

The energy challenge adopting clean tech - how quickly can the World change?

Prof Ray Wills

Director and Partner
Duda&Wills

Chief Adviser
Sustainable Energy Association of Australia

Adjunct Professor
The University of Western Australia

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Business Government Sustainability

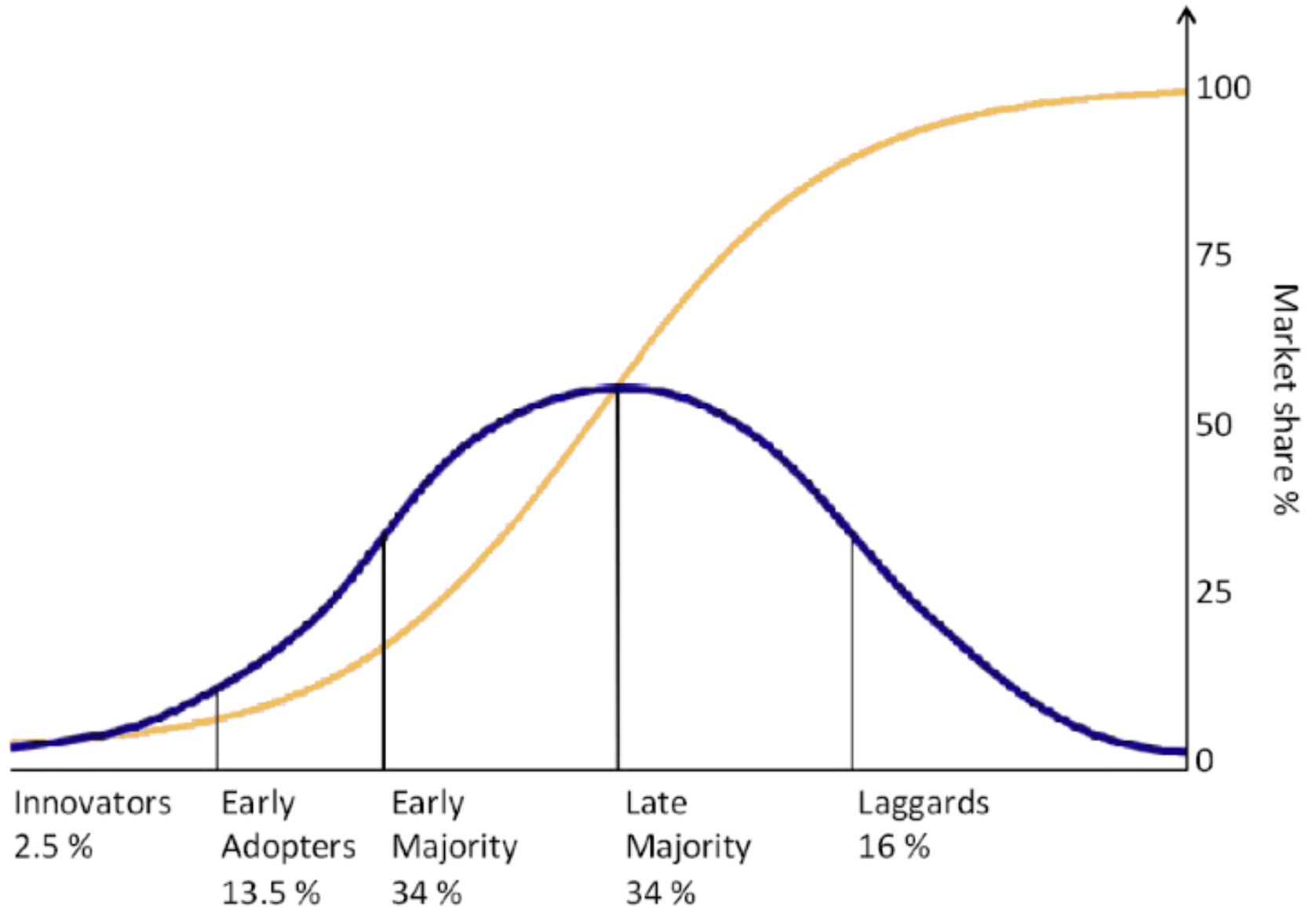
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Adoption of technology

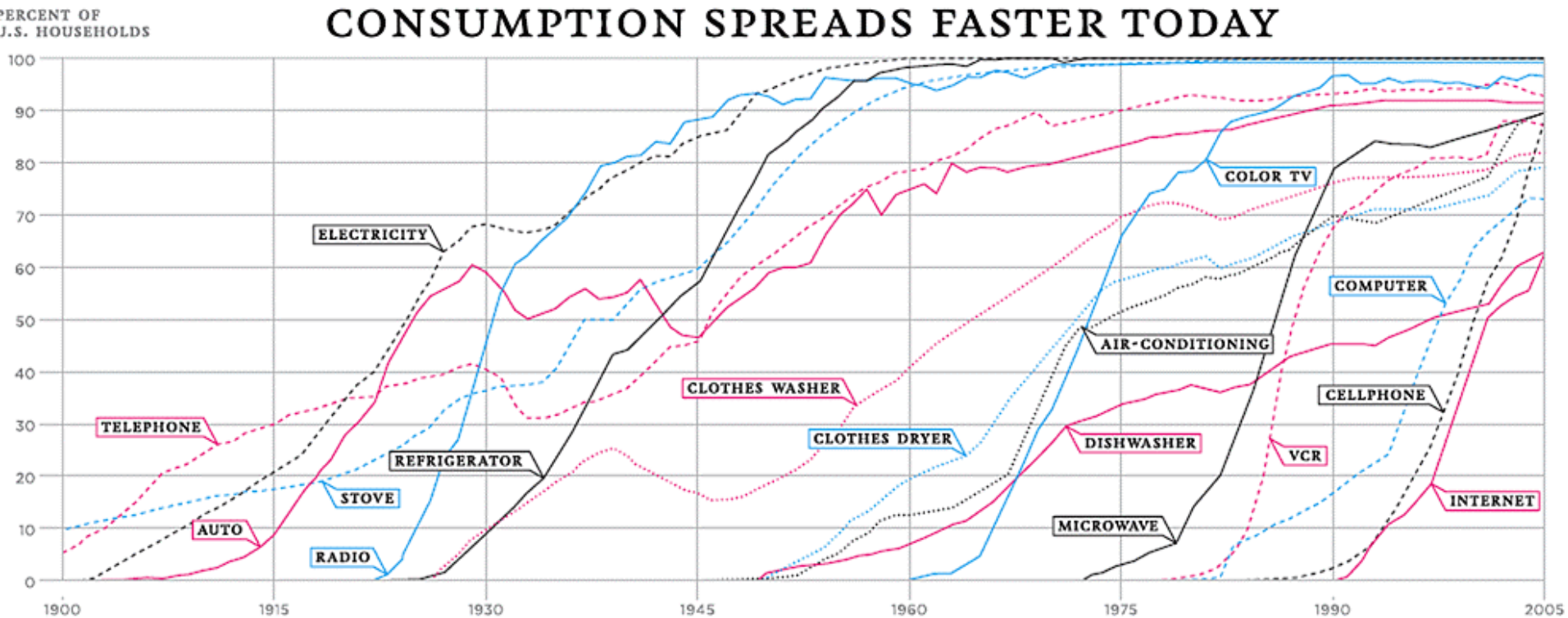
- The natural turnover and retirement of appliances, buildings and vehicles can bring about a modest penetration of sustainable energy in the next ten years.
- However, adoption of new technology is often not just 'natural'
- The transition to sustainable energy, like many new technology shifts, will be more rapid with changes favoured by:
 - policy measures and regulation;
 - consumer sentiment;
 - pricing advantage.

Roger's diffusion curve

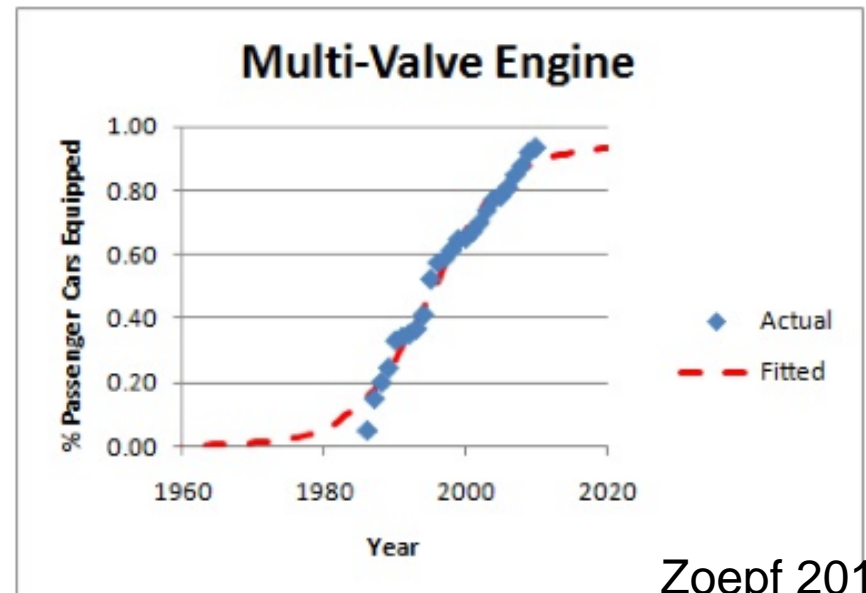
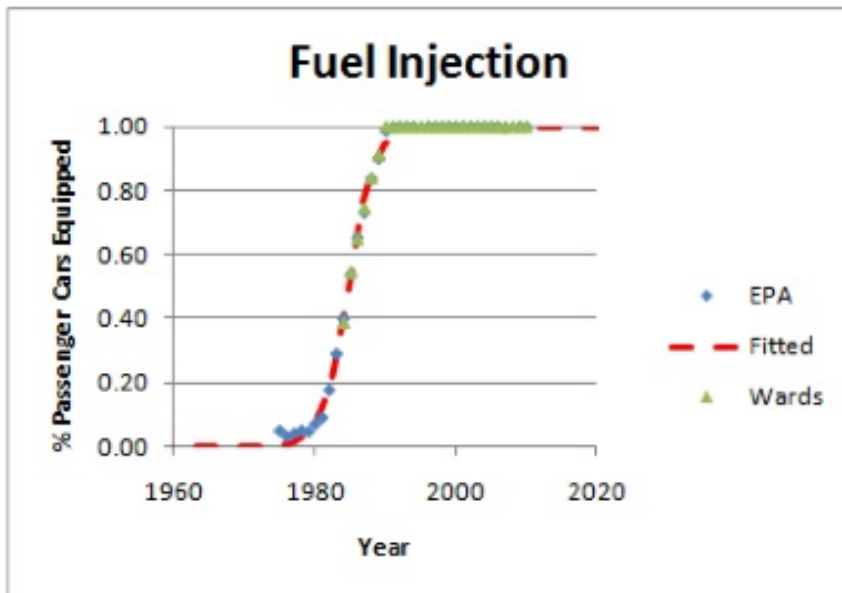
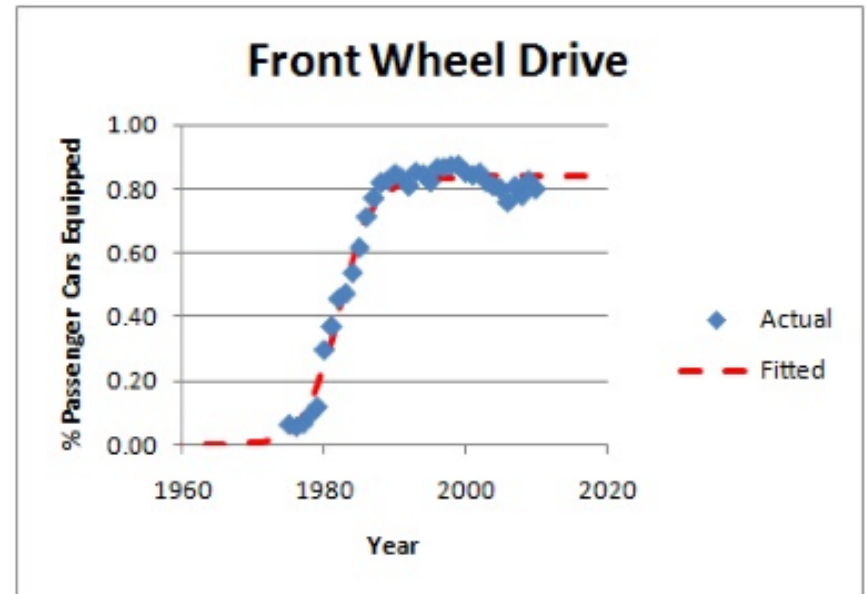
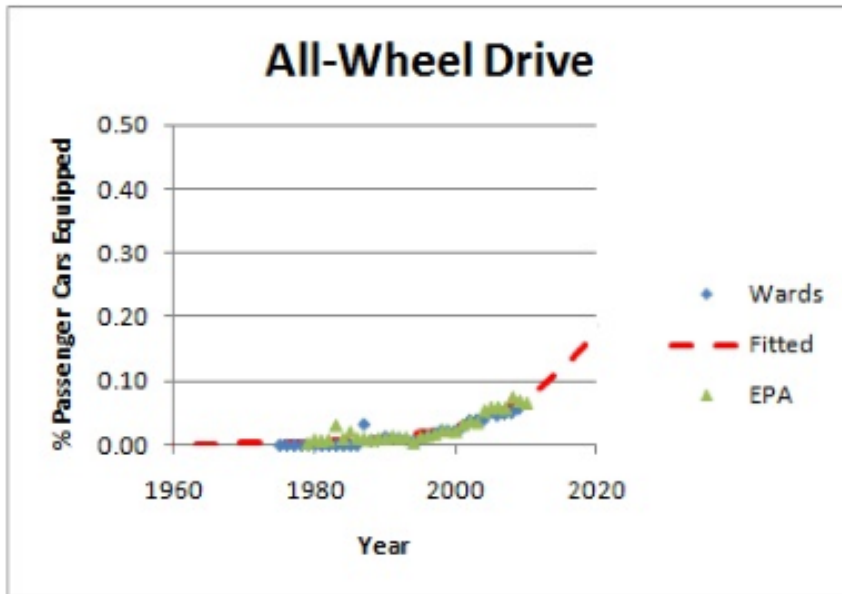


Technology adoption rates – US

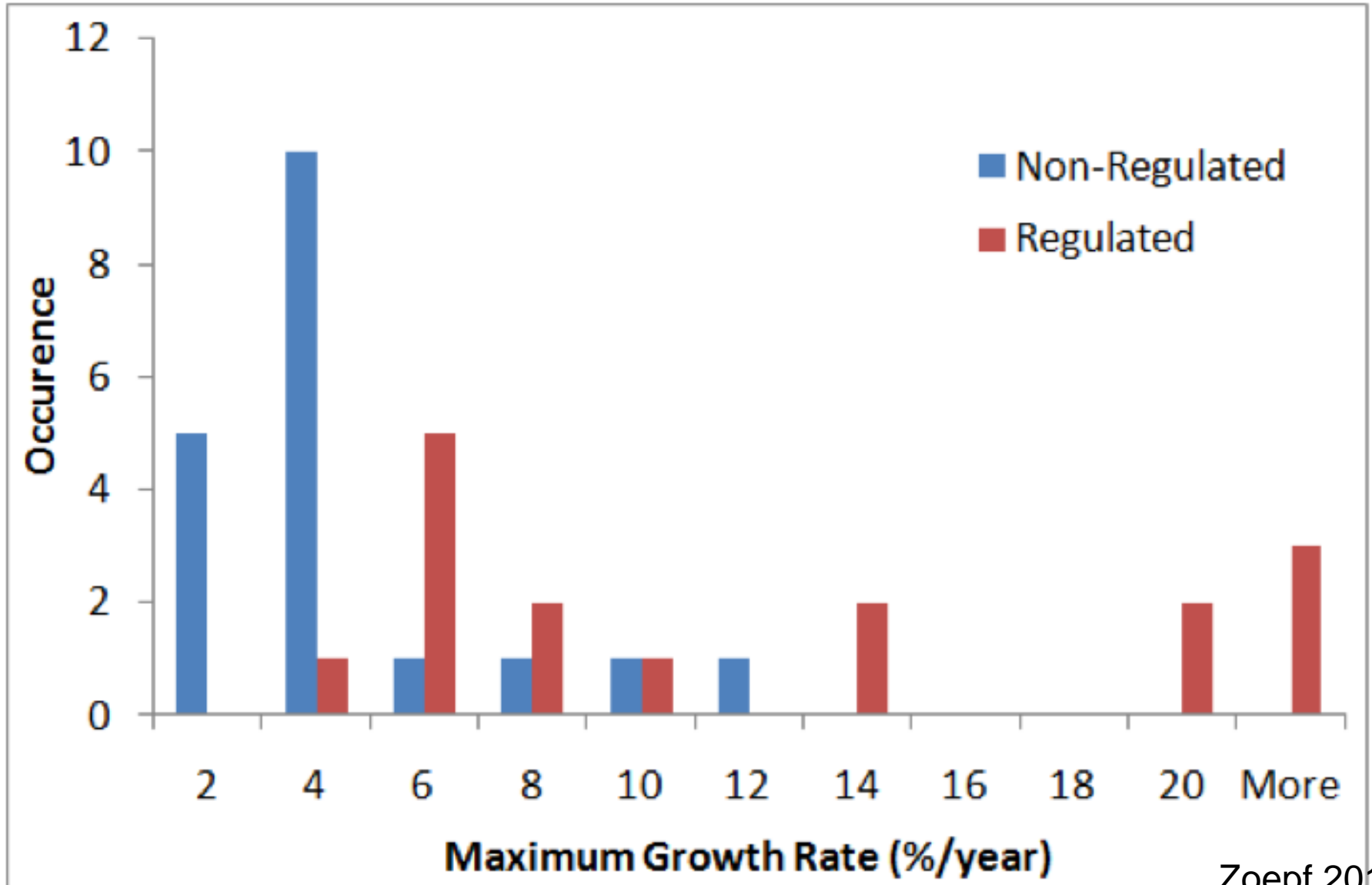
- Will electric cars be dishwashers or VCRs?



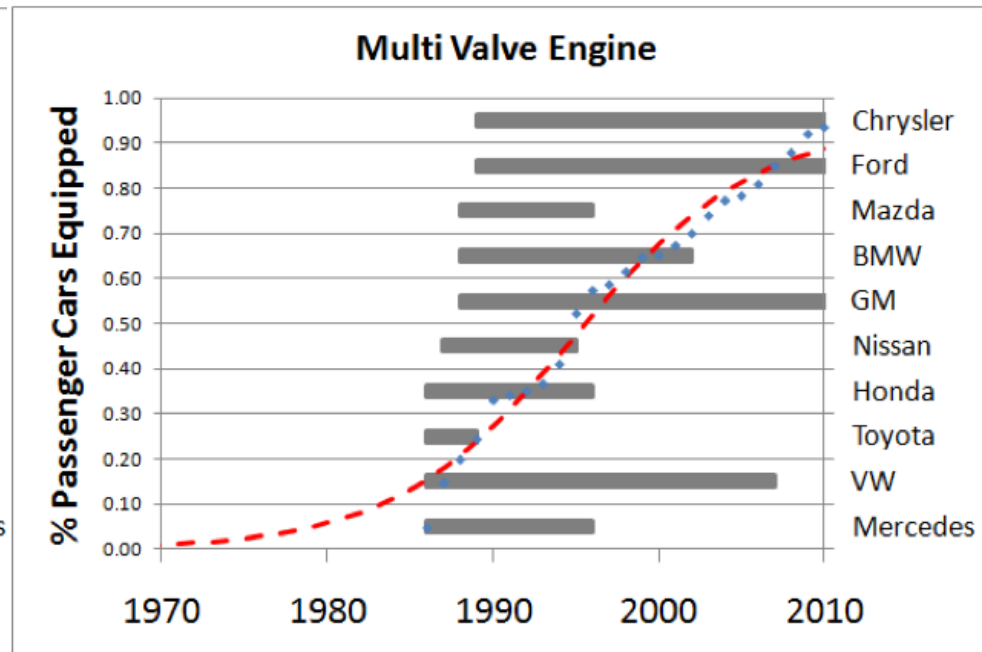
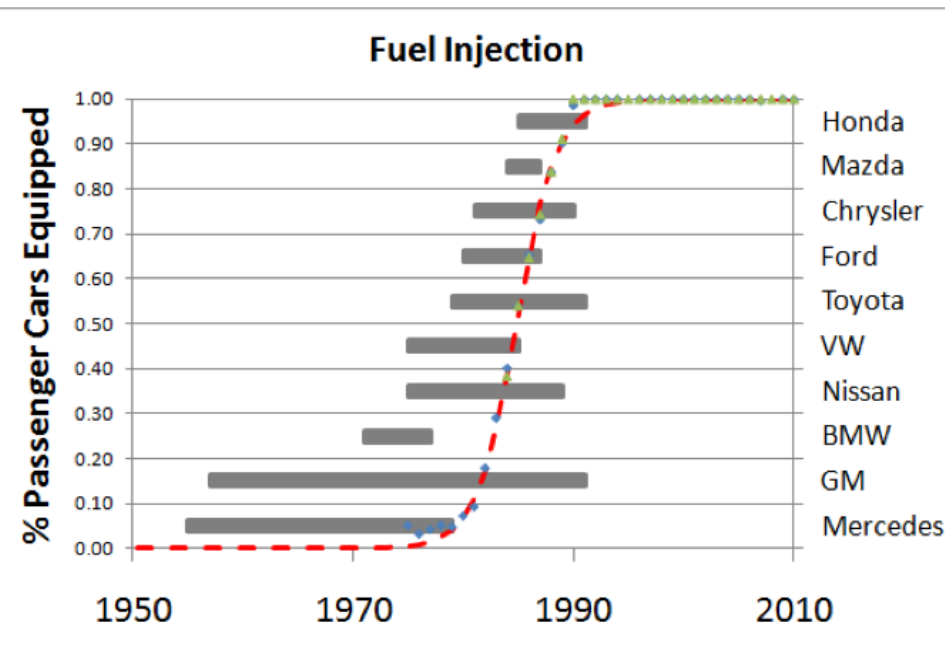
Technology adoption rates - vehicles



Technology adoption rates - vehicles



Technology adoption - manufacturers



Technology adoption rates

- Can historic deployment rates be used to describe future technologies? Expect some similarities – just faster!
- Small-scale deployment for approximately five years - exponential growth and an inflection point ten or more years after first application
- Is there an opportunity for disruptive technology entry?
- Beginnings of disruptive innovation may be in market innovations,
 - Vehicle ownership model (eg Better Place) could rapidly change the how and what is purchased
 - Roof top solar – companies may own the panels on your roof

Technology adoption rates

LIFX: The Light Bulb Reinvented

by [Phil Bosua](#)

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Technology



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days to go

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Project by
Phil Bosua

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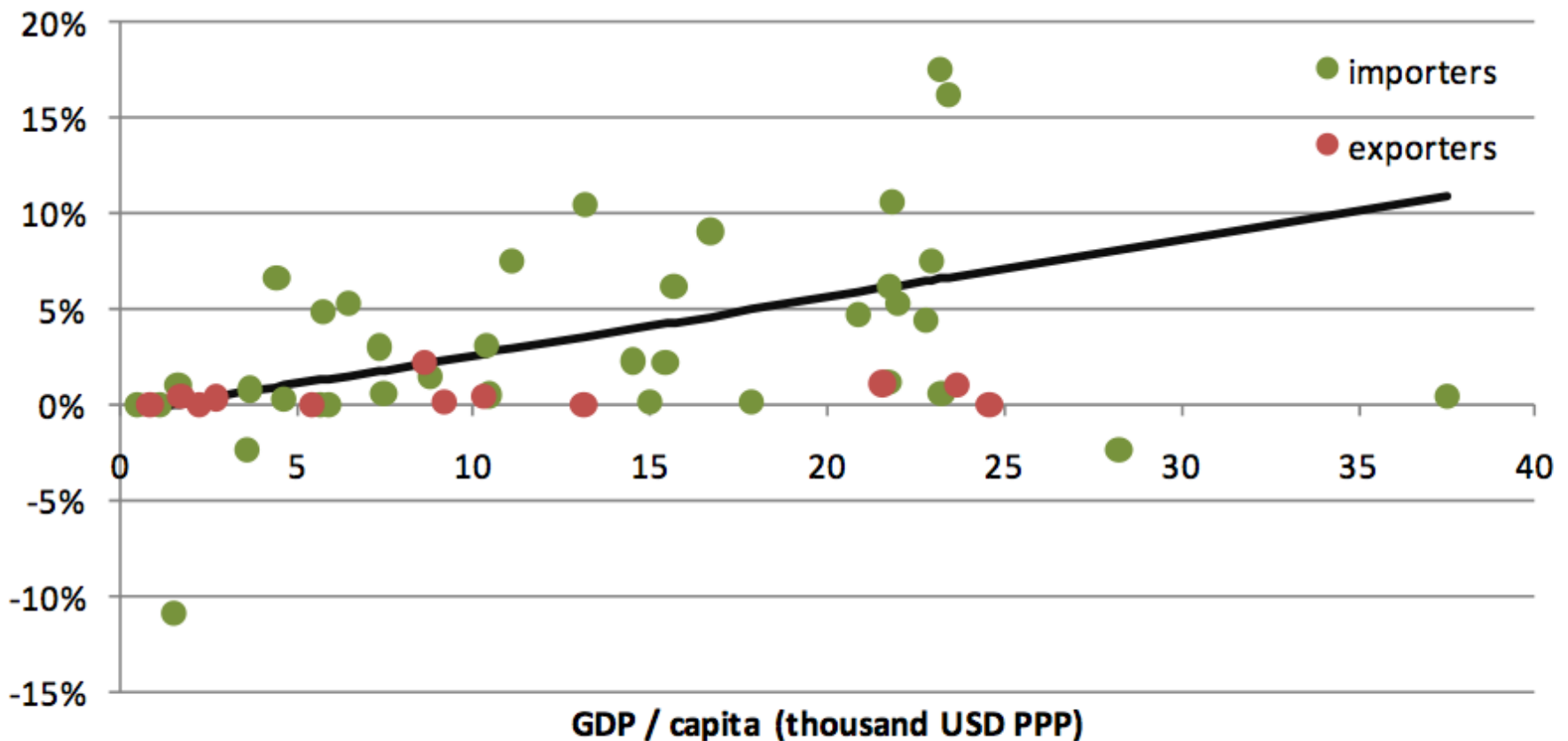
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Technology adoption rates

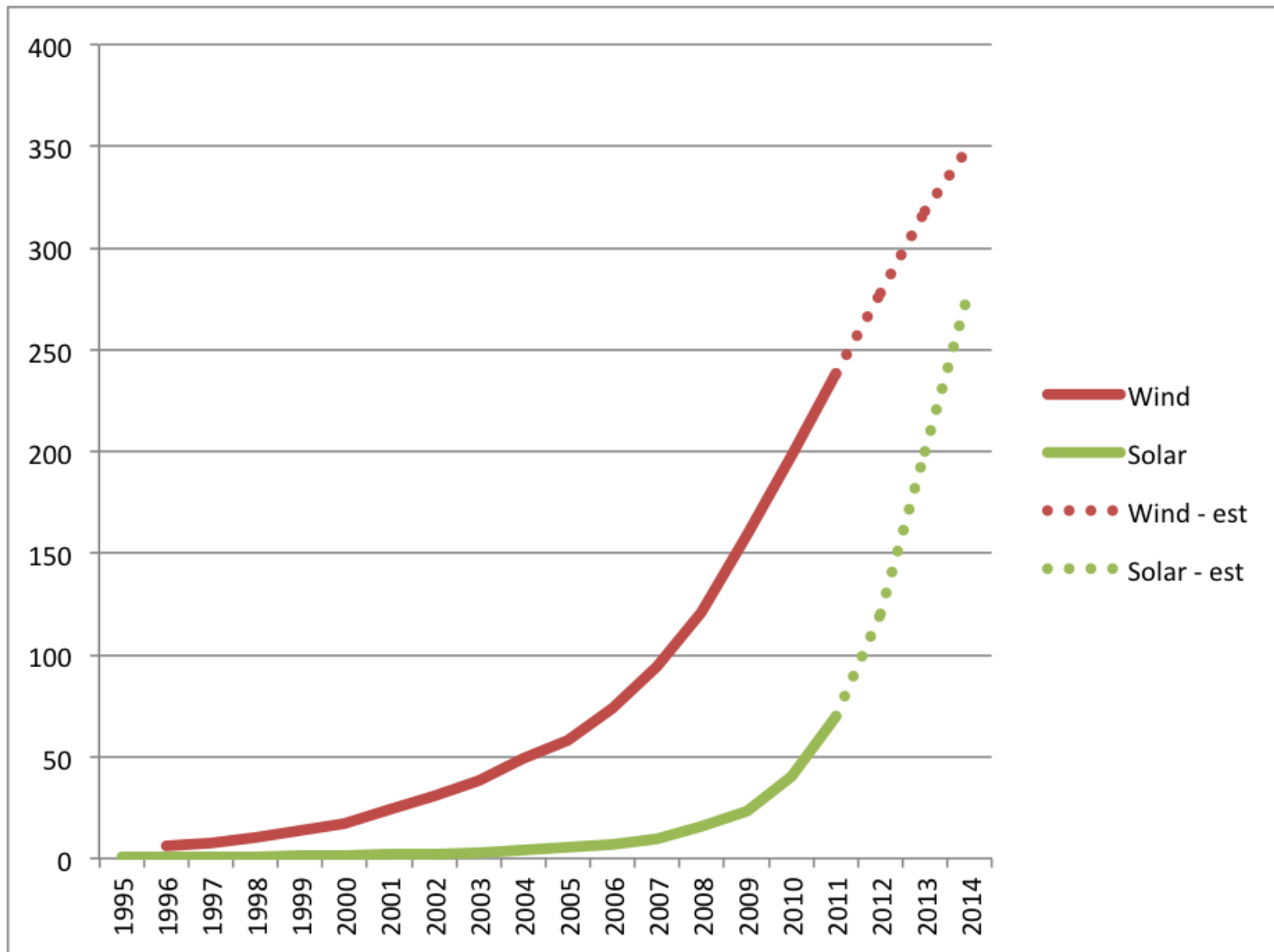
- Marked decrease in developmental lag
- Innovation/development of new products
- Supply side capabilities
- Market competition
- Growing consumer expectations
- Higher level of communication between consumers - blogspace
- Fleet/building/operations managers – and CFOs
- Regulation
- Energy security

Renewable energy growth

Figure 2.9 Changes in percent shares of RE technologies in power generation, 1990-2009

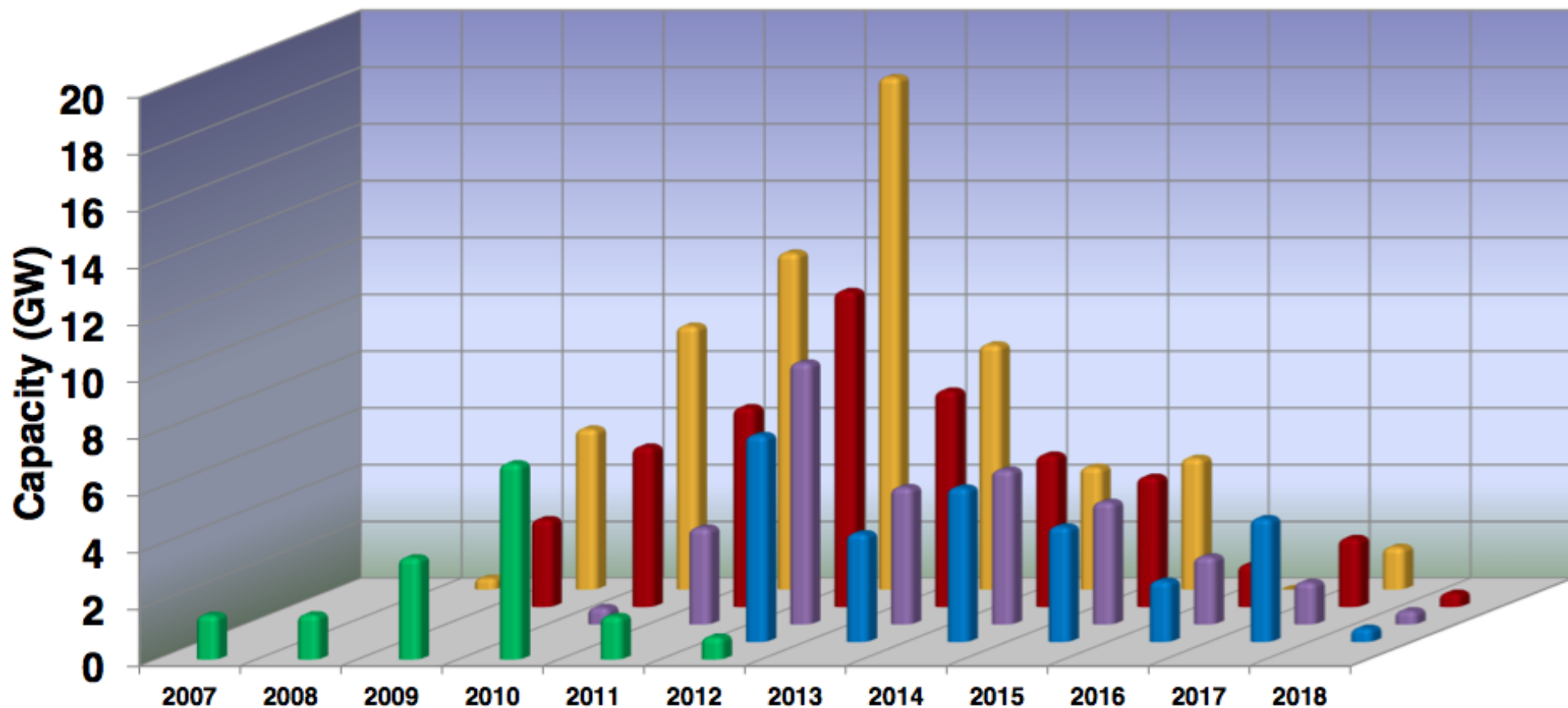


Global renewables 2013?



Latest Capacity Announcements vs. Actual

Figure 1a



Total Identified Capacity Declines Due to Commissioning, Cancellations, and Fewer Postponements

Actual

2012

2010

2009

2008

Totals → 16 GW

28 GW

32 GW

49 GW

64 GW

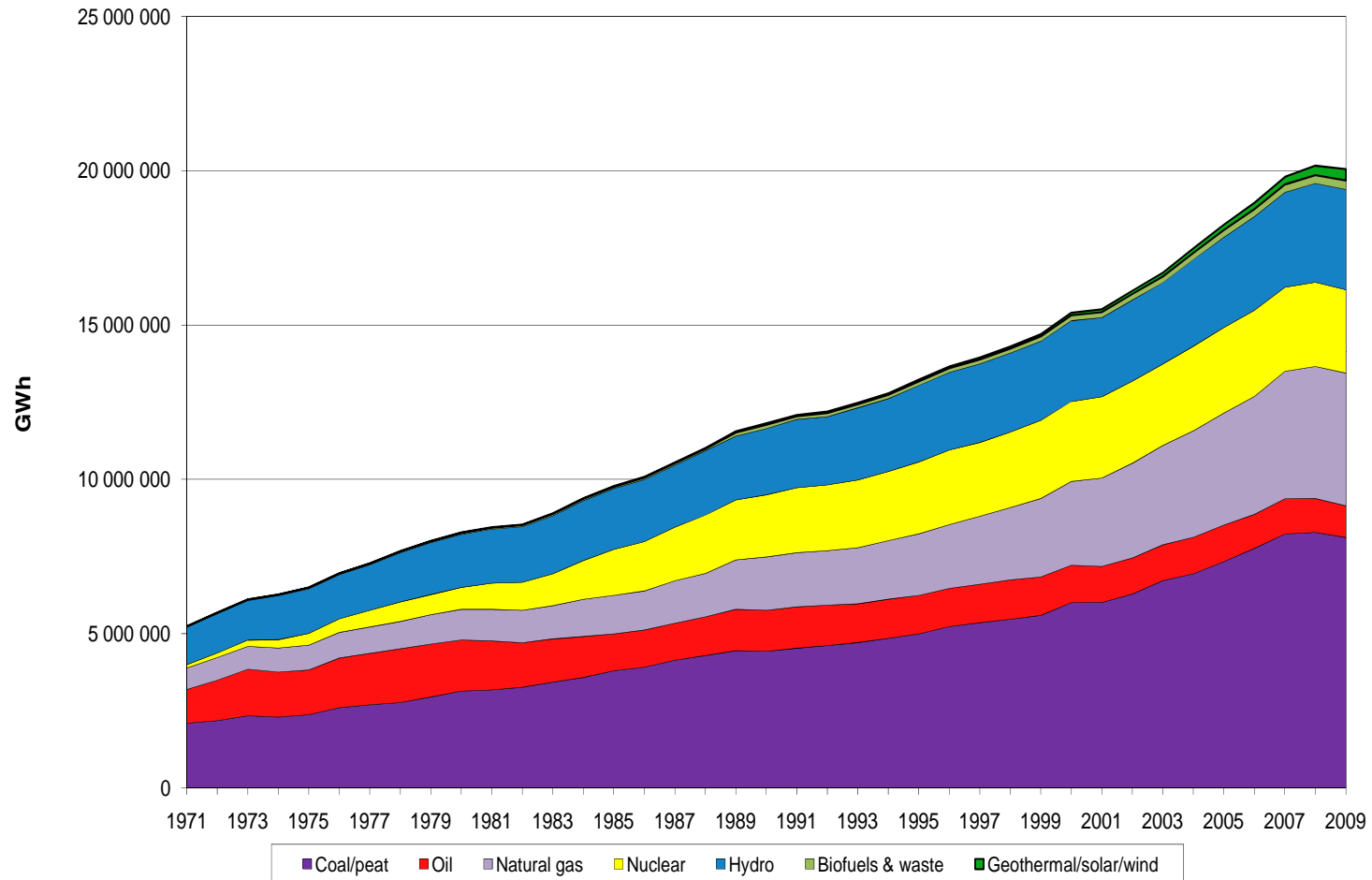
Global electricity ...

IEA Energy Statistics

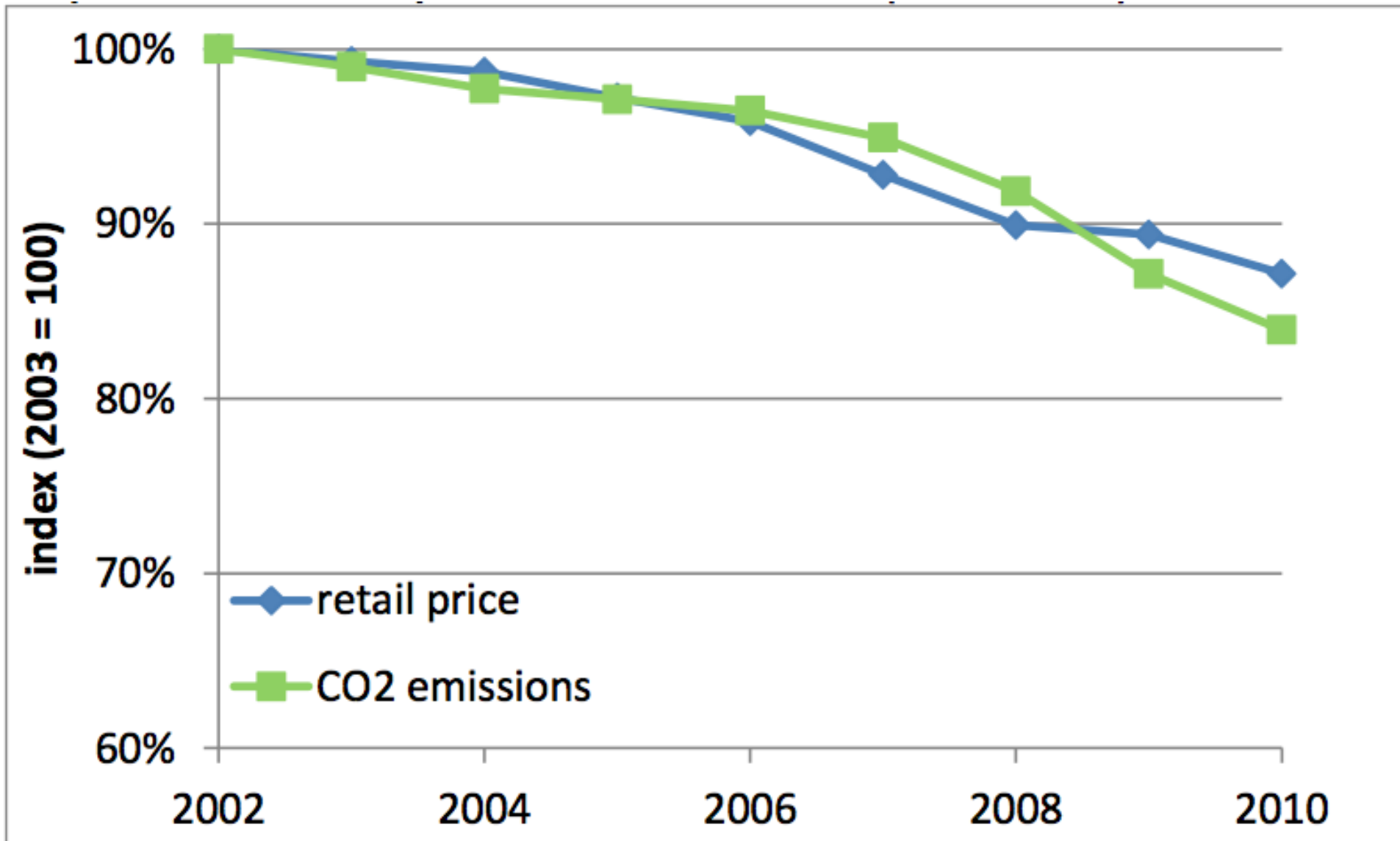
Statistics on the Web: <http://www.iea.org/stats/index.asp>

Electricity generation by fuel

World

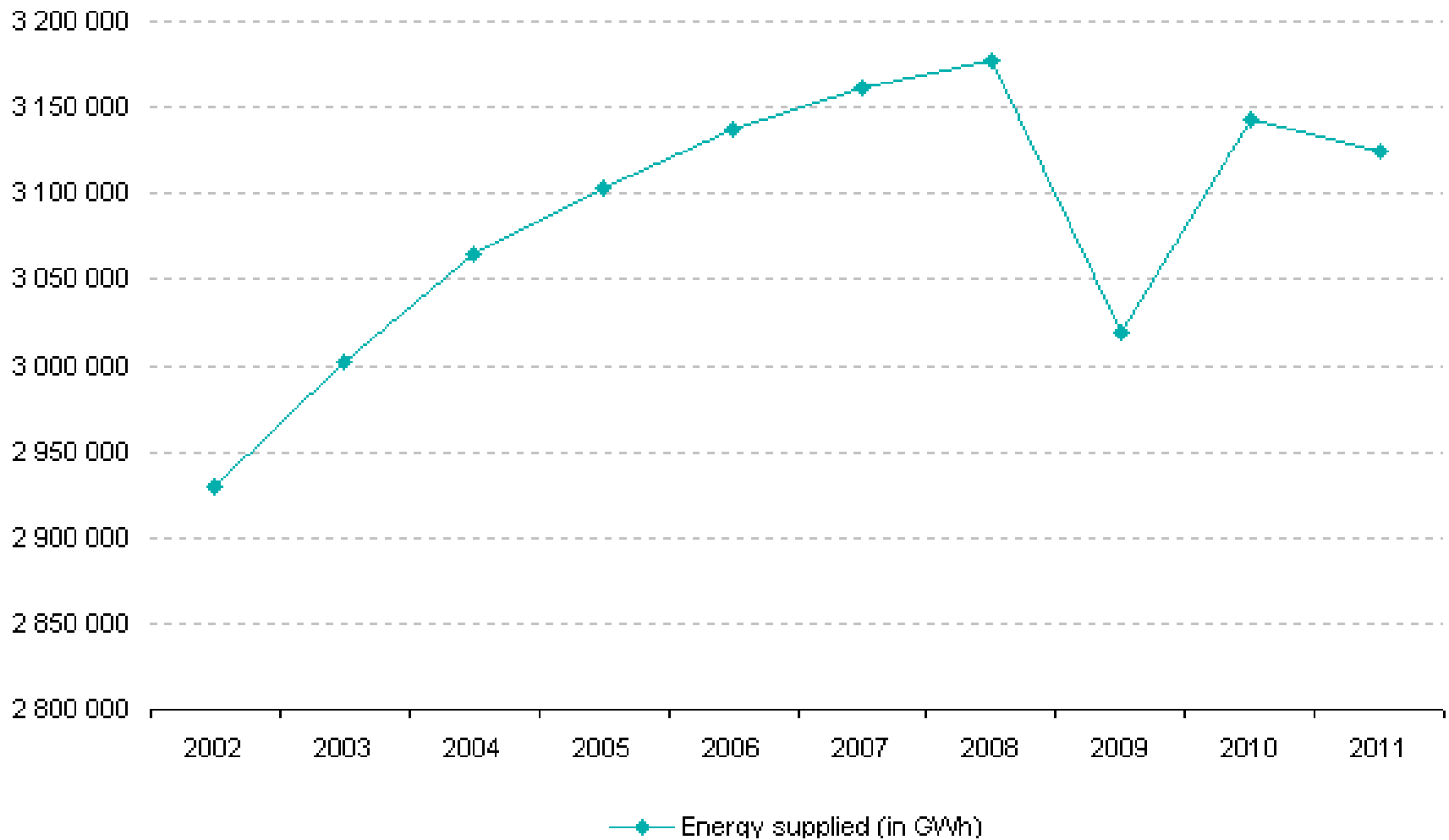


Trends in car prices and CO2 2002-2010



How clean are Europe's cars?

Global electricity growth - Europe

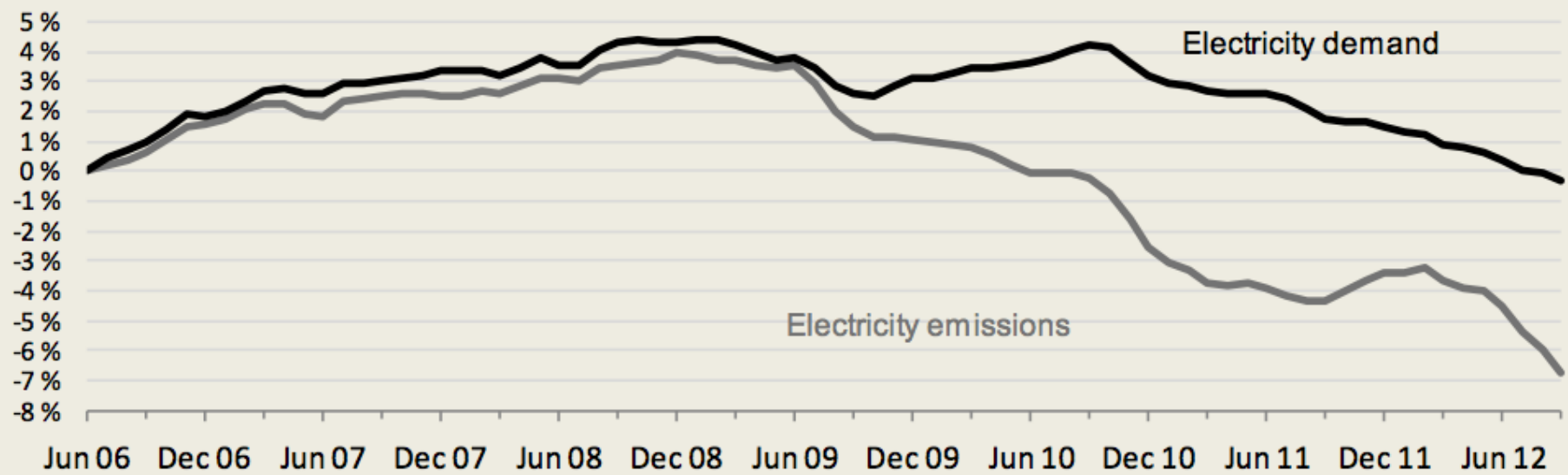


Australian renewables 2011...

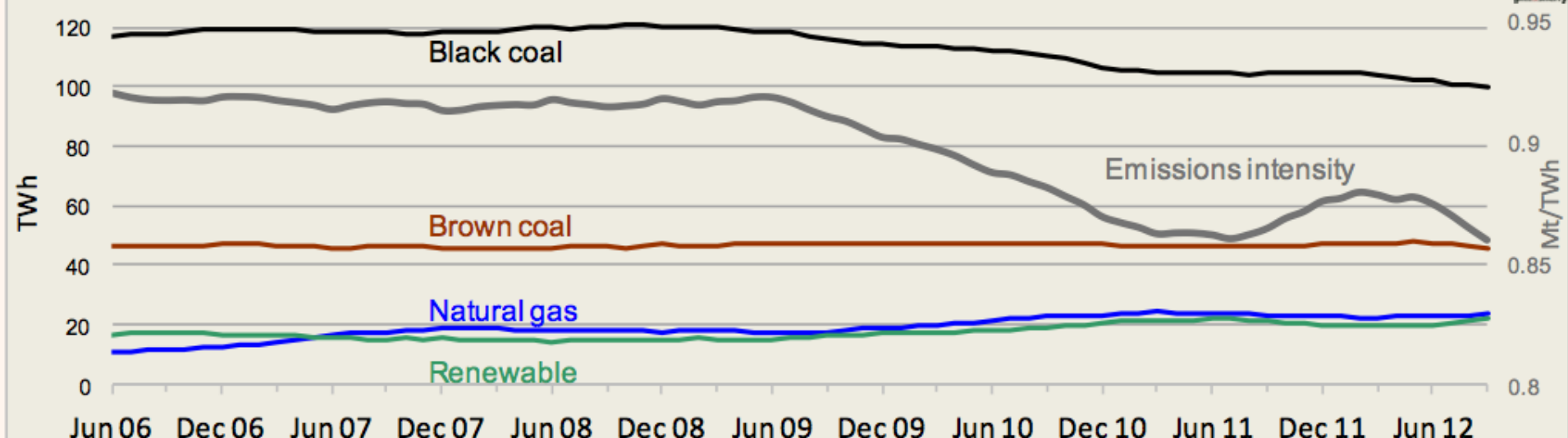
- The transformation of Australia's energy mix has begun – in 2011 new electricity generation construction 25% solar, 31% gas and 33% wind.
- Coal-fired power currently 75% of Australia's total generation - in 2011 only 14% of new investment was coal.
- This is still behind the average world-wide investment in renewable energy – China's economy 8 times larger than Australia, investment in renewables over 20 times larger!

Australian electricity consumption 2012...

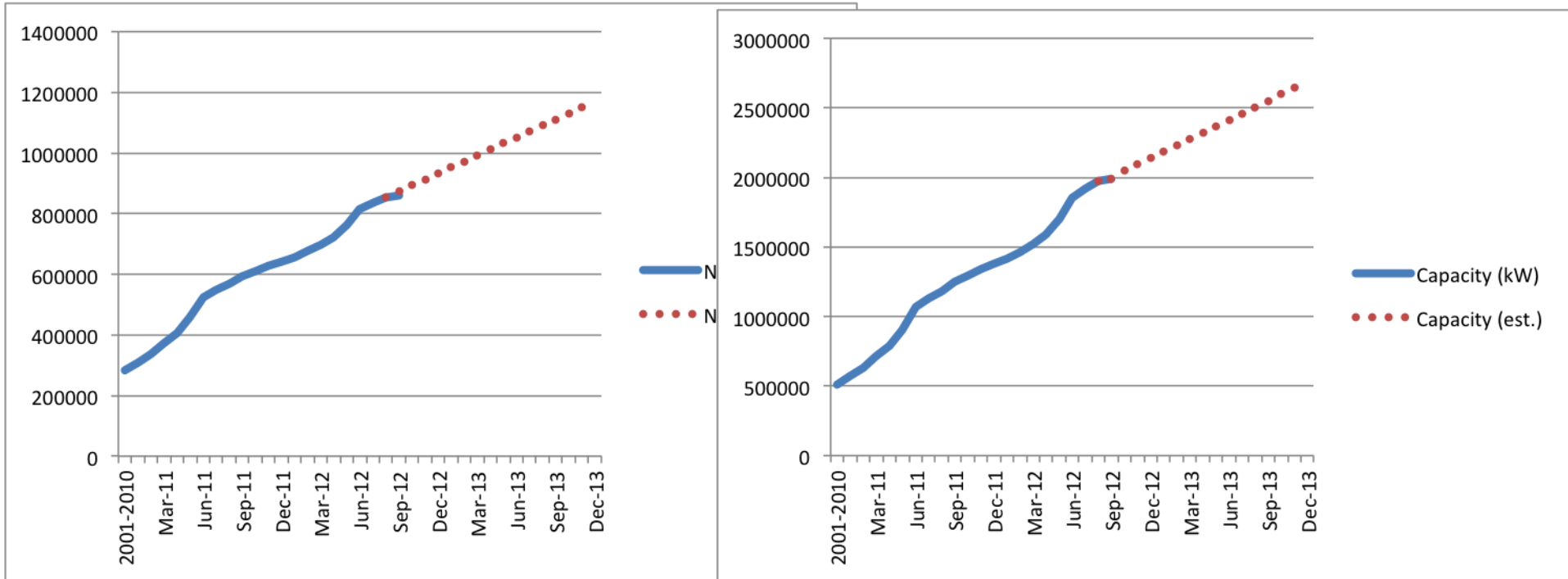
Changes in electricity generation and emissions



Eastern states electricity generation and emissions intensity

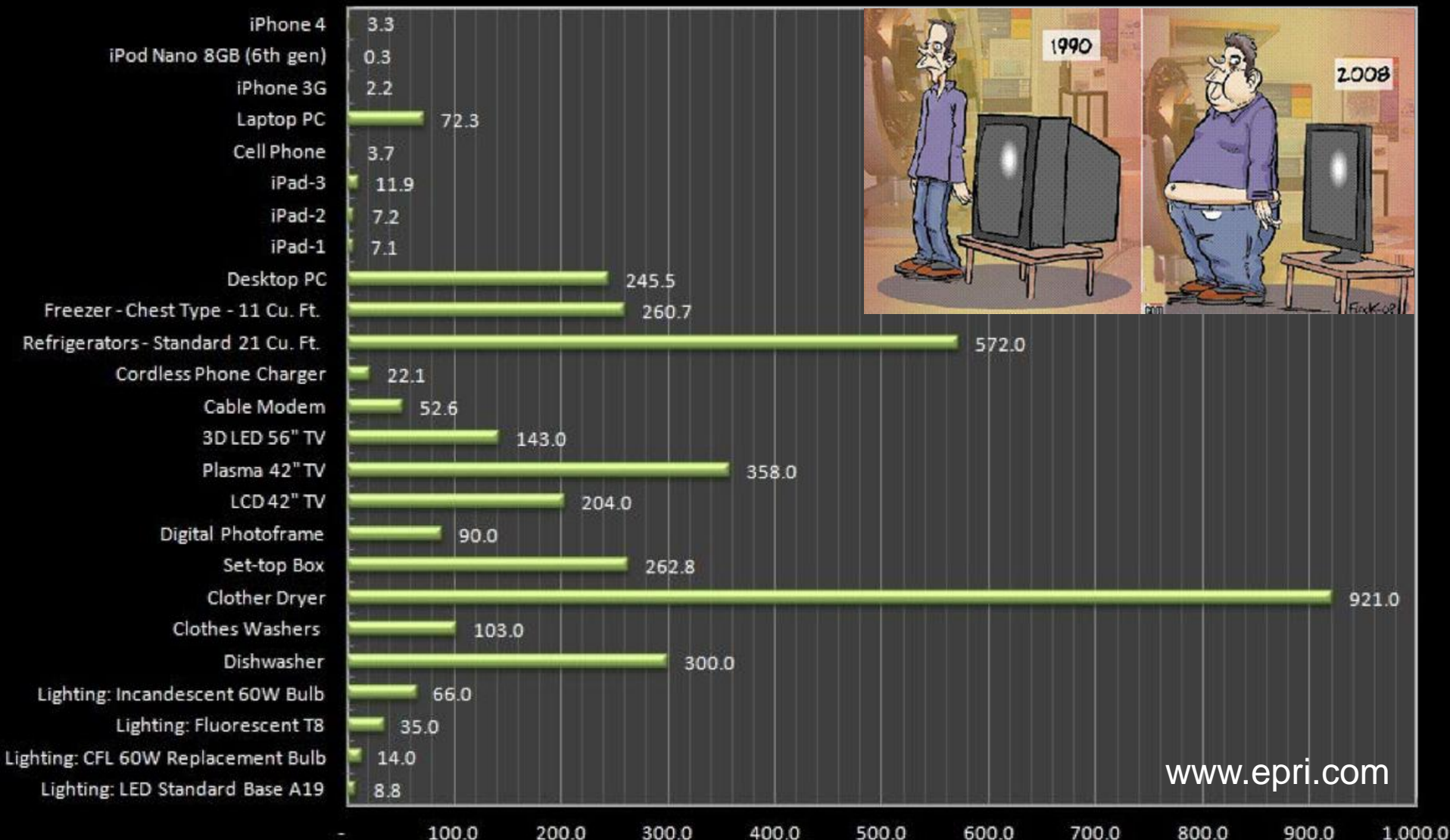


Solar on Australian homes

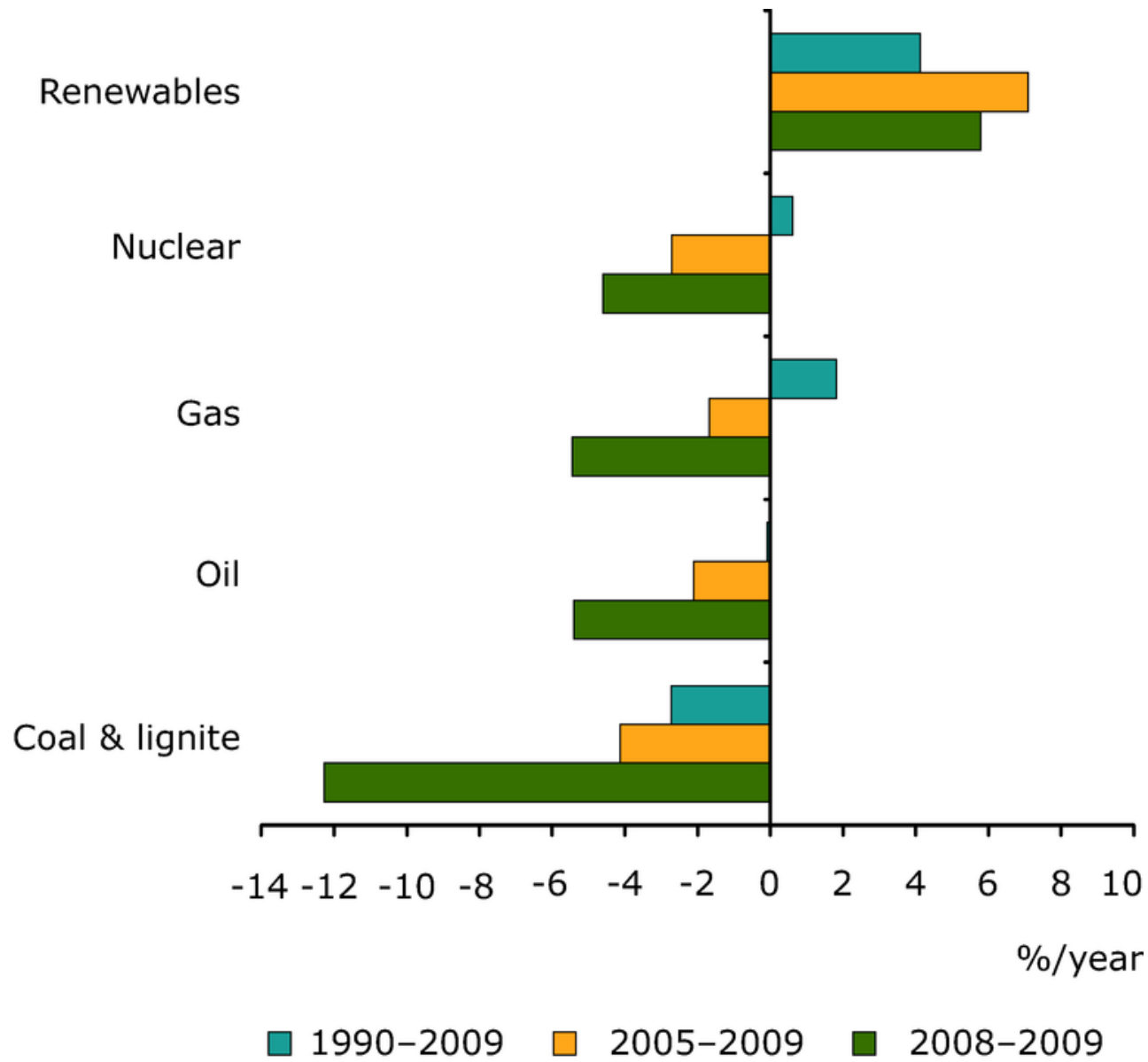


Technology energy use

Annual Electricity Energy Consumption (in kWh)



Global electricity growth



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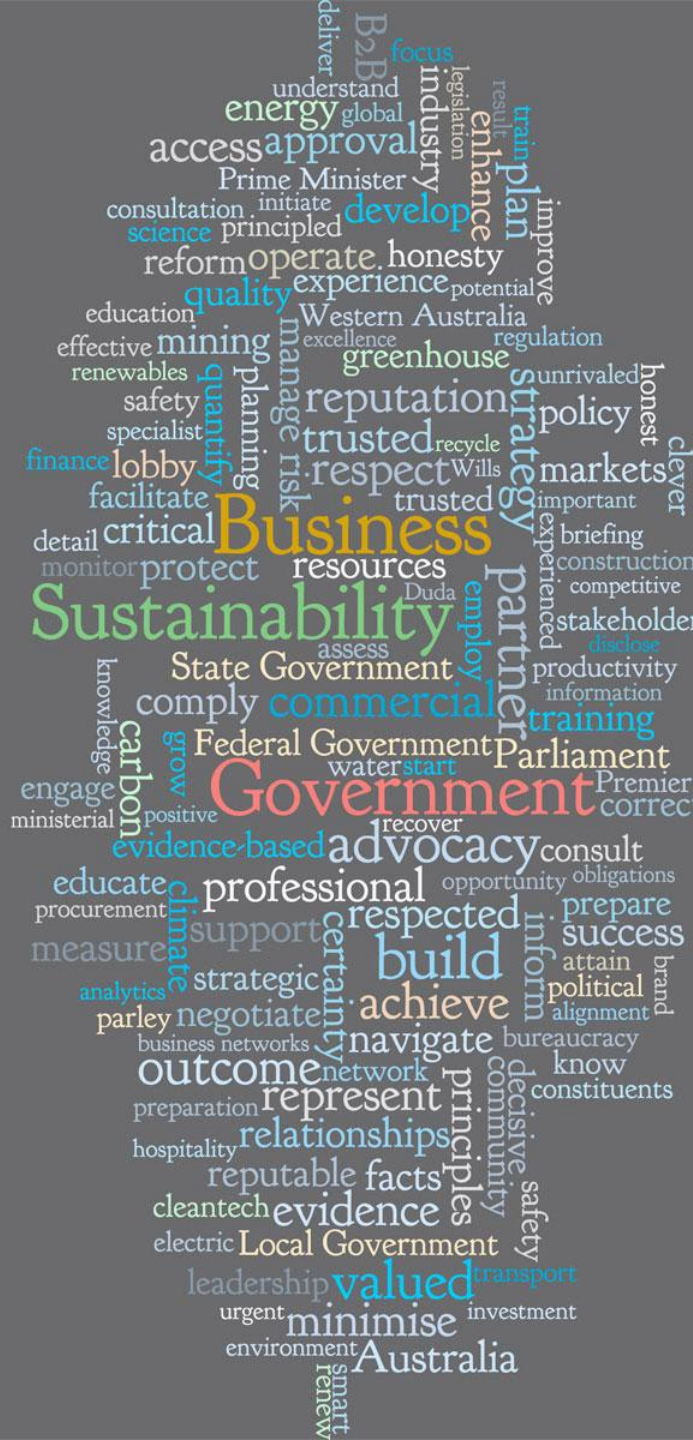
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