

# Preparing for a low-carbon future: the way forward

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2 August, 2011



GE imagination at work



# GE is diverse... in technology and markets

GE Energy \$37.5B



Healthcare \$16.9B



Aviation \$17.6B



Transportation \$3.4B



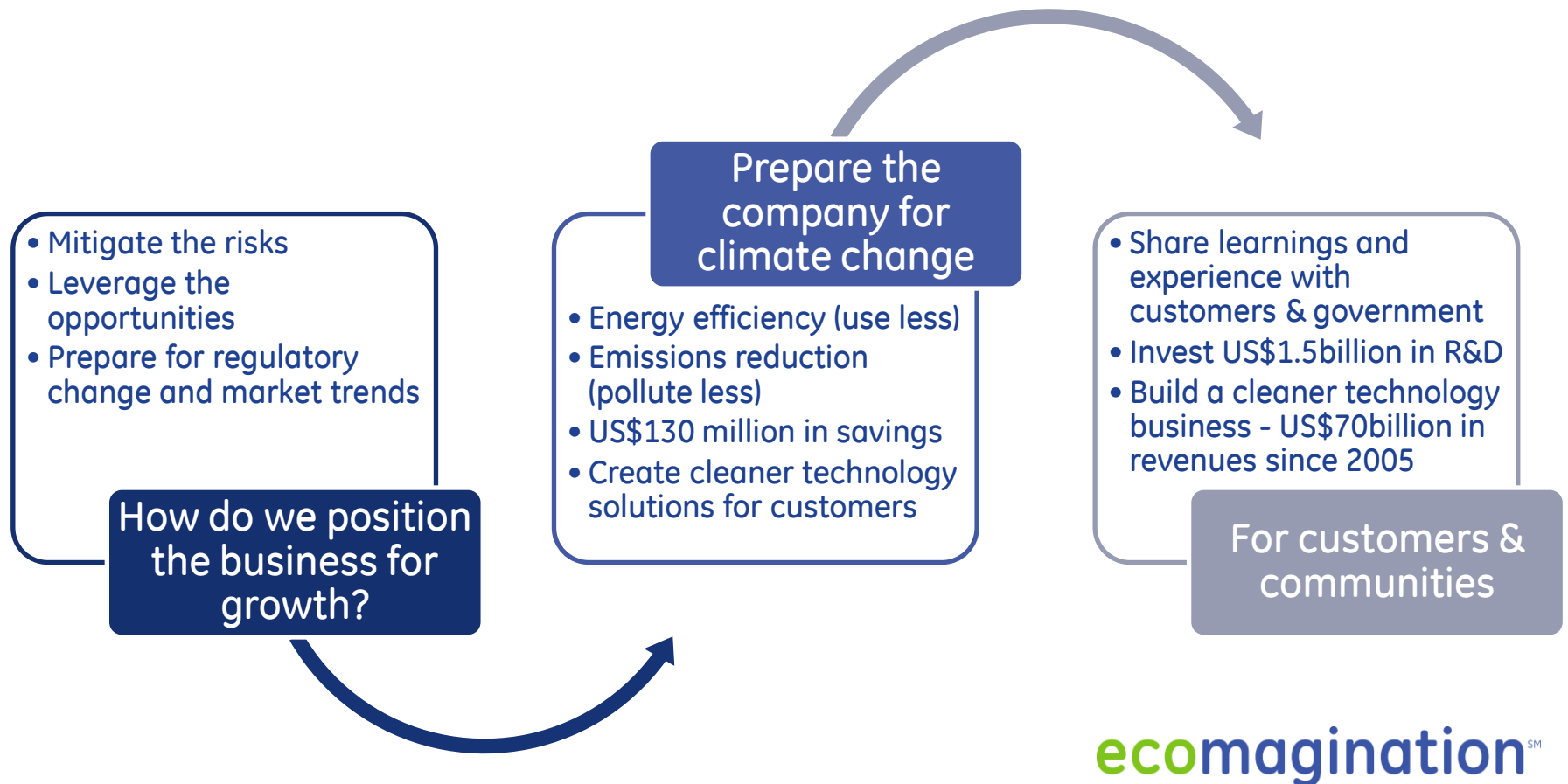
GE Capital \$47.0B



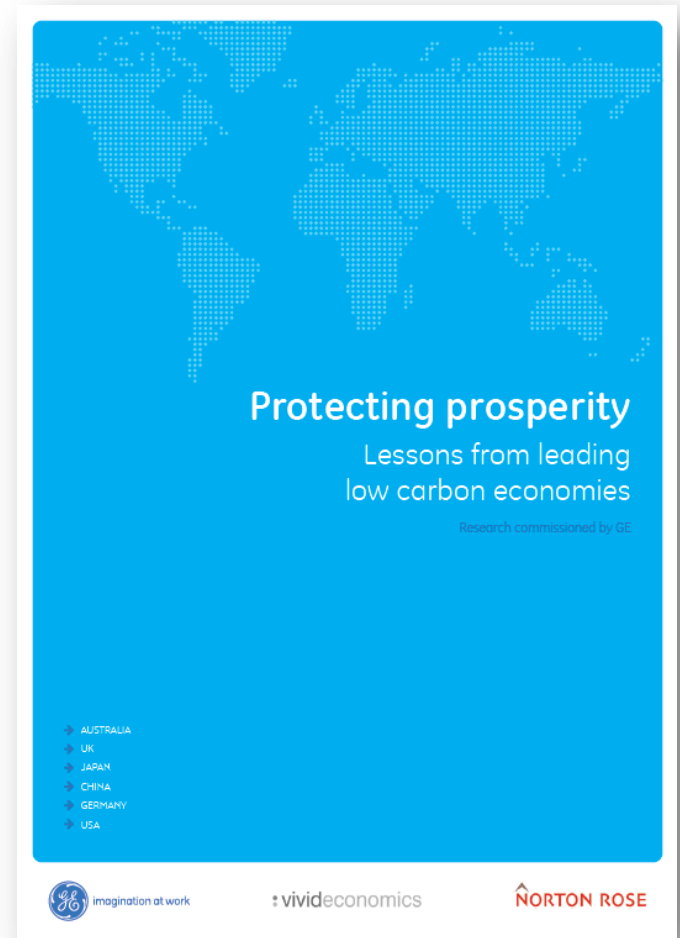
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# Climate change is one of the megatrends of the 21<sup>st</sup> Century



# Australia's carbon productivity challenge



# The transition to a low carbon future is happening today...

- Emissions Trading Schemes are already in place in 32 countries, 4 others on the way
- Major trading partners already on the move - Japan, China, India and South Korea
- While the emissions of many countries are going down, Australia's are going up - projected to be 24 percent above 2000 levels by 2020 under Business As Usual

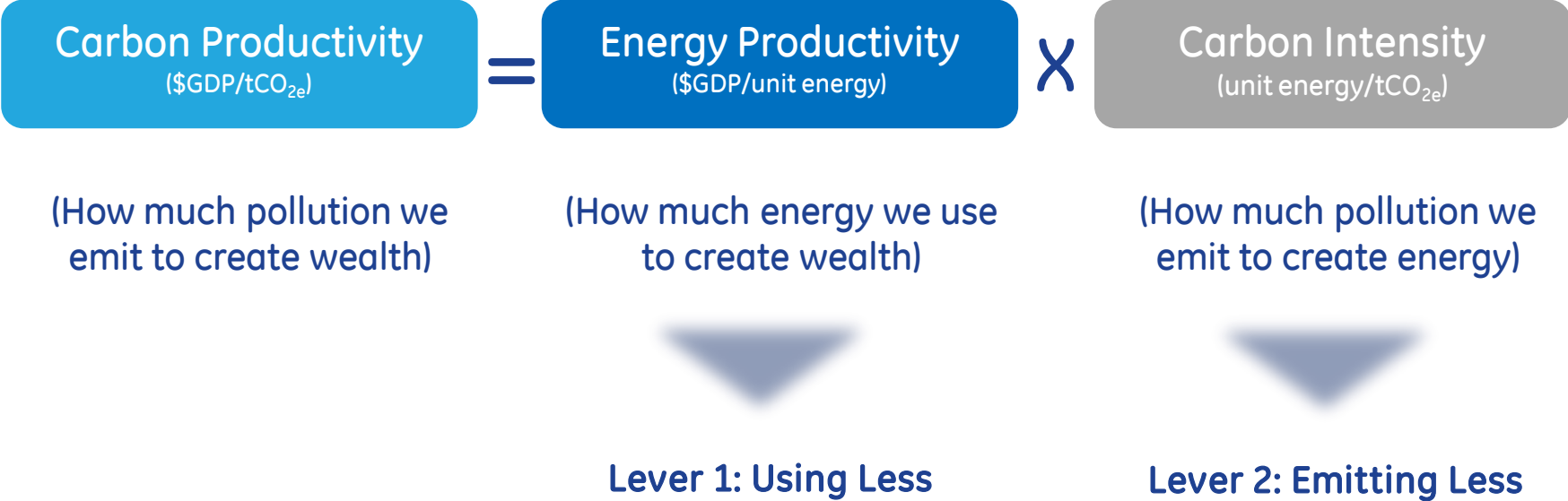


# Australia needs to prepare to secure its prosperity

- Global policies on climate change have the potential to threaten our prosperity
- China's 12<sup>th</sup> 5 yr plan +20% carbon productivity target
- UK plan to cut emissions to 50% of 1990 levels by 2025
- EU ETS expansion to include international aviation; further impositions likely to follow



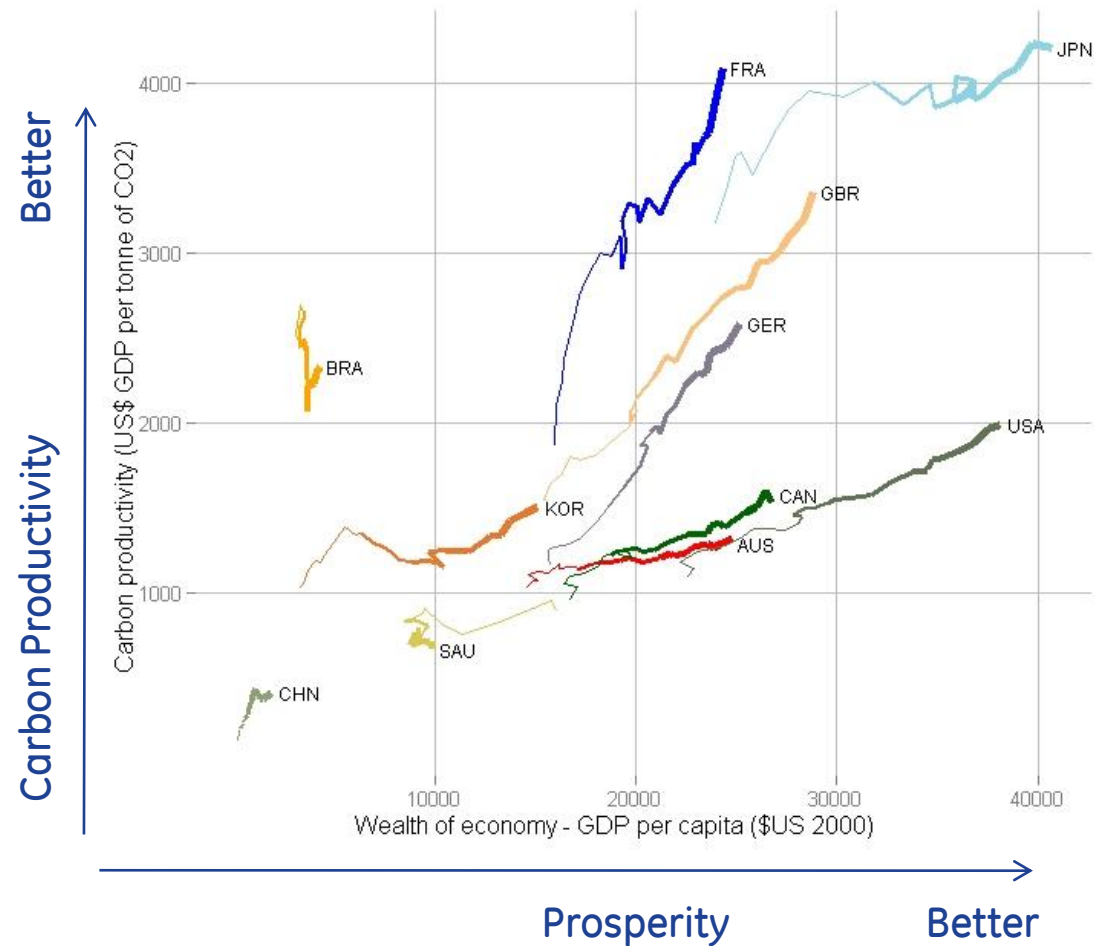
# Carbon productivity is the key metric



**Economies that can grow while reducing carbon emissions will be best positioned for higher prosperity in a low carbon future**

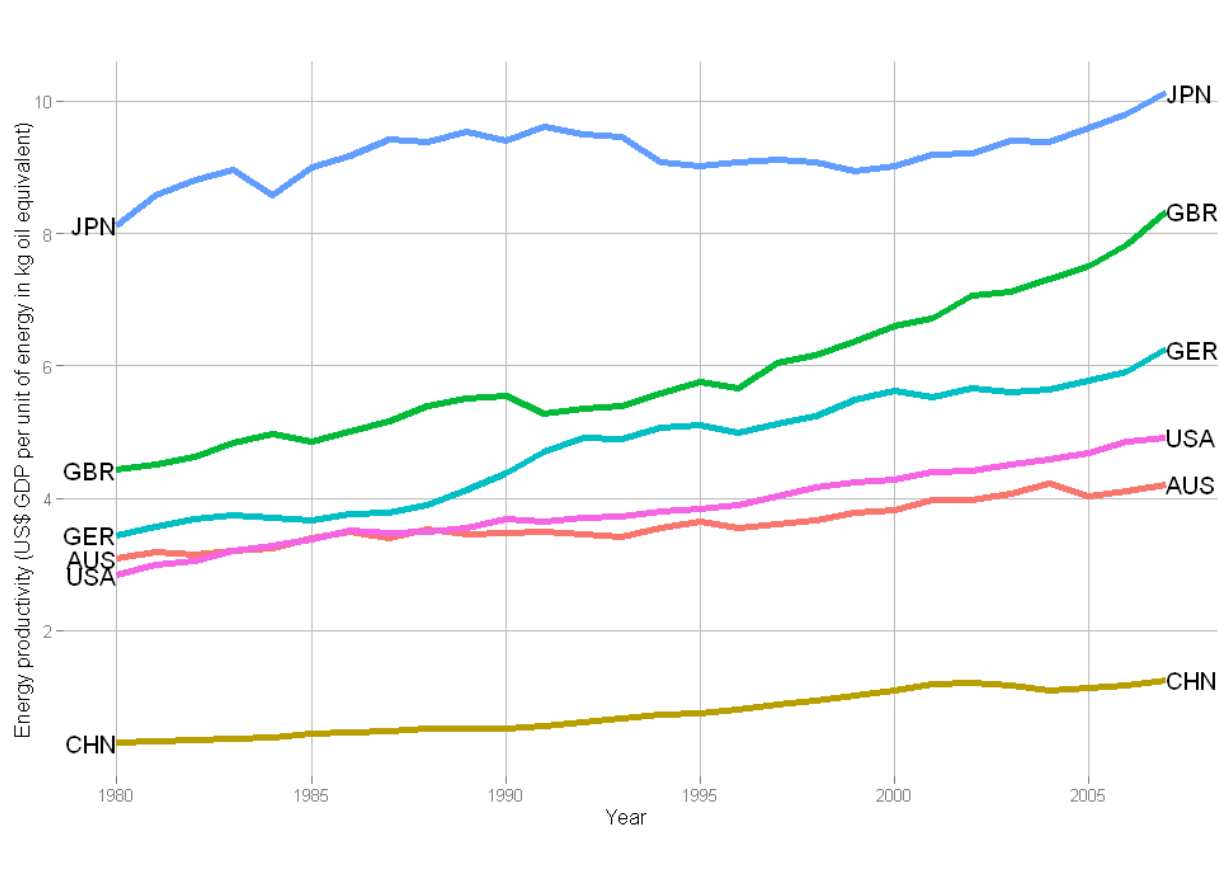


# Some nations have improved carbon productivity growth and prosperity



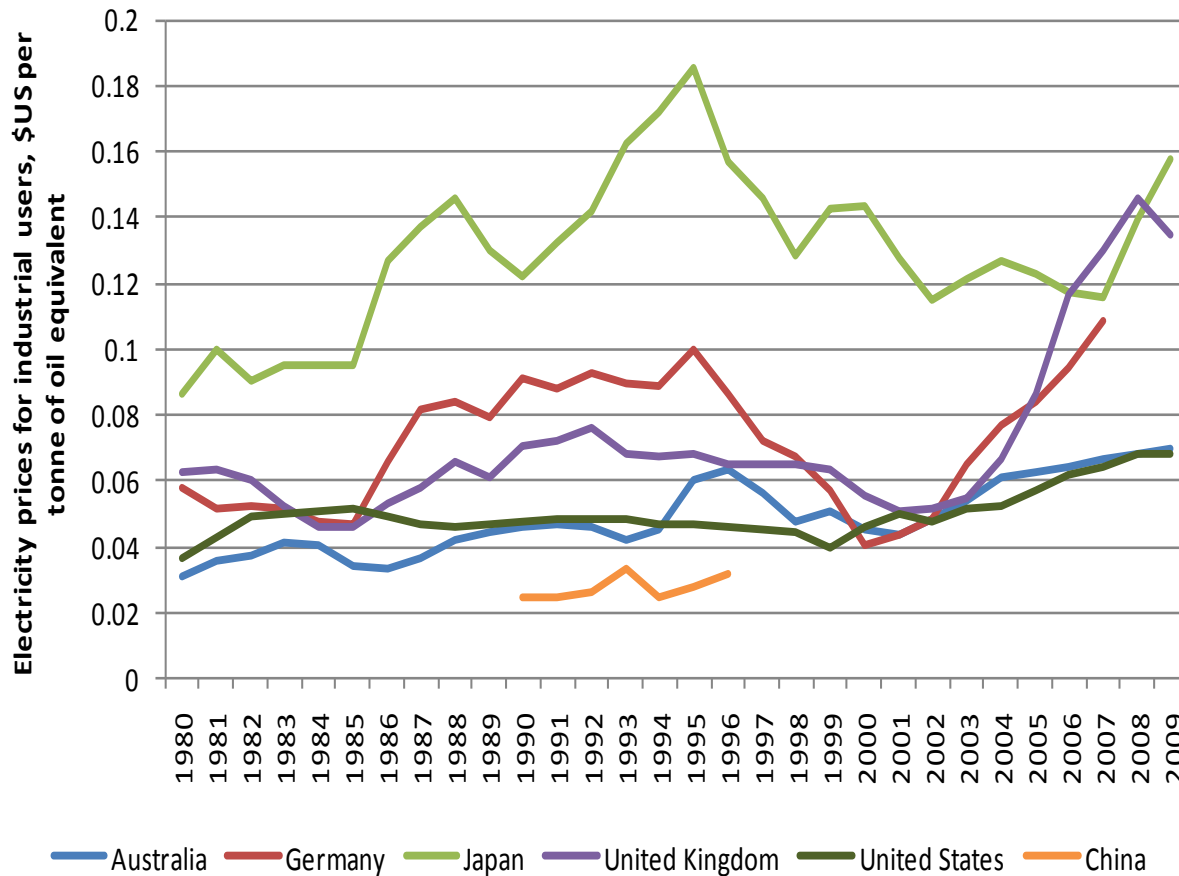
- Line starts thin in 1980 and finishes thick in 2007
- European nations are the clean growth leaders
- China has the highest relative improvement even though carbon productivity growth decreased after 2000

# All nations have improved energy productivity, some more than others



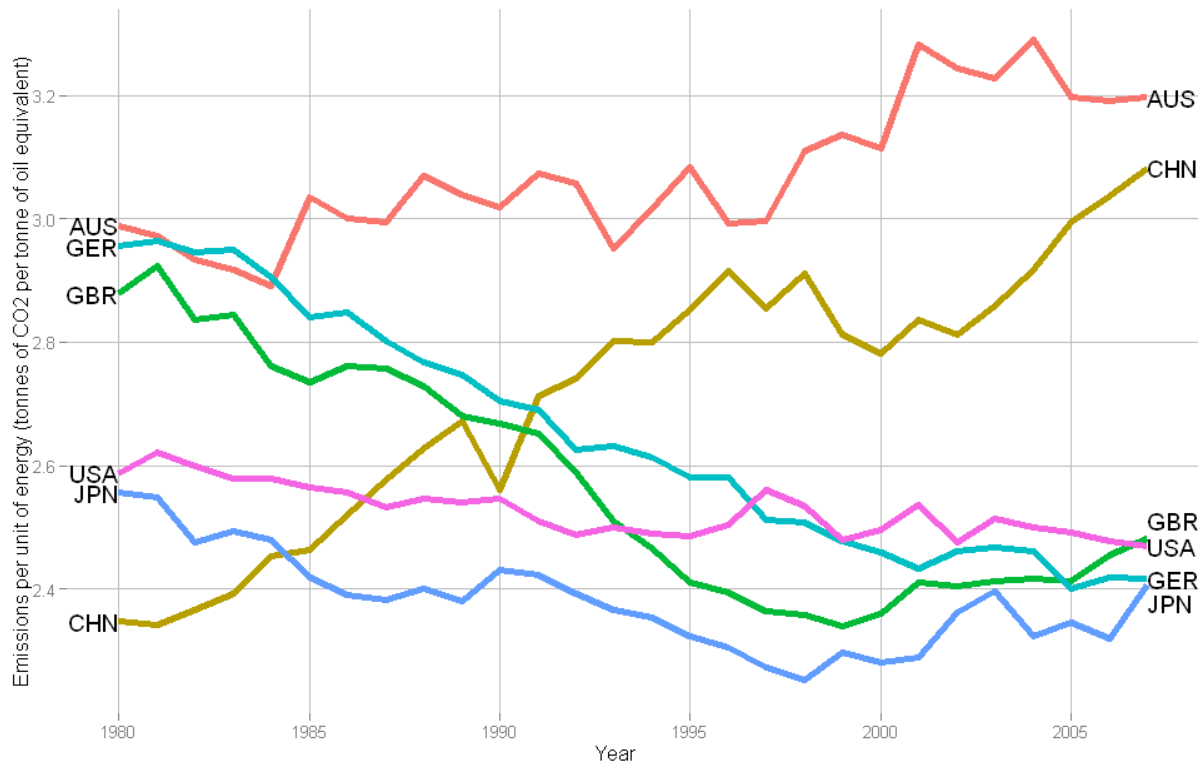
- Globally, energy productivity has improved since 1980
- Britain and Germany have improved fast and are approaching Japan
- China has the largest relative improvement

# Low electricity price = low energy productivity



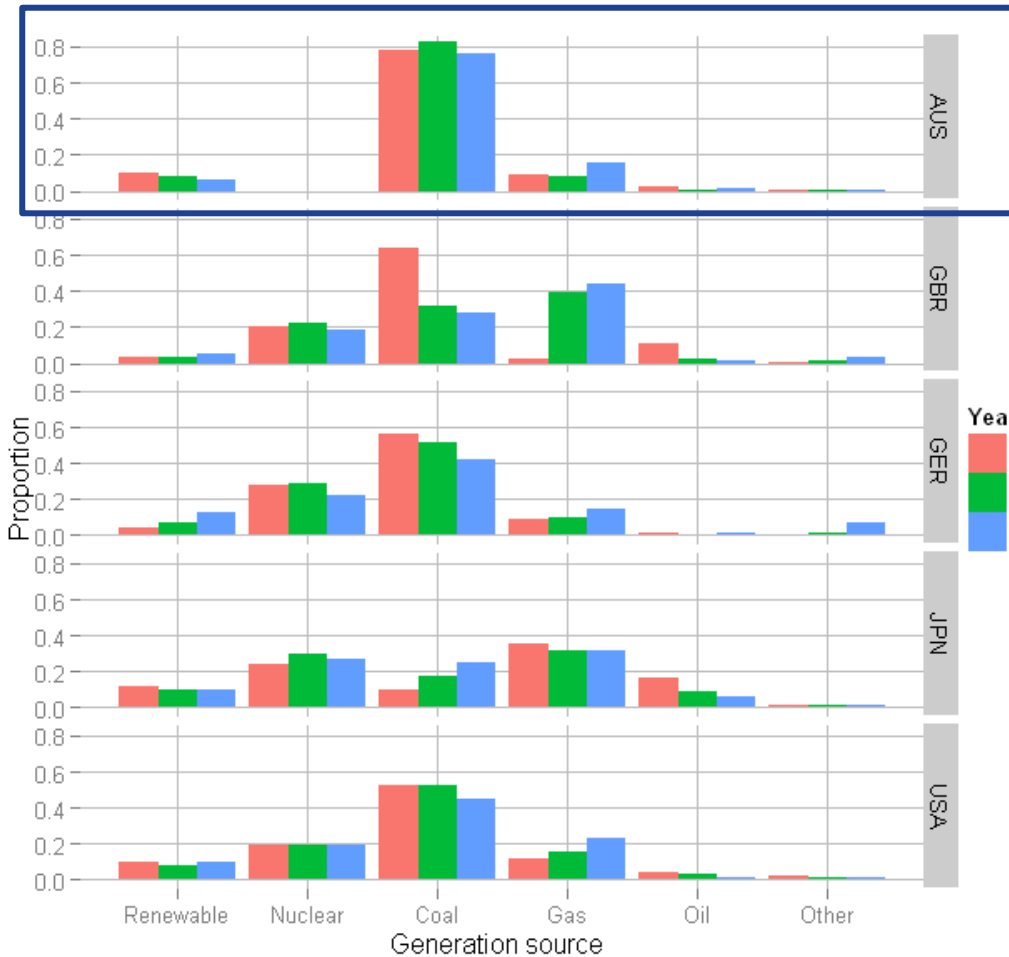
- Countries with high fossil fuel reserves have lower electricity prices
- Countries with lower electricity prices have lower energy productivity

# Carbon intensity has generally been improving, with some exceptions



- Most developed countries have improved and converged
- Australia's cheap, abundant coal has led it in the wrong direction
- China's increase is due to sectoral shift, eg from direct combustion to electric heating

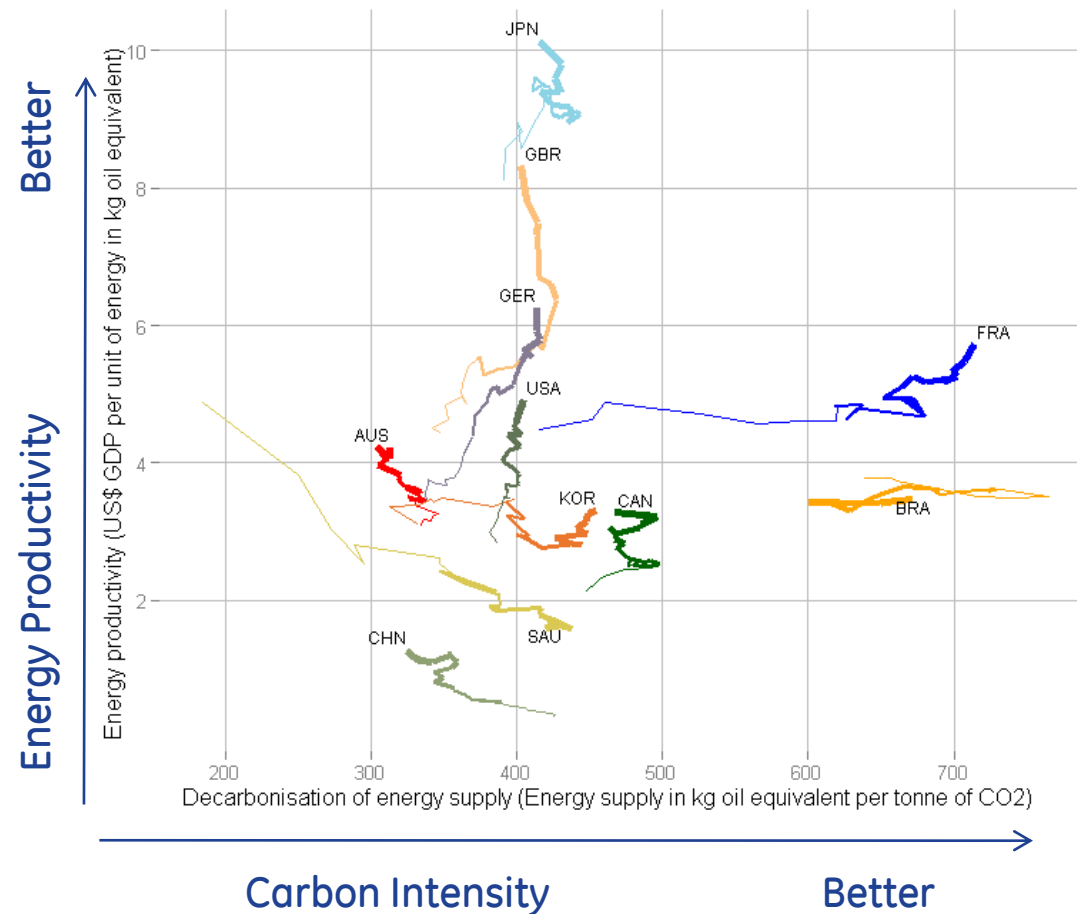
# Continued dependence on coal is driving Australia's carbon intensity...



- Australia's energy sector represents a unique challenge
  - higher share & emissions intensity of coal vs other countries
  - share of renewables is the lowest and declining
  - transfer to gas is marginal
- Coal to gas switching is a feature of countries that have increased carbon productivity: UK & Germany

# Policy impacts the trajectory of change

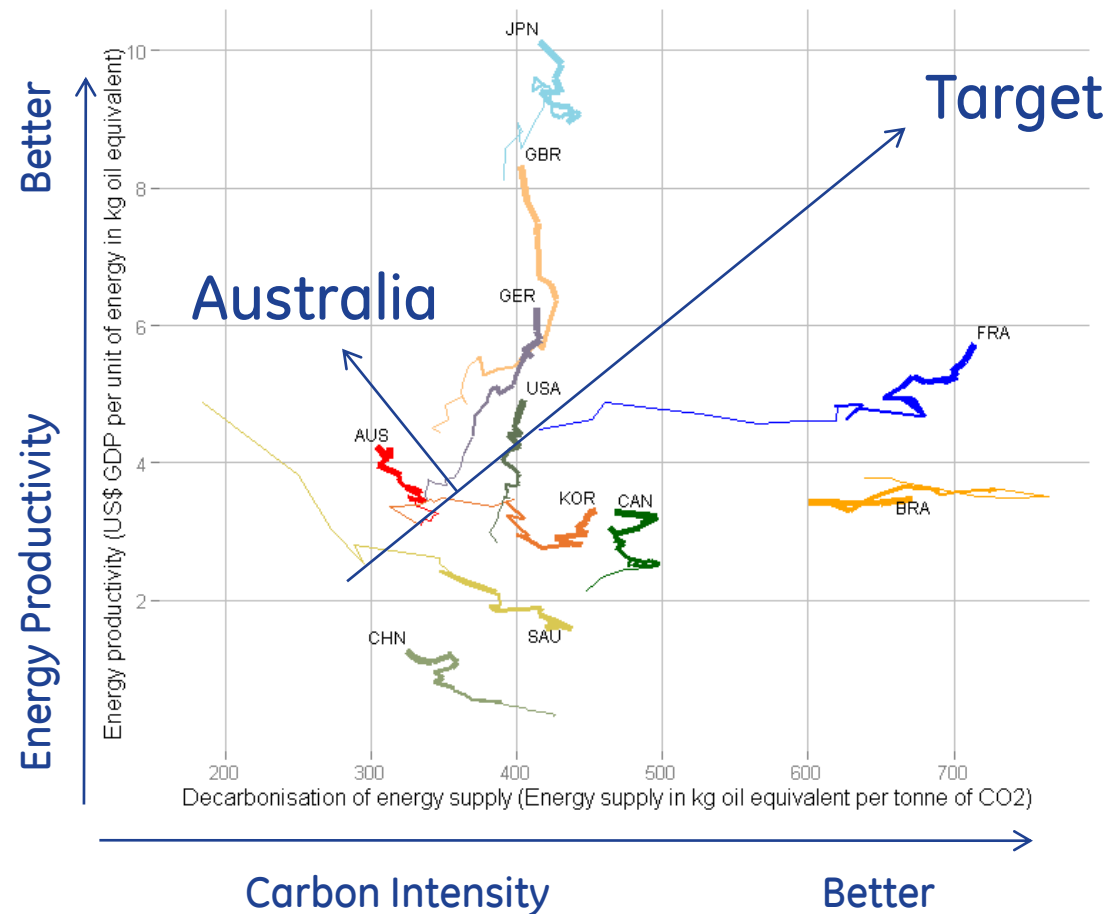
Use of the two levers – international comparison (1980-2007)



- UK improved carbon intensity fast in the 1980s, then improved energy productivity to maintain the growth in carbon productivity
- France improved carbon far more with less improvement in energy productivity
- US and Canada have improved energy productivity with slight improvements in carbon intensity
- Australia has improved energy productivity modestly but got worse on carbon intensity

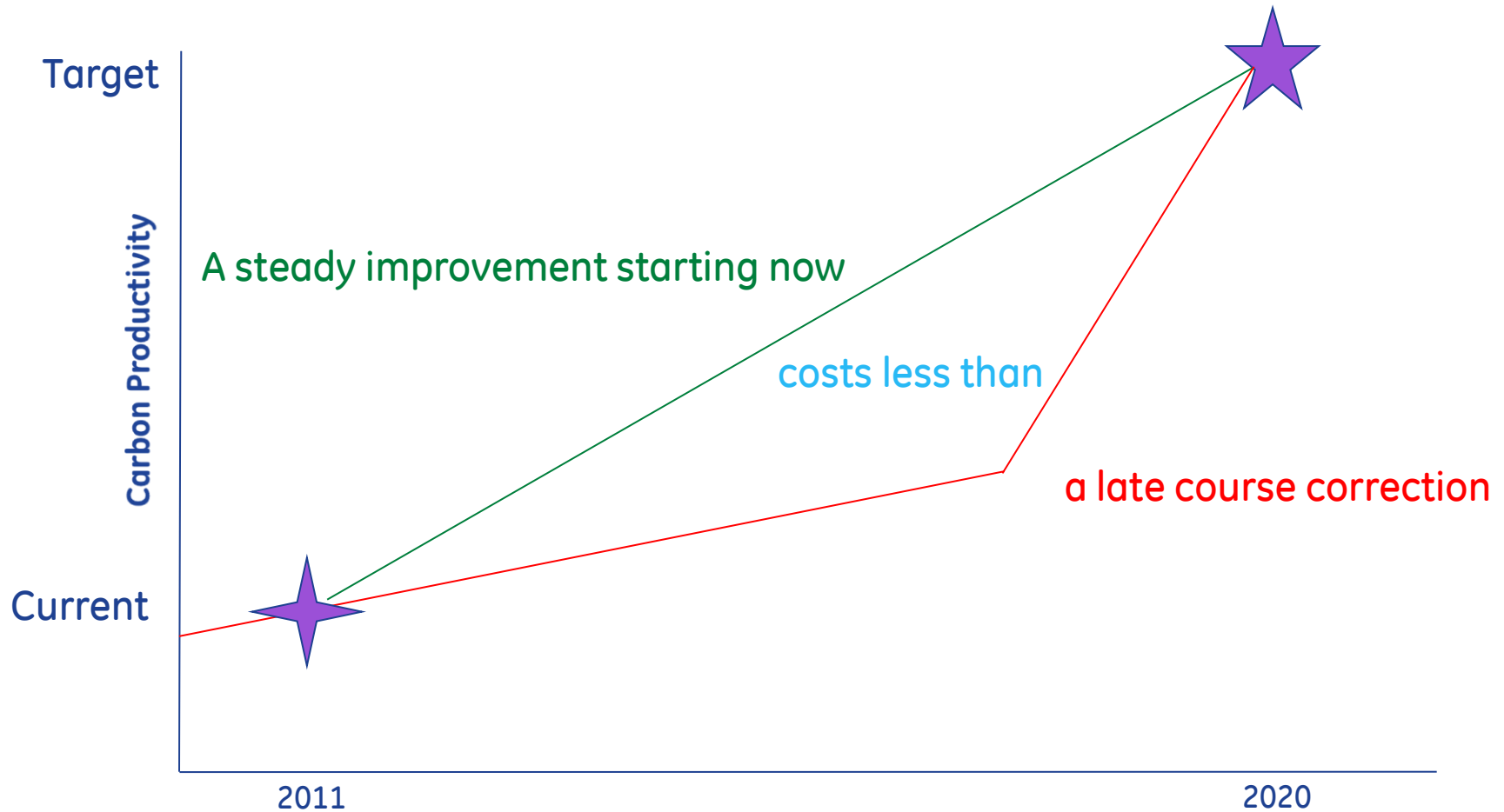
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# Need to improve the run rate



**Australia is well behind the required run rate**

**It would be easier to start the trajectory change now than leave it to the last few years**

# International experience

Country	Carbon Productivity 1980-2007	Energy Productivity 1980-2007	Carbon Intensity 1980-2007	Abatement effort	Policy efficiency
Japan	Highest, grew 32%	Highest, grew 25%	Low, fell 6%	Low	Least efficient policy mix with narrow high-cost measures. Most effective is market-based coal and oil tax, renewables standard less due to illiquid market.
Germany	High, grew 122%	Moderate, grew 82%	Low, fell 18%	Highest	Policy mix 5 <sup>th</sup> on efficiency, spends more than necessary. Low cost EU ETS crowded out by high-cost renewable subsidies. Fossil fuel subsidies remain.
UK	High, grew 118%	High, grew 88%	Low, fell 14%	High	70% abatement from low-cost EU ETS, overall efficiency reduced by small high-cost renewable policies. Mandated -34% emissions 1990-2020.
US (California)	Moderate, grew 81%	Moderate, 73%	Low, fell 5%	Moderate	California has most efficient policy mix with 95% of abatement from a broad low-cost ETS and a non-technology specific renewables scheme similar to LRET.
China	Lowest but grew 213%	Lowest but grew 306%	High, grew 32% due to sectoral split	Low but preparing to ramp up	Shut down inefficient plant early, drove industrial energy efficiency. Committed to 40+% carbon intensity reduction 2005-2020, 12 <sup>th</sup> 5-year plan goal: +20% carbon productivity. Readying a low-cost ETS.
Australia	Low, grew 27%	Low, grew 36%	Highest, grew 7%	Low	3 <sup>rd</sup> most efficient policy mix driven by low-cost but limited abatement from GGAS, QLD Gas Scheme and LRET: all market-based with tradable permits.



# Lessons to drive carbon productivity and low-carbon competitiveness

1. **Australia has a unique problem in our highly carbonised electricity sector - investment is needed and good investment needs good policy.**
2. **According to our research, good carbon policy includes:-**
  - **A broad-based, market-driven carbon price is the least-cost method to reach a given emissions target as seen in the markets with an ETS**
  - **A well-designed mix of policies with a few broad, complementary measures is most efficient as seen in California and in parts of Australia including RET, GGAS, Qld Gas Scheme**
3. **Others, including Europe and the US, are already taking action and making gains in carbon productivity, giving them a comparative advantage in the low-carbon global economy**

# Thank you



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