

Transport for Achieving the
1.5°C Transformation Agenda
实现1.5摄氏度转型议程的交
通创新

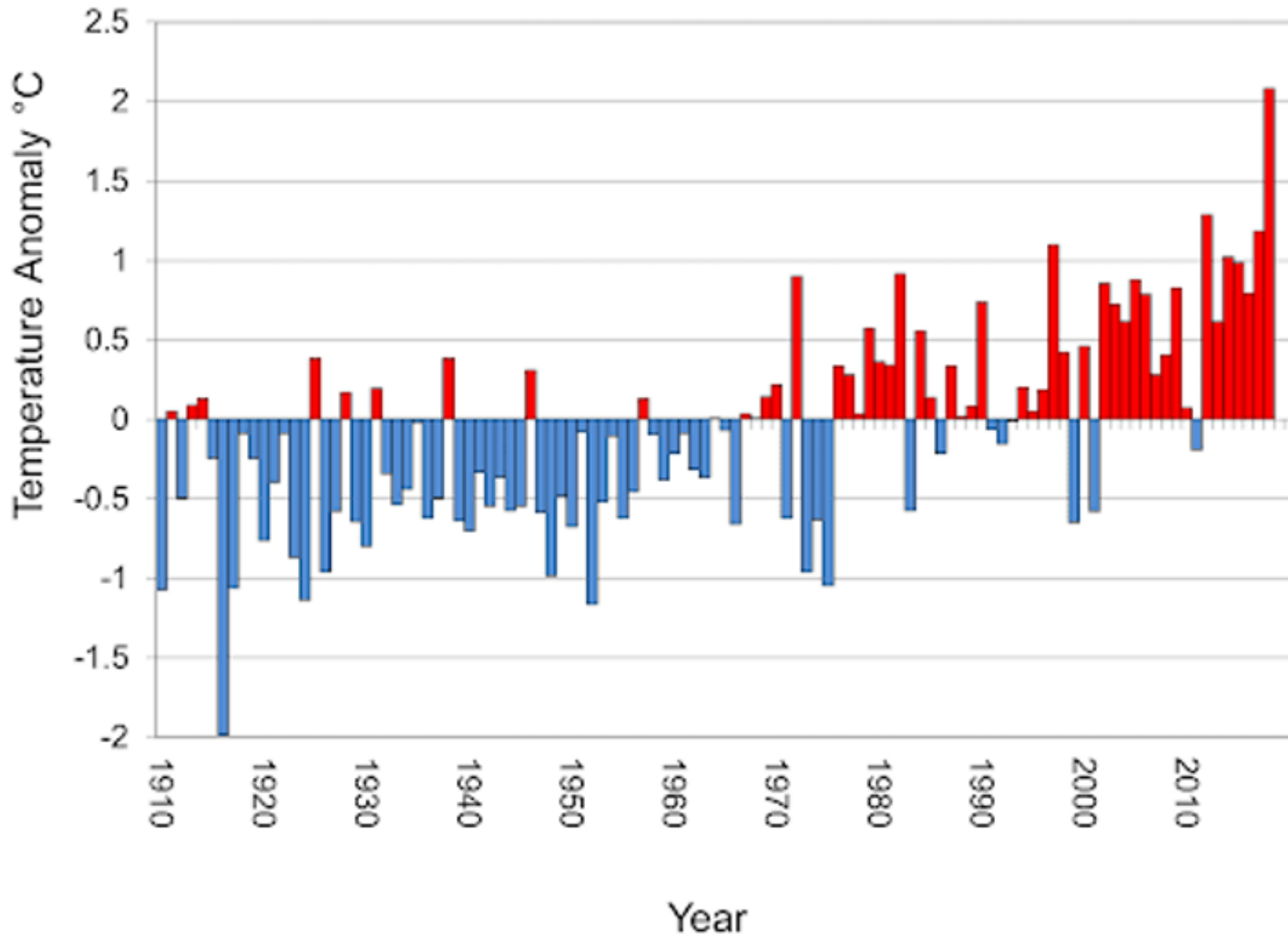
By

Professor Peter Newman AO

Curtin University, Perth, Australia

and Co-ordinating Lead Author of Transport in IPCC

Australian Summer Mean Temperature

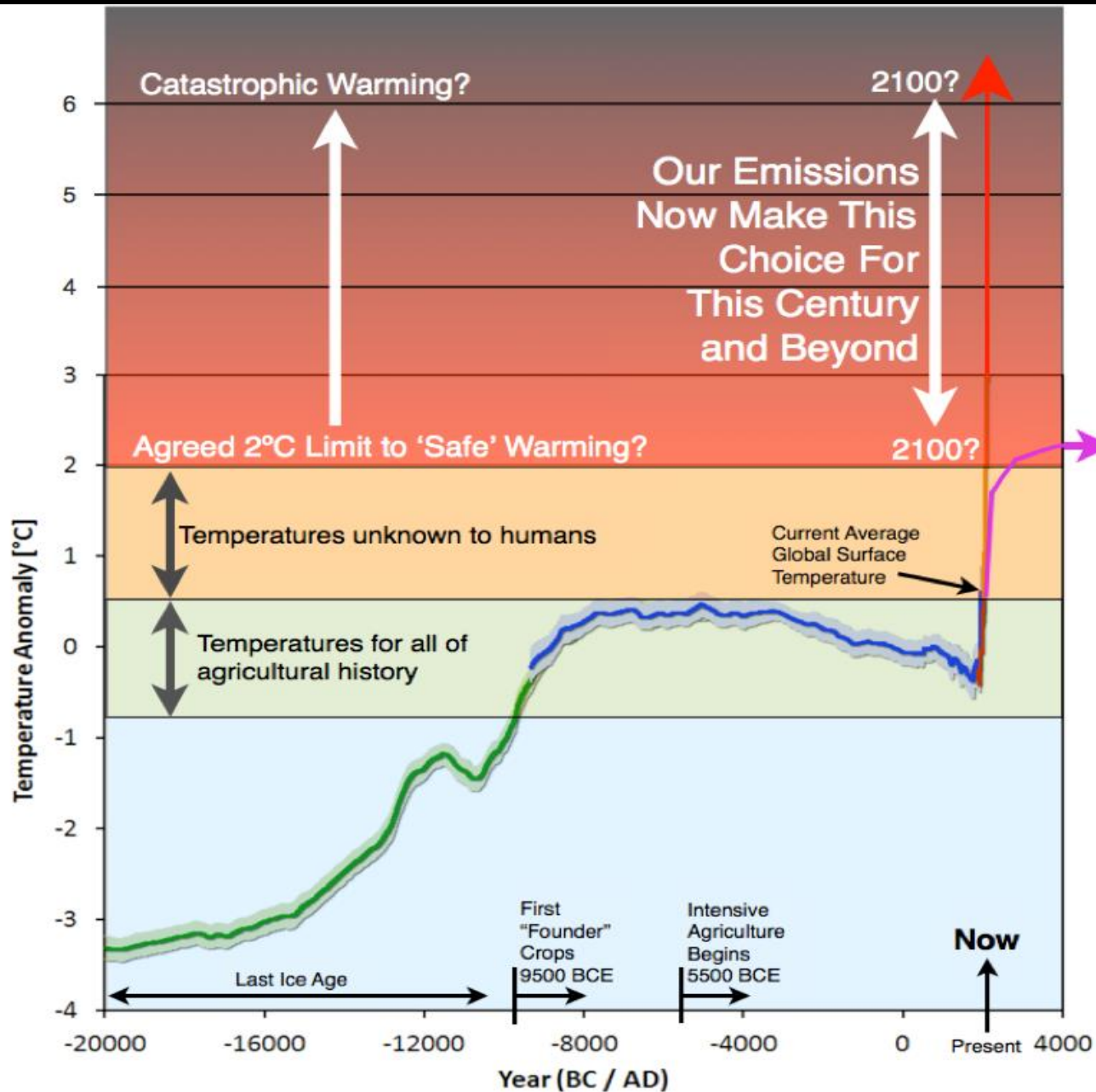


The global climate is warming

Eighteen of the last 19 years have been the warmest on record.



There is only 1 in 100,000 chance that this is not caused by human use of fossil fuels and land clearing
....not sun spots, not volcanic activity, not any other natural system....

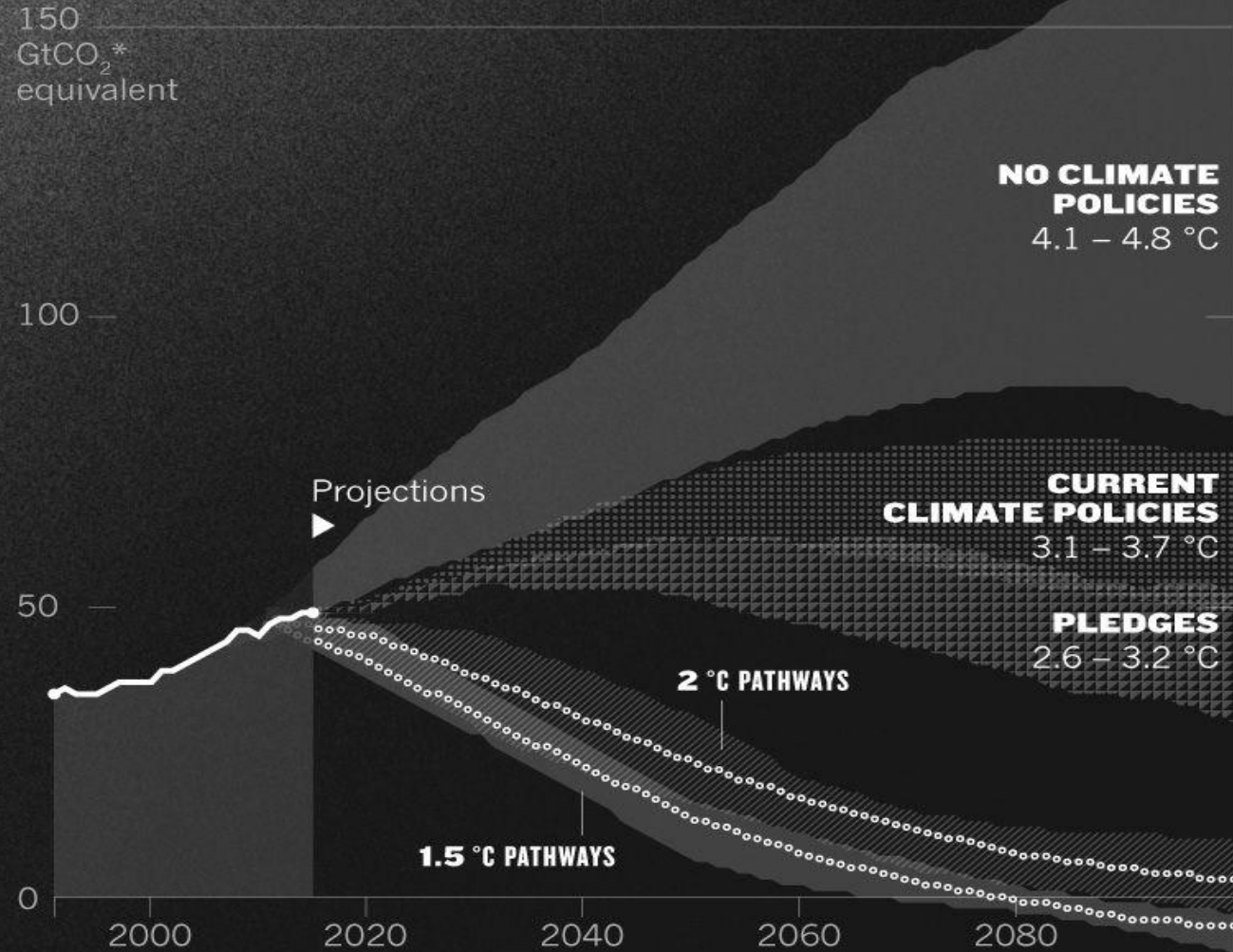


Leaving the 'safe operating space' 1°C band

Its our cities and agriculture that are threatened....

PLOTTING THE FUTURE

Greenhouse-gas emissions could take many paths in the coming years, resulting in differing levels of warming relative to pre-industrial levels. Thanks to policies that have already been implemented by governments around the world, temperatures are not expected to rise as high by 2100 as they otherwise would. But to achieve the 1.5 °C and 2 °C targets set by the 2015 Paris climate accord, more-aggressive emissions reductions will be needed.



* Gigatonnes of carbon dioxide

TRANSFORMATION is necessary....

The image shows the cover of an IPCC special report. At the top right is the IPCC logo: "ipcc" in a stylized font, with "INTERGOVERNMENTAL PANEL ON climate change" underneath. The title "Global Warming of 1.5°C" is prominently displayed in the center. Below the title is a short summary: "An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty". The central graphic is a colorful, abstract illustration with a blue and purple background and a yellow and orange foreground, suggesting a transition or a specific climate state. At the bottom, there are logos for "WG I", "WG II", and "WG III" in boxes, and the logos for "WMO" and "UNEP" on the right.

The next economy is being defined by this...and some are leading, while others are laggards.

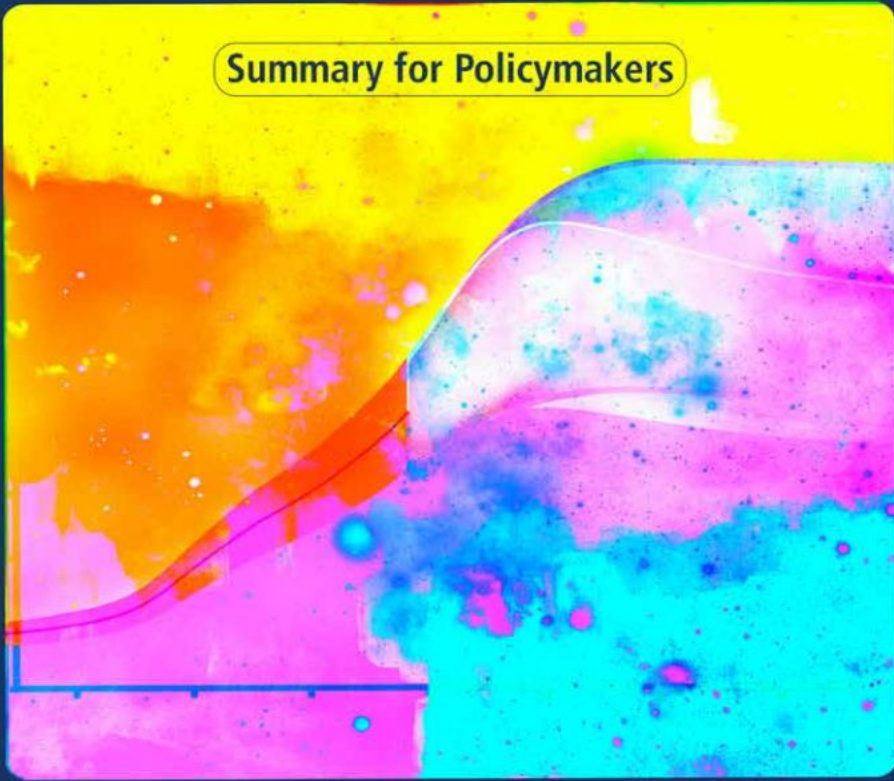
ipcc

INTERGOVERNMENTAL PANEL ON climate change

Global Warming of 1.5°C

An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

Summary for Policymakers



WG I WG II WG III



WMO



UNEP

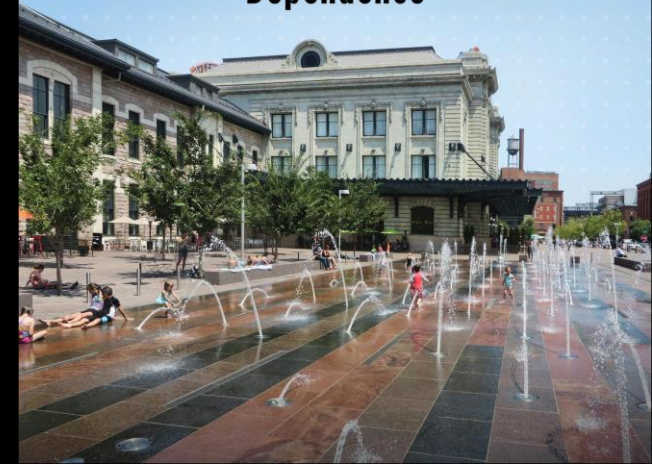
IPCC 1.5°C Transformation needs: Decoupling & Disruption

Peter Newman, Timothy Beatley, and Heather M. Boyer

RESILIENT CITIES

SECOND EDITION

Overcoming Fossil-Fuel
Dependence



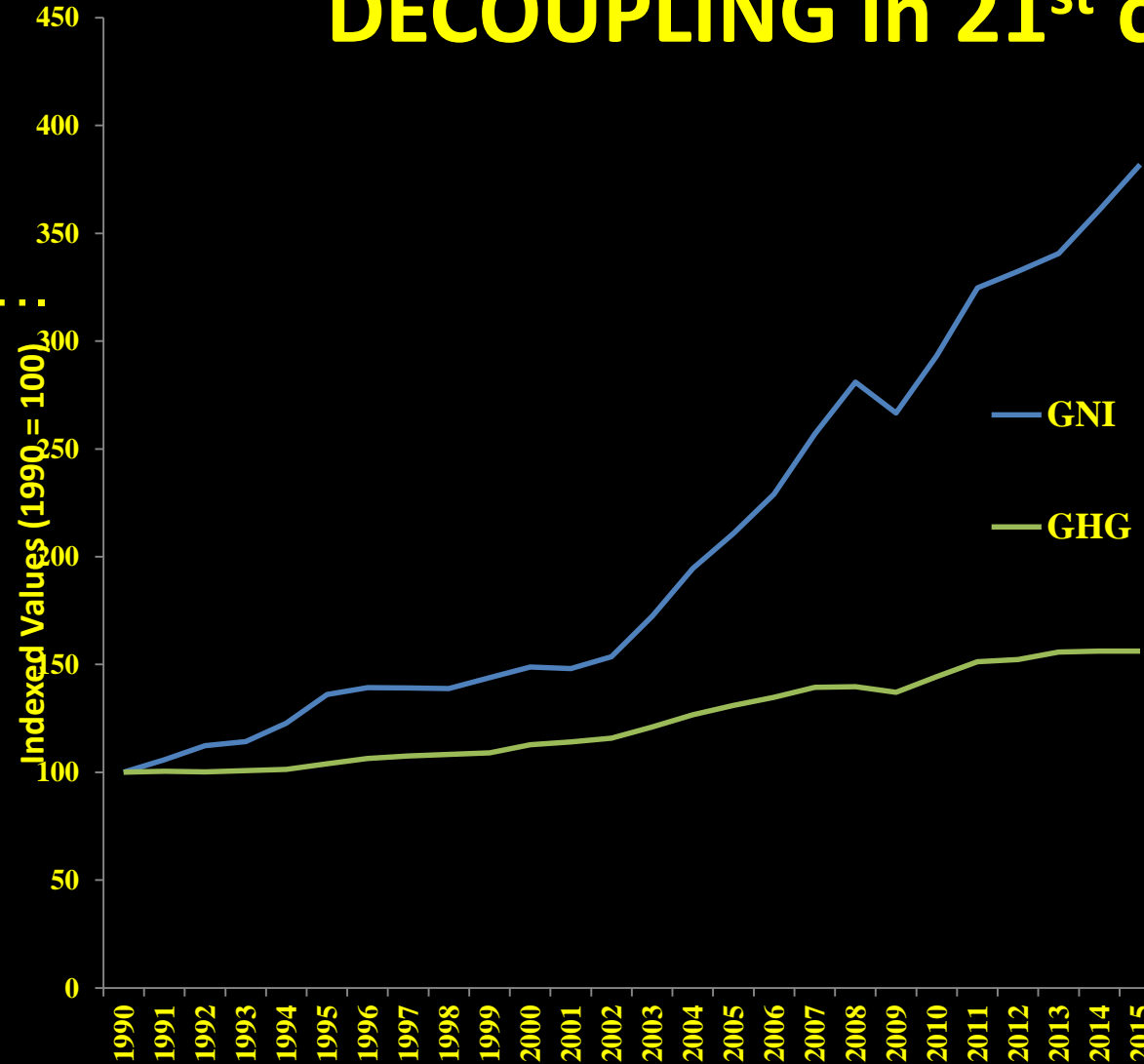
UNEP reports...

Turning point in world history....

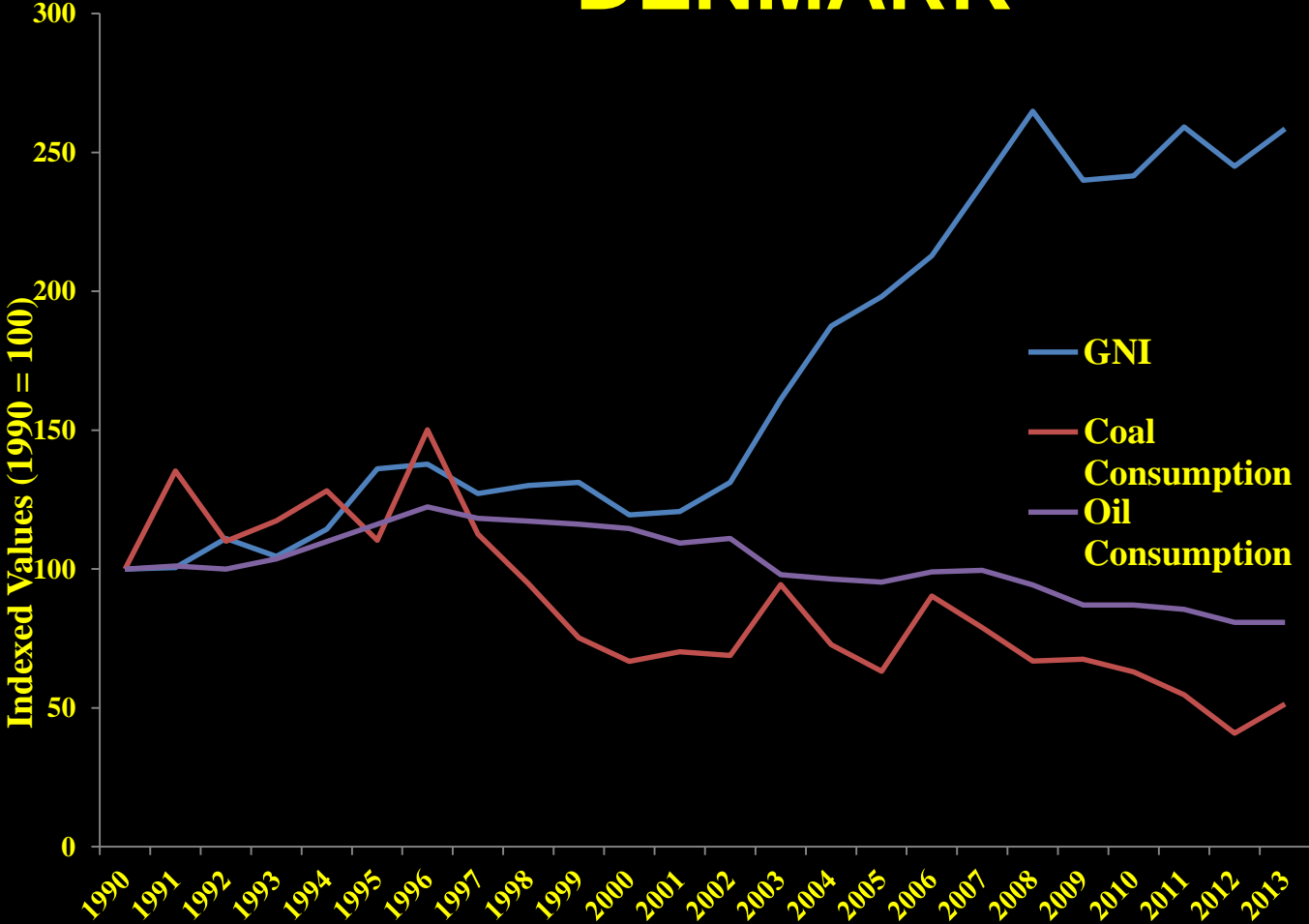
GHG going DOWN,

Wealth going UP

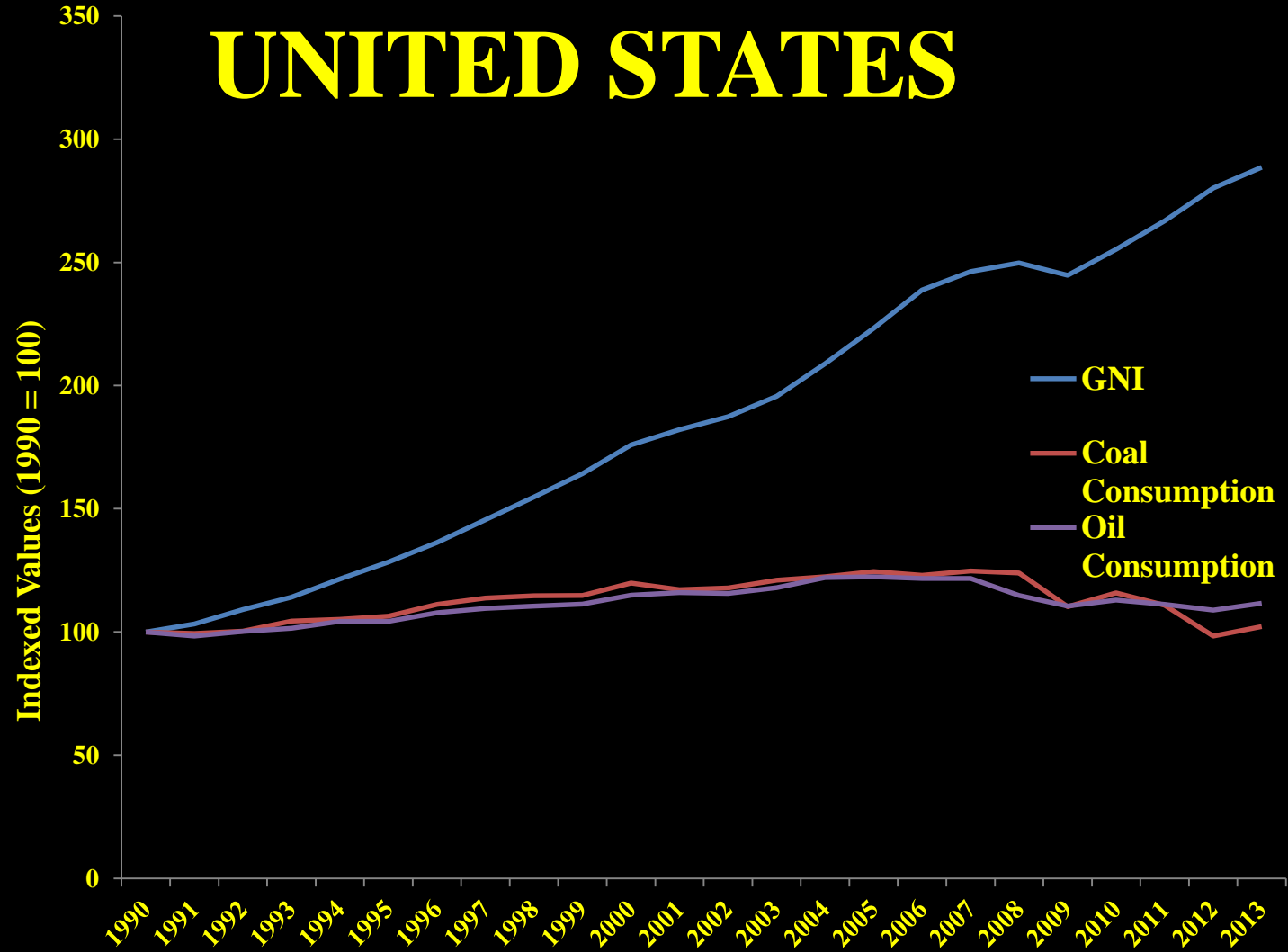
DECOUPLING in 21st century



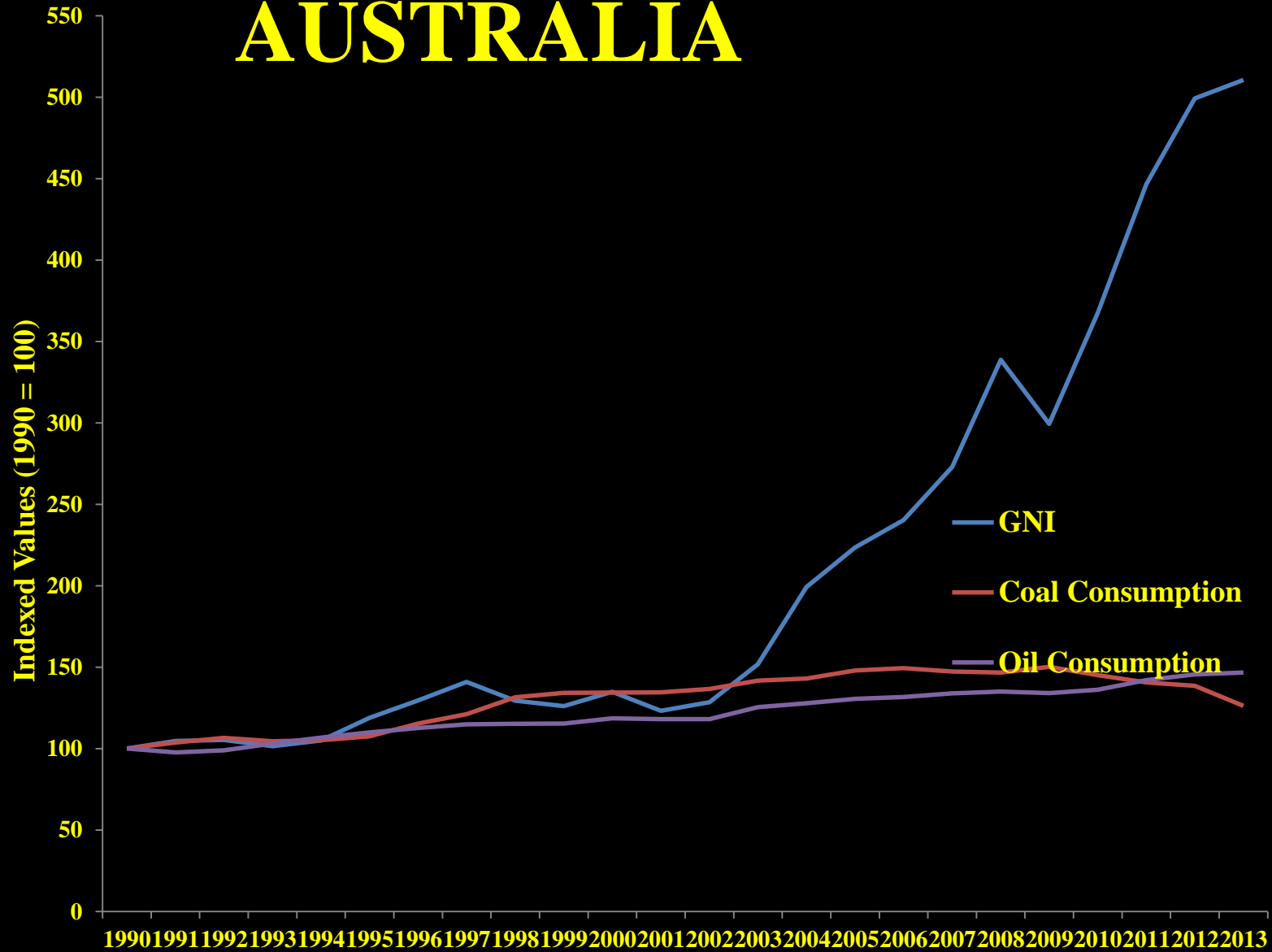
DENMARK



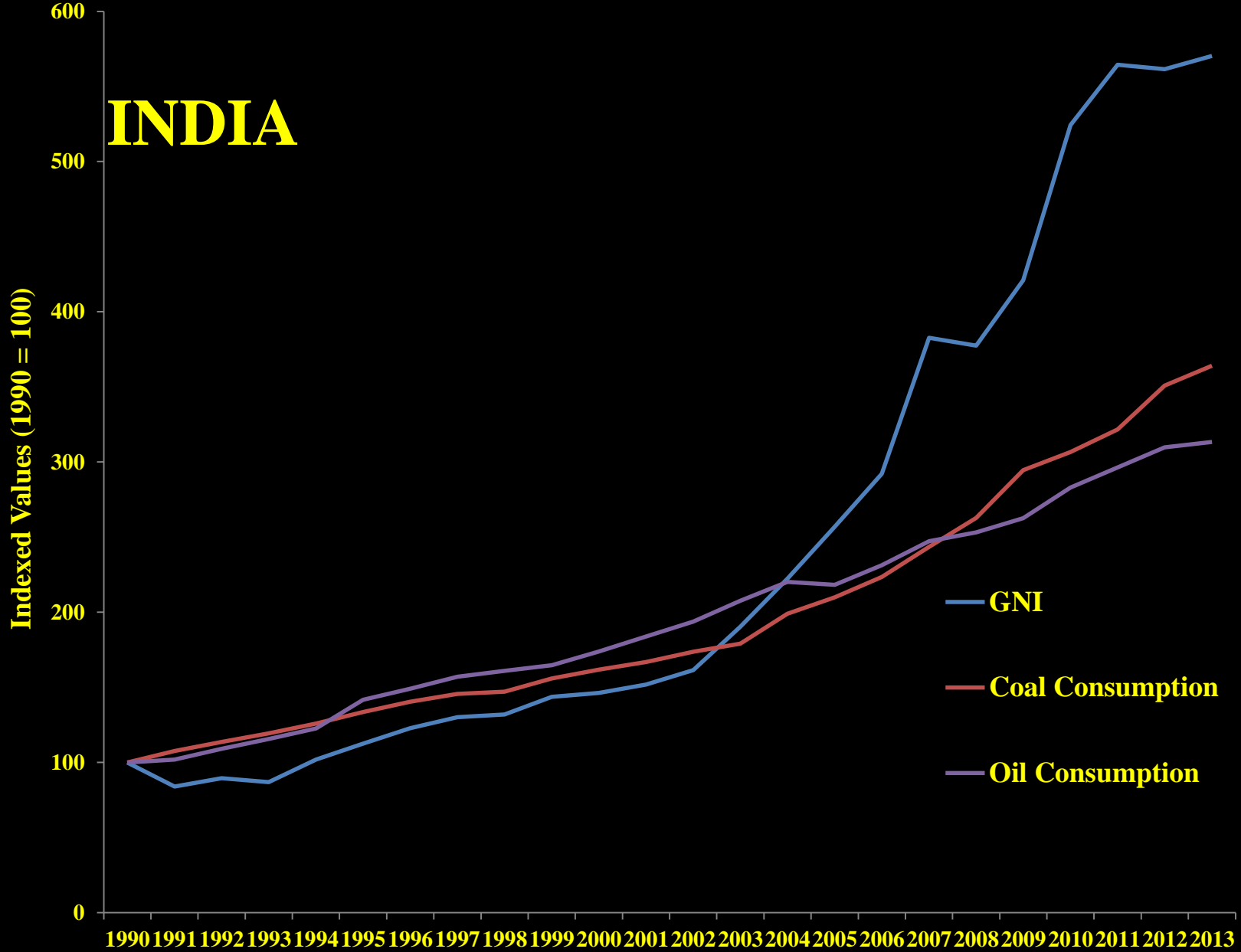
UNITED STATES



AUSTRALIA

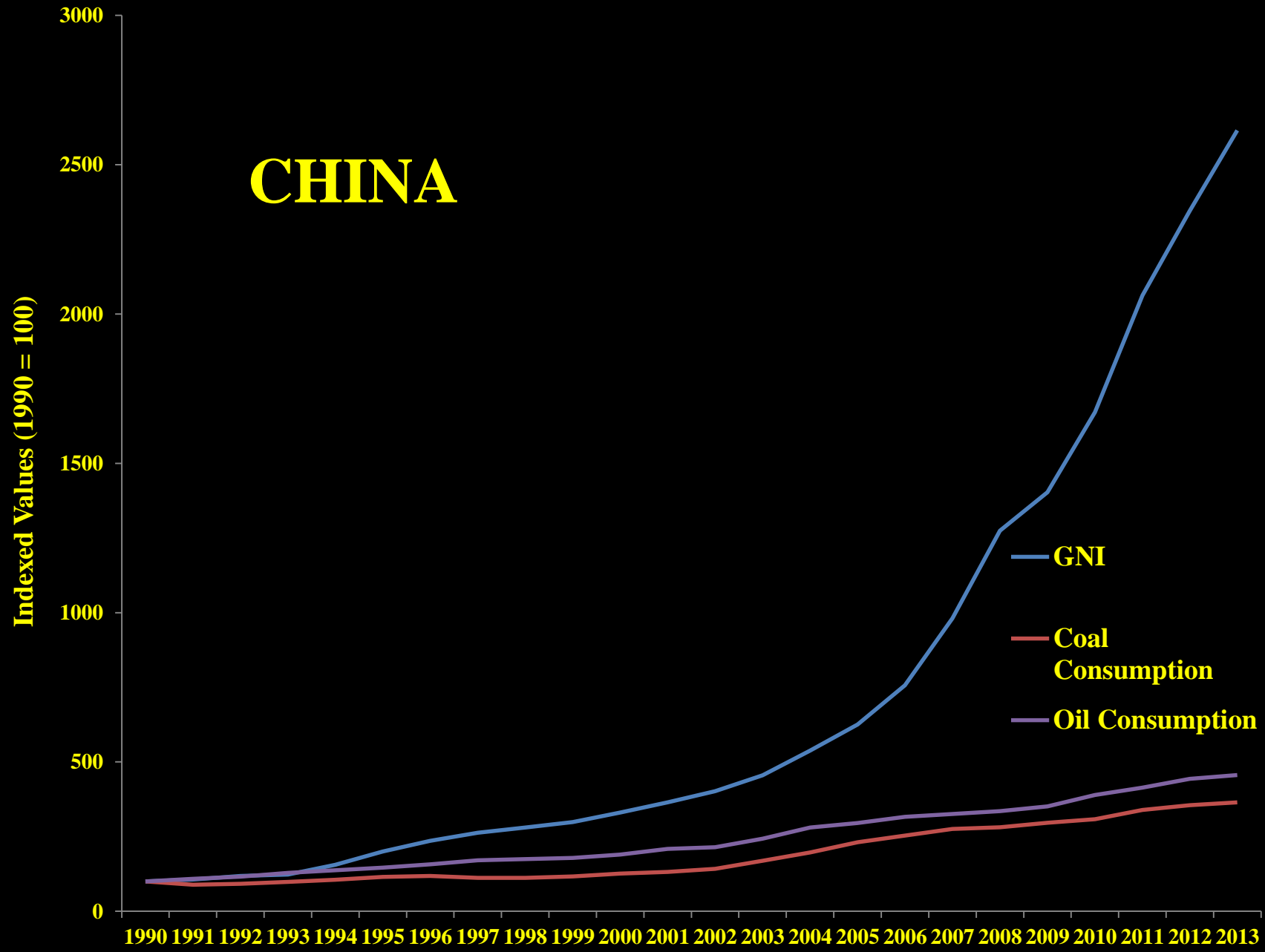


INDIA



EKC suggests
a minimum GDP
before envtal priority

CHINA



It is not fast enough...

1. High efficiency using smart technology and urban design
2. Solar and wind with storage replacing all carbon-based power
3. Electrifying everything
...households, industry and transport
4. Agriculture and forestry being carbon positive
5. Cities and Regions being carbon positive....

UNIVERSITY OF
EXETER

IPCC Special Report on 1.5°C Global Warming

Second Lead Author Meeting
Exeter, United Kingdom

5-9 June 2017




Met Office

ipcc
INTERGOVERNMENTAL PANEL ON
climate change



Disruptive Innovation is when growth follows *demand* rather than supply costs and grows super exponentially....

The disruptive innovations driving our power and transport systems...

2010 to 2016....according to IRENA

1. Solar grew by 66%
2. Wind grew by 30%
3. Batteries grew by 50%

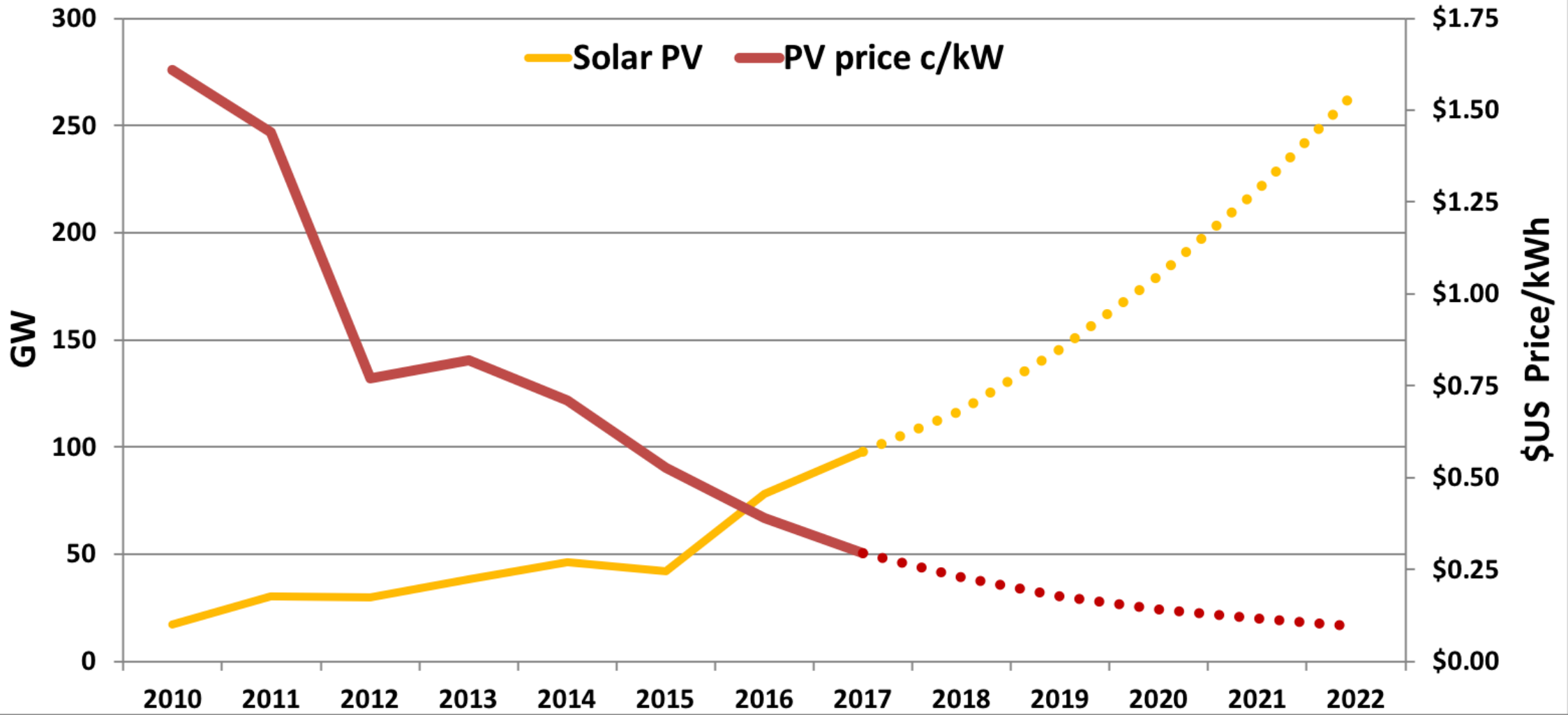
And the annual rates keep going up...

NEXT LOOKS LIKE Electric Vehicles....

Solar growth as cost drops— mass production China

Global cumulative solar & price

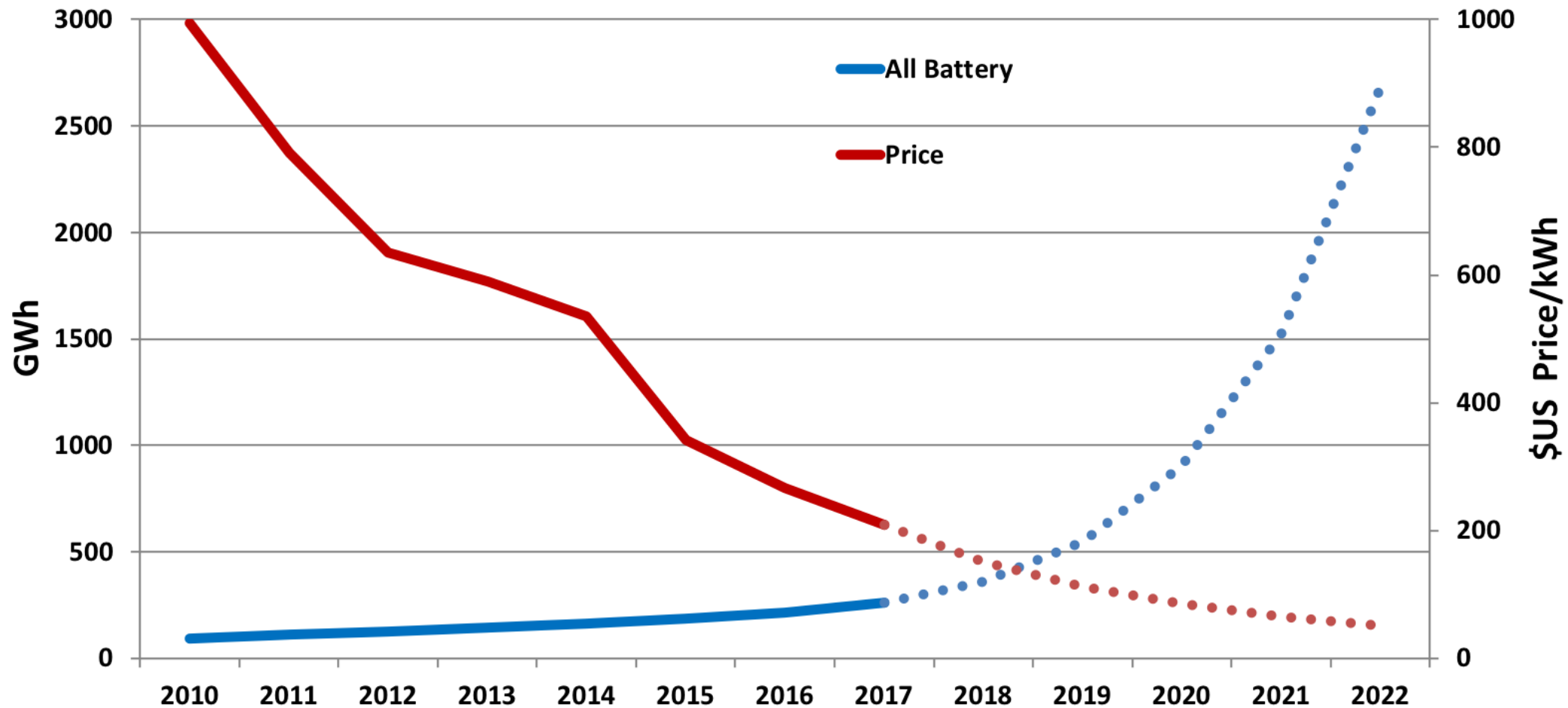
2010-2017 market data; @FSS_Au @ProfRayWills forecast av. 28% annual price decline 11Feb18



Battery growth as cost drops....

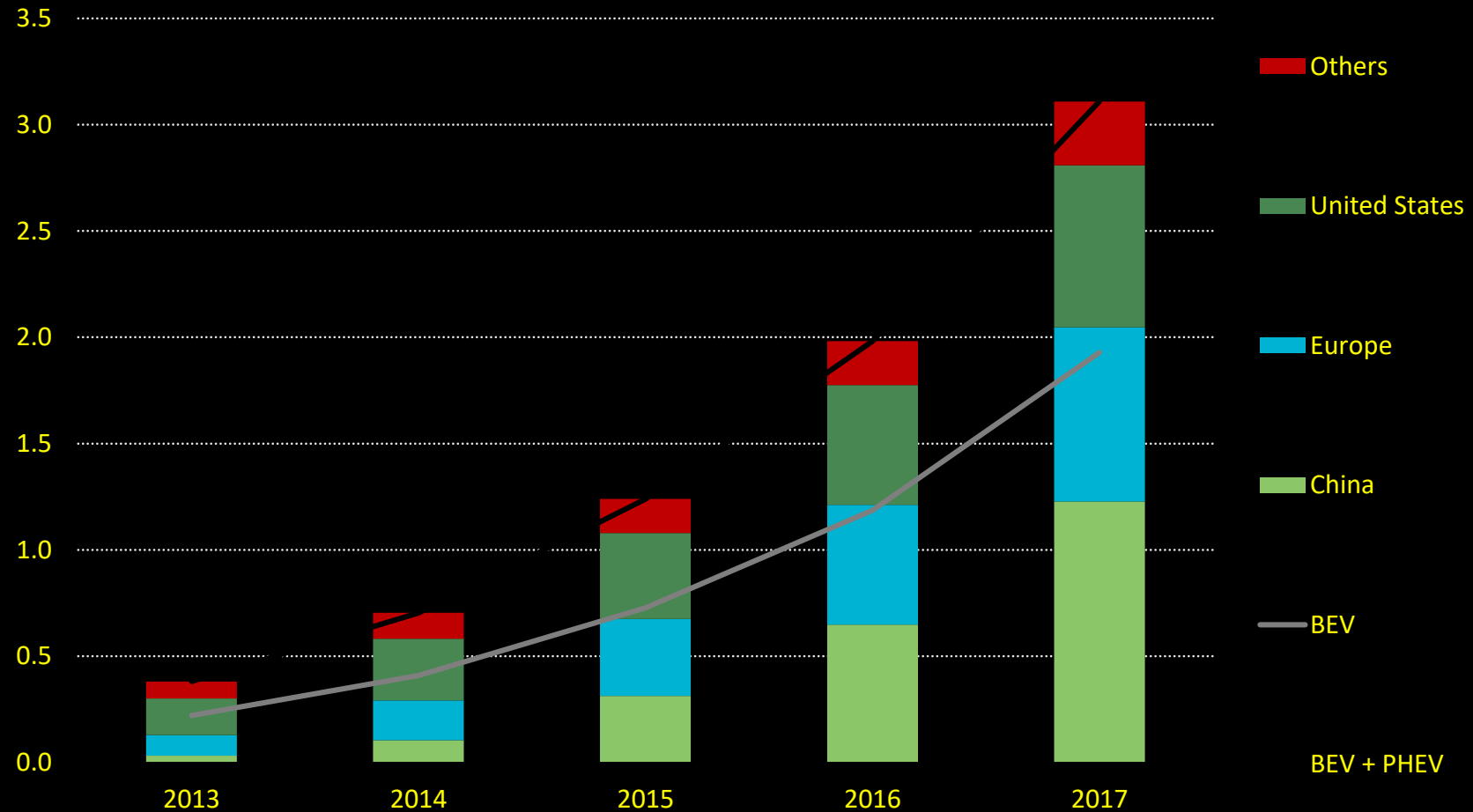
Global cumulative all batteries (EVs + storage) & price

2010-2016 market data; @FSS_Au @ProfRayWills forecast av. 28% annual price decline Update 14Feb18



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

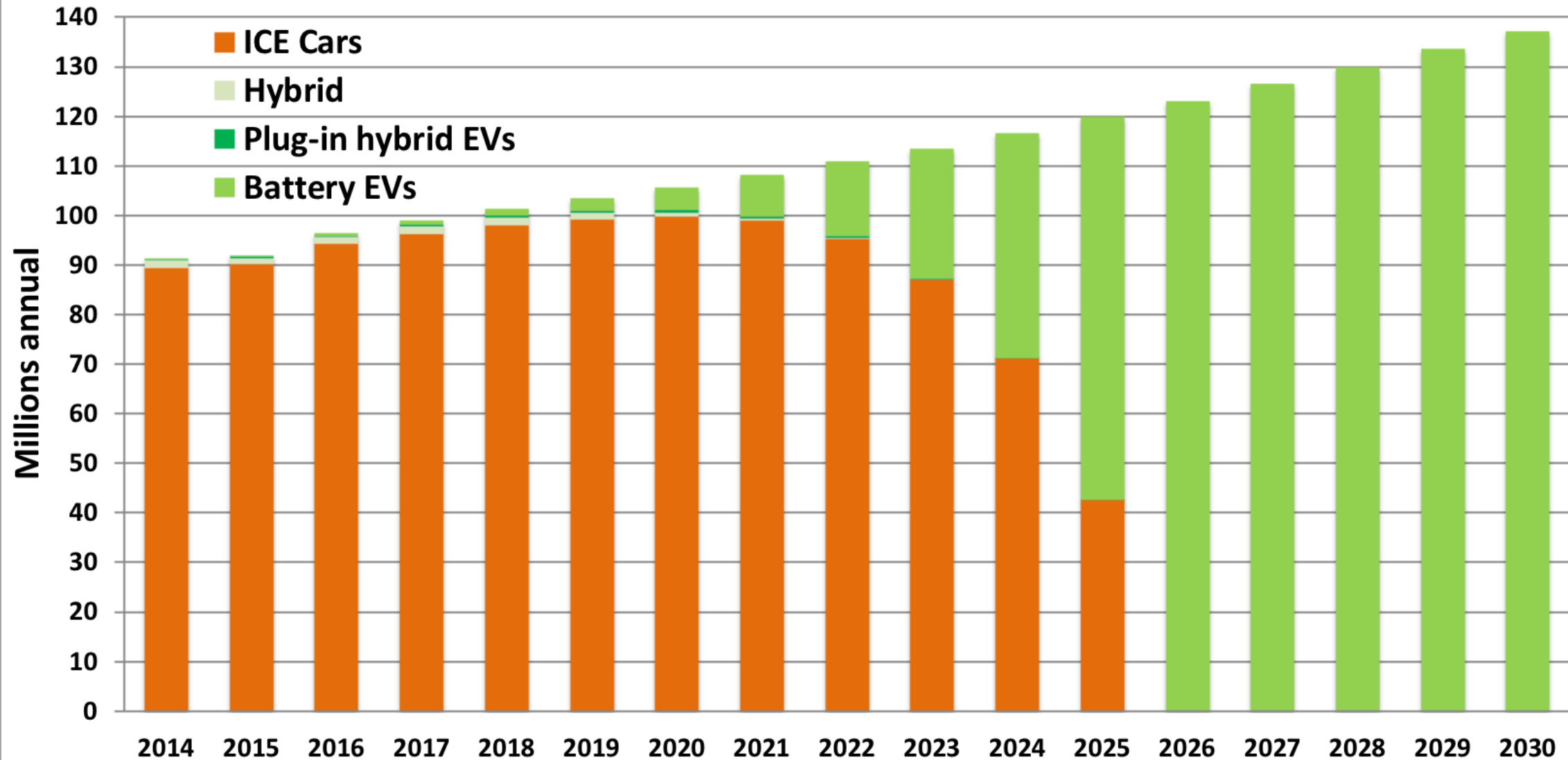
Honda Zero Carbon Home



Growth in Electric Vehicles

Transition to EVs - global vehicle annual sales to 2016 and projected to 2030

Car data OICA; EV data 2014-2016 @InsideEVs & @IEA Chart & projection @FSS_Au @ProfRayWills updated 11Feb18



Electrification of all kinds of transport is underway...

The CHALLENGE is for AVIATION and SHIPPING....

250 m electric bikes in China

Autonomous electric shuttles

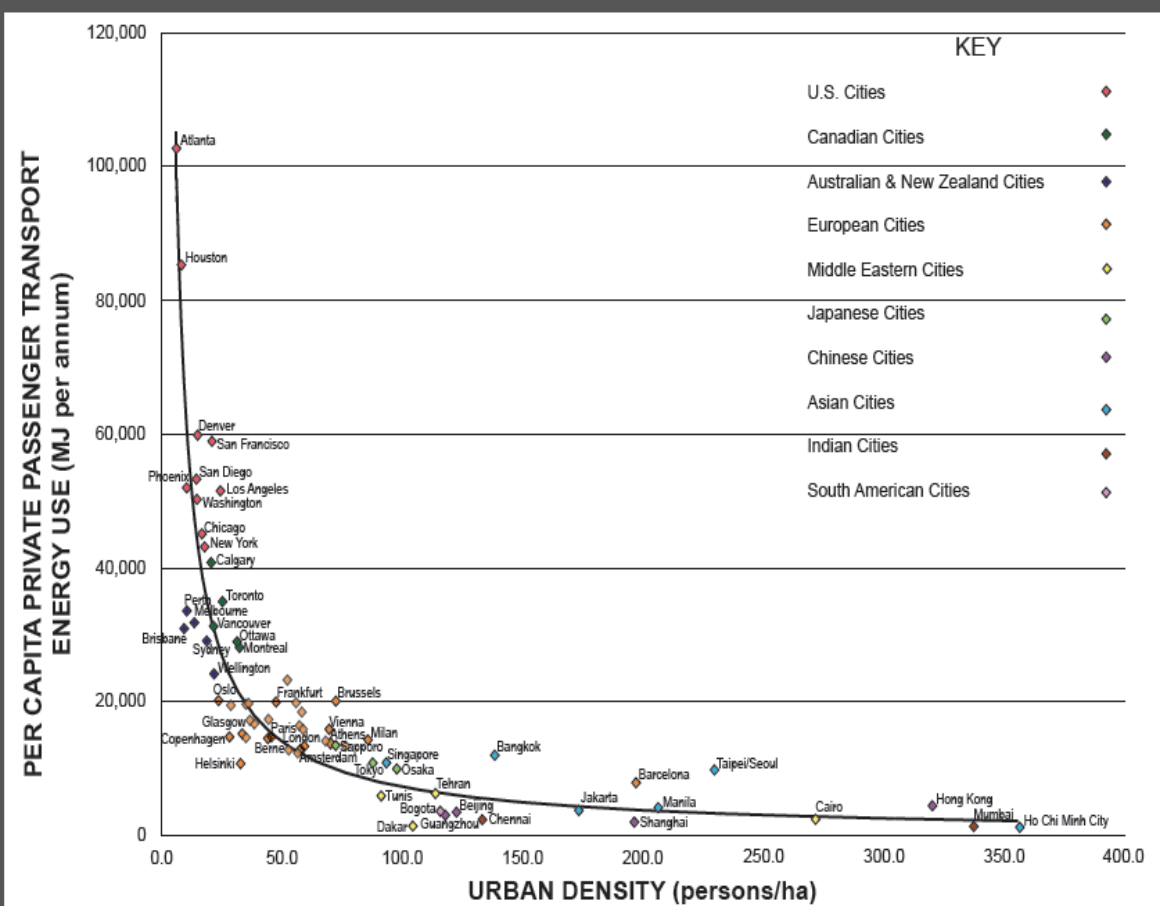
The laggard...



www.shutterstock.com · 335388089



Electric trains! A personal and academic journey...for 40 years this January



Now we are in the era of PEAK CAR...
due to TIME and SPACE

2015

1989

2009

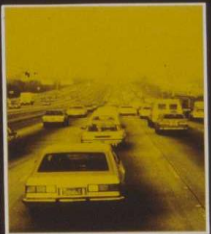
PETER NEWMAN *and* JEFFREY KENWORTHY

THE END of AUTOMOBILE DEPENDENCE

*How Cities are Moving
Beyond Car-Based Planning*



CITIES AND AUTOMOBILE DEPENDENCE



AN INTERNATIONAL SOURCEBOOK

PETER NEWMAN
JEFFREY KENWORTHY

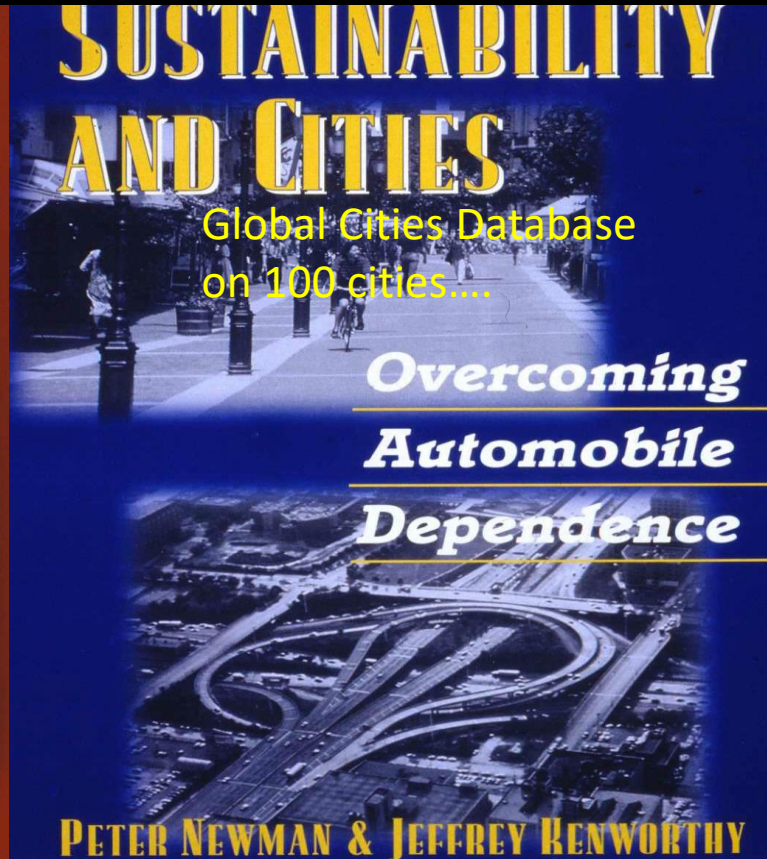


SUSTAINABILITY AND CITIES

Global Cities Database
on 100 cities....

*Overcoming
Automobile
Dependence*

PETER NEWMAN & JEFFREY KENWORTHY



TIME: Rail outstripping traffic speeds...

| COMPARATIVE SPEEDS IN GLOBAL CITIES | 1960 | 1970 | 1980 | 1990 | 1995 | 2005 |
|---|-------------|-------------|-------------|-------------|-------------|-------------|
| Ratio of overall public transport system speed to road speed | | | | | | |
| American cities | 0.46 | 0.48 | 0.55 | 0.50 | 0.55 | 0.54 |
| Canadian cities | 0.54 | 0.54 | 0.52 | 0.58 | 0.56 | 0.55 |
| Australian cities | 0.56 | 0.56 | 0.63 | 0.64 | 0.75 | 0.75 |
| European cities | 0.72 | 0.70 | 0.82 | 0.91 | 0.81 | 0.90 |
| Asian cities | - | 0.77 | 0.84 | 0.79 | 0.86 | 0.86 |
| Global average for all cities | 0.55 | 0.58 | 0.66 | 0.66 | 0.71 | 0.70 |
| | | | | | | |
| Ratio of metro/suburban rail speed to road speed | | | | | | |
| American cities | - | 0.93 | 0.99 | 0.89 | 0.96 | 0.95 |
| Canadian cities | - | - | 0.73 | 0.92 | 0.85 | 0.89 |
| Australian cities | 0.72 | 0.68 | 0.89 | 0.81 | 1.06 | 1.08 |
| European cities | 1.07 | 0.80 | 1.22 | 1.25 | 1.15 | 1.28 |
| Asian cities | - | 1.40 | 1.53 | 1.60 | 1.54 | 1.52 |
| Global average for all cities | 0.88 | 1.05 | 1.07 | 1.11 | 1.12 | 1.13 |

SPACE



240 Persons travel
to work:

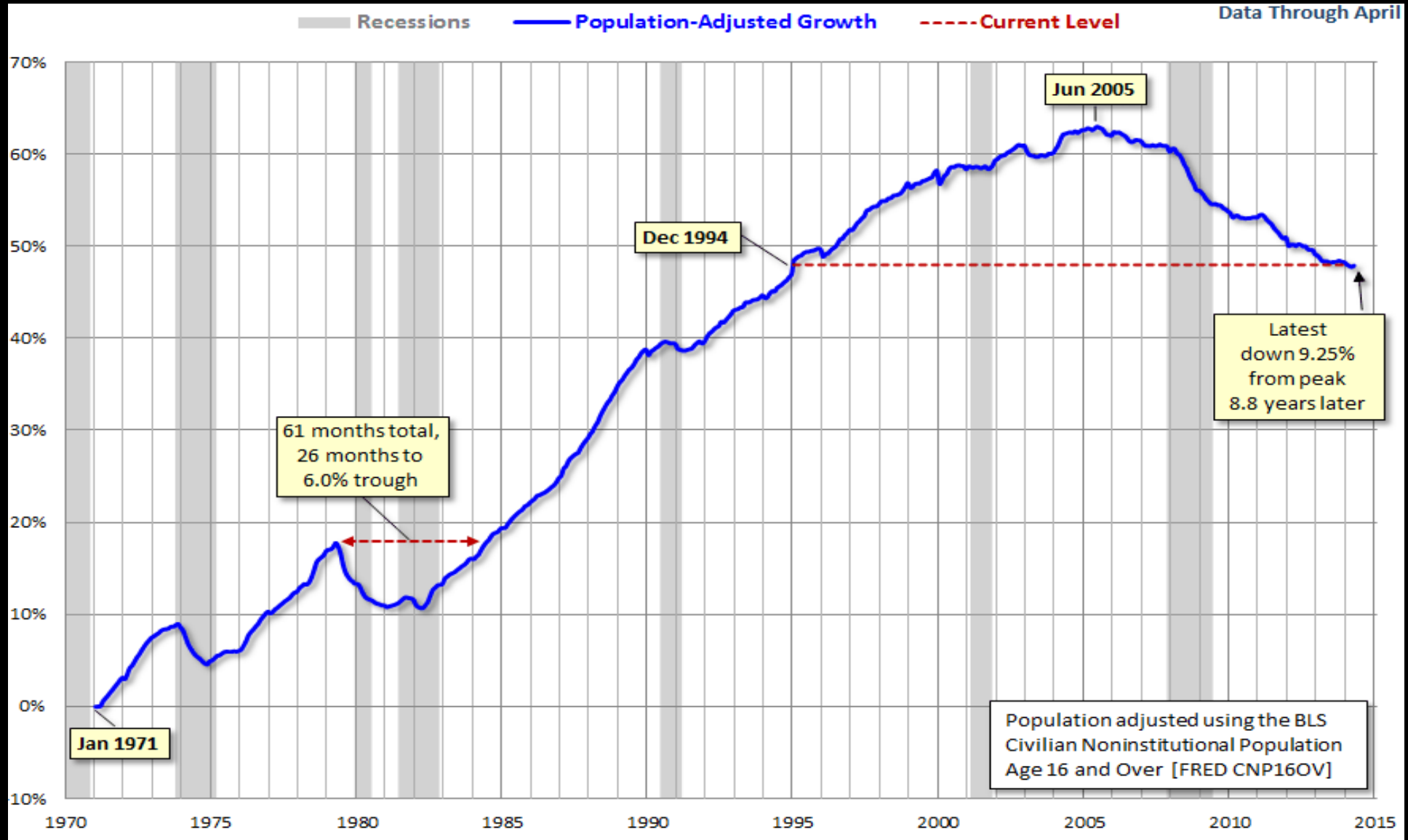
-- in 177 Cars

-- in 3 Busses

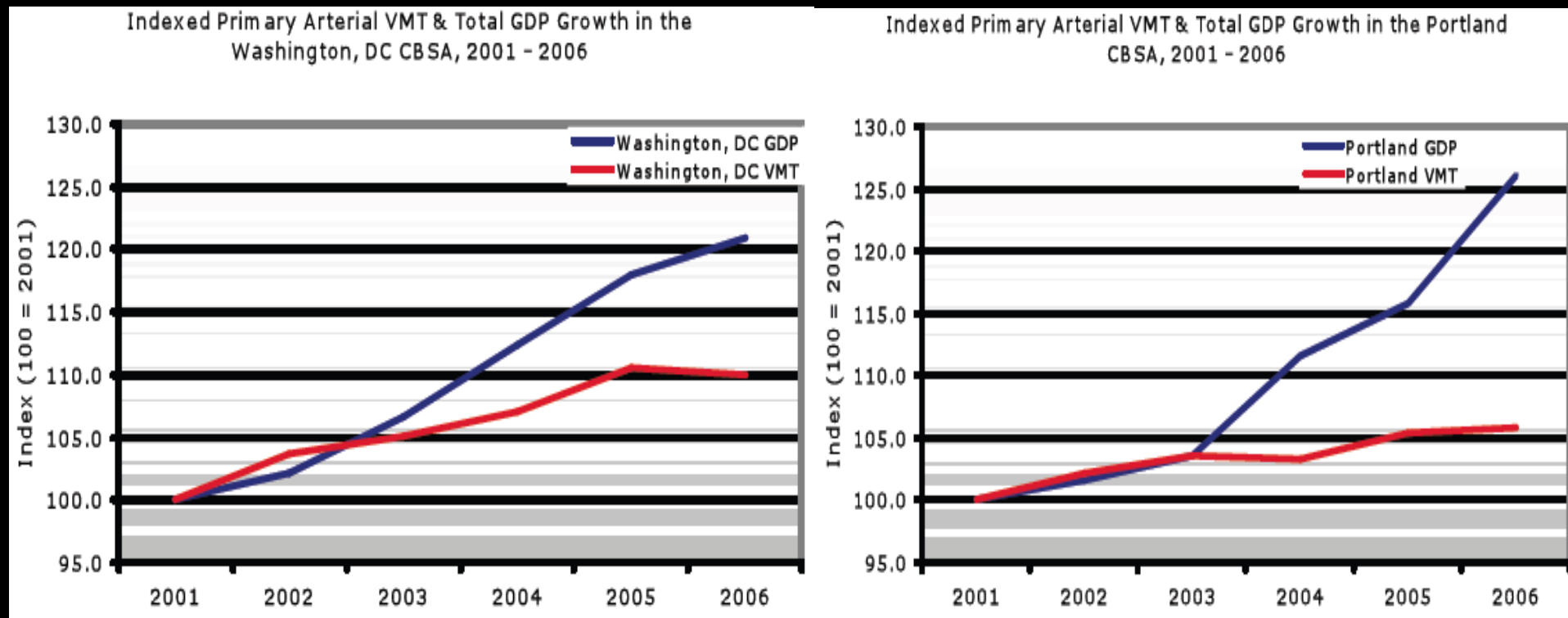
-- in 1 Tram



THE USA IS DRIVING LESS



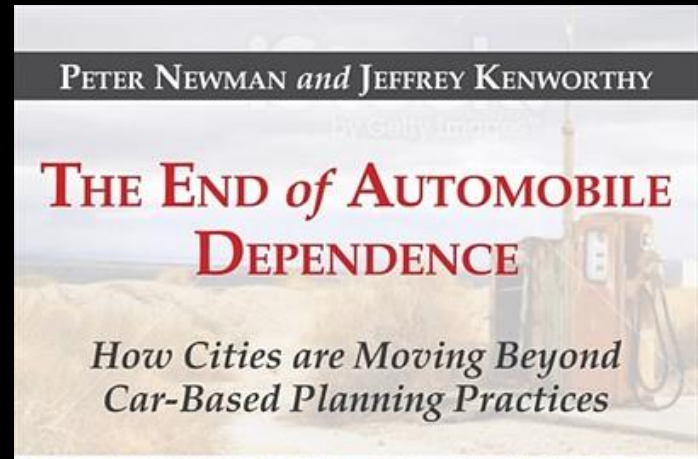
Decoupling of car use from GDP most of all in the cities with rail investment, eg Washington DC and Portland



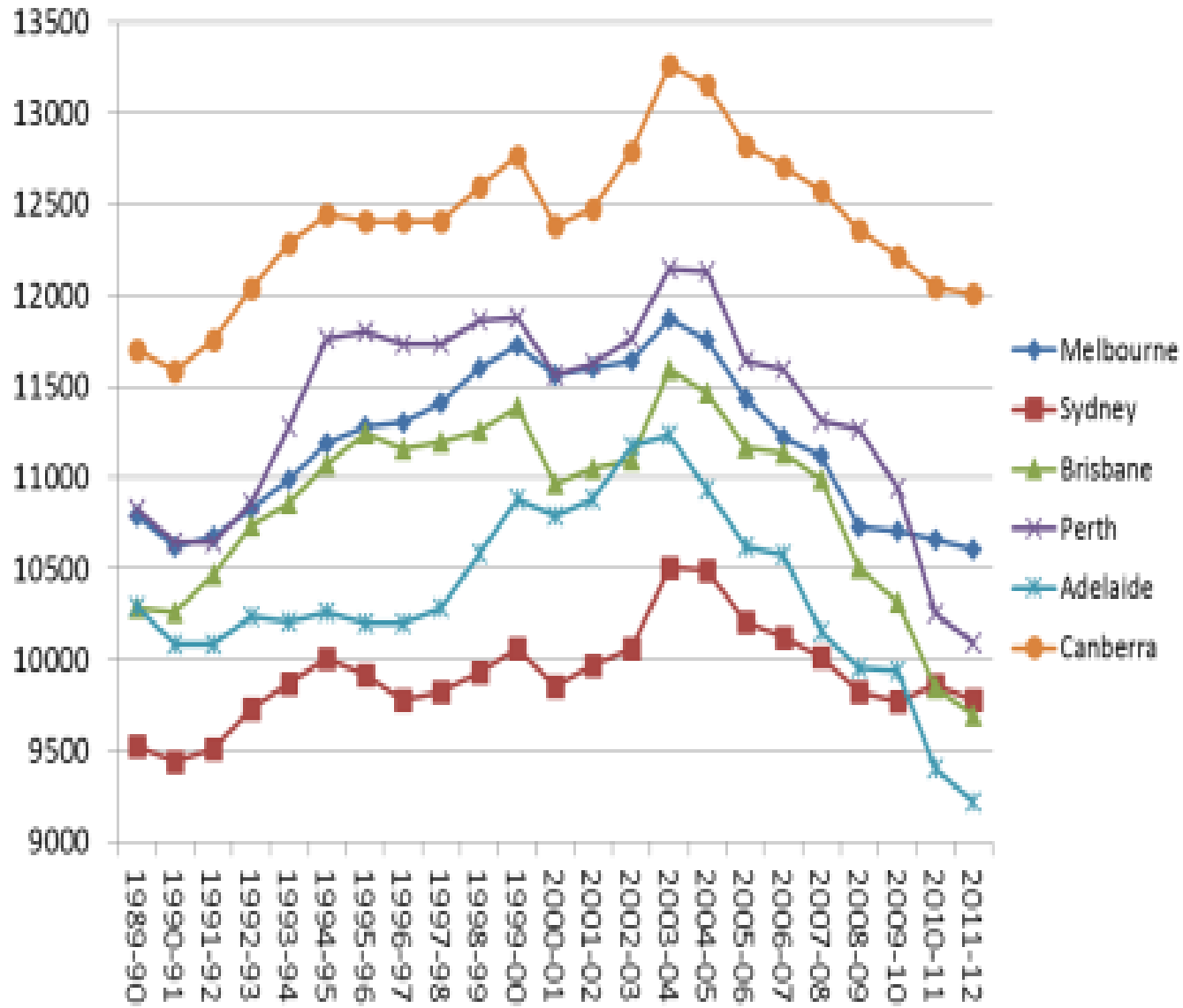
Trains not Roads - for the economy



The top 6 most walkable cities in the US have 38% higher GDP



AUSTRALIA IS DRIVING LESS and investing in TRAINS



What about China....?

Modal split of daily trips by different transport modes (%)

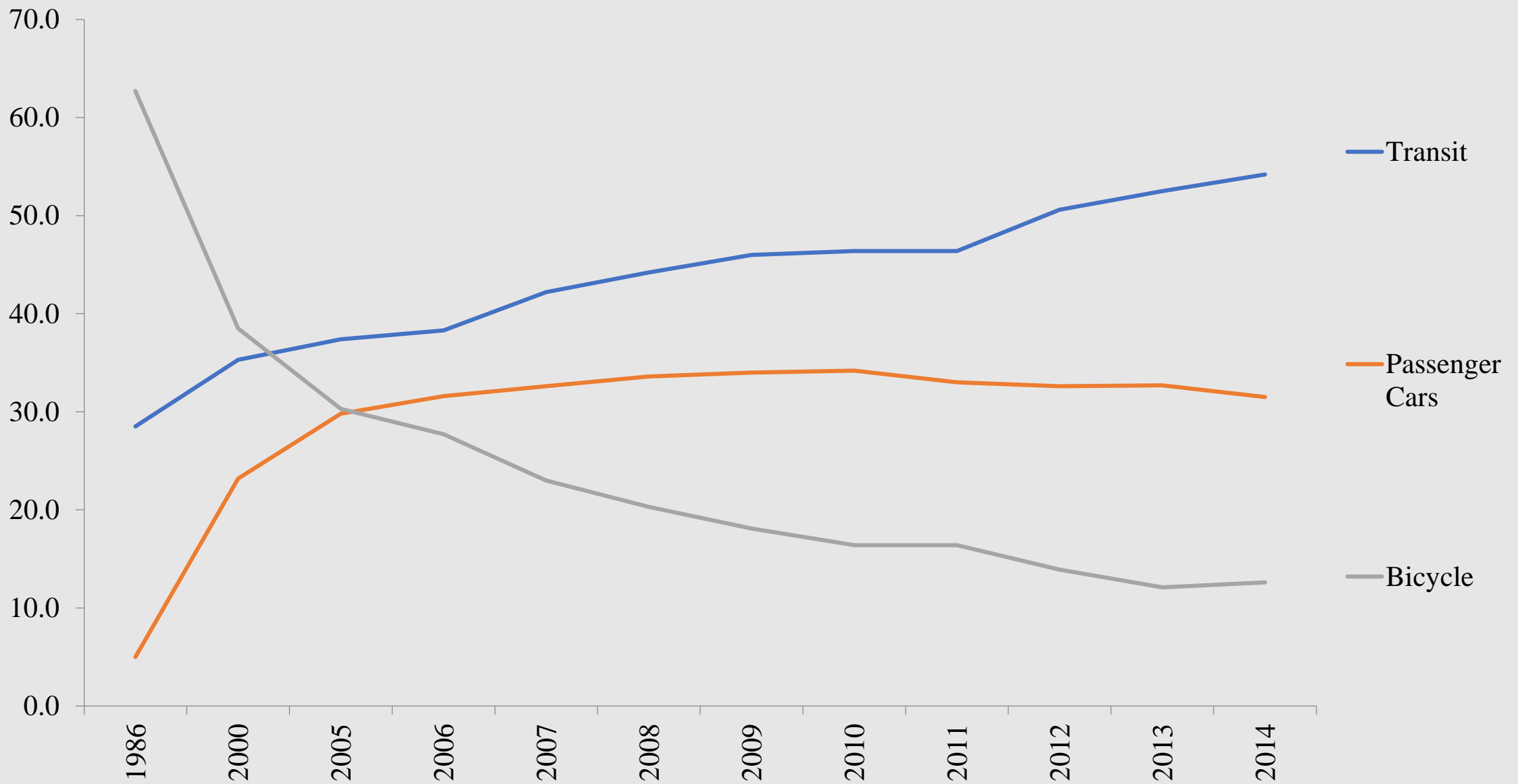


Figure Modal Split of Daily Trips (excluding walking) in Beijing (%)

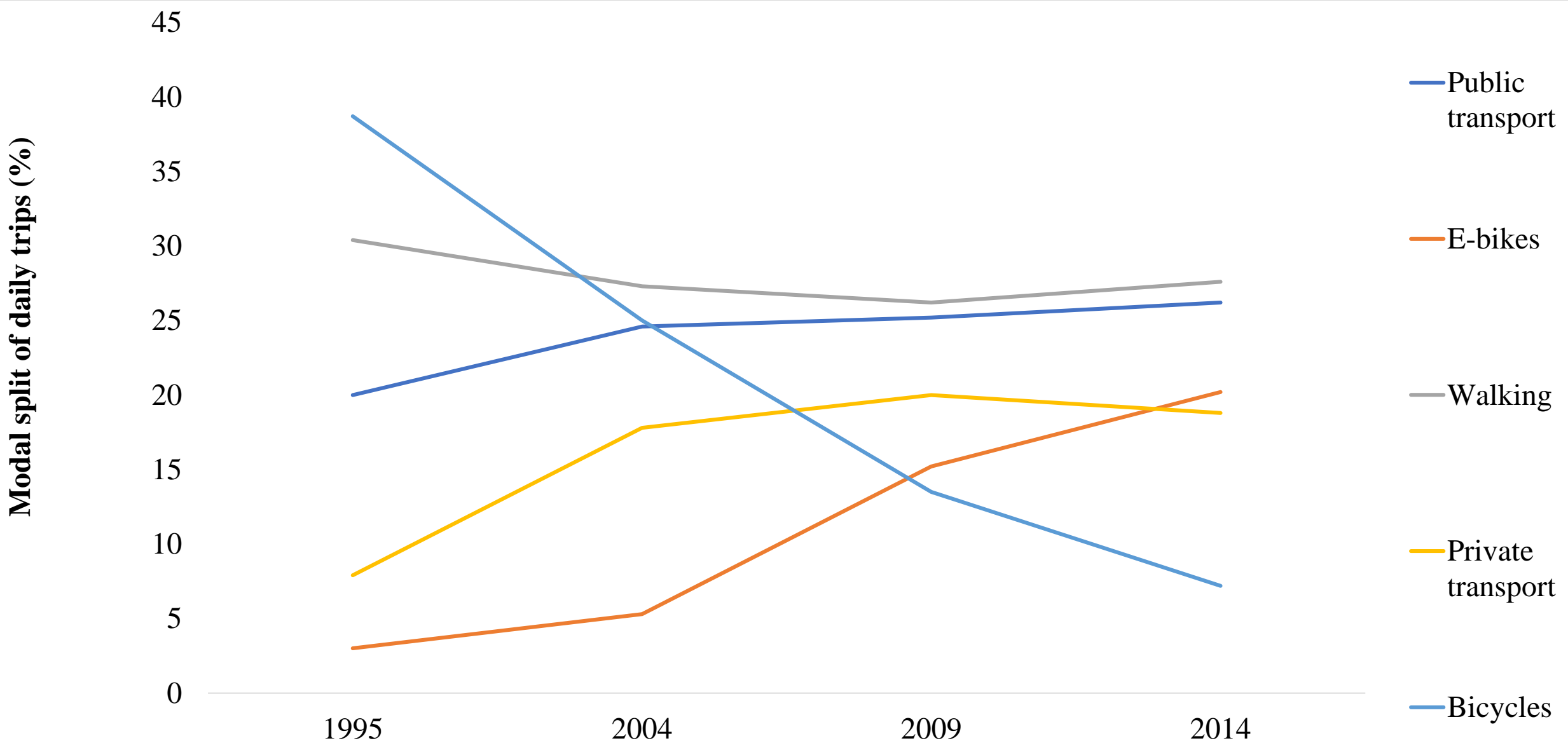


Figure Modal split of daily trips in Shanghai from 1995 to 2014

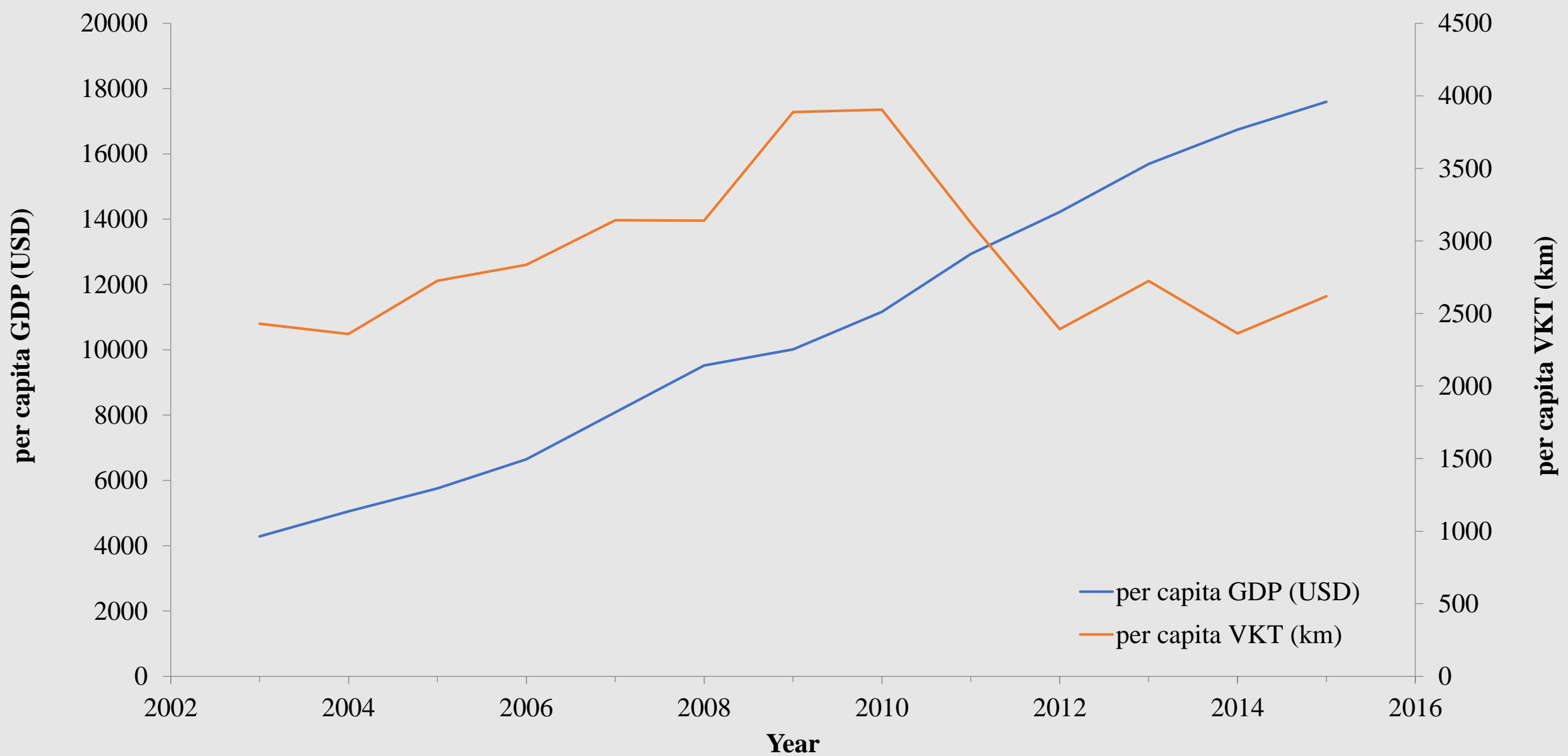


Figure Relationships between economic performance (USD) and private automobile use (km) in Beijing from 1986 to 2014

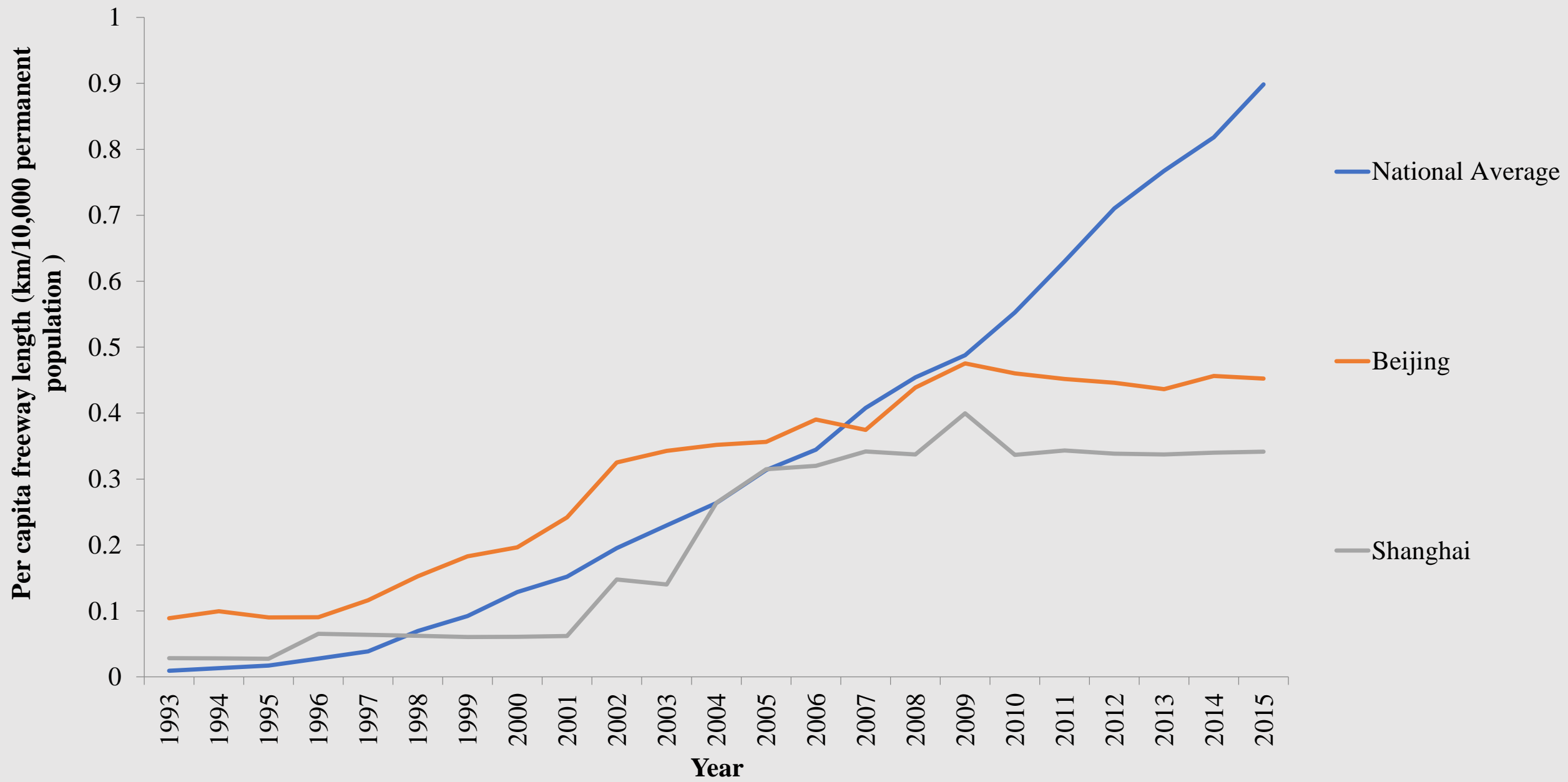


Figure Per capita freeway length (km/10,000 permanent population)

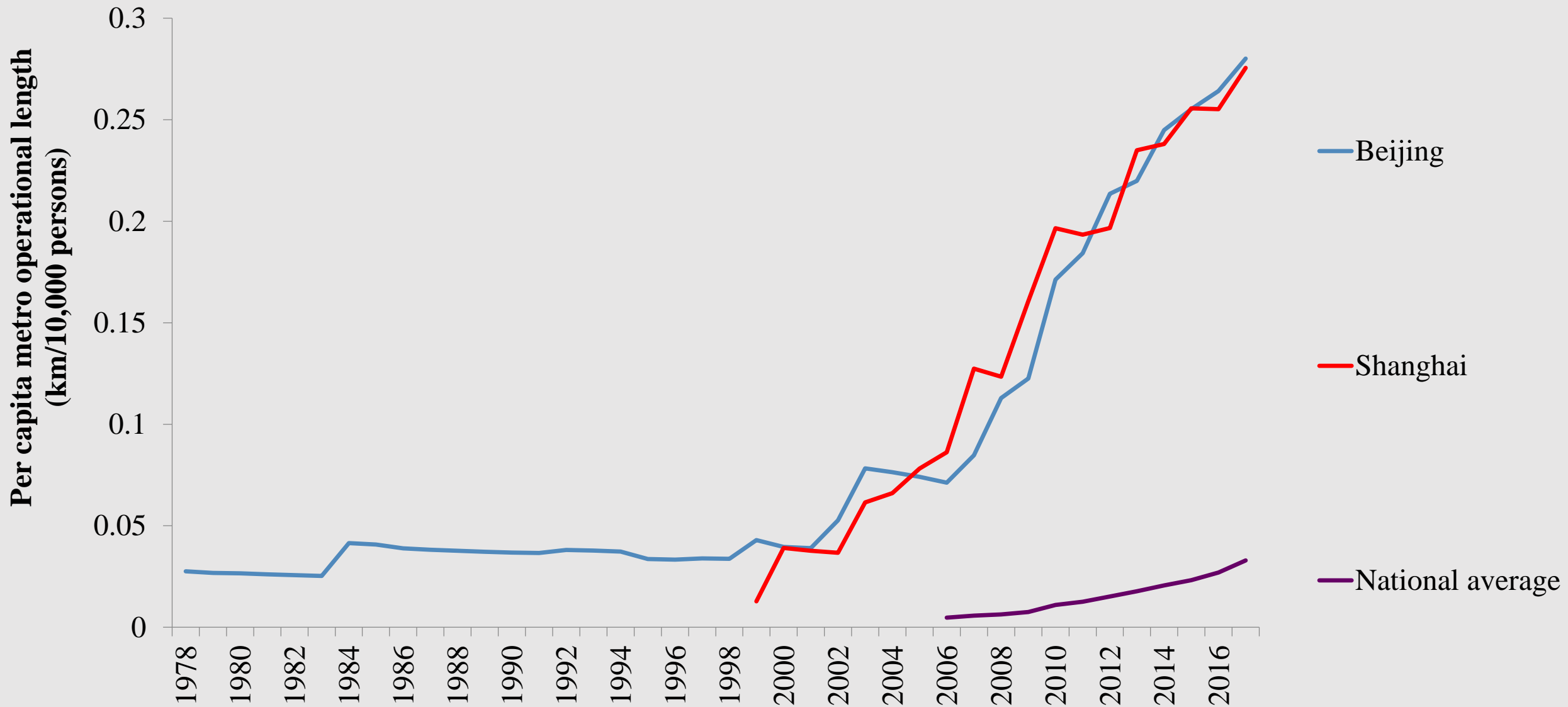
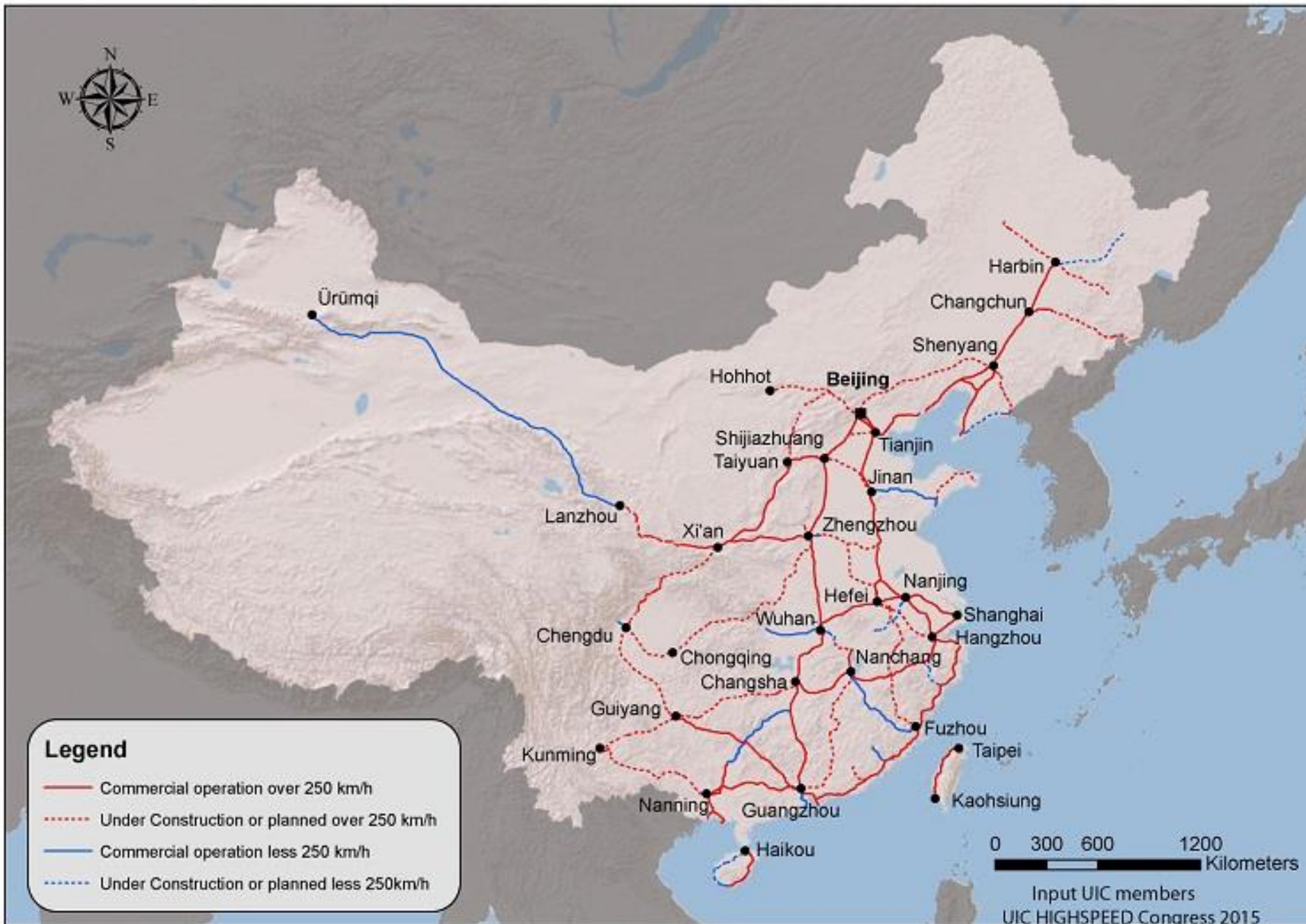


Figure Comparison of per capita metro operational length in Beijing, Shanghai and national average (km/10,000 persons)



HSR map in China

WHAT IS NEXT? THE TRACKLESS TRAM.....

Electric. 70 kph. 300-500 people capacity



TRACKLESS TRAM in ZhuZhou

No steel tracks

BUT

Optically guided tracks
by GPS, LIDAR and
sensors following white
line

Autonomous transit technology is being transferred from HSR to buses for rapid shared mobility – this is transformative....





Footage: CRRC