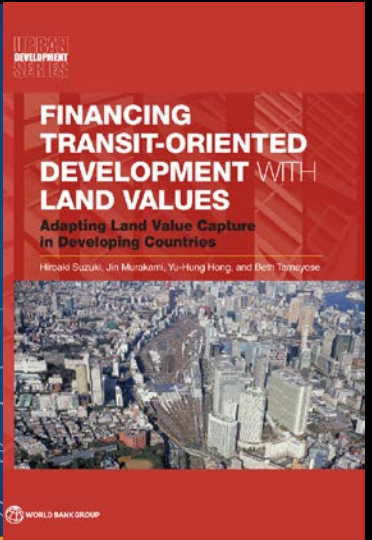
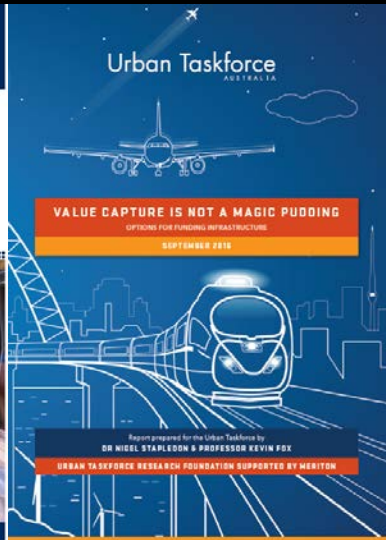
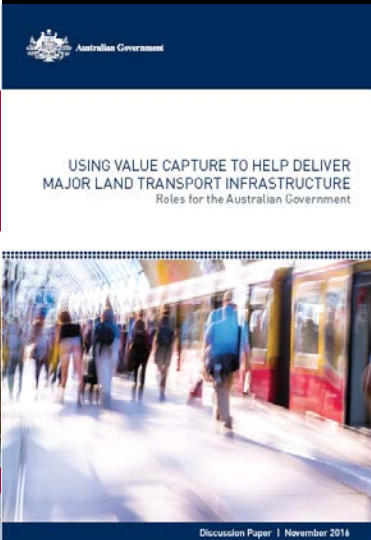
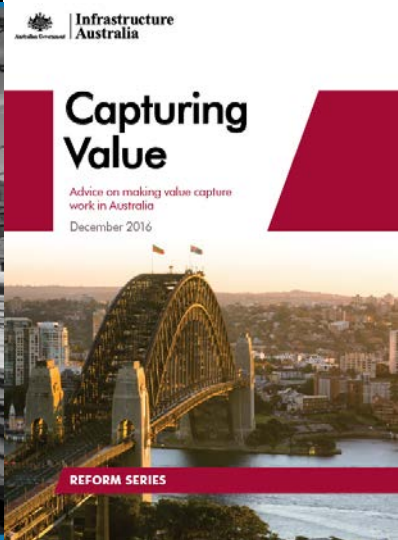
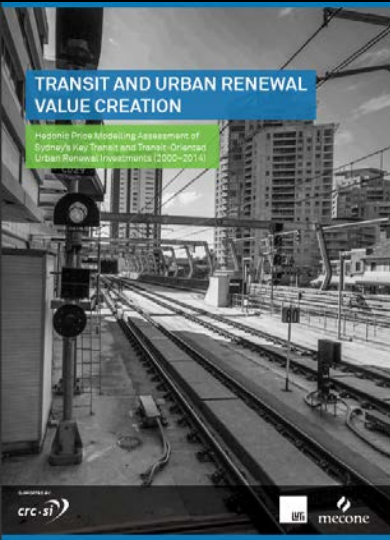


# Global Trends in Financing Sustainable Cities

by  
Peter Newman  
Professor of Sustainability  
Curtin University

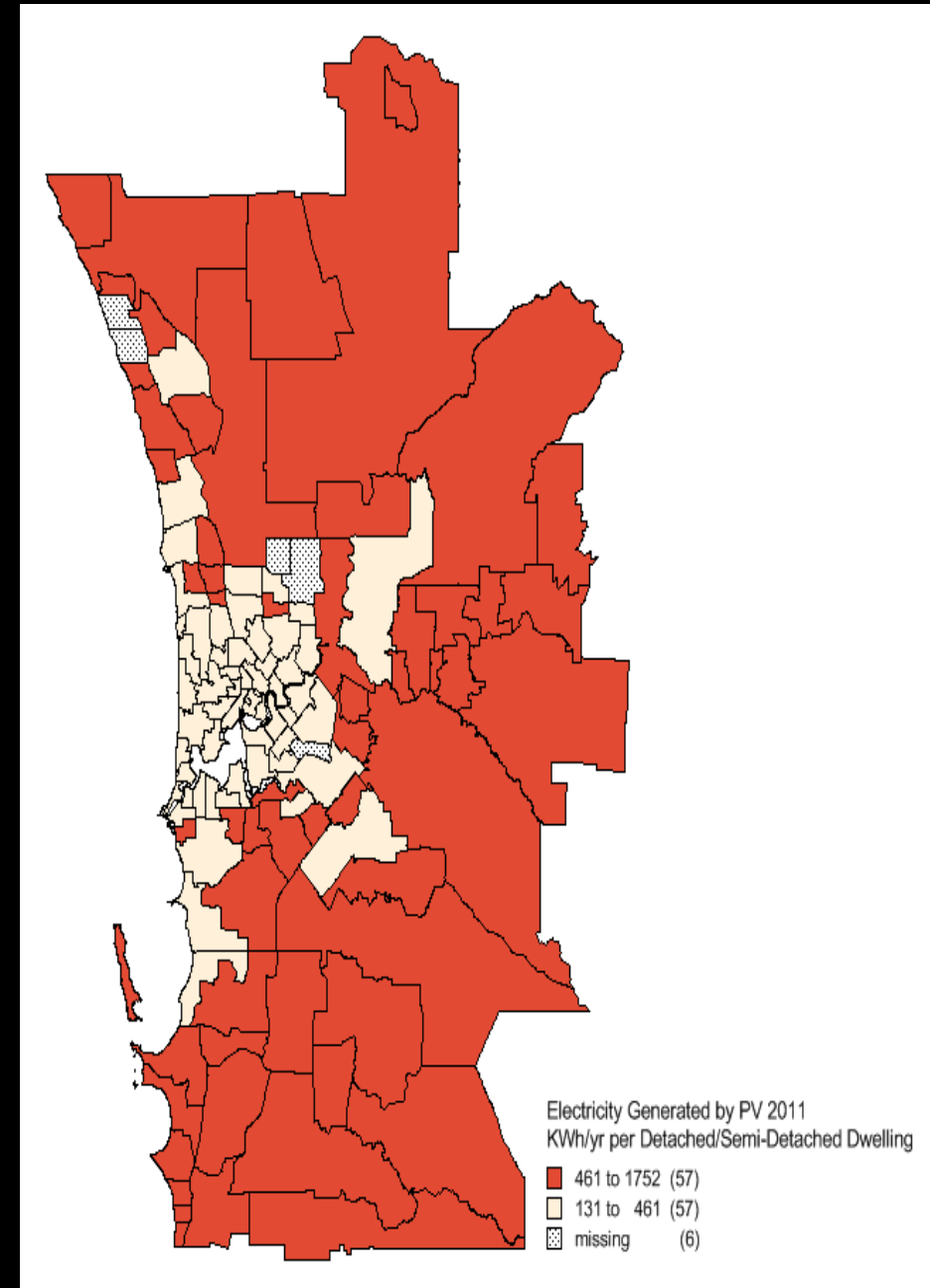


# Solar power (PV) in Perth – mostly outer suburbs

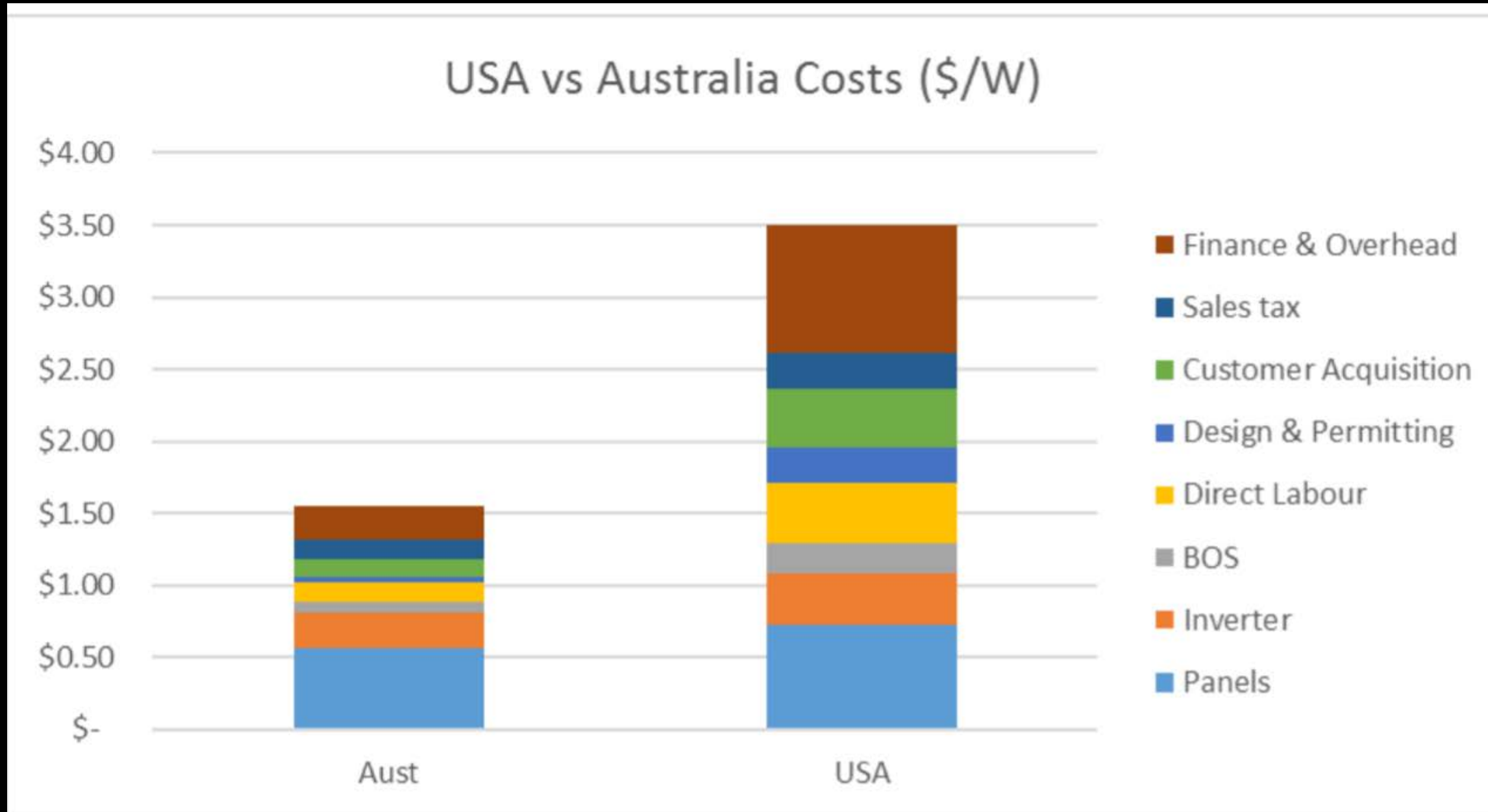
25% of Perth homes  
550 MW in 4 years...  
Largest power station in WA

70% by 2025  
'It is inevitable...'  
Minister for Energy.

Coal assets stranded.



# Costs of a 5kw Solar PV system



# Josh's House...affordable and zero carbon.

[Joshshouse.com.au](http://Joshshouse.com.au) 40 million hits

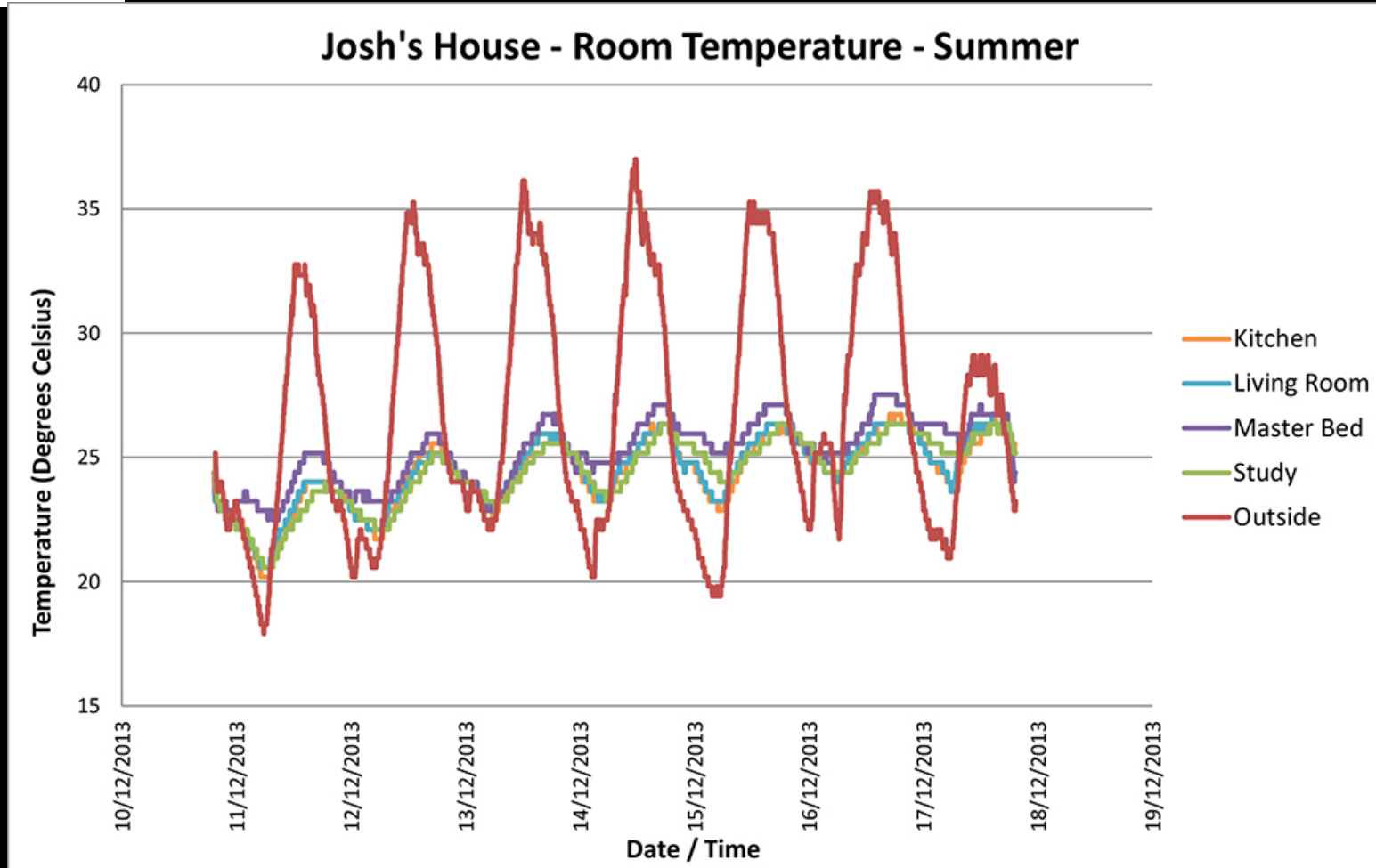






# Summer Temperatures

## No air con but always cool in summer...





The holy grail arrives



BYD-ENERGY





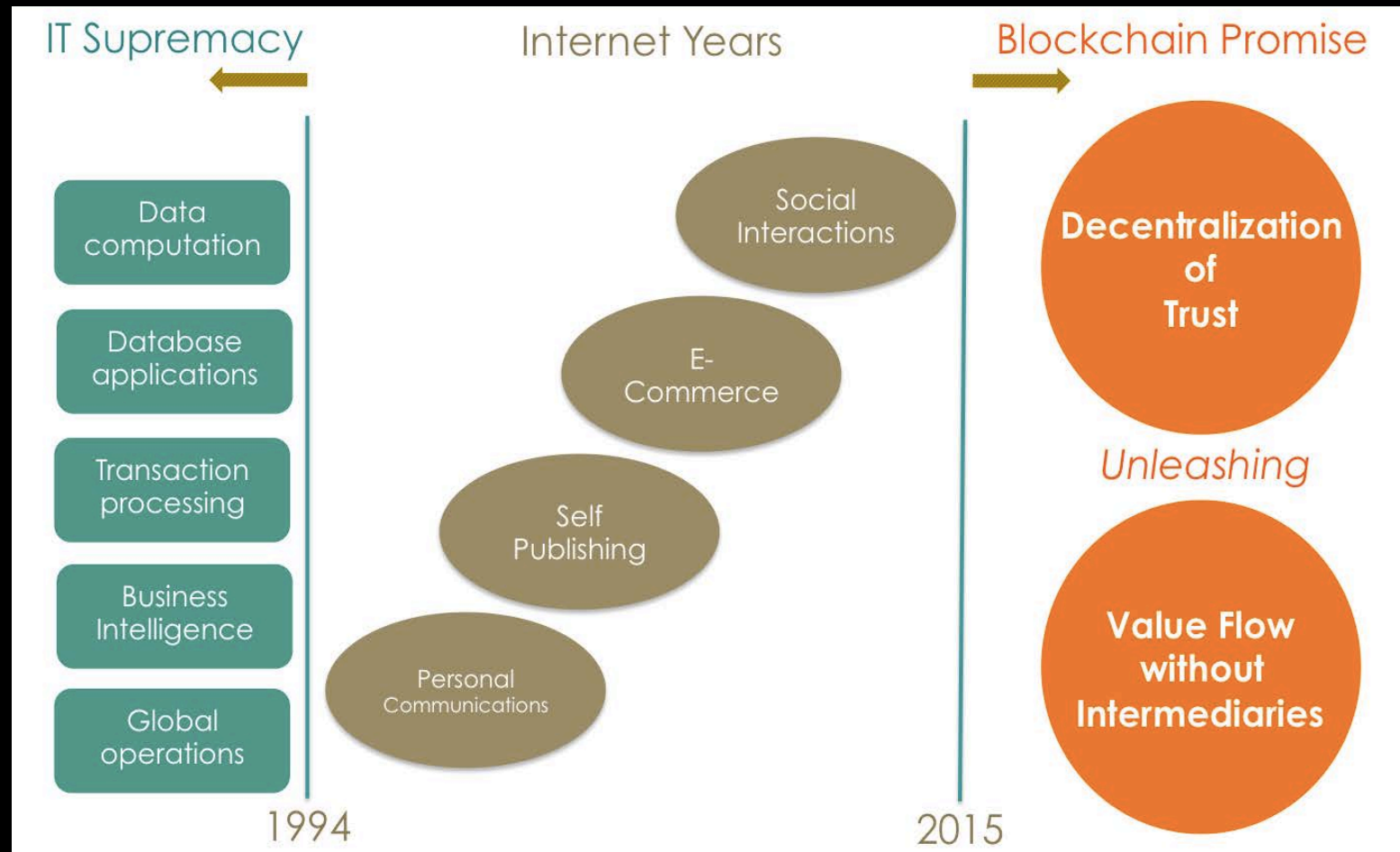
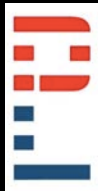
# WGV solar-storage, social housing, water sensitive design, electric vehicles and 'Citizen Utilities'...PIMBY!

WGV – Zero carbon and SDG's!



# Blockchain and 'citizen utilities'...making microgrids work

Power Ledger Pty Ltd





## METRONET AND INFILL TO SHAPE NEW COMMERCIAL HUBS IN PERTH

The McGowan Government's priority to reinvigorate Western Australia's economy and enhance the liveability of our cities and towns is taking shape.

Smart planning and collaboration is helping grow our economy – creating jobs and investor certainty and encouraging vibrant, sustainable communities.

The Government's approach to a compact urban footprint is to prioritise infill near quality public transport to ensure a mixture of medium and high-density housing alongside commercial tenancies and vibrant community spaces.

As the density of our suburbs change and more infill is delivered, precinct and design policies are crucial to providing quality developments that contribute positively to our local areas.



The roll-out of Metronet will play a major role in the creation of new and vibrant precincts. For example, the planning for the Forrestfield and Belmont stations is being revisited by the Metronet team, with the City of Kalamunda and the City of Belmont to create highly functional and busy precincts in the surrounding areas.

The first stage of Metronet includes up to 18 new stations, which have the potential to become attractive new areas to live, recreate and do business.

The State Government, with LandCorp, recently called for private sector investment in more than 30 precinct-scale project opportunities capable of eventually generating thousands of jobs for Western Australians.

The diverse range of high-quality commercial and residential land lots will boost economic growth and create lively new communities to support our growing population. A number of these projects have particular potential to support aged care and integrated services, quality mixed-use infill and residential development close to public transport links.

In the city we have a number of new



developments such as the hotel and apartment projects at Elizabeth Quay and construction at Perth City Link, which is focused on completing the King and Lake Street connection.

By early 2018, the new connection and the William Street Mall will open, providing opportunities for businesses to prosper.

Meanwhile, the Metropolitan Redevelopment Authority (MRA) has signed an agreement for a 250-room Dorsett Hotel and serviced apartments to be built on the two lots adjacent to Perth Arena, with a development application due to be lodged by mid-2018.

To the north, there are major project investments such as the Ocean Reef Marina, which will eventually become a must-see destination for Perth and

prove an asset for locals, visitors and recreational boaters alike.

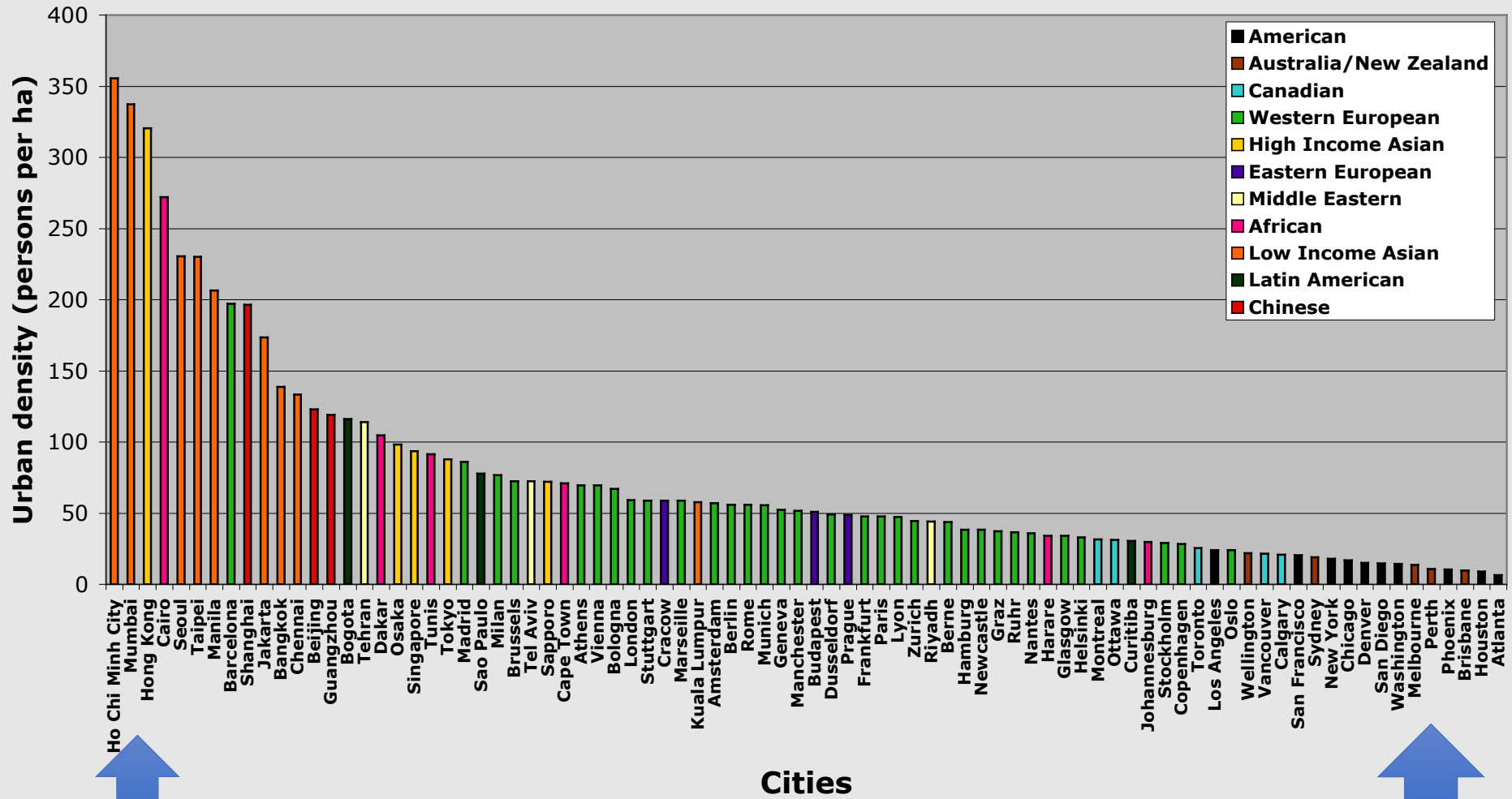
In the south, stage 1B at the Murdoch Health and Knowledge Precinct is to become a major hub delivering commercial space, new homes and leading health and research facilities including WA's first medi-hotel.

In regional WA, residential and commercial developments such as Albany's Middleton Beach Active Centre are also flagged as major investment opportunities. The budget also included a \$34.4 million allocation into the Transforming Bunbury's Waterfront project.

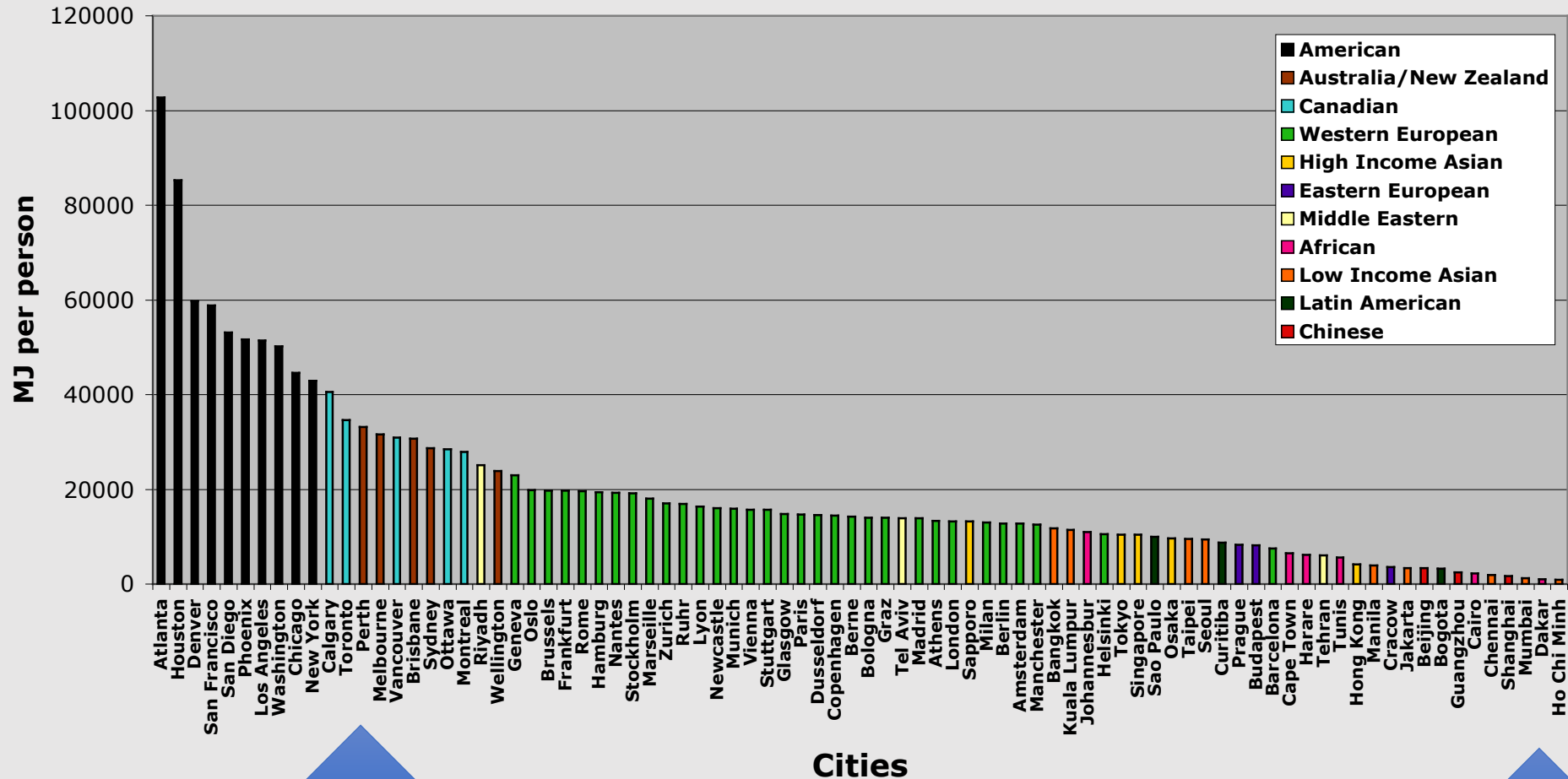
While integrated land use planning and infrastructure provision are key to these initiatives, cooperation between stakeholders – the property development sector, local

Funding  
transport and  
infill...

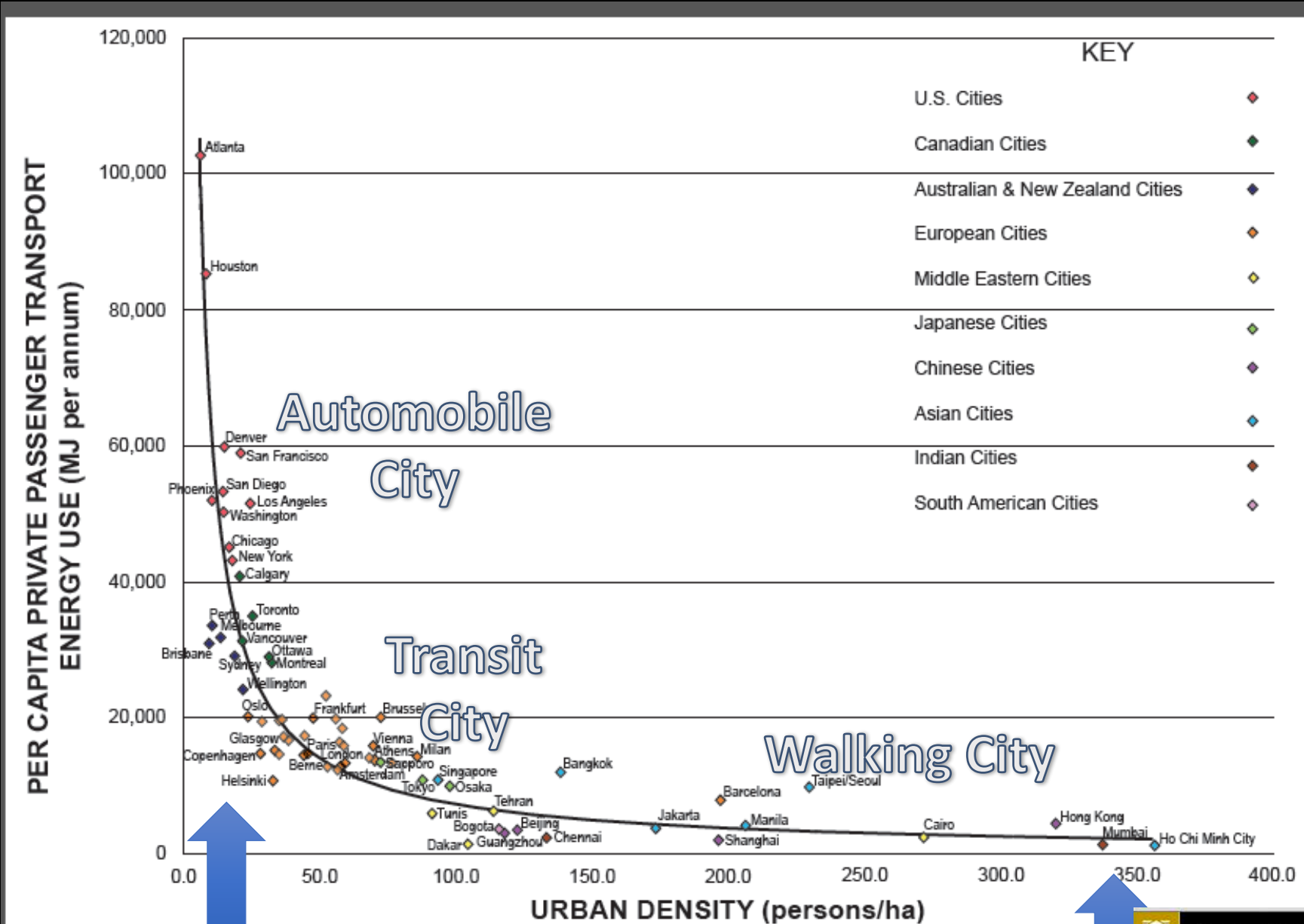
# Urban Density, 1995 (Persons/Ha)



# Private Passenger Transport Energy Use per Person, 1995



# Transport and density shape the city...





PETER NEWMAN *and* JEFFREY KENWORTHY

# THE END *of* AUTOMOBILE DEPENDENCE

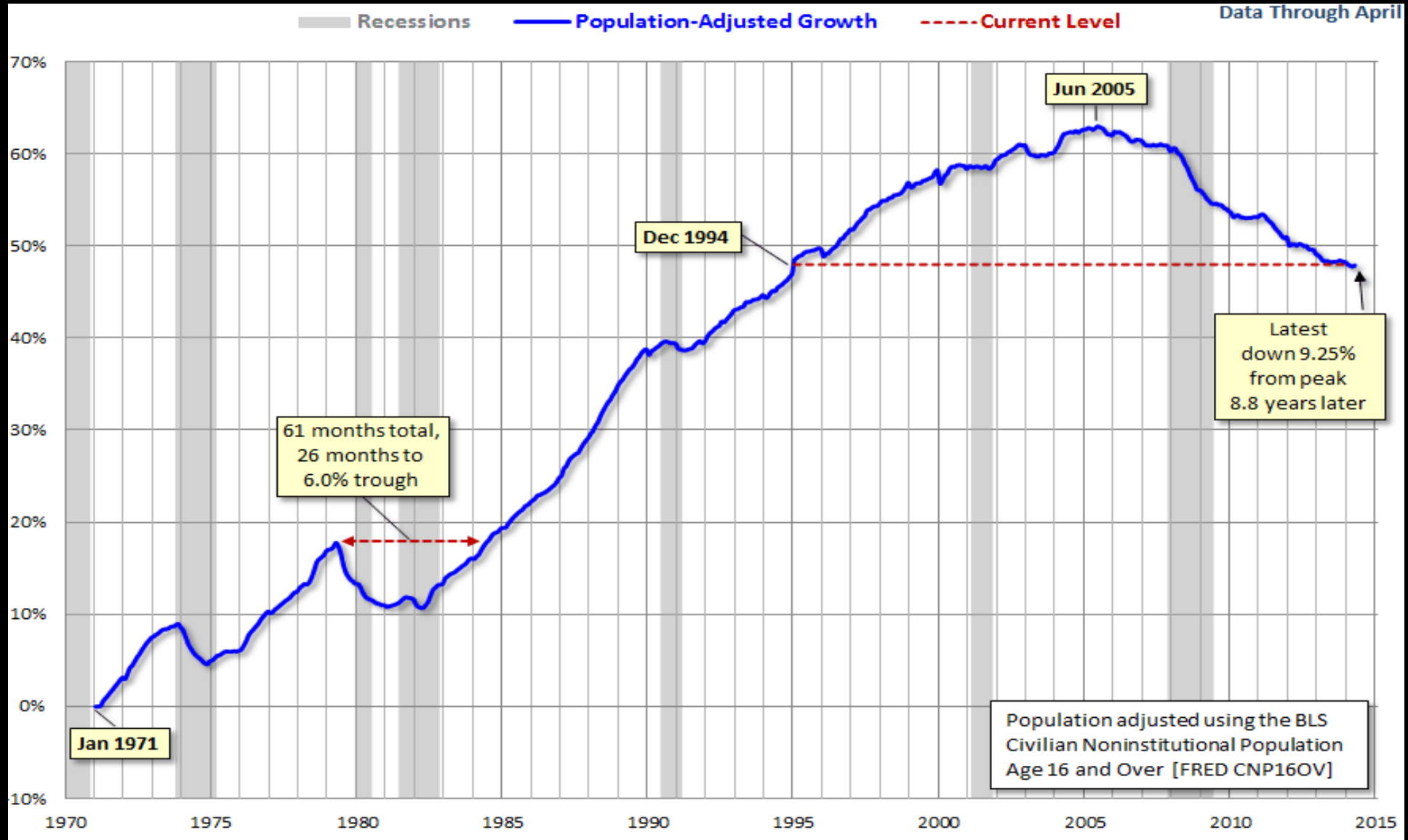
*How Cities are Moving  
Beyond Car-Based Planning*



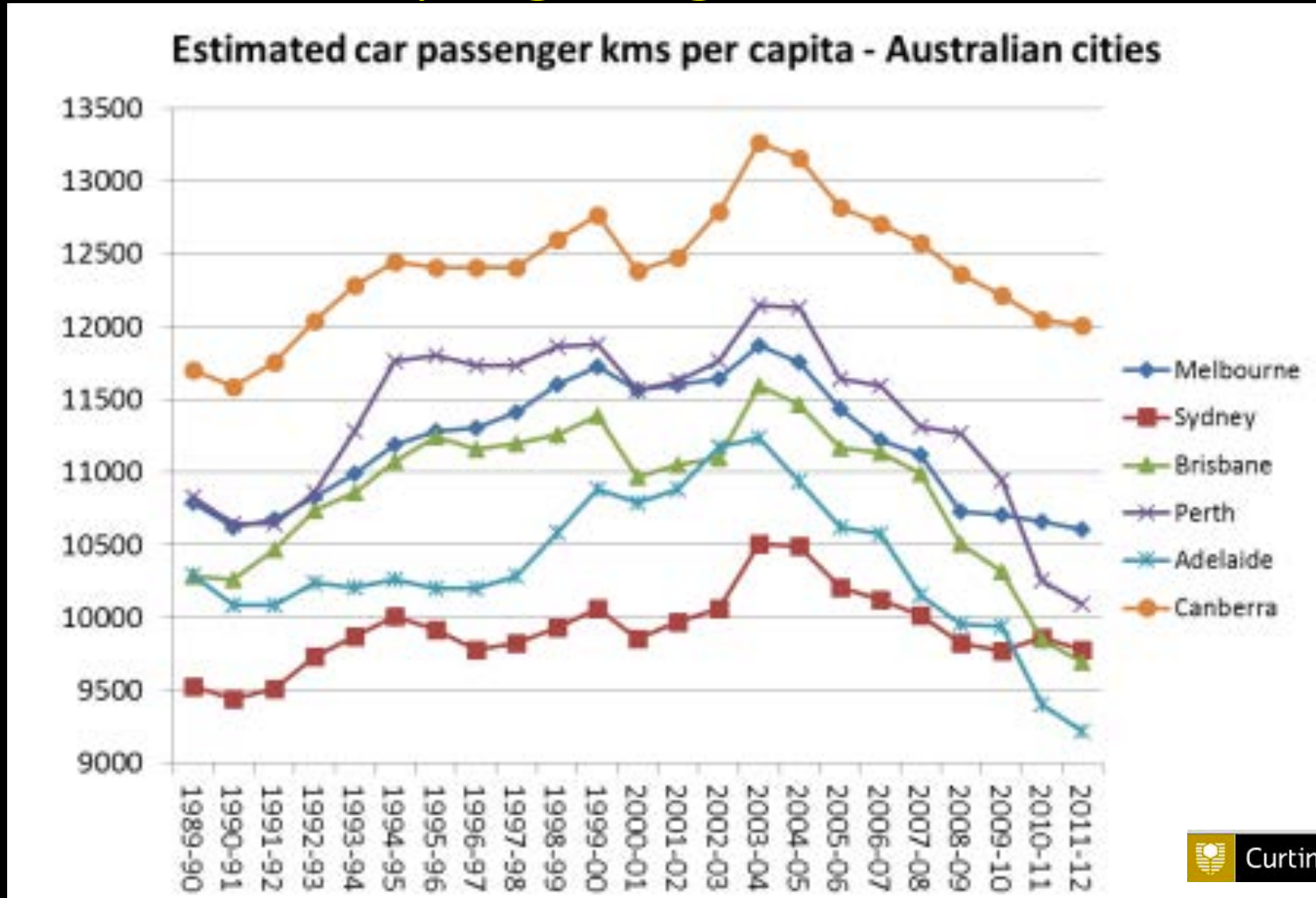
New era  
emerging...

The third in a trilogy...  
A journey from the 1970's to now.

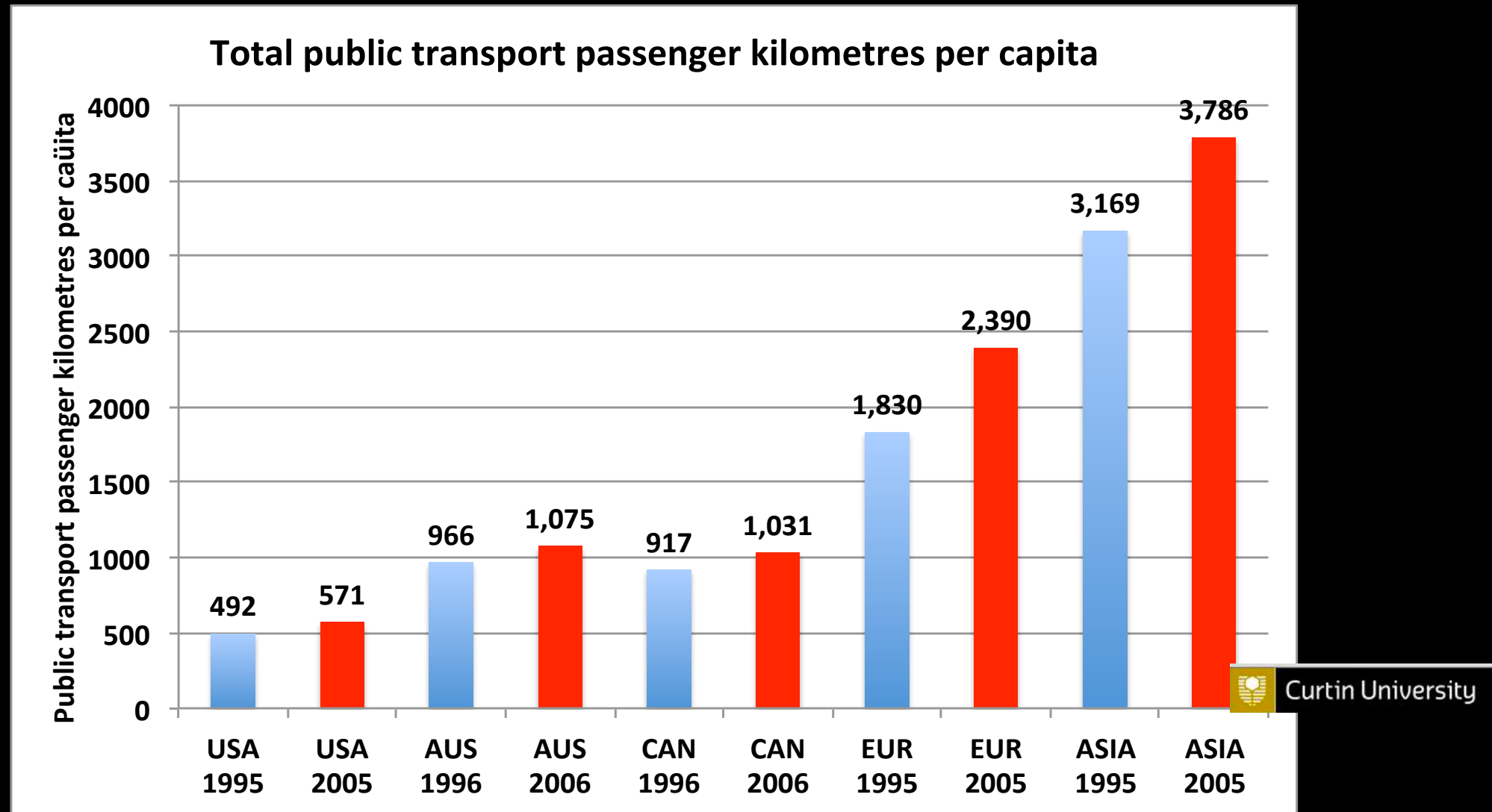
# 21<sup>st</sup> century...THE USA IS DRIVING LESS



Australian city car use peaked the same year...and keeps going down.



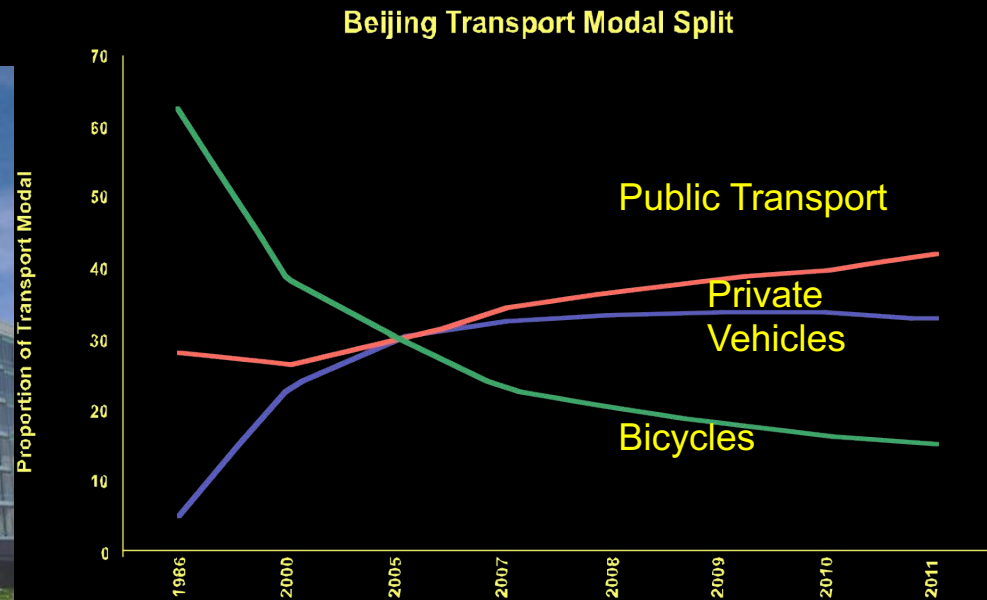
# Public transport – especially rail – is now booming everywhere





# Global growth now in 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

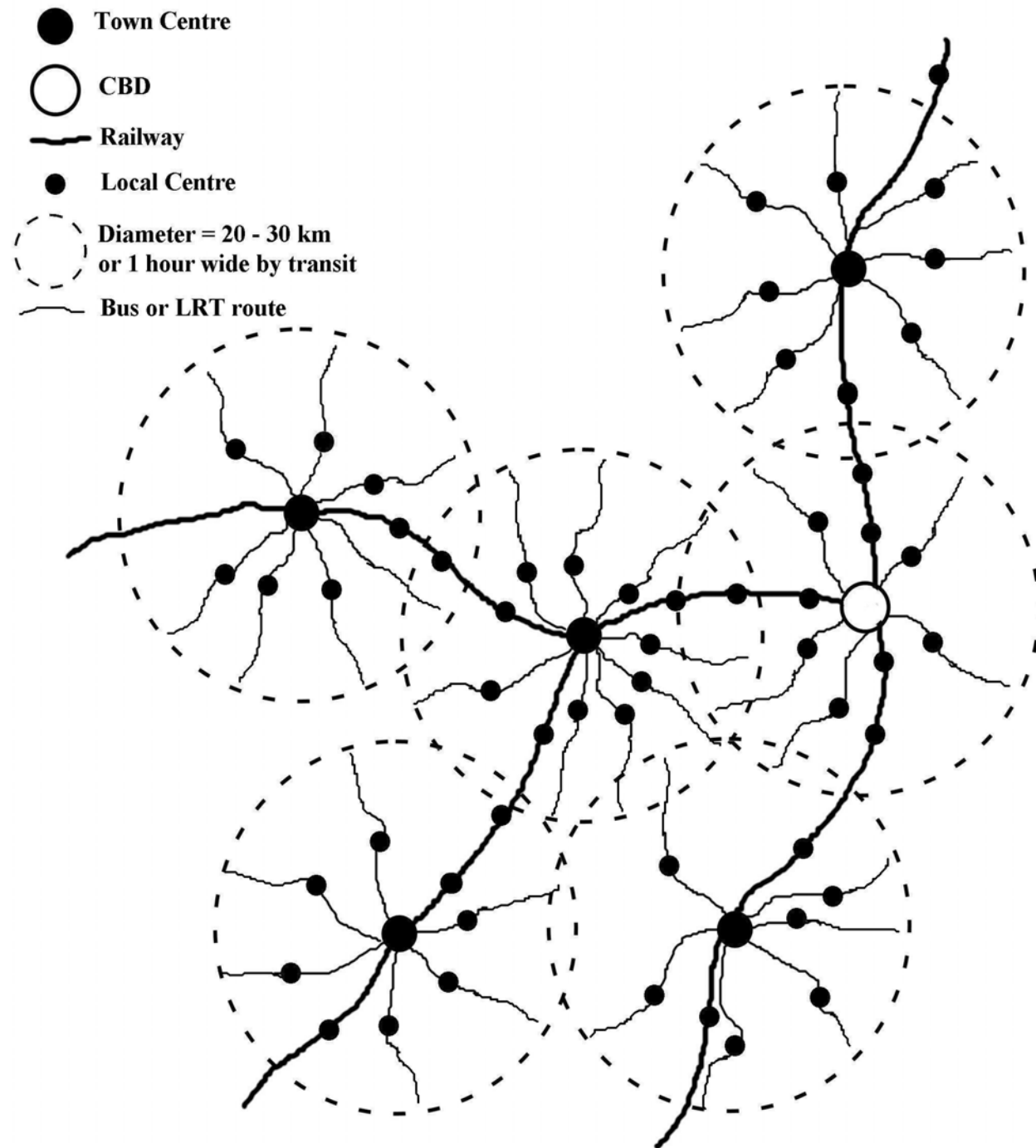


Cities are regenerating back in rather than sprawling.....but how do they link with transit and get the finance?

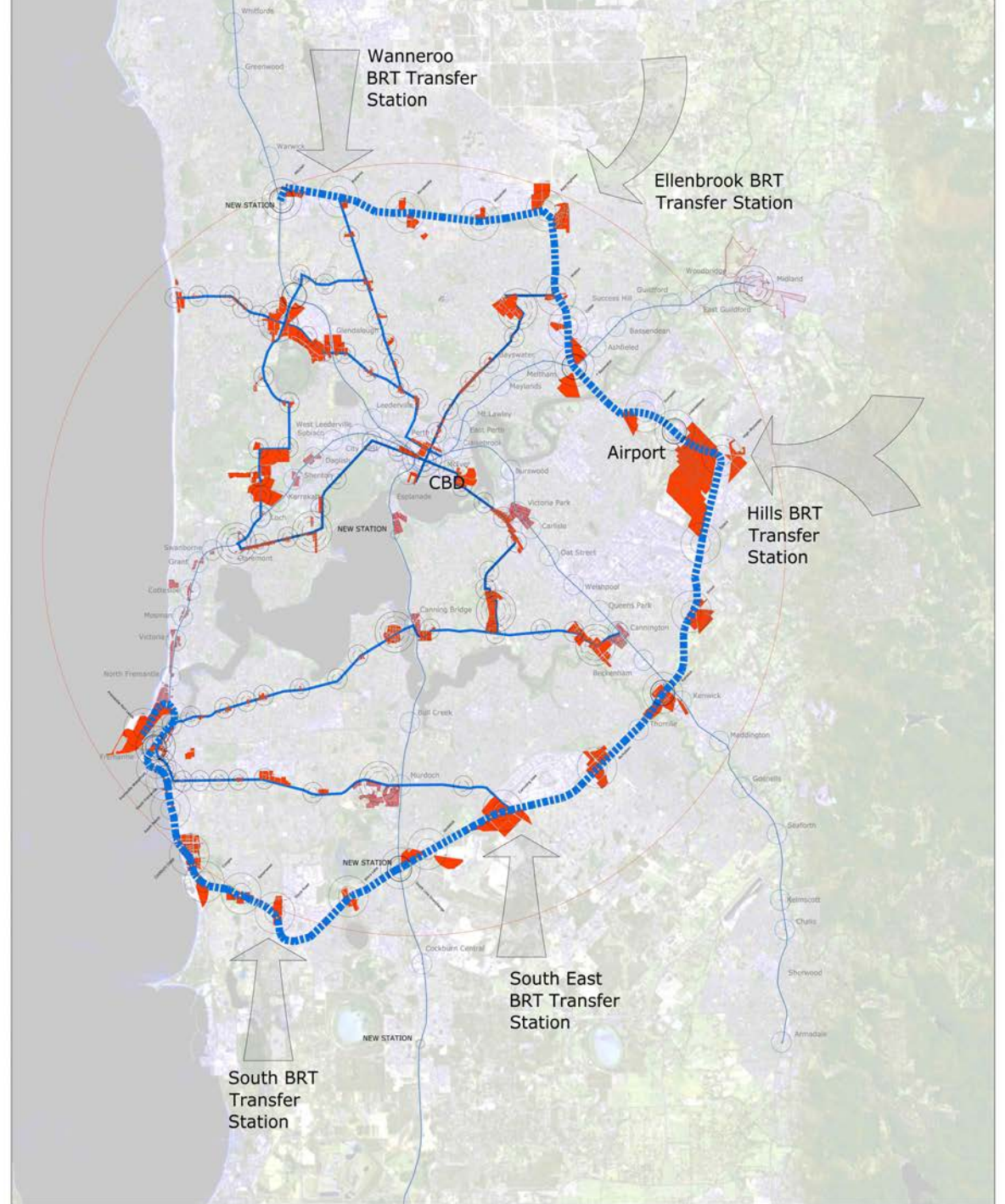
New partnerships or City Deals....

Sydney...

Rebuilding  
30 minute  
cities



# The Ring Rail, LRT and BRT plus development sites for the next 30 years growth in Perth





# The rail revival in Perth...



\$2.5 billion set of projects.....costing more than double....  
SO HOW DO WE FUND the demand for urban rail and urban regeneration

## Metronet and City Deals



City Deals

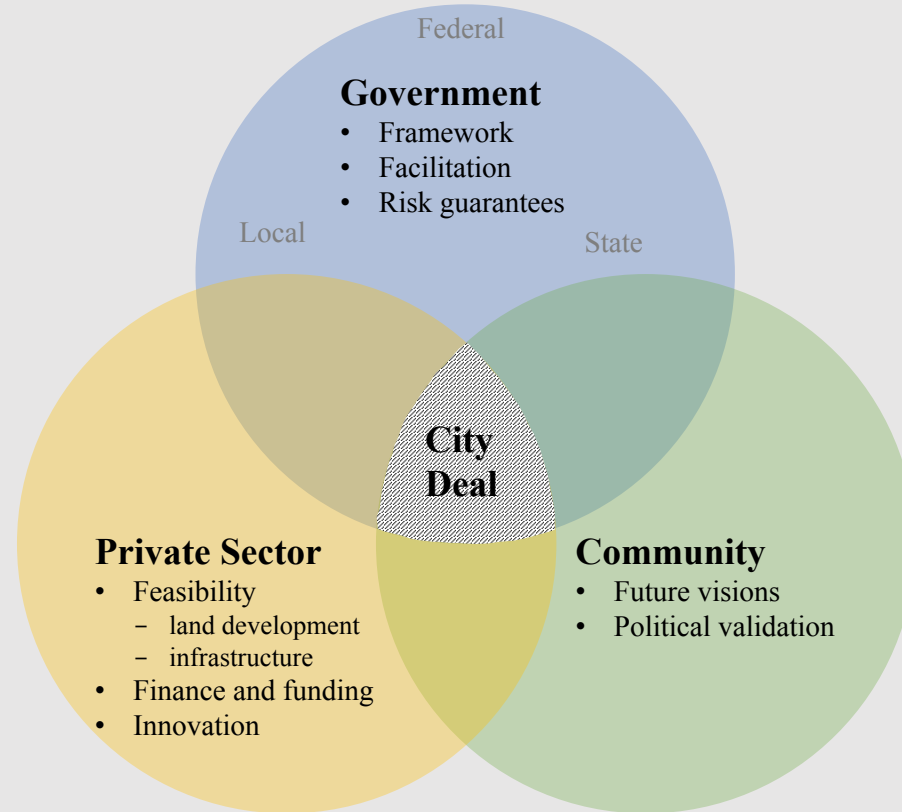




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# City Deal

A new way of Building Australian cities for their long term based on partnerships...



## Stirling to Curtin: Key Development Areas



Stirling City Centre



Riverside Project



Bentley Technology Precinct



Greater Curtin wants to create a city in the suburbs using rail to create the spatial efficiency...needs a new approach!





FEBRUARY 2016

# ENTREPRENEUR RAIL MODEL

A DISCUSSION PAPER



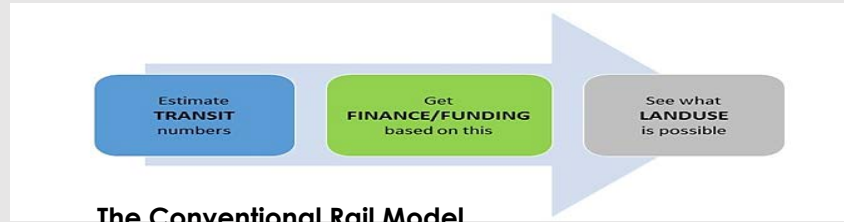
## *Tapping Private Investment for New Urban Rail*

Prepared by Peter Newman, Brian Jones, Jemma Green and Sebastian Dawes-Slate for Curtin University

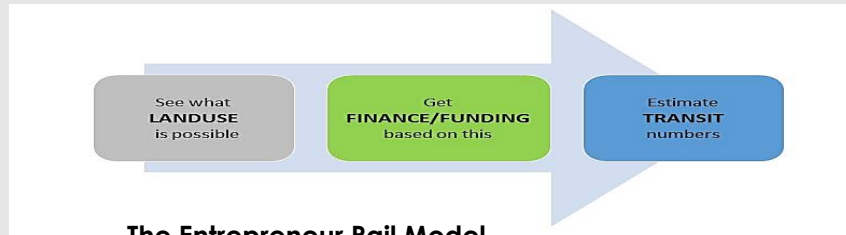


East Fremantle Now and After Light Rail - Images by Cole Hendigan

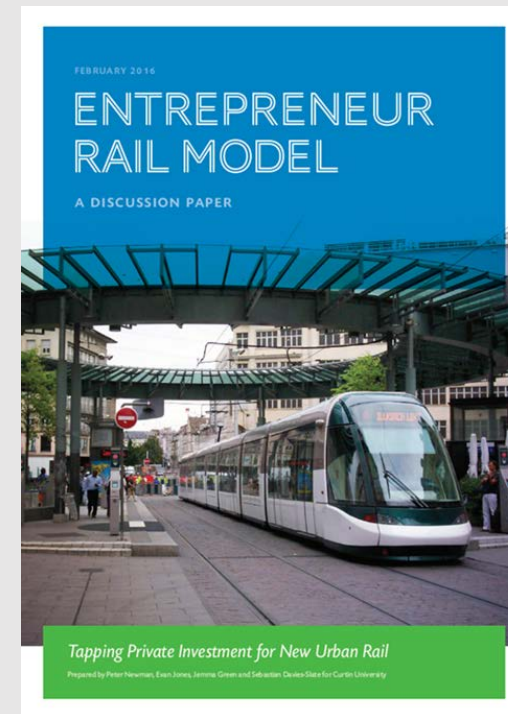
# The Entrepreneur Rail Model



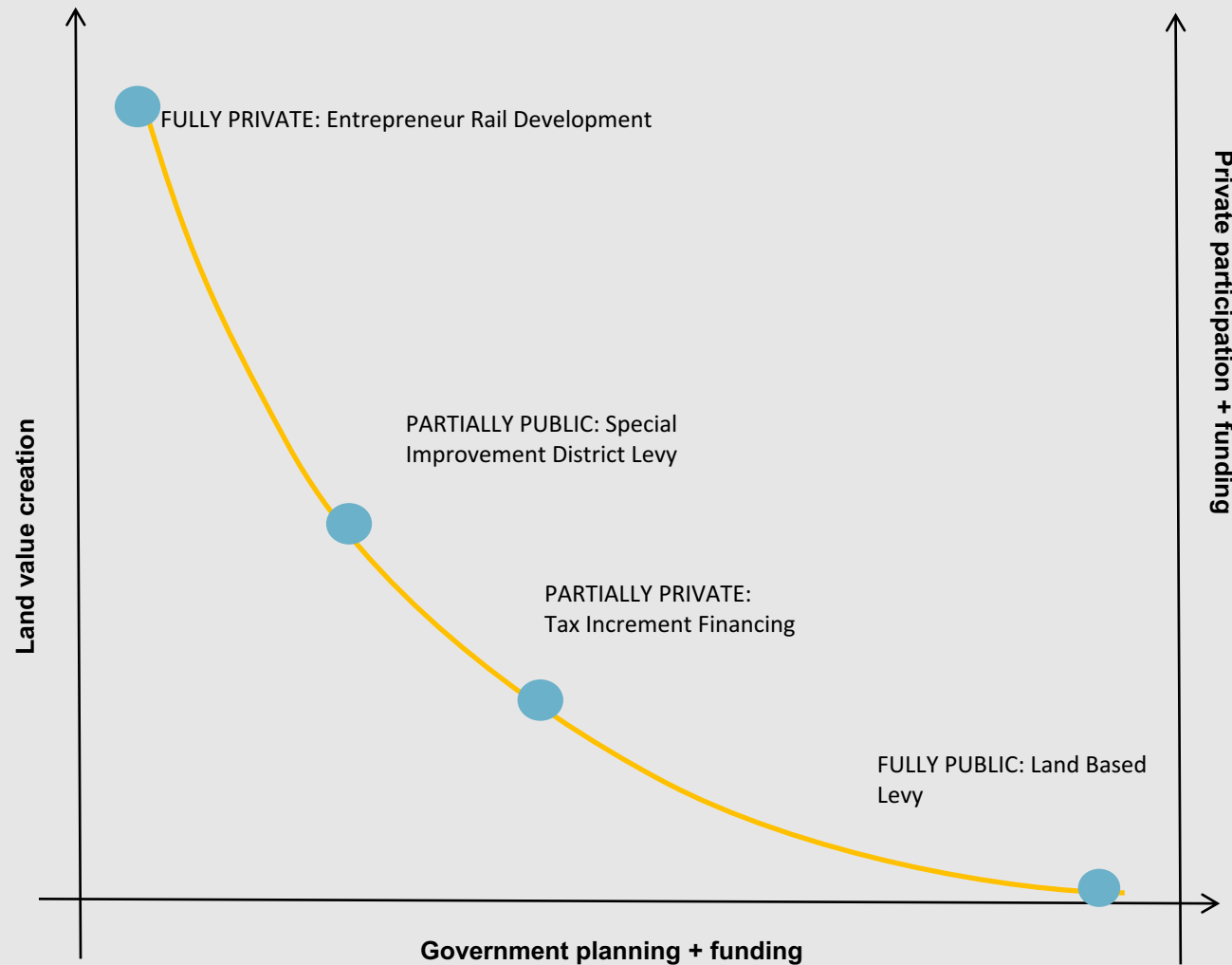
The business-as-usual predicts numbers of people who could use a railway line based on present land use.



The Entrepreneur Rail Model starts by the private sector predicting **how much land can be developed** as the fundamental source of the funding.



# How economic value increases with earlier involvement of private investment....





# Private Metro in Copenhagen – sold Military land





# All Japanese rail and Hong Kong MTR build and operate rail through land development





This is how we always built  
railways for nearly 100  
years...

Now we have a new demand  
maybe we can do it again...?

**SITUATED**  
**MAGNIFICENT** **NEDLANDS PARK** **SWAN RIVER**

**TRAMWAY ESTATE**  
Between Perth & Fremantle

**TERMS** 1/5 Cash — Balance  
to suit Purchasers

**No Interest**

Offices —  
Surrey Chambers  
5<sup>th</sup> Georges Terrace Perth

*Hope & Klen*  
Civil Engineers  
101 & 103 Barrack St Perth

*Subject to Act 1901*

The advertisement features a detailed street map of the Nedlands Park area, showing a grid of streets and the Swan River. A photograph shows a view of the estate, and an inset map shows the location of the estate relative to Perth and Fremantle.

# A NEW TRAVEL ALTERNATIVE FOR SOUTH FLORIDA

- ✓ First private passenger rail service
- ✓ Designed to serve tourists, business travelers and Florida residents



ORLANDO  
(3 hours)



WEST PALM BEACH  
(1 hour)



FORT LAUDERDALE  
(30 minutes)



DOWNTOWN MIAMI

- ✓ Stations in key, downtown areas





MIAMICENTRAL

brightline

There is another issue for funding road building...there will be no gasoline tax.

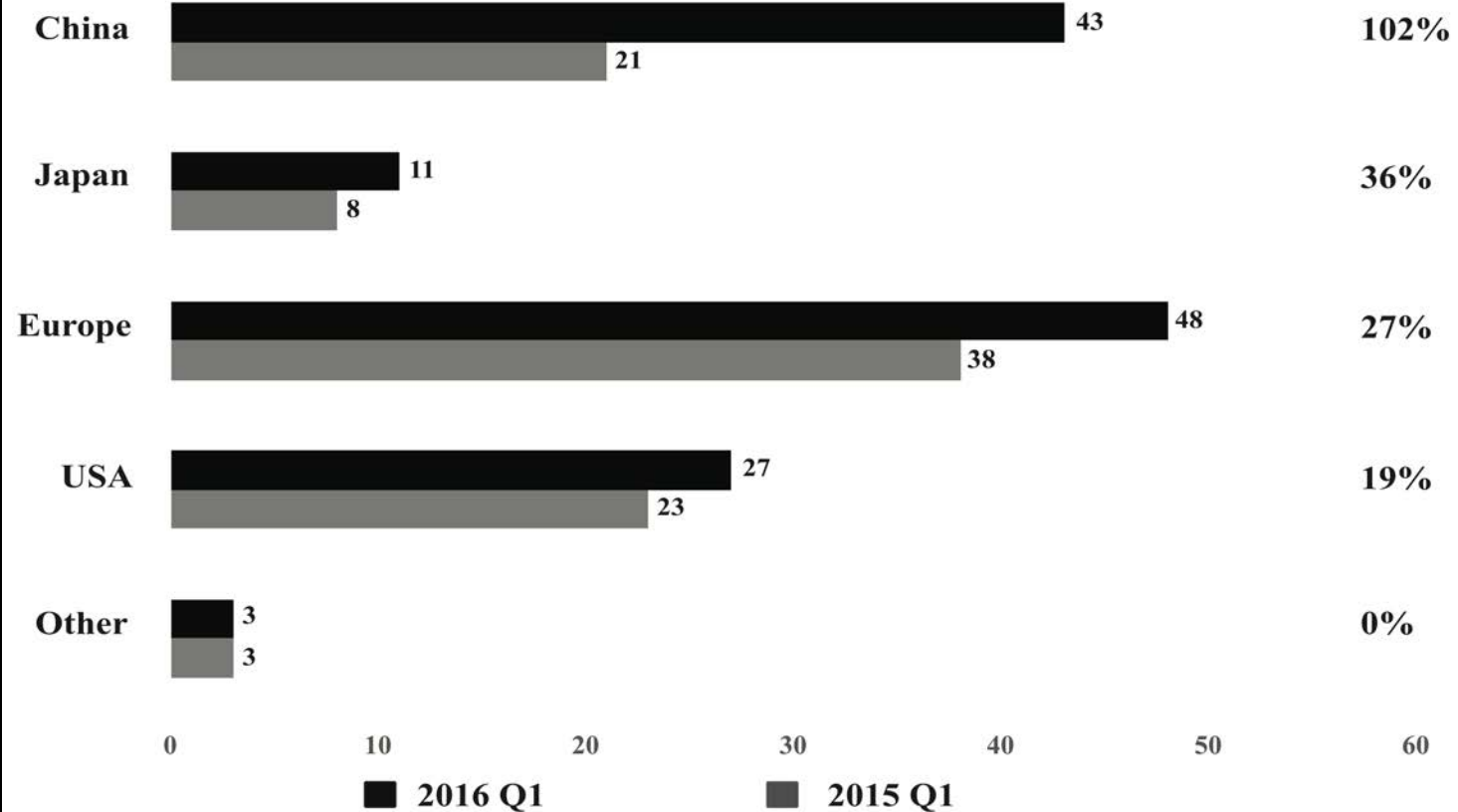


# Electric vehicles are growing globally at over 40% per year ...

## Honda Zero Carbon Home



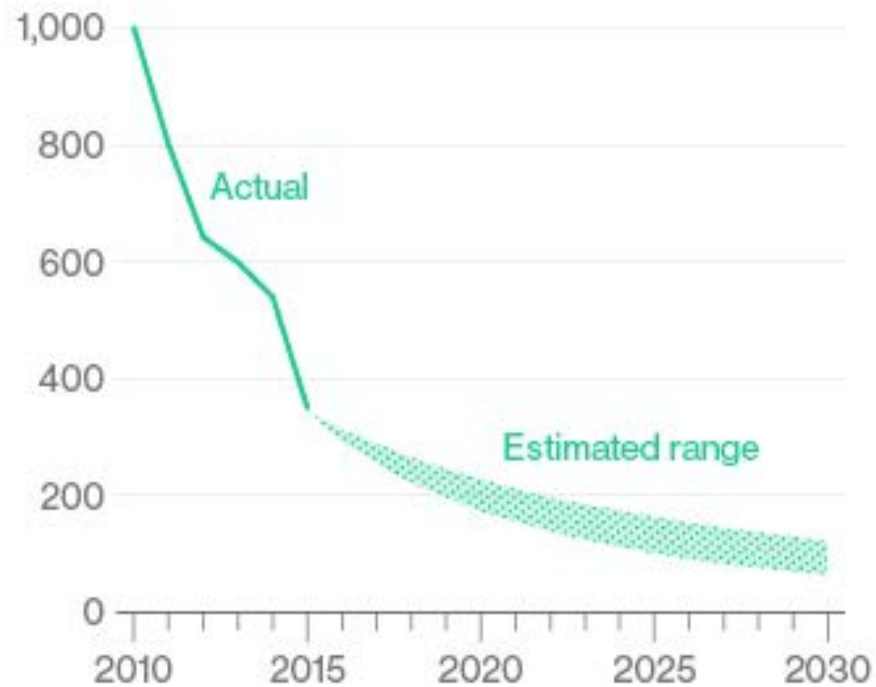
### Volume of Plug-in Electric Vehicles and % Growth 2015-2016



# Electric cars 35% of market by 2035

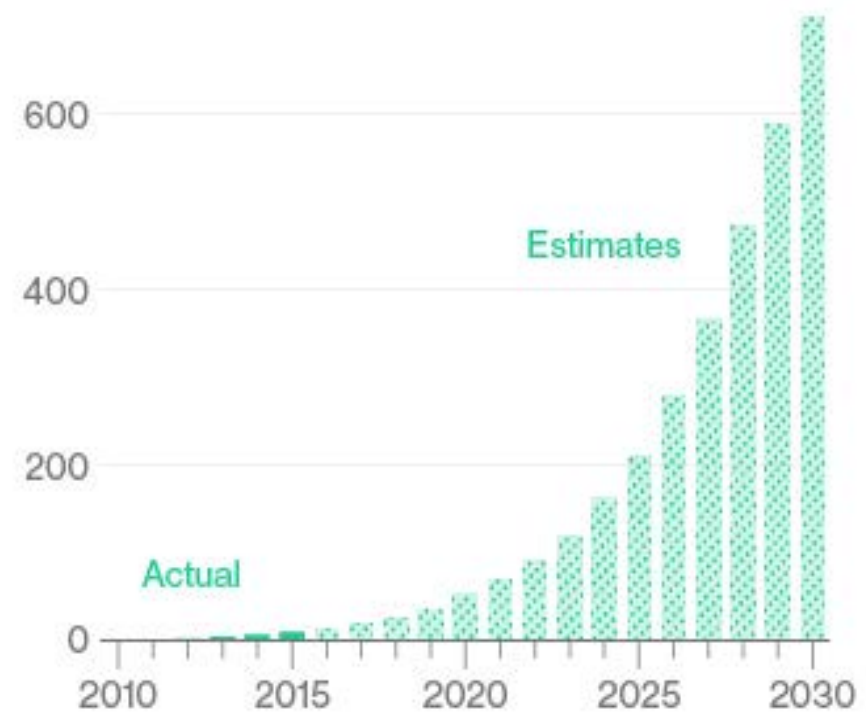
Cost for lithium-ion battery packs

\$1,200 per kilowatt hour



Yearly demand for EV battery power

800 gigawatt hours

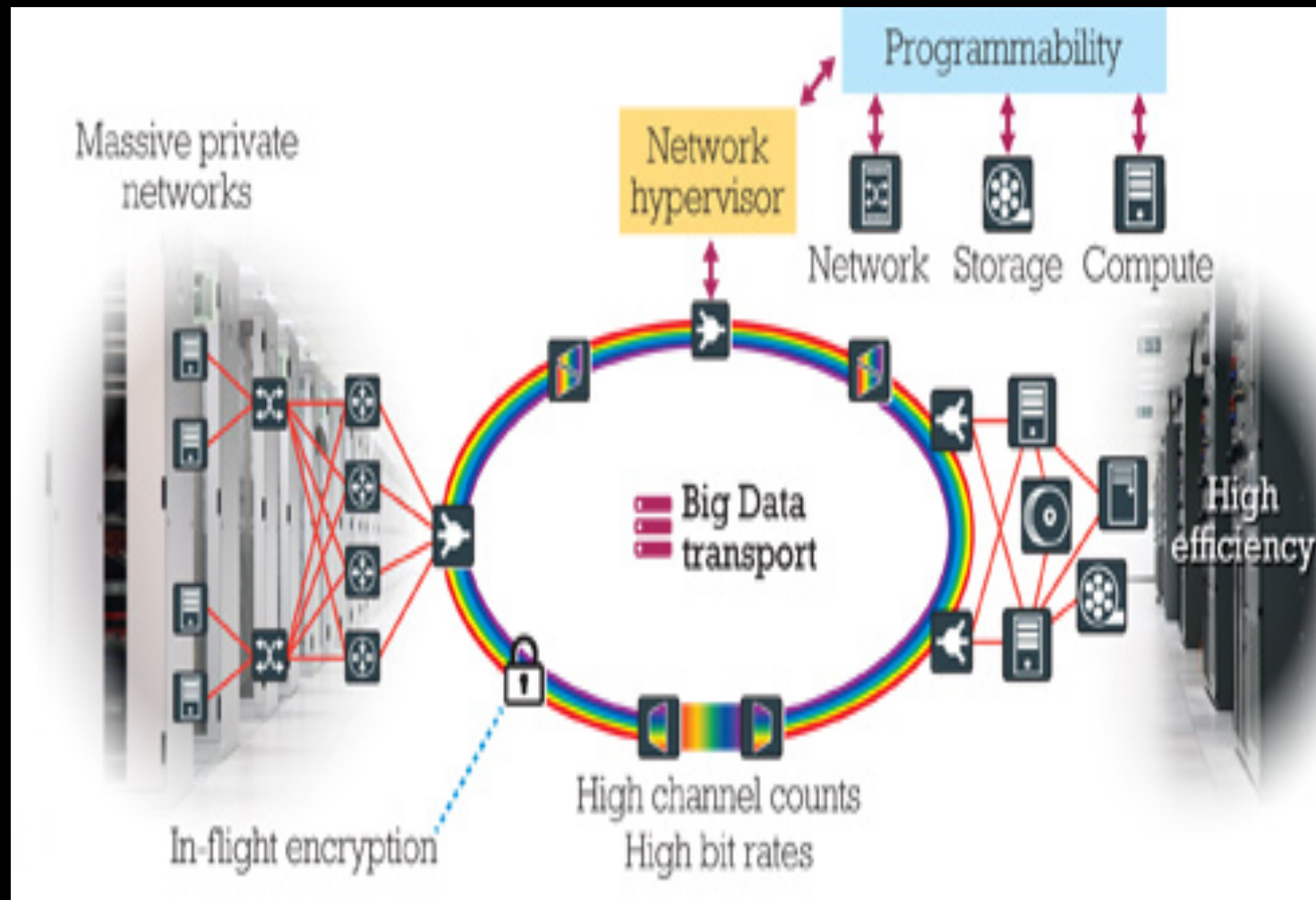




# EVs and Li-ion Batteries – solar transport

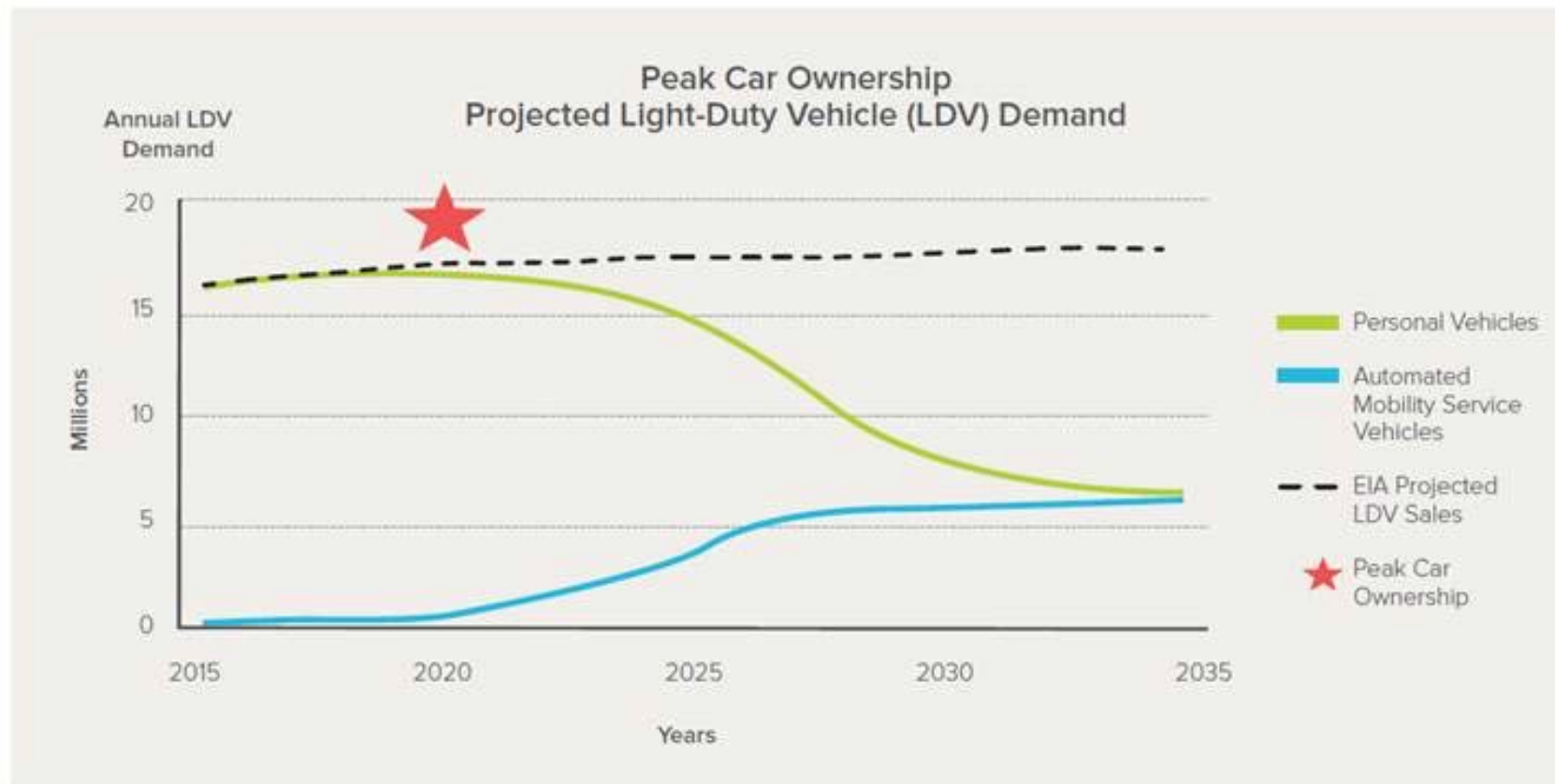


No problem to know how much a vehicle uses the road.....



# But private vehicles are phasing out... 'Transport as a Service'

FIGURE 12:  
PROJECTED LIGHT-DUTY VEHICLE DEMAND





# Smart transport is electric shared transport....

## On-demand shuttle buses to move NSW commuters between home and train stations

By Michelle Brown

Updated 24 minutes ago



PHOTO: Citymapper uses smart screens to tell passengers their location and what's coming next. (Facebook: Citymapper)

A private rideshare-style service to move people between their doorstep and the train station will be trialed in Sydney and the

RELATED STORY: [Could Sydney's inner-west soon see Uber-style buses?](#)

RELATED STORY: [NSW puts problem Sydney bus zone out to](#)



PHOTO: Chariot in the US has sought to reinvent mass transit through crowdsourcing routes. (Facebook: Chariot)

# E-Bikes are the new part of the solar revolution...can do all modes with one CARD



- 200 million e-bikes in China



www.shutterstock.com · 335388089



Combination of a bus and a tram....



New trackless  
train in  
ZhuZhou  
ART –  
Autonomous  
Rail Transit



# Predictions – After the Peak

