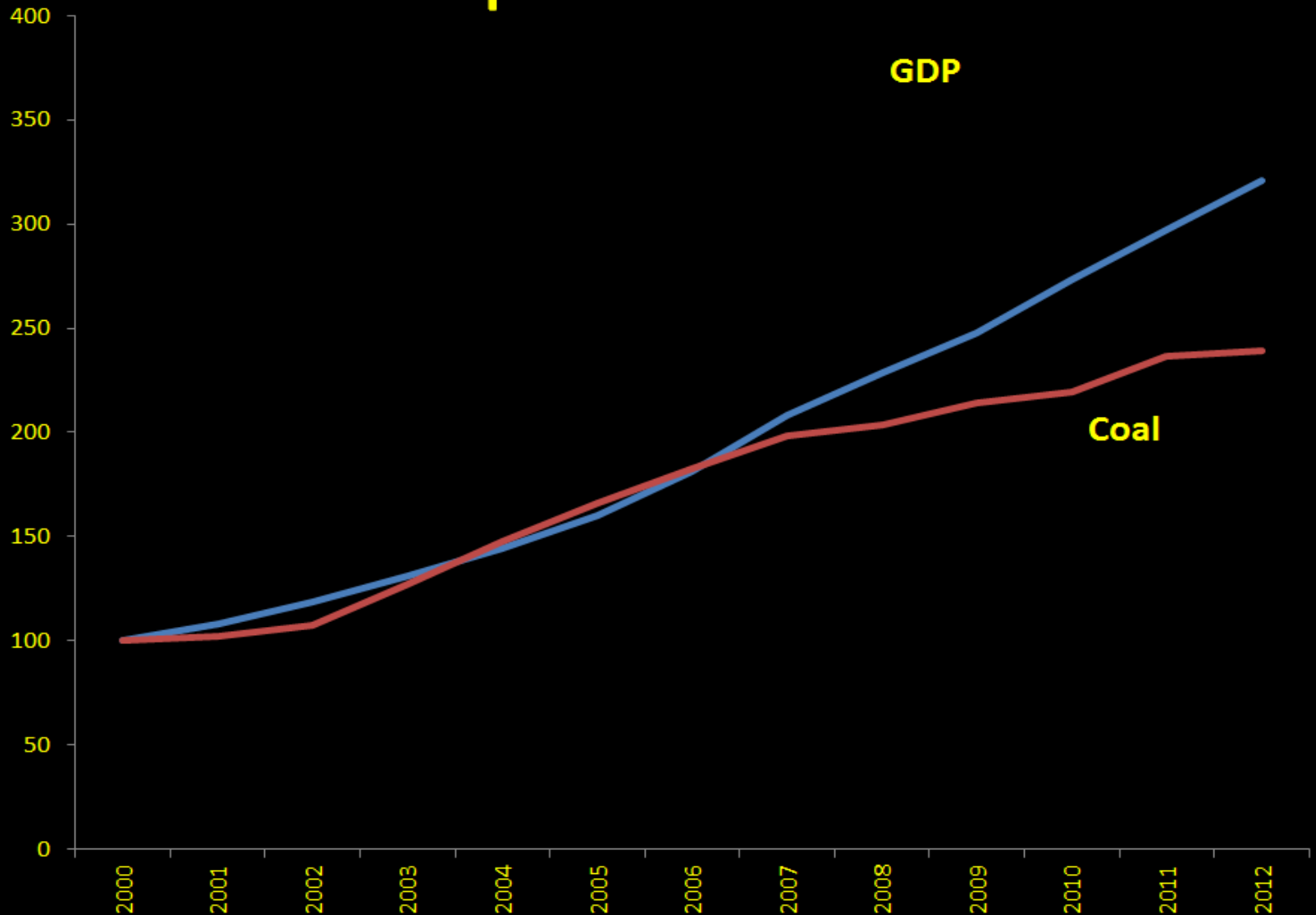
Australian GDP vs Oil Consumption

GDP vs Consumption (Indexed 1998 = 100)

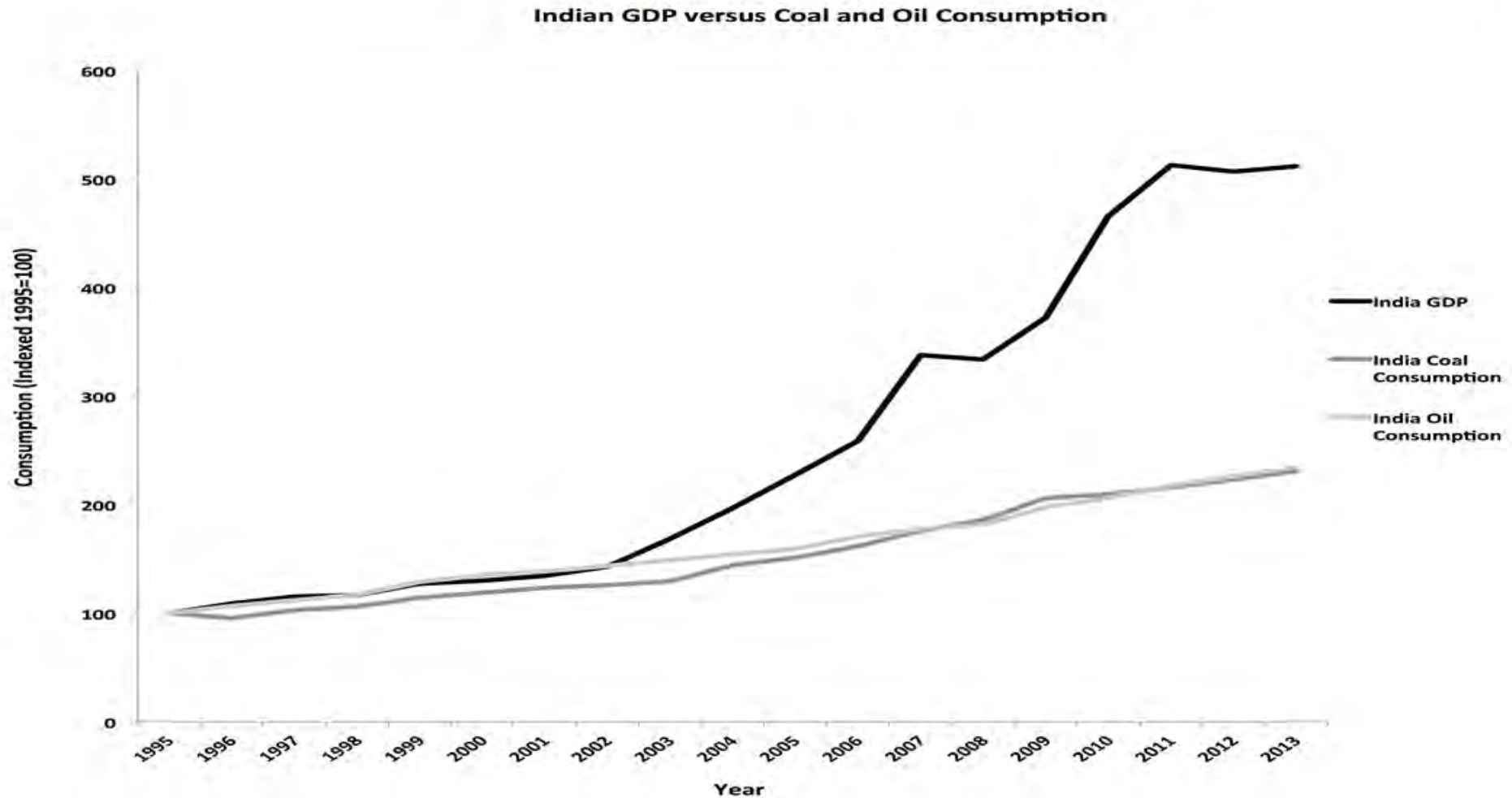


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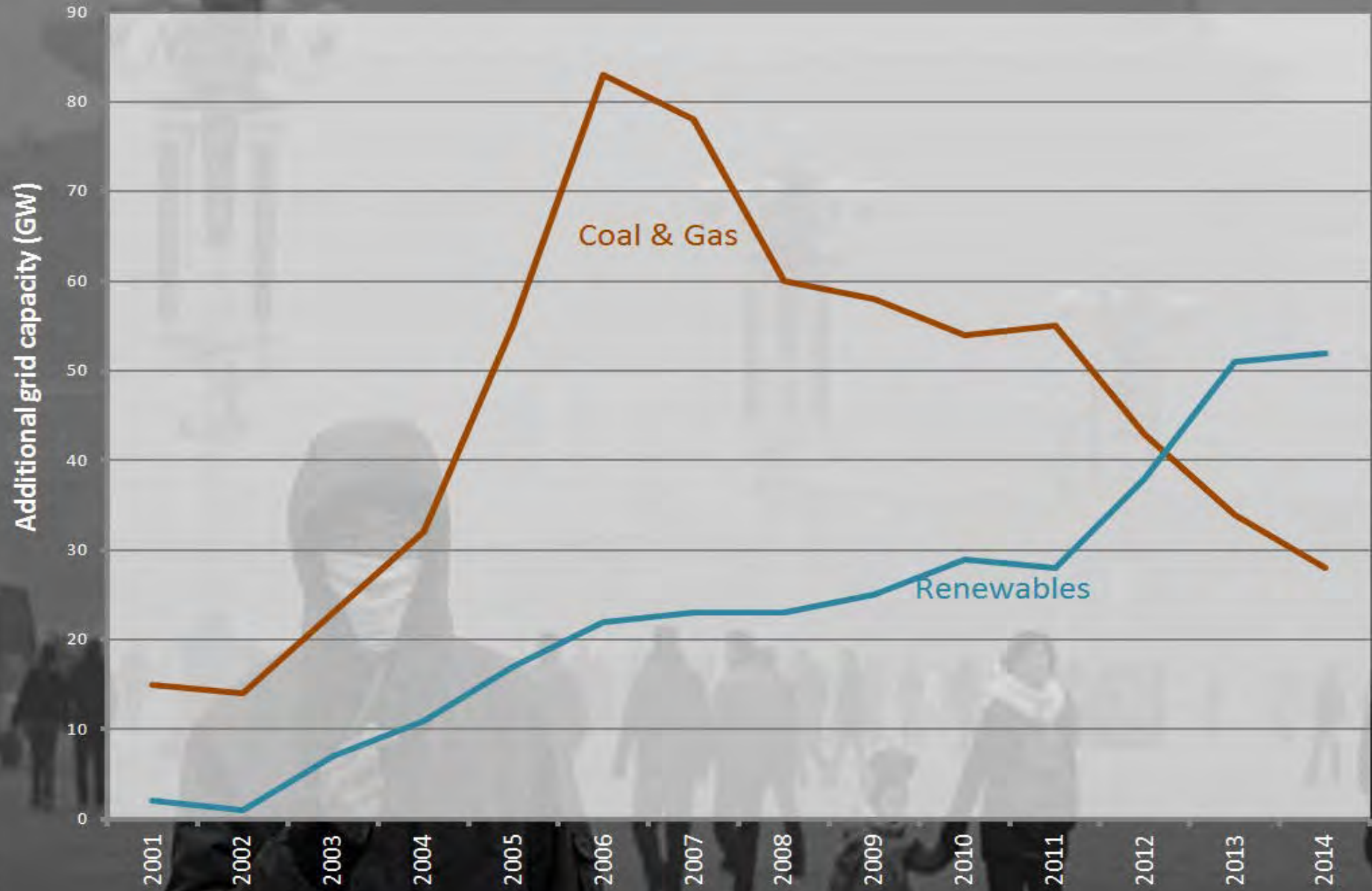
China decouples GDP and coal



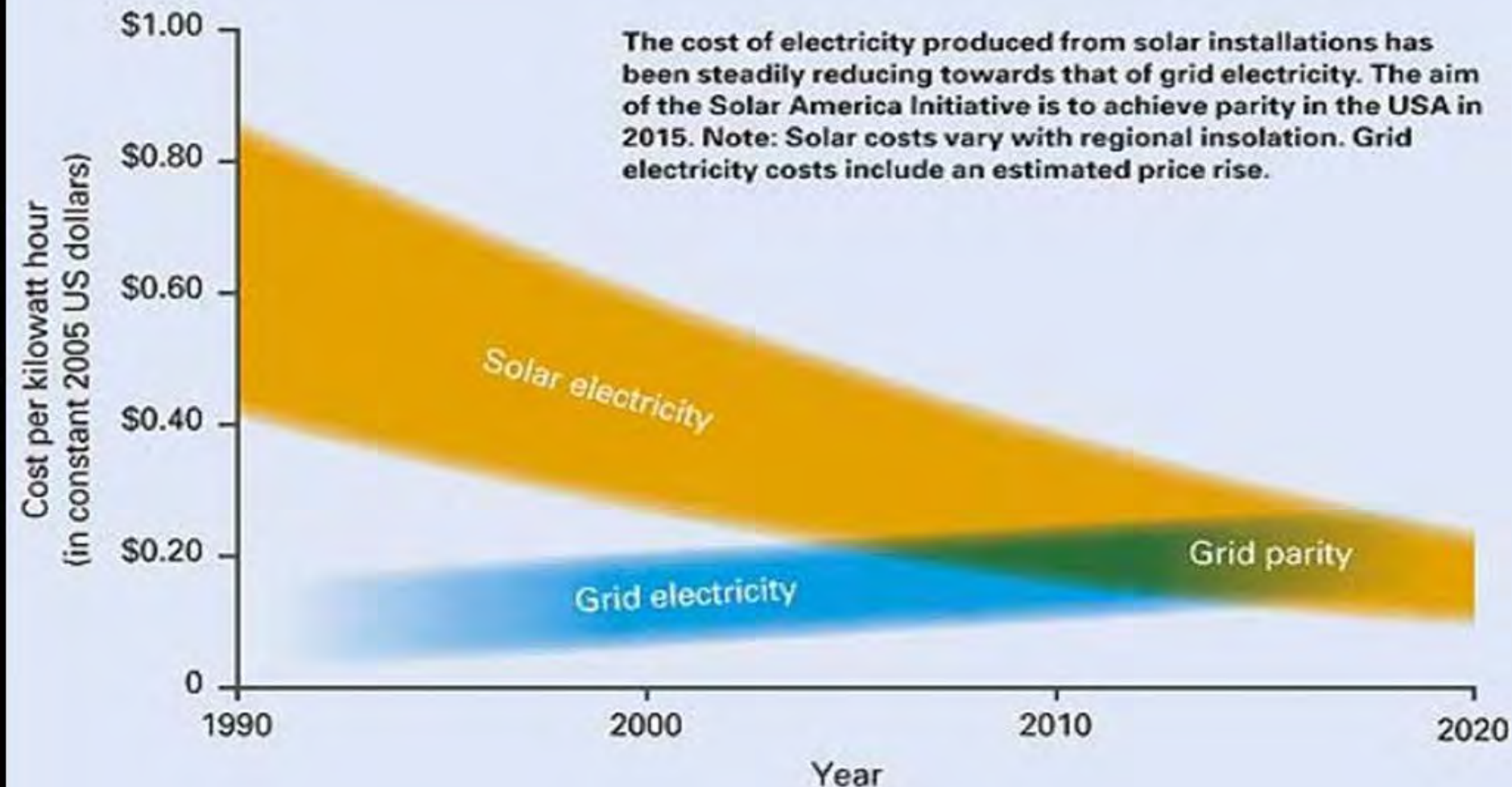
India rapidly decoupling GDP from fossil fuels....



Solar takes off....



THE PATH TO GRID PARITY

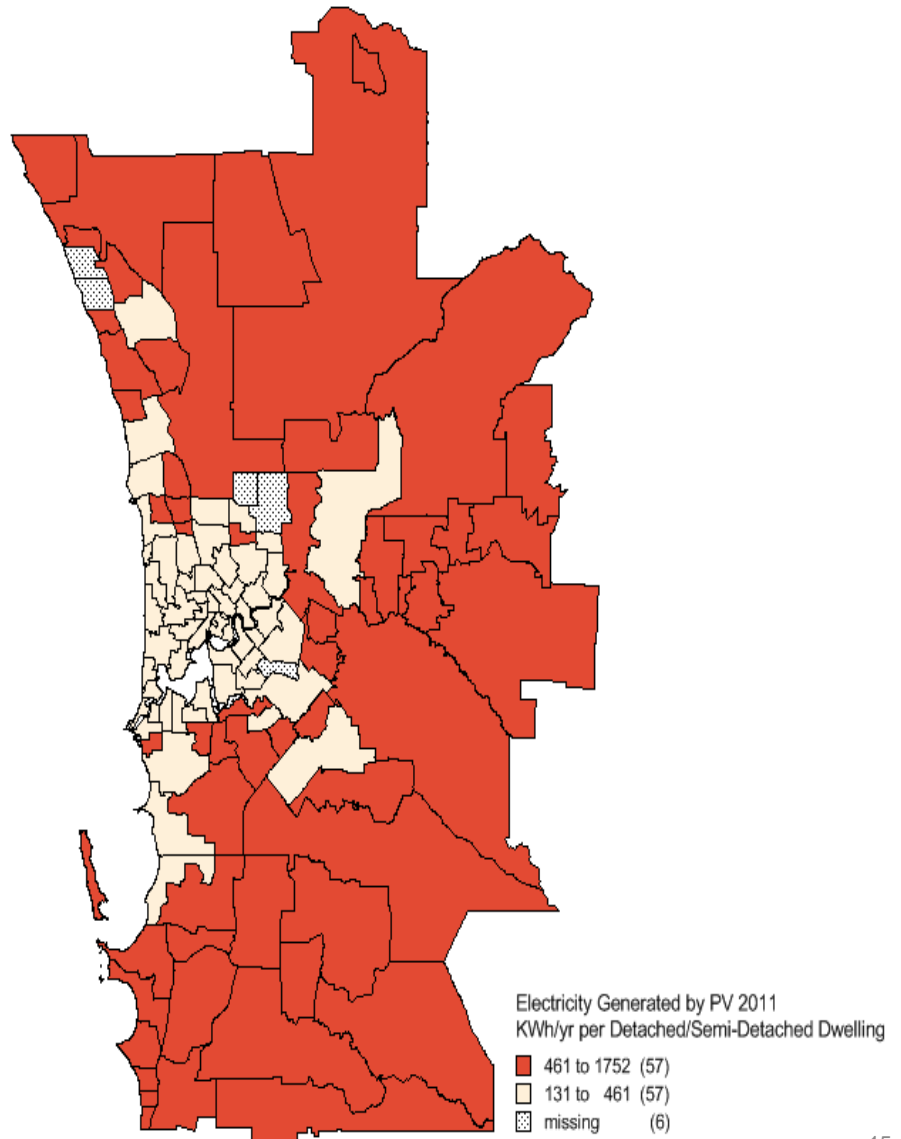


Perth solar city

20% of Perth homes
490 MW in 3 years...

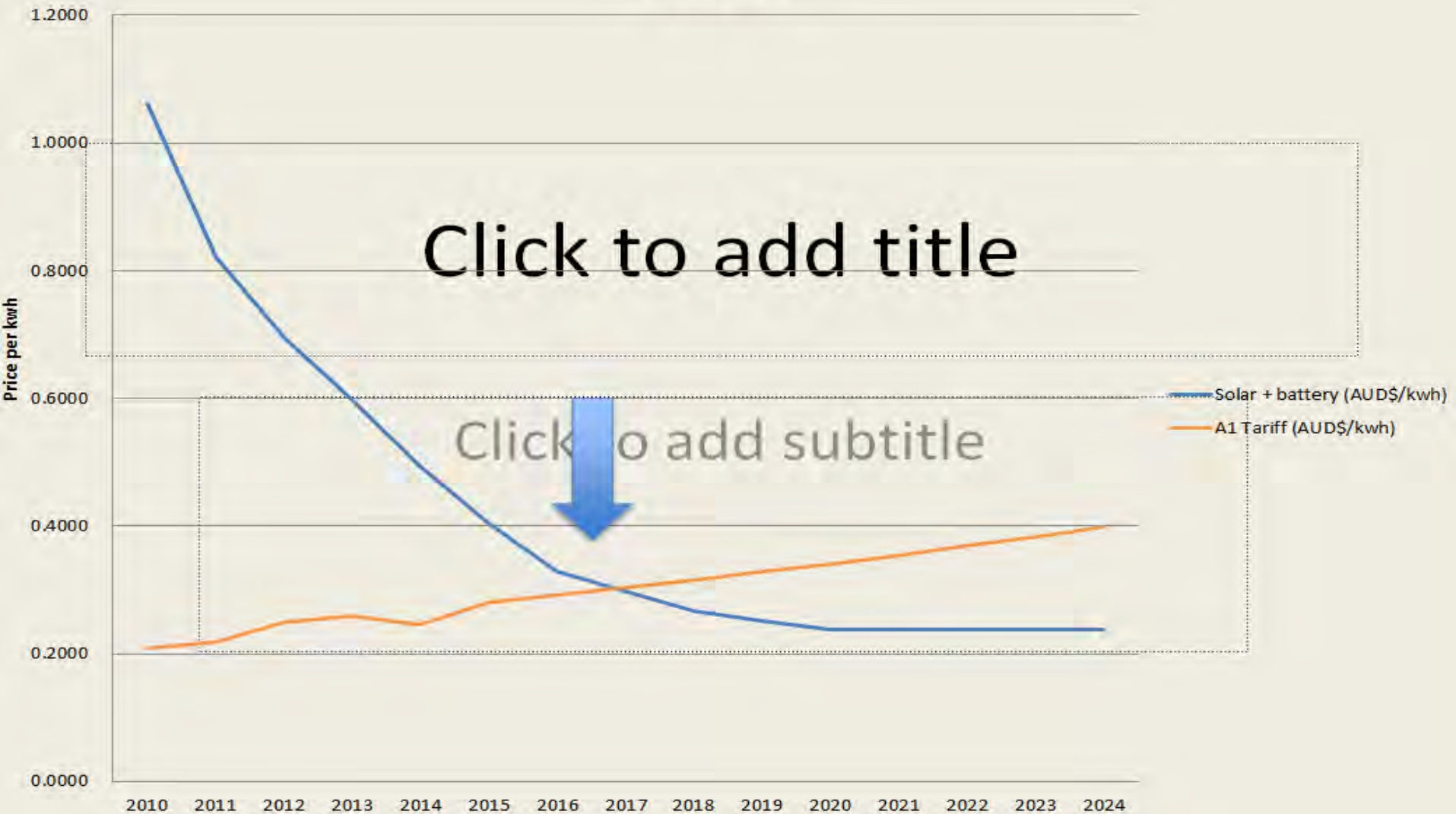
‘It is inevitable...’

Minister for Energy



Next phase solar/batteries/EV's

A1 Tariff vs Battery plus Solar PV Cost in SWIS

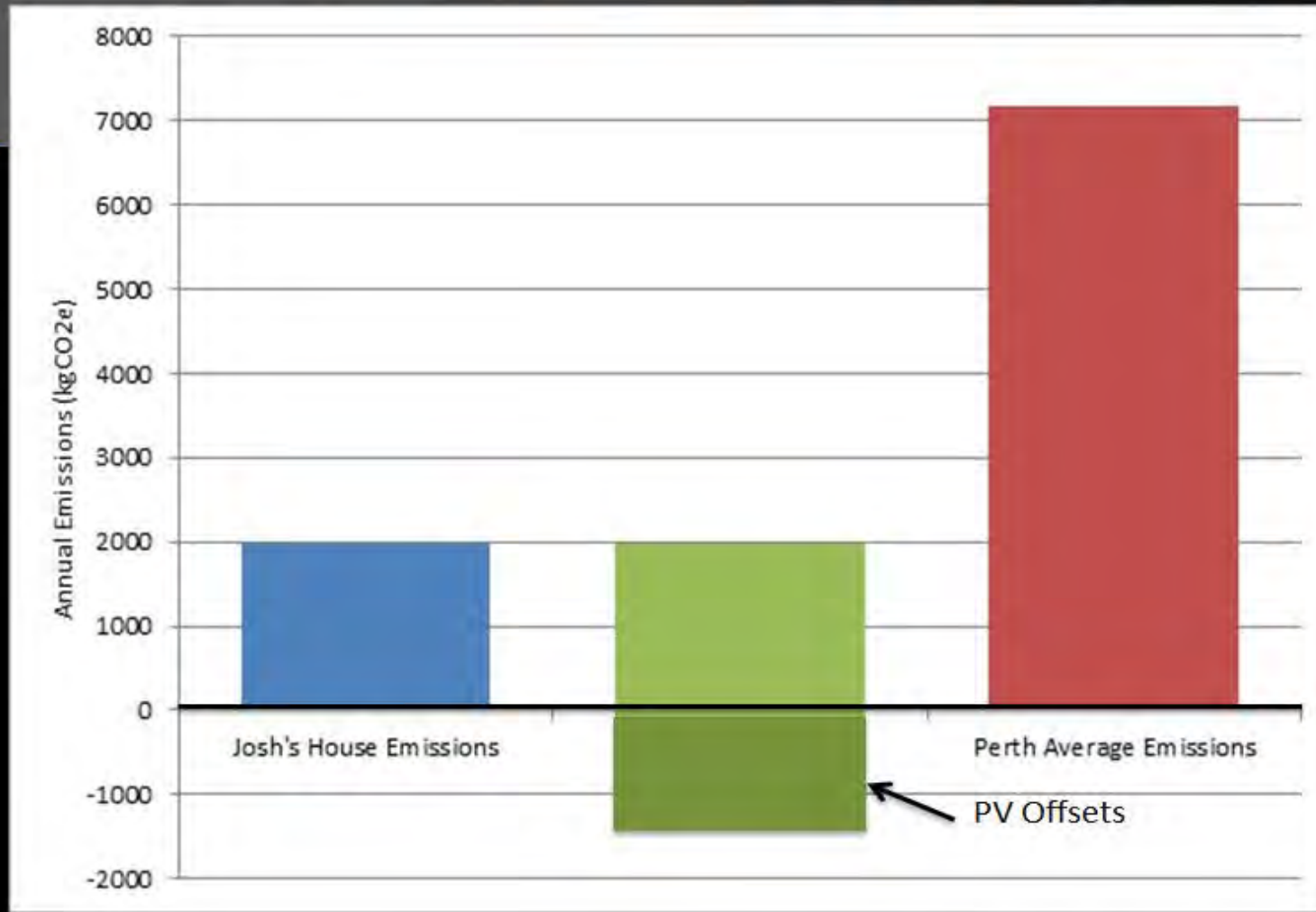


The holy grail arrives



JOSH'S HOUSE

It's carbon positive!



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Honda Zero Carbon Home



Tesla



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Most new redevelopment can now use solar-batteries, eg WGV



We can now make cities in the suburbs....

- Redevelopment so far is mostly in the city and inner area
- Now can make precincts work in the suburbs. An organizational principle for creating community and bringing people to live/work together.
- System change...

Cities are disrupting...

PETER NEWMAN *and* JEFFREY KENWORTHY

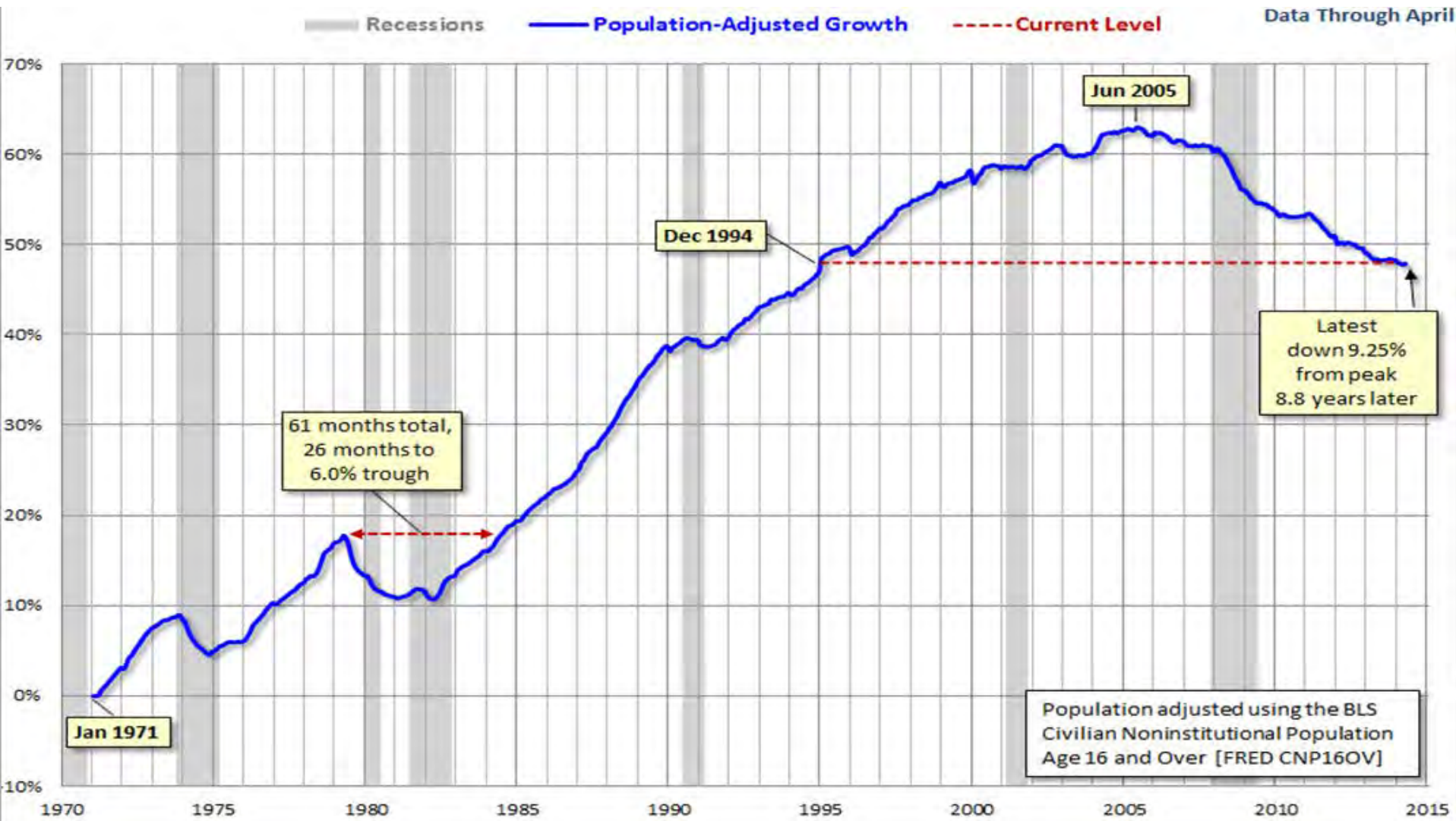
THE END *of* AUTOMOBILE DEPENDENCE

*How Cities are Moving
Beyond Car-Based Planning*

Cities reducing oil
through less car
dependence

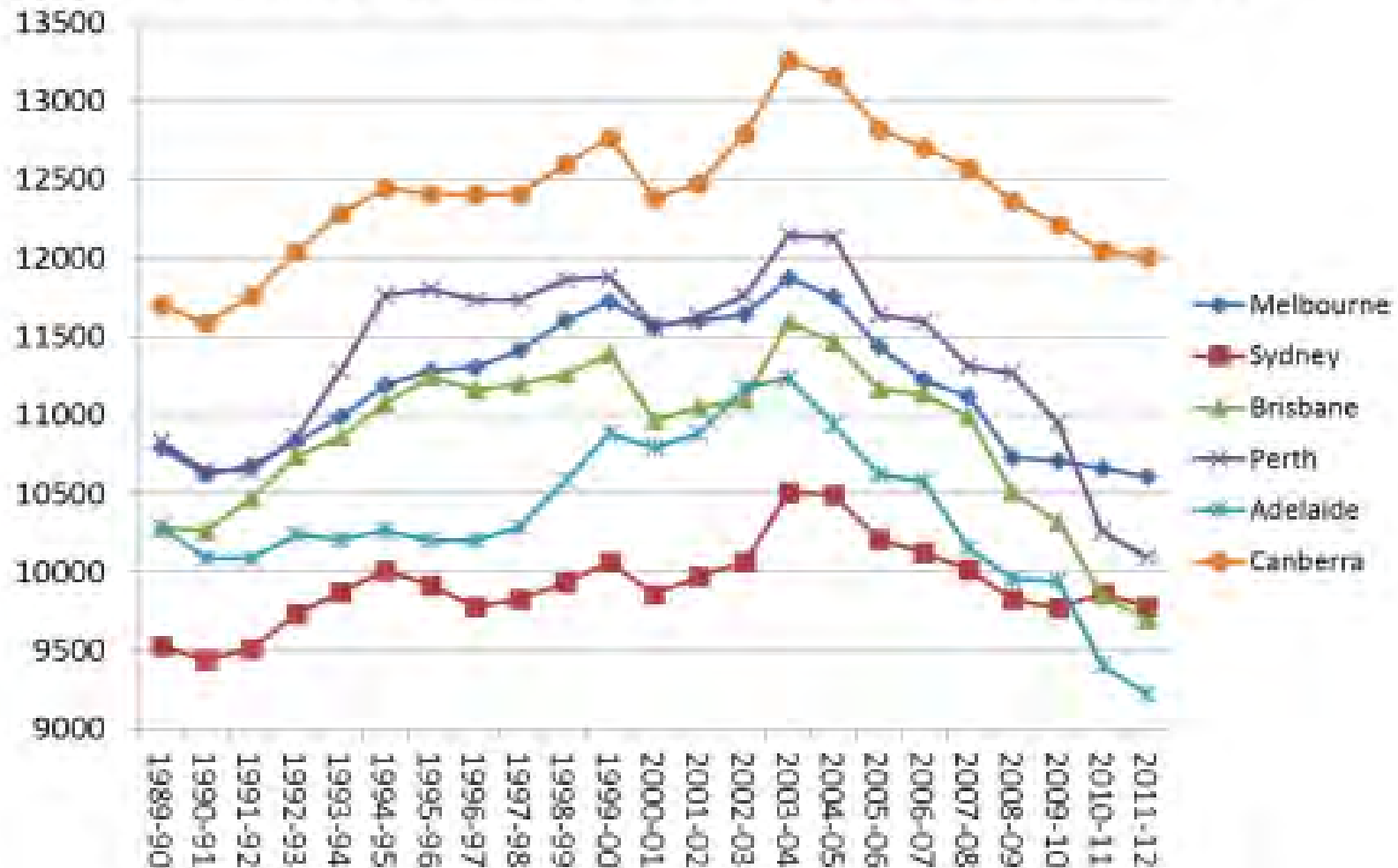


THE USA IS DRIVING LESS



Australian city car use peaked the same year...

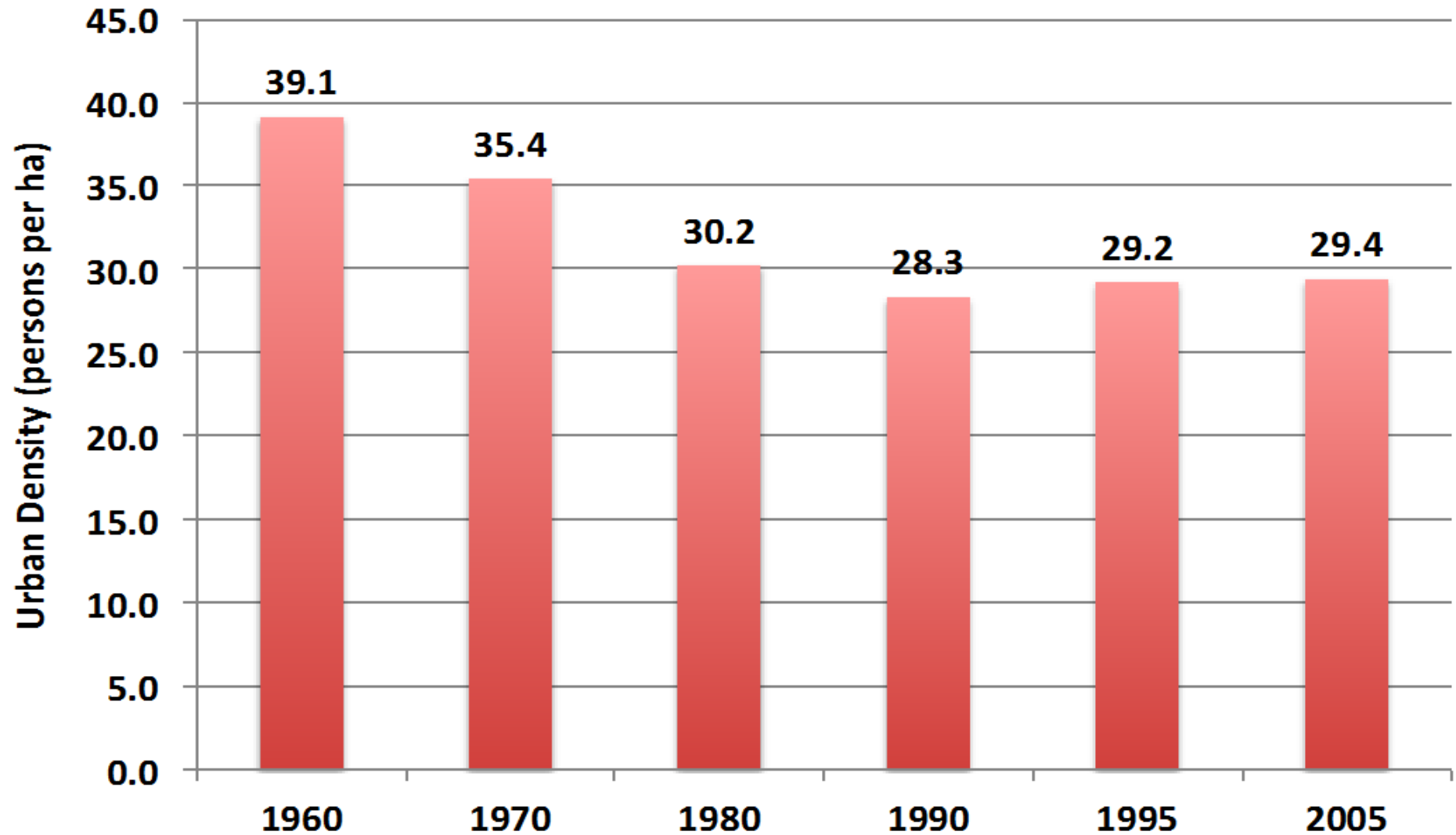
Estimated car passenger kms per capita - Australian cities



Two major causes...

1. Rail is now faster than traffic down most corridors. So rail investment is happening
2. The new economy is being created in walkable urban areas where people can meet easily. So density has reversed its decline and cities are coming back in.

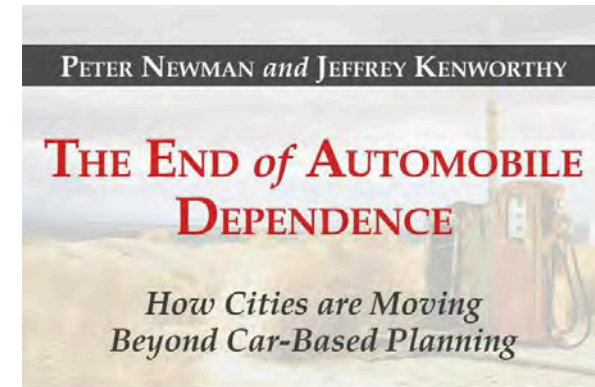
Urban Density Trend in 23 Cities in the USA, Australia, Canada and Europe, 1960-2005





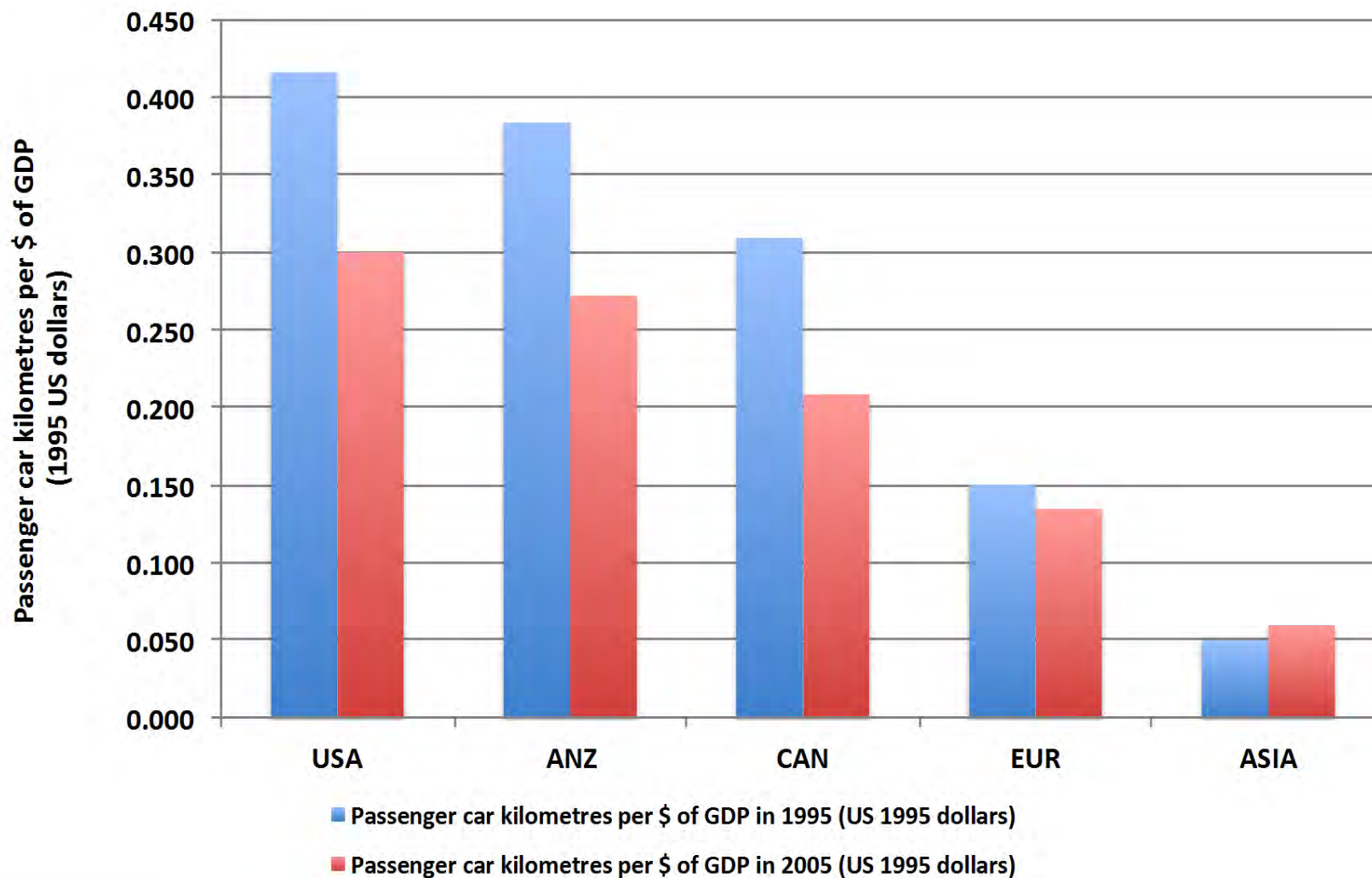
Glaeser and Florida...

The top 6 most walkable cities in the US have 38% higher GDP.
70% of knowledge economy workers in Boston live in walkable areas.



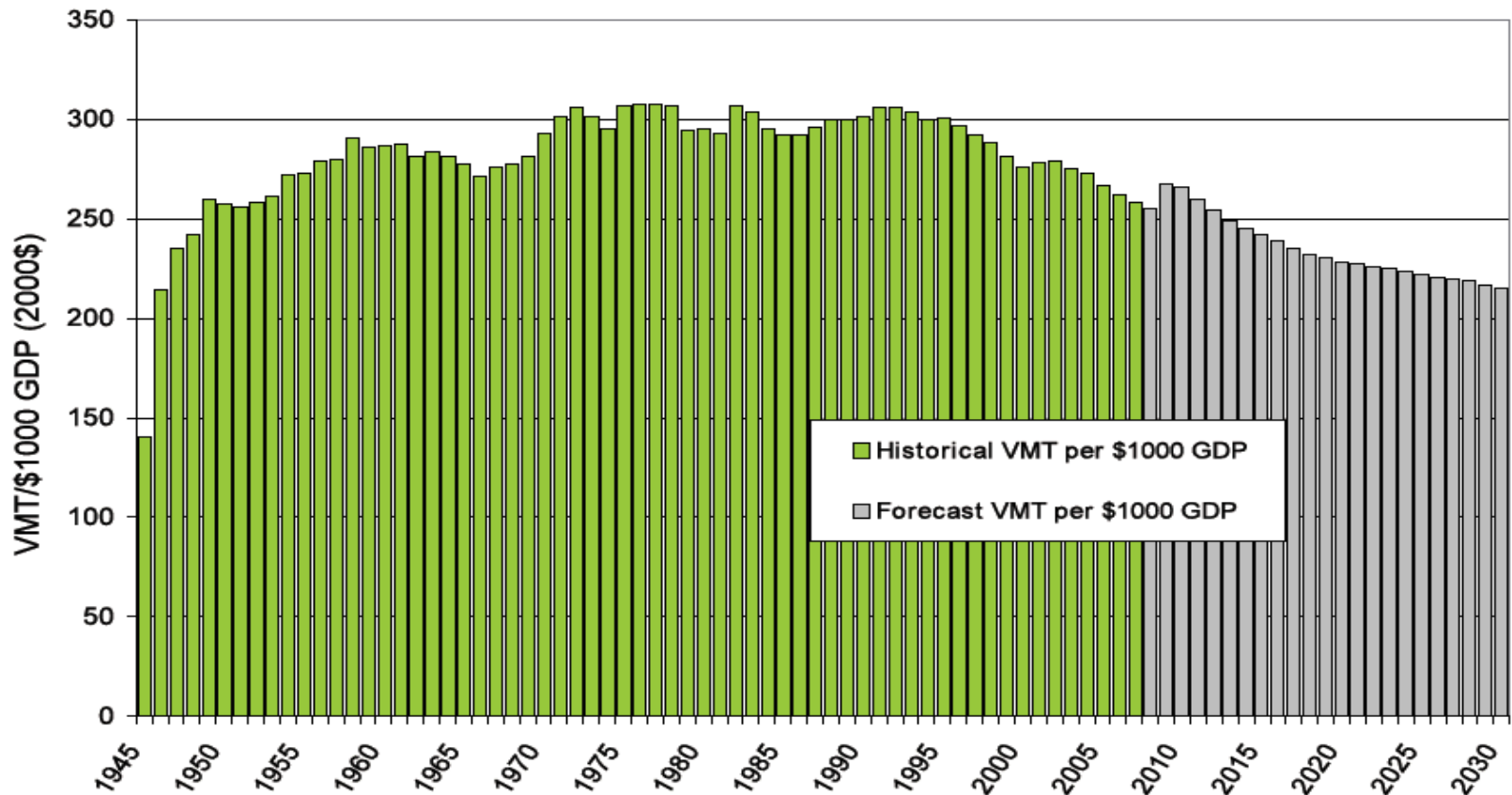
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Decoupling car use and GDP

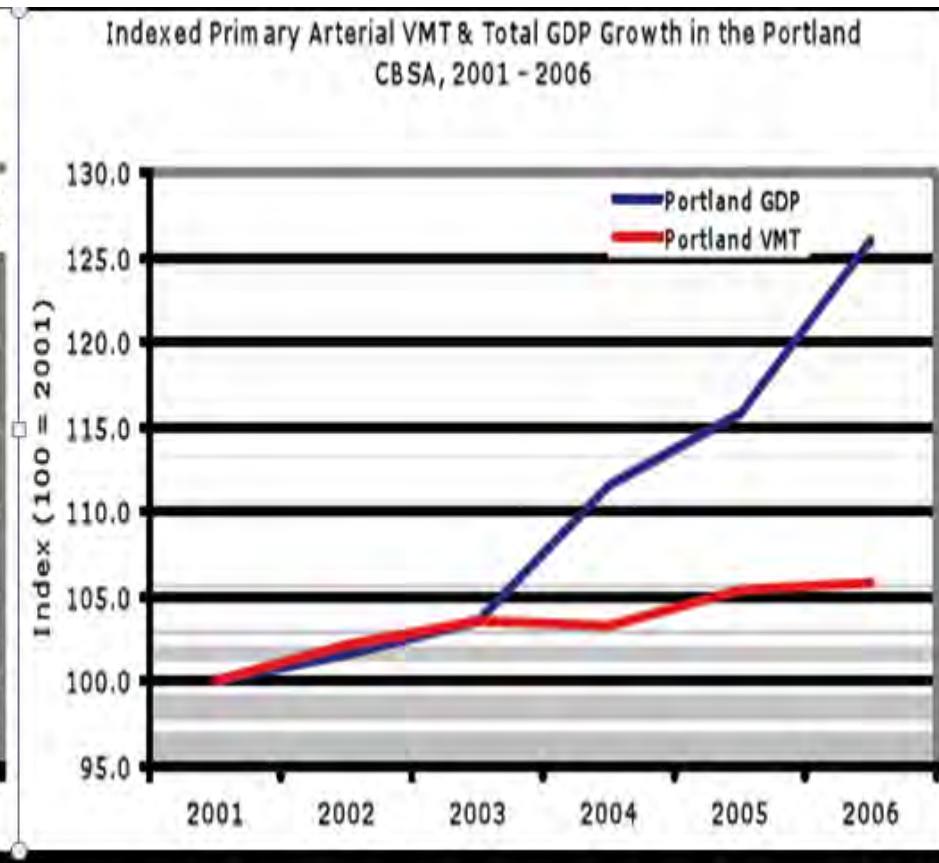
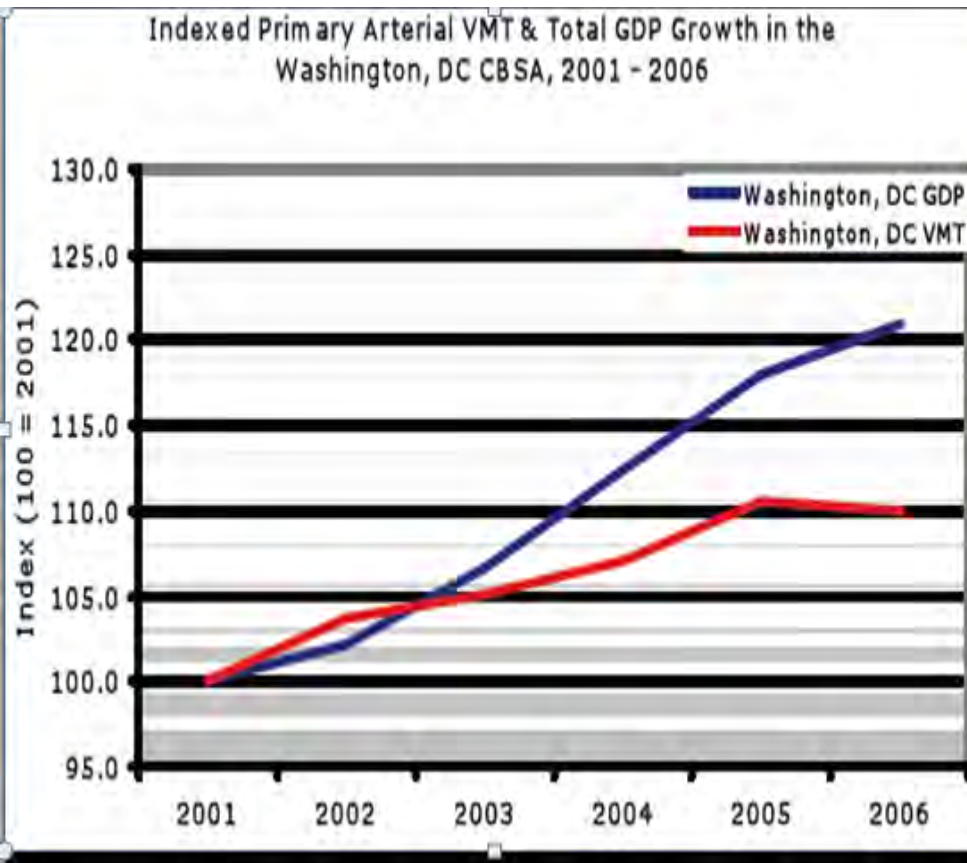


Car use is now officially recognised in the US to be decoupling from wealth

Transportation Vehicle Miles Traveled/\$GDP, 1945-2030



Decoupling most of all in the cities with rail investment, eg Washington DC and Portland





Shanghai 1990 and 2010



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1990's - Flirting with the American model...



Rapidly filled...

So what can be done?



**Shanghai Metro...12 lines, 273 stations, 420km
covering 80% of metro area...
Built mostly since 2000; carries 8 million per day**



Global growth now in ELECTRIC rail ...

82 Chinese cities building metros and high speed rail

between cities Shanghai 8m passengers/day

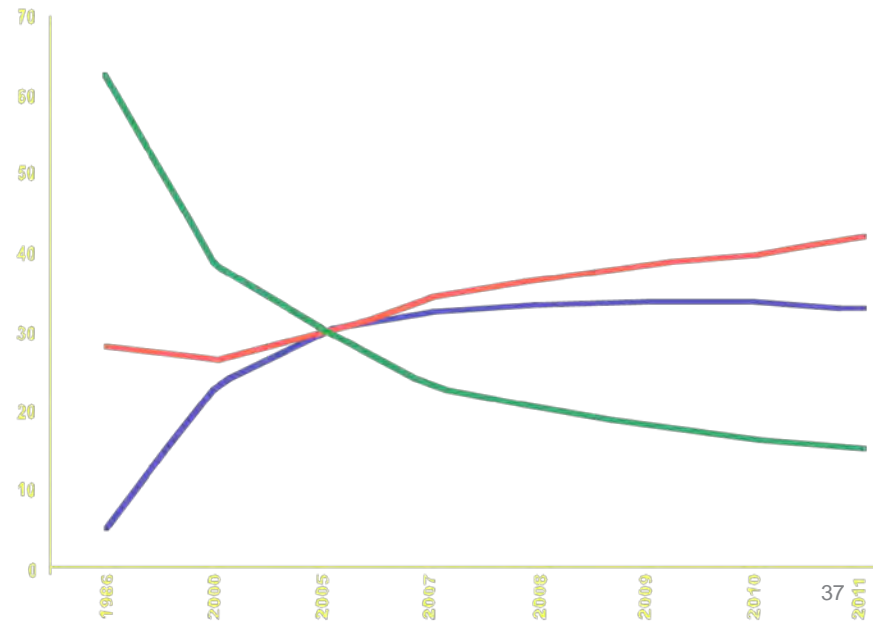
51 Indian cities building metros Any city over 1m.

Middle east cities building rail for first time



Proportion of Transport Modal

Beijing Transport Modal Split



Sydney's new light rail – no catenary, so can be zero carbon



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► Turnbull looks to 'get creative' on infrastructure

PM explores radical road, rail funding

AFR 12 October, 2015

How can private sector build rail?



Malcolm Turnbull, right, said direct grants were not the only way to support infrastructure. PHOTO: SCOTT FLETCHER

From page 1
Turnbull explores
road, rail funding

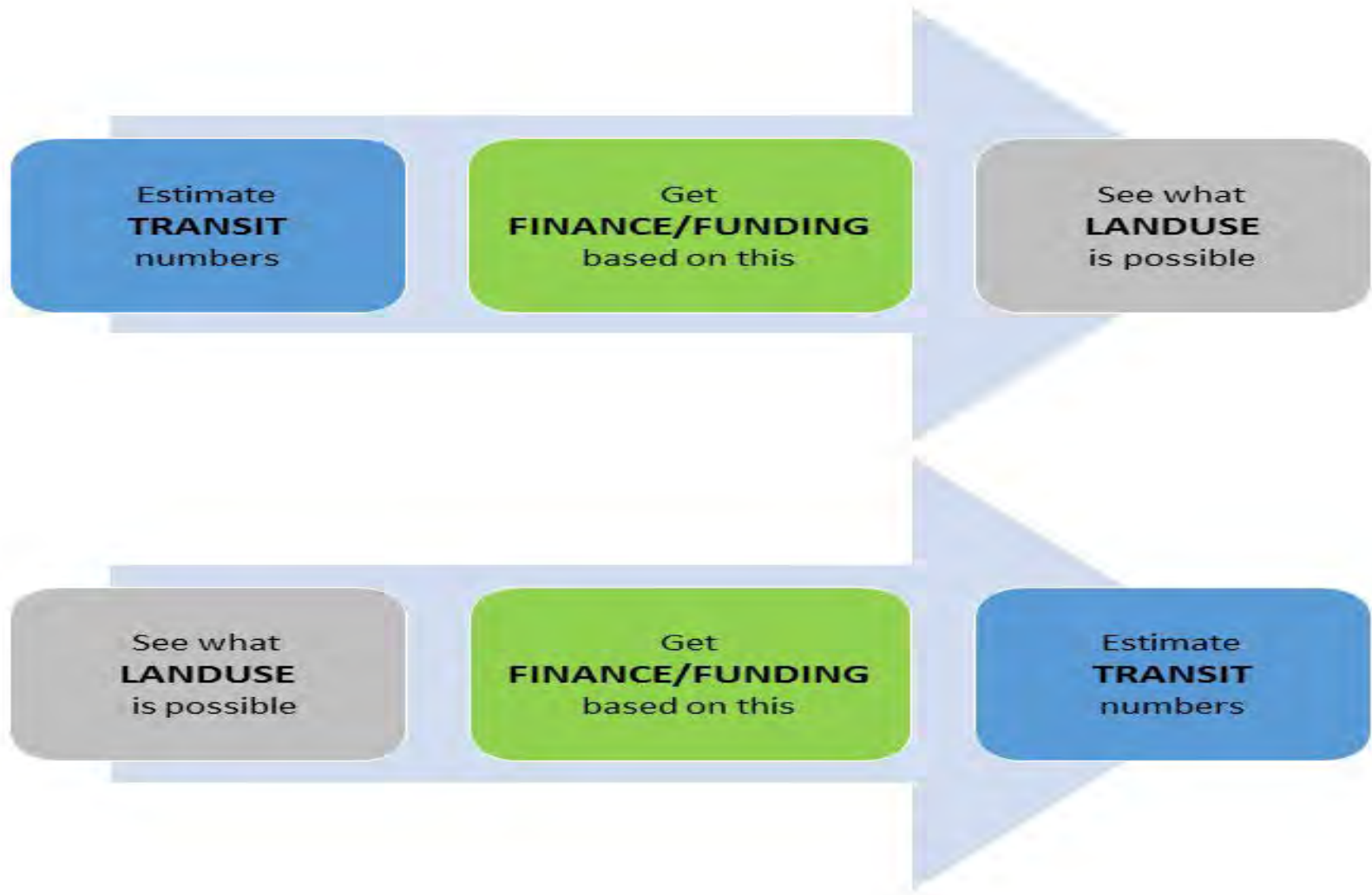
ment, not least because of sharply constrained federal and state budgets.

Prominent economist Saul Eslake estimates Canberra could borrow an extra \$50 billion for infrastructure

economy from the end of the res investment boom.

Former Infrastructure Australia board member and Curtin Un Professor Peter Newman

From TFL to LFT....

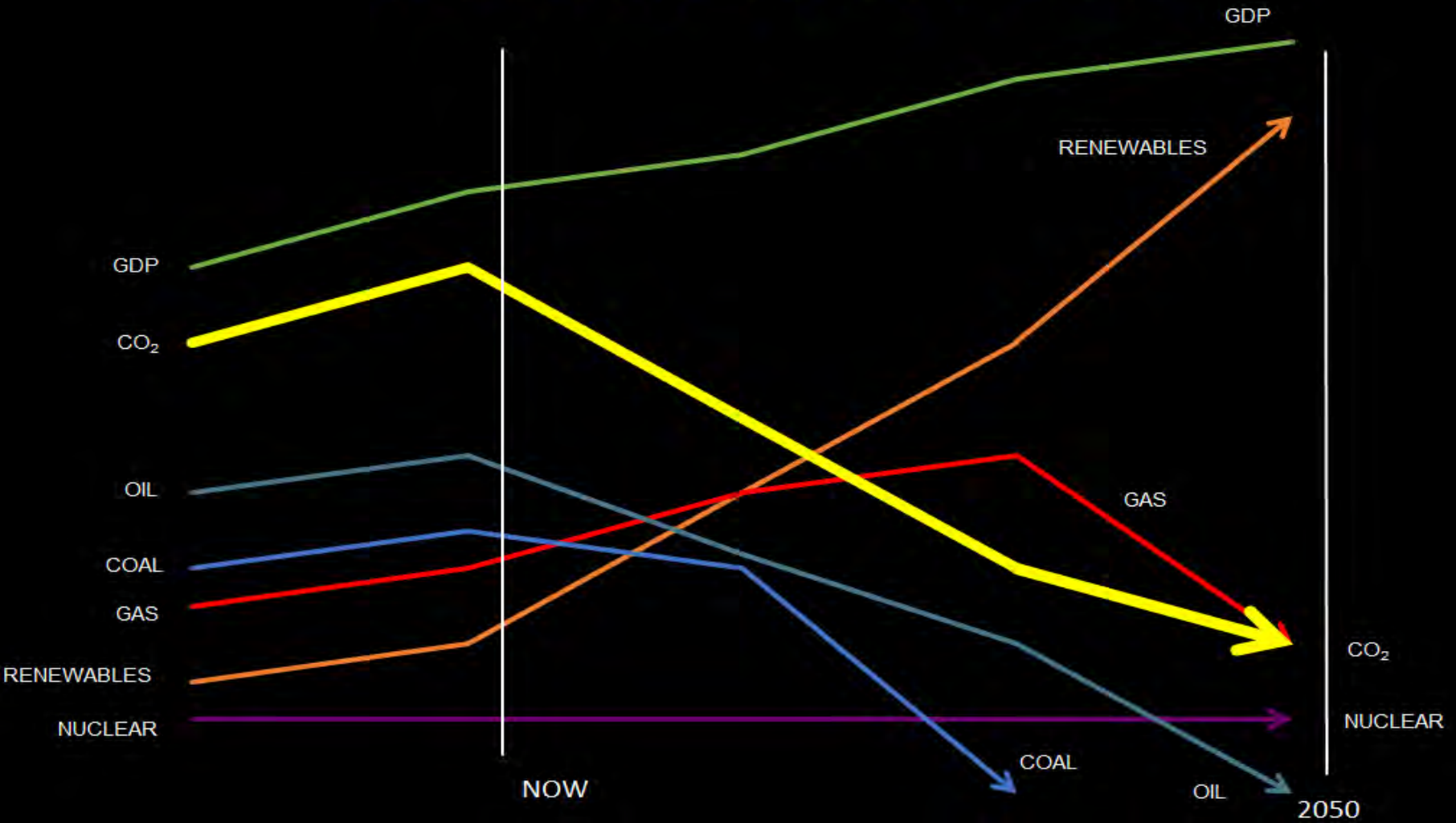


Curtin CRCLCL Node of Excellence in Regenerative Cities and Regions



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Predictions – After the Peak



Thank you

To find out more, contact:

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