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Economic Policy and Climate Change: A Reference Price for Carbon

Presentation at the Grantham Research Institute on Climate Change and the Environment, LSE, and Global Green Growth Institute's conference on the Economics of Green Growth

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Claire Langley

Global Economy and Development at the Brookings Institution

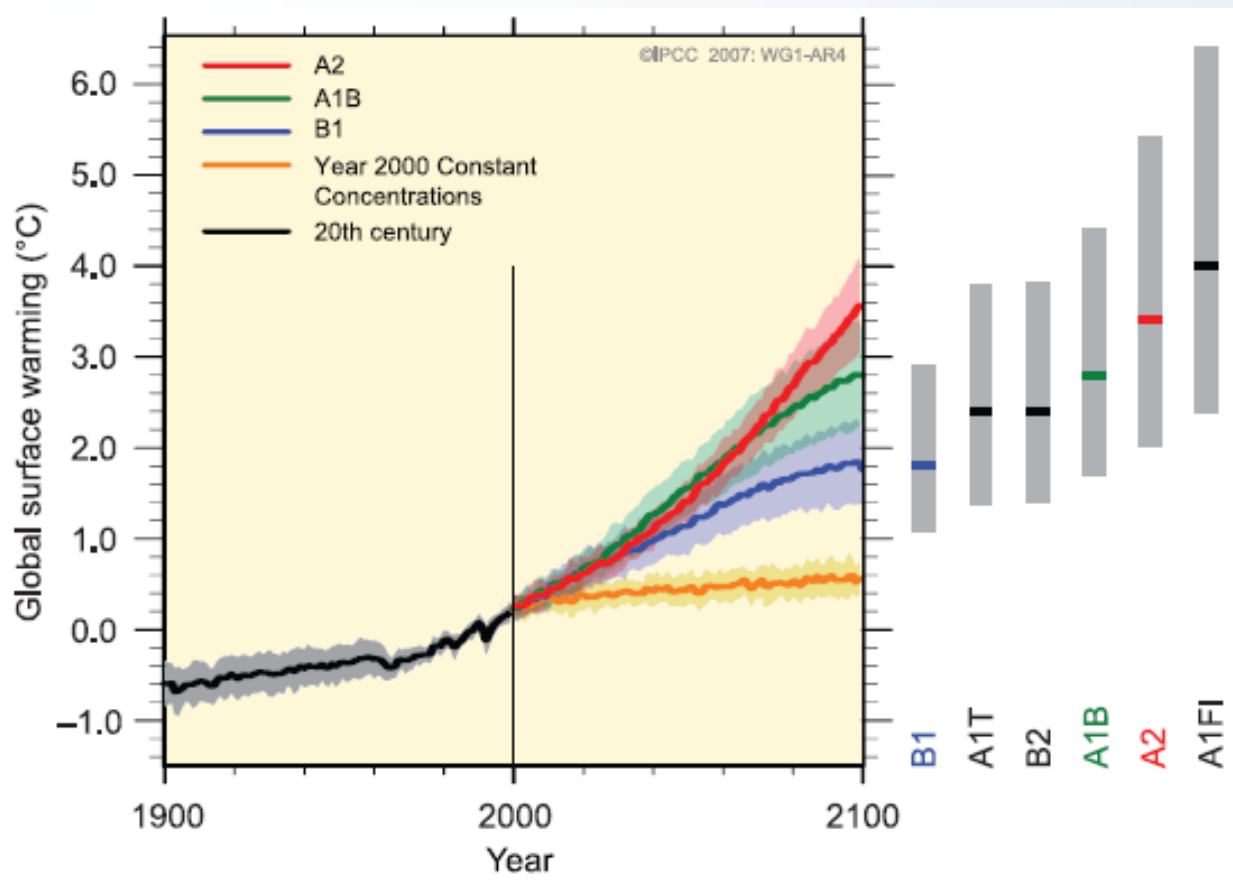
The proposal

Establishing and continuously updating a global reference price for carbon that producers and consumers can observe worldwide to help overcome the barriers to climate change policy reform.

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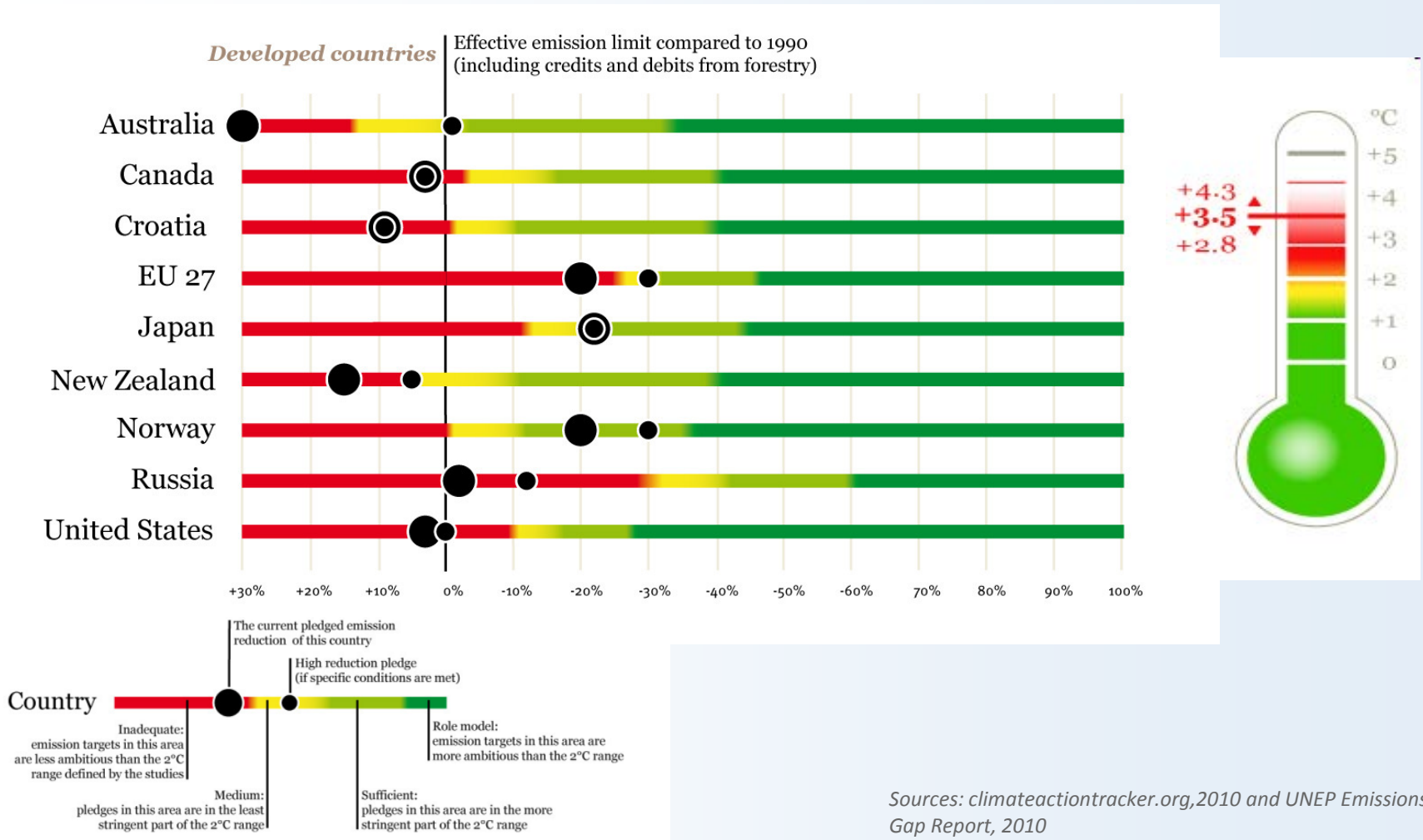
- The current context of worsening science and the policy debate
- The causes of complacency
- The proposal: a reference price for carbon
- Existing analysis
- The contribution of a reference price for carbon

Model projections of global warming with IPCC SRES emissions scenarios



- IPCC predicted in 2007 that past GHG emissions already in the atmosphere will result in 1.6°C warming by 2100.
- Business as usual will result in a rise of between 2.5°C and 6.5°C by 2100.
- Current emissions are at the top end of these predictions.

Copenhagen Accord pledges amount to a more than 3°C temperature increase by 2100



There are a range of potential climate and resource scarcity impacts associated with temperature scenarios between 1.5 - 4°C



High level Trends

Approx. Temp Increase (IPCC A1B)

~1.5°C Increase

~2°C Increase

~4°C Increase

Potential climate impacts (selected from a range of sources)

2020: Agricultural yields fall by 20% in some regions

2025: 2/3rds world's population facing water stress

2030: Global peak oil likely to occur by this time

2030: Diarrhoea increase 5% in low income countries

2030: 18% of worlds corral reefs lost

2030: temperate glaciers in equatorial Africa disappear

2040-2105: Arctic sea ice free in summer

2050: Crop yields fall by 30% in Central and South Asia; but rise 20% in East and S.E. Asia

2050: 1/4 World plant and animal species may face extinction

2050: 150m-200m people displaced by climate impacts

2050: land subject to increasing water stress double that of decreasing water stress

2080: 1.1bn-3.2bn face water shortages

2085: Dengue Fever increases to affect 3.5bn people

2100: sea levels rise 0.8-2.0 m

Climate change as a stress multiplier may be felt faster and more profoundly than predicted

- Climate science is improving and has demonstrated change is happening faster than previously understood:
 - » IPCC First Assessment Report (1990) predicted rises in global temperatures of 0.3°C per decade in the 21st century under a BAU scenario.
 - » IPCC Fourth Assessment Report (2007) updated its prediction and issued a range of models showing global temperatures rising by between 1.1 and 6.4°C during the 21st century.
 - » The tipping points are not adequately understood by the scientific and policy community.
 - » AR5?
- The direction of the science is clear, but uncertainty still remains regarding the exact nature of the forecasts and how natural and human systems will respond.

The climate change debate: ebbs and floods of concern

- Climate change gained prominence with policymakers and the public between 2005 and 2009, with the release of several influential reports and international conferences:
 - » Publications: UN Millennium Ecosystem Assessment, 2005; Stern Review, 2006; IPCC AR4, 2007; etc.
 - » International conferences: G-8 Gleneagles, 2005; UNFCCC COP13, Bali, 2007; Major Economies Forum, 2009; UNFCCC COP15, Copenhagen, 2009; etc.
- Since 2009 and the financial crisis in Europe and the U.S., climate dropped off the global agenda.
- Climate is again the focus of international concern with renewed U.S. attention and a clear pathway toward a global deal in 2015 in the UNFCCC.

The risks and costs highlight the urgency

- The science is strengthening, showing more severe consequences – e.g. the acceleration of Arctic ice decline and increased frequency of extreme weather events.
- Long lag and lead times for climate technology promotion and energy policy.
- Economic impact will be severe, and will worsen as mitigation actions are delayed. The IMF estimates GDP losses for the following scenarios:
 - » Stabilizing at 650ppm (3.6°C) by 2100 will result in GDP losses between \$0 and \$24 trillion.
 - » Stabilizing at 550ppm (below 3°C) by 2100 = losses between \$4 and \$65 trillion.
 - » Stabilizing at 450ppm (2°C) by 2100 = losses between \$12 and \$125 trillion.
- 3°C is technically unfeasible if action is delayed to after 2030, while 2°C would require the development and wide-scale deployment of still unproven low-carbon technologies.

The causes of complacency

- The distribution of costs and benefits:
 - » The **global public good** nature of the problem is an obstacle to timely action and a challenge to existing weak governance structures.
- The high level of uncertainty:
 - » **Climate science:** Although the science on climate change existence and cause is clear, models predict a wide range of probabilities in terms of impacts, timing, and feedback mechanisms.
 - » **Economic impacts:** Climate impacts are likely to affect multiple segments of society, with high costs potentially altering the growth path and relative prices characterizing it.
 - » **Low-carbon technology:** Wide-scale viability of breakthrough technologies depends on various factors such as progress on mitigation measures, improvements in climate science, and government R&D spending.

A way forward: a reference price for carbon

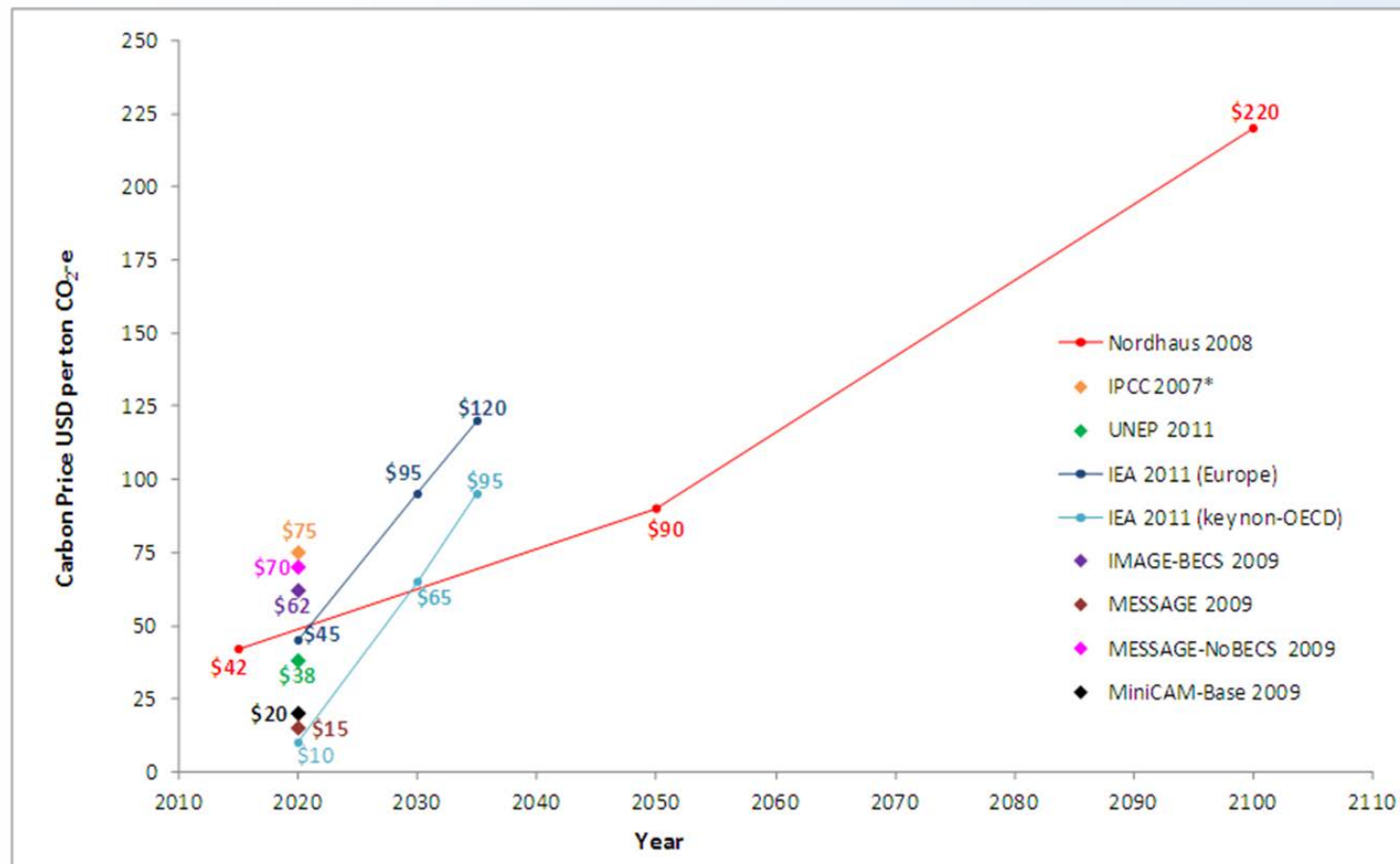
Establishing and continuously updating a global reference price for carbon that producers and consumers can observe worldwide to help overcome the barriers to climate change policy reform.

- A global reference price on carbon could be an effective tool to inform globally coordinated action on climate change.
- Carbon pricing is the best way to mitigate climate change:
 - » More efficient abatement policies.
 - » Overcome barriers to policy reform.
 - » Provides confidence for long-term investments.

Determining the reference price

- To simplify the argument conceptually, we view the world as a whole – growing along an optimal growth path with associated carbon emissions.
- The path of carbon emissions is intrinsically linked to the optimal growth path, and becomes the carbon constraint, or carbon budget. From this we can derive a shadow price for carbon – which once set in global policy, becomes the reference price.
- The reference price would be estimated for the present and projected into the future, with a tendency to rise over time as the carbon constraint becomes increasingly binding.
- The price could fall if a technological breakthrough is achieved, making renewable or low carbon technologies much cheaper.

Carbon price trajectories under selected scenarios for GHG stabilization at 450 ppm CO₂-e



*IPCC data shows a range of prices of 50 to 100 USD between 2010 and 2030

Sources: Nordhaus, 2008; IPCC, 2007; UNEP, 2011; IEA WEO, 2011; selected scenarios discussed in Clarke et al., 2009.

The contribution of a reference price for carbon

- Provide clarity on the true cost of carbon and the scale of the problem.
- Guidance for long-term decisions by:
 - » Policymakers: progress on international and intersectoral agreements where actors could commit themselves to a gradual reduction between the actual and the reference price.
 - » Investors: gain a clearer picture on the direction of policy and build confidence on investments in low carbon technologies.
- Inform the debate on climate change and support evidence-based arguments.

Addressing the challenges

- Current carbon pricing models are limited and the following issues need to be addressed toward next steps in implementing a global reference price for carbon:
 - » Create coherent standards for measurement.
 - » Take into account distribution issues.
 - » Include the full costs of climate change impacts on the global economy.
- Reaching consensus on mutual action at the international level would help to overcome political barriers.
- An authoritative institution, or institutions, would need support by the global community to provide regular updates on a reference price for carbon.