

De-*carbon*izing for Growth

Why everyone is wrong about the costs of addressing climate change

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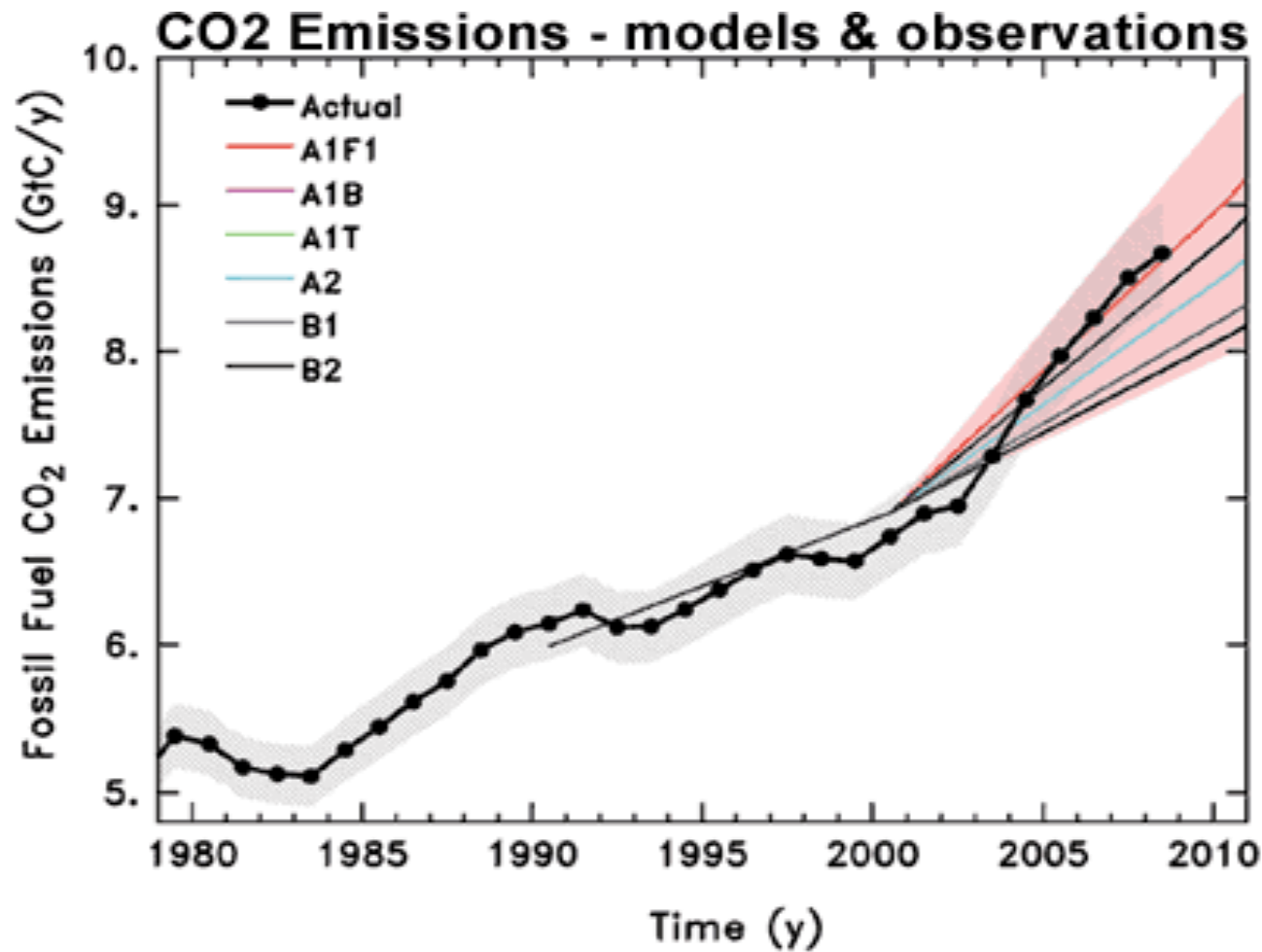
University of New South Wales

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De-*carbon*izing for Growth: **The Key Point**

We will de-carbonize the global energy system not because we are sufficiently concerned about the risks of a climate system greatly modified by human activity but because, in the absence of this gigantic global infrastructure investment opportunity, ***we will never meet the economic growth targets required to fulfil the aspirations of a global population that will reach 9.5 billion in 2050.***

Our definitive climate response **failure**



Failure in the UN Climate Negotiations

The CONVENTIONAL WISDOM:

Reducing carbon emissions means agreeing to be a bit poorer in the future—reducing carbon emissions lowers future **GDP** growth.

This leads to 3 significant climate negotiations road blocks and...

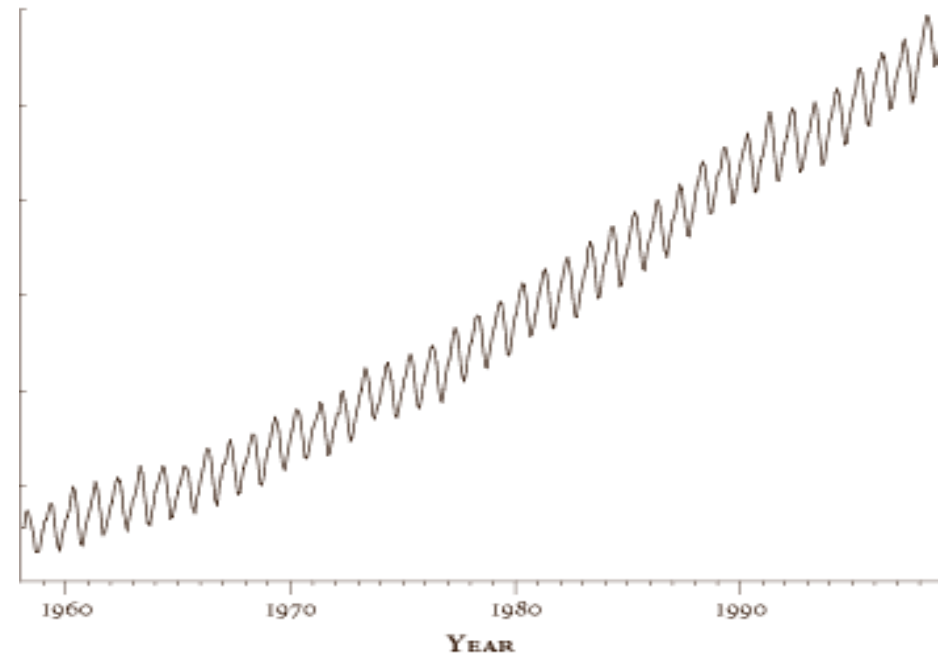
- “*Common but differentiated responsibilities*” (China and India)
 - Low regulated carbon prices due to “*leakage*” (EU ETS)
 - Push reduction timetables into the future (COP21→2020)
- ...a “**race to the bottom**” and a strong disincentive for progress

De-*carbon*izing for Growth: **Revelle/Keeling**

Challenge the conventional wisdom!!!



MONTHLY ATMOSPHERIC CARBON DIOXIDE CONCENTRATION
MAUNA LOA, HAWAII • 1958-1998



Our global economic growth **imperative**

Except for Syria, Somalia, Egypt, the Ukraine, and other countries facing major national security challenges at the moment, all other nations are pursuing one major objective above all others:

Promoting economic growth and jobs (as measured by **GDP**)

Not just economic growth but **EXPONENTIAL** economic growth (food, water, energy, resources, materials, services, etc.) For example, 3% annual growth is, by definition, exponential (more people wanting more)

OECD 2050 Global **GDP** target

The OECD currently projects that, in order to meet the growing economic aspirations of a global population that is expected to reach 9.5 billion by 2050, global **GDP** will need to reach...

2050:	US\$305 trillion
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2014:	US\$60 trillion
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1970:	US\$18 trillion
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Exponential growth rate over the next 36 years needs to almost **double**!

Ten Challenges on the road to \$305 trillion (1)

Forgetting about climate change for a moment, there are many significant challenges to growing GDP from **US\$60 trillion** to **US\$305 trillion** in 36 years; some of which include...

1. **Global debt** (public and private) approaching **US\$250 trillion**
2. **Global productivity** growth is declining
3. **Aging global population** and massive growth in retirees (Japan)
4. **Soaring global health care costs** (chronic diseases and mental illness)

Ten Challenges on the road to \$305 trillion (2)

- 5. Underinvestment in stationary energy (IEA US\$50 trillion 2030)
- 6. Current global growth is well under 3% (5+% required)
- 7. Rising fossil fuel prices, risks and declining *energy surpluses*
- 8. Constrained global food production (2008 per capita peak)

OECD **Green Growth** report (2011) –reaching the 2050 GDP target is impossible without immediately addressing a range of key environmental (degradation) and natural resource (depletion) constraints...

- 9. Climate change—IPCC AR5 WGII SPM; *slowing down growth*)

Ten Challenges on the road to \$305 trillion (3)

10. Perverse economic performance metrics (GDP)

- GDP measures everything—even negative welfare events—as **positive**
- GDP loves inefficient outcomes (internal combustion vehicles)
- GDP says nothing about income/wealth distribution (Thomas Piketty)
- Climate change costs based on lowered GDP (IPCC AR5 WGIII 2014)

U.S. State of **Vermont** used a corrected economic growth metric (**GPI**) and recently discovered its economy stopped growing in 1978

Costanza et al. extend this to 17 of the G20 economies (2013)

Large new **growth engines** now required

With the numerous challenges and roadblocks on the road to US\$305 trillion, we will need many new economic growth engines:

Australia—best performing OECD economy in the last 15 years and the best future growth prospects. Federal Treasury estimates a **30% growth deficit to 2030** (exports: thermal coal, coking coal, LNG, iron ore, etc.)

McKinsey global resource productivity book (2014)—we will need substantial increases (**10-1000x**) in the efficiency with which capital, energy, water and other resources are utilized. Many economic activities, as currently pursued, will not survive (creative destruction?)

De-carbonization growth opportunities

IEA estimates that the level of investment required to de-carbonize the global energy system is approximately **US\$1 trillion per year**. My calculations suggest that this number is closer to **US\$2 trillion per year** (item 4 below).

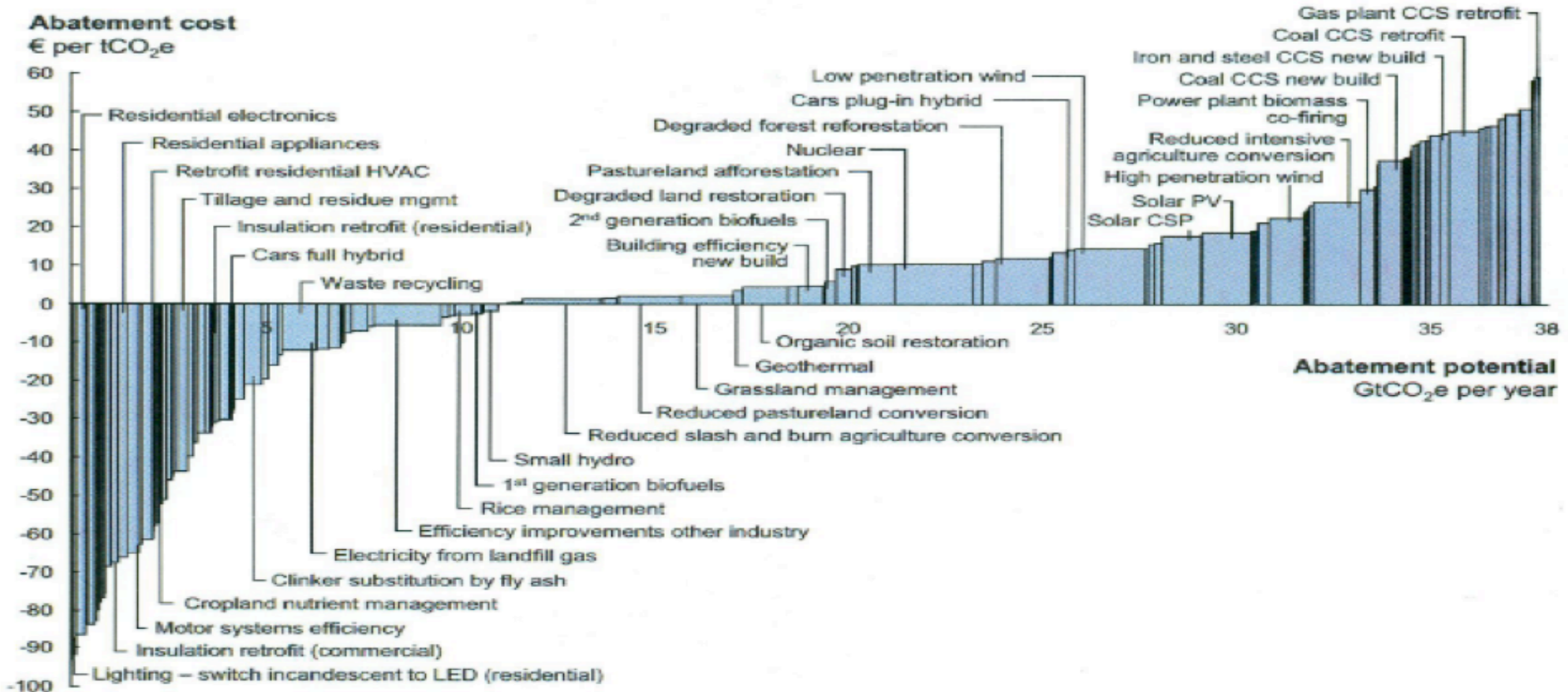
Investment areas to improve capital/energy/resource efficiency (**all 5 are essential**):

1. Improve the poor efficiency of the existing fossil system (McKinsey MACC)
2. Expand existing commercial low carbon solutions (wind, solar PV, solar thermal)
3. Accelerate proven *but not yet at scale* solutions (electric cars, smart grids, energy storage)
4. **Pay debt/equity holders of high carbon assets for early closure** (avoid “lock in”)
5. Invest much more in **game changers** (artificial photosynthesis, integral fast reactors, synthetic biology, quantum computing)

McKinsey global *carbon* abatement costs

Exhibit 1

Global GHG abatement cost curve beyond business-as-usual – 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO₂e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: Global GHG Abatement Cost Curve v2.0

Changing the **finance equation**

De-**carbon**izing the energy system is ultimately about changing the ratio between investments into low growth inefficient activities that keep carbon emissions high or increase them (**black** capital) and activities that greatly improve capital/resource efficiency and have the effect of lowering carbon emissions on a scale and timescale relevant to the 2 degrees C target (**green** capital)...

The current ratio is: **40:1 black: green**

Our 23+year approach: A price on **carbon?** (Kyoto, EU ETS, California)

One bright spot: **Green bonds/Climate bonds** (US\$400 billion)

Where does the money come from? **Plan A/B**

Plan A: put a robust price on carbon and let the market react, if not...

Plan B: recognize fundamental trends in the market and leverage them...

- Institutional investors control **US\$83 trillion** (AUM)
- Traditional stable investment opportunities declining
- Need for greater returns is very high (pension funds and insurance)
- Only 1% of pension funds' capital is invested in infrastructure (even less in **green** infrastructure)
- *The investment trend towards **green** infrastructure is inevitable*

Where does the money come from? **Plan B**

Green Bonds/Climate Bonds

- ESG investing has concentrated historically on equities
- Global debt market is USD\$100trillion
- New bonds launched in 2008 by World Bank, IFC and EIB
- USD\$12 billion in 2013—same amount in Q1 2014 (\$400b est. 2016)
- No premium yet on the green or climate credentials
- 25 major banks signed **Green Bonds Principles** (BAML, Citi, BNP Paribas, etc.)
- 2-9x oversubscribed by institutional investors (Toyota \$1.63b)
- World Bank issues AUD\$300million **“Kangaroo Green Bond”** (last week)

Where does the money come from? **Plan A**

Revenue neutral **carbon taxes** represent a tremendously effective means of accelerating the finance equation transition (liquidity threshold) and lowering taxes on growth activities:

Australia AUD\$23-25/tCO₂e tax led to AUD\$7 billion in annual revenue with an inflationary impact of +0.02%/yr (Reserve Bank of Australia)

1. Some revenue to compensate low income households
2. Revenue to the **Clean Energy Finance Corporation** (CEFC)
3. Large emitters saved money from improving energy efficiency
4. Filling in the remaining 30% wealth gap

Australian Federal Government budget shortfall is AUD\$20+ billion

What about **Australia**?

“Australia’s luck runs out as China slows down”

→ **Financial Times** 26 March 2014

Where does real future growth come from?

When do we start to invest in the future?

Where do we start to invest? A bigger role for the **CEFC**

Car manufacturing? Electric vehicles (Apple model?)

Sovereign wealth fund? (Norway)

THANK YOU

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Paris COP21/CMP11 (**December 2015**)

- Our last chance for a global agreement (2 degrees C/**450ppm**)?
- Current progress is disappointing (**Warsaw**)
- New commitments will begin in 2020
- **Green Climate** (under)**Fund**(ed)
- **MRV** (monitoring, reporting and verification)
- **Haiyan** impact (Andrew, Katrina, Sandy, ...)?



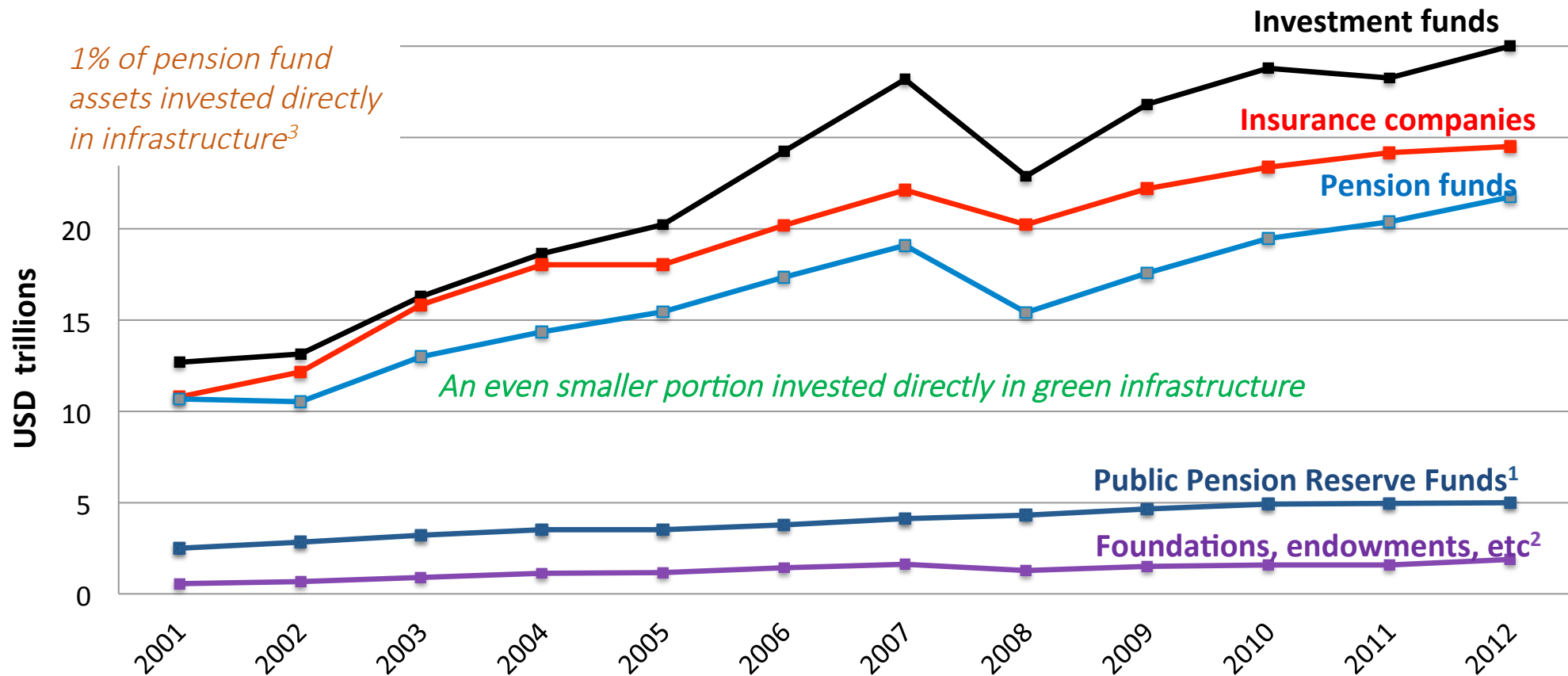
De-*carbon*izing for Growth: **New Narrative**

Success at COP21 in 2015, and more generally for Australia and many other countries between now and 2050, requires a new narrative:

The only way to be wealthier in the future is to start reducing your energy-related carbon emissions now!

1. Insert the new narrative into the *UN Secretary-General Climate Summit* in New York (September 2014)
2. Organize a **Climate Finance Summit** in France in early 2015 (CEM)
3. Invite **finance ministers** to COP21 in 2015
4. Find and showcase key projects within the 5 de-carbonisation investment themes

\$83 trillion in assets under management by institutional investors in the OECD (2012)



erves not included. Pension and insurance companies' assets include assets invested in mutual funds, which may be also counted in investment funds.

ion Reserve Funds (PPRFs) e.g. Government Pension Fund – Norway or Unites States' Social Security Trust Fund.

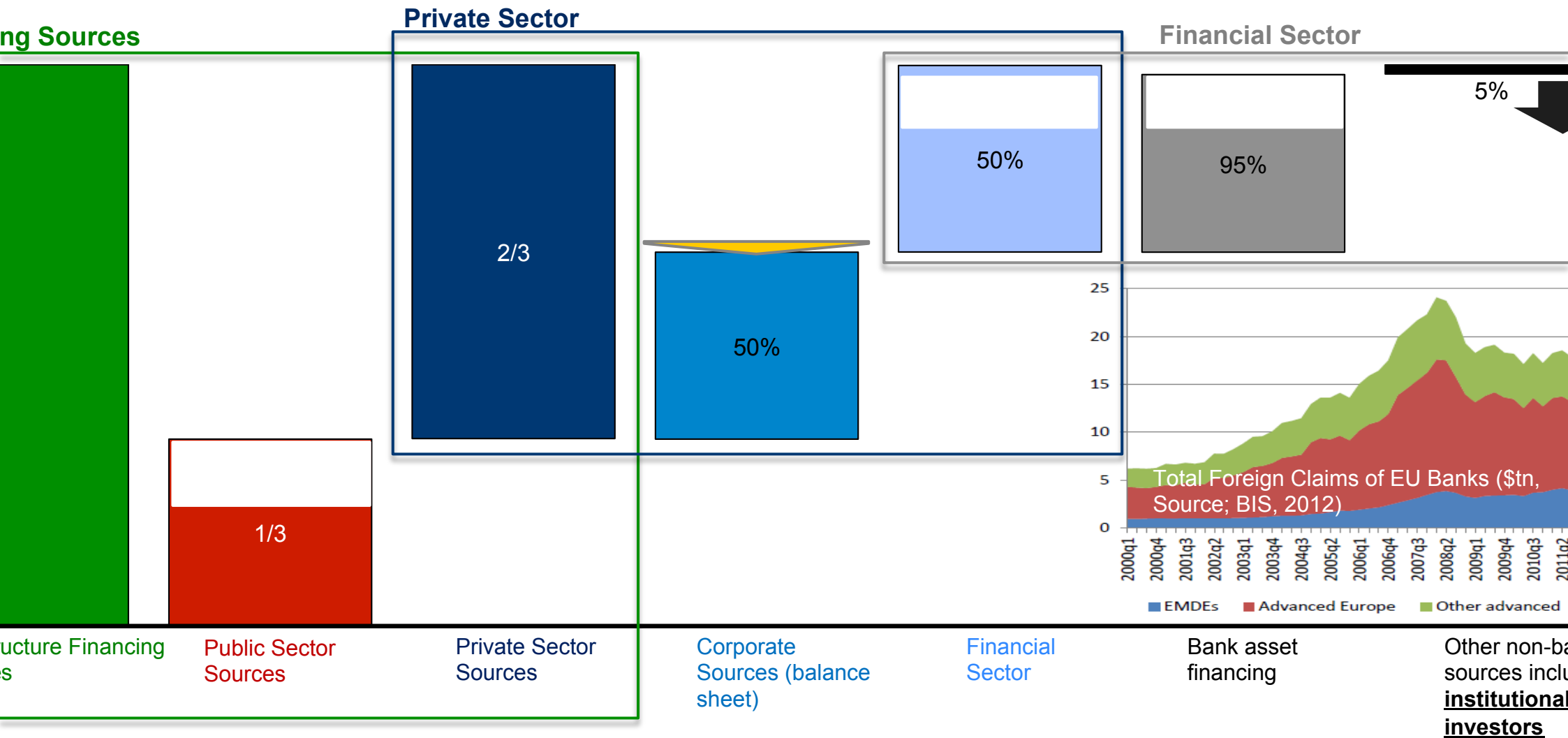
s of institutional savings include foundations and endowment funds, non-pension fund money managed by banks, private investment partnership and other forms of institutional investors.

CD Large Pension Fund Survey (2013)

Global Pension Statistics, Global Insurance Statistics and Institutional Investors databases, and OECD estimates.



Landscape of investment financing sources for green infrastructure in OECD countries (illustrative example, varies by country)



OECD Analysis based on OECD (2012) The Role of Institutional Investors in Financing Clean Energy; G20/WB/FSB/OECD (2012) European Bank Deleveraging and Credit Conditions; G20/OECD (2012) The Role of Banks, Equity Markets and Institutional Investors in Long-Term Financing for Growth and Development



Summarising challenges to scaling up institutional investor participation – policy lessons

Issues with infrastructure investments

- **Direct investing challenges**
- **Regulatory and policy issues**
 - illiquidity and direct investment restrictions e.g. capital adequacy rules (Solvency II, IORP II)
 - uncertain new policy application e.g. Solvency II for pension funds?
 - accounting rules e.g. mark to market for illiquid assets
- **Lack of project pipeline and quality historical data**
 - Compounded by exit of banks (Basel III/deleveraging)

Unintended consequences

Issues particular to green investments

- **Risk/return imbalance**
 - Market failures: insufficient carbon pricing and presence of fossil fuel subsidies
- **Unpredictable, fragmented, complex and short duration policy support**
 - Retroactive support cuts, switching incentives or start and stop (PTC)
 - Use of tax credits popular with insurers can discourage tax exempt pension funds
 - Unrelated policy objective discouragement e.g. EU unbundling
- **Special species of risk**, e.g. technology and volumetric require expertise and resources

Risk/Return

Regulatory risk

Unintended consequences

Lack of suitable investment vehicles

- **Issues with fund and vehicle design**
- **Nascent green bond markets , no indices or funds, no market for illiquid vehicles**
- **Challenges with securitisation**
- **Credit and ratings issues**



Governments can take 7 actions to address investment barriers

Ensure a stable and integrated policy environment, which provides investors with clear and long-term incentives and predictability;

Address market failures (including a lack of carbon pricing).

Provide a national infrastructure road map

Facilitate the development of appropriate financing vehicles or de-risking instruments

Reduce the transaction costs of green investment

Promote public-private dialogue on green investments with high level experts in private sector and with energy, climate/environment, finance and infrastructure ministries

Promote market transparency and improve data on infrastructure investment



De-*carbon*izing for Growth: **Outline**

1. Our collective climate response failure
2. Challenging the **conventional wisdom**
3. Our global economic growth imperative/challenges
4. Large new growth engines now required
5. Our de-*carbon*izing growth opportunity
6. Where does the money come from?
7. What about **Australia**?