A Green New Deal: climate change mitigation as an economic stimulus

Dr Alex Bowen
(*Principal Research Fellow, Grantham Research Institute)*

Are economic growth and environmental sustainability compatible?

Complexity Economics for Sustainability: Research Seminar, Madingley Hall, Cambridge
4 December 2009

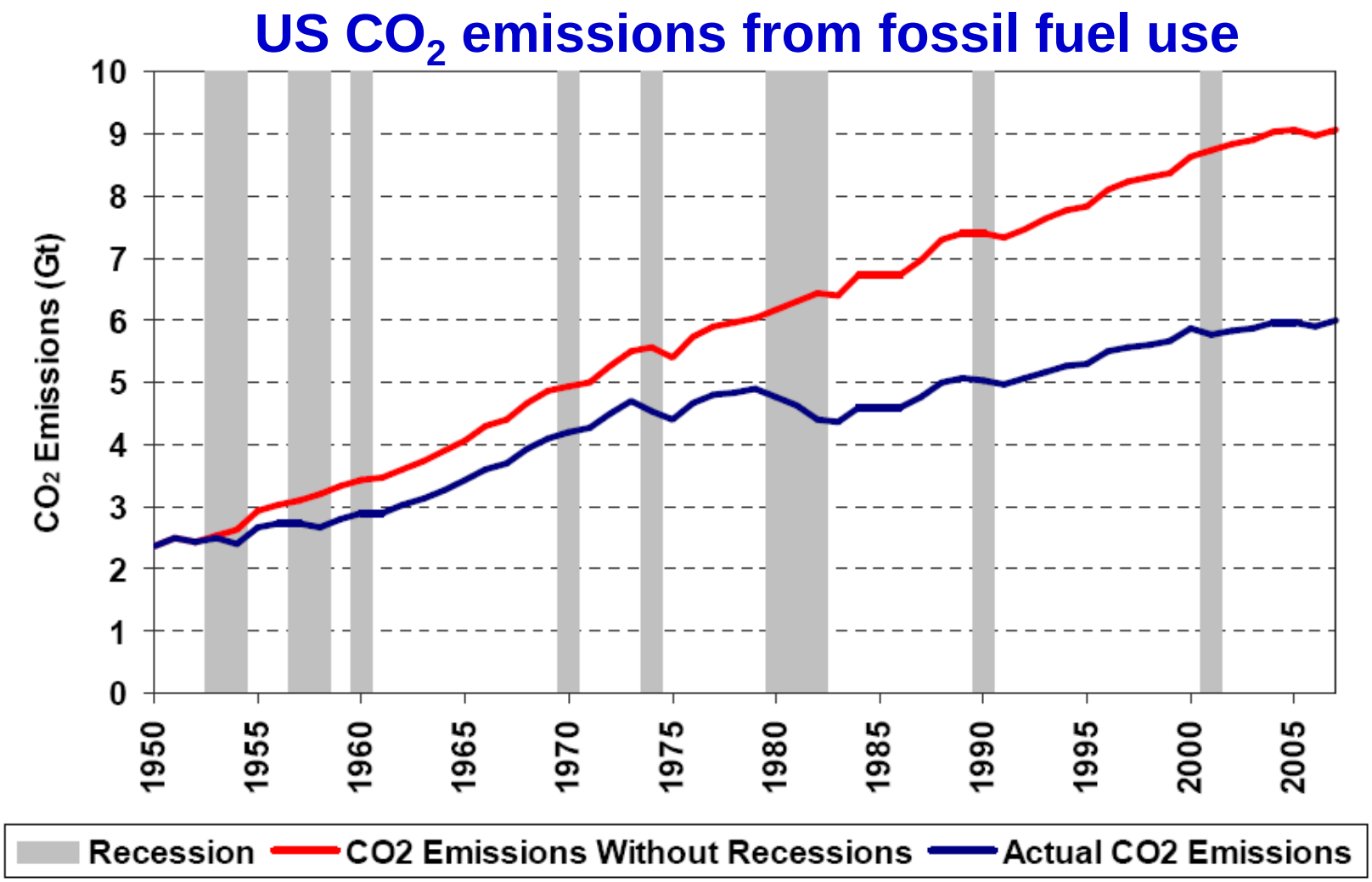
LSE the London School of Economics and Political Science

Grantham Research Institute on Climate Change and the Environment

The need for stronger environmental policies

- Interaction with long-run growth and development
  - "We are not managing our environment in a sustainable manner" OECD (2008)
  - Threat to Millennium Development Goals
- Climate change risks greater than we thought

Has the recession reduced the urgency of action?

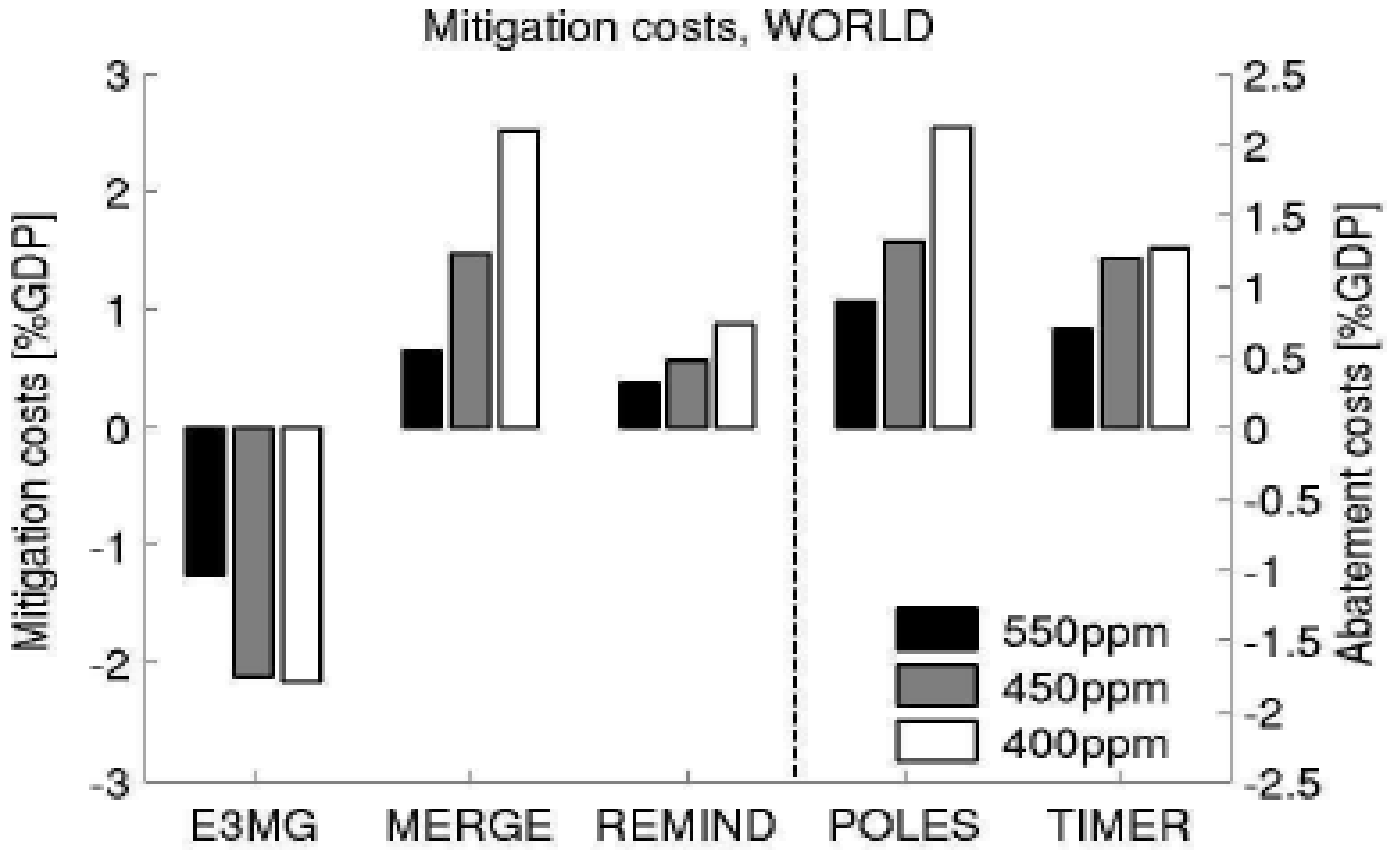


Source: Bowen et al (2009) CCCEP WP 11

Feasibility of 2 C ceiling?

- Feasible with good policies
  - Menu of technologies (–ve emissions techs?)
  - Induced technical progress
  - Full participation
  - High (and rising?) carbon price
  - Early start

Mitigation costs



Source: Knopf, Edenhofer et al (2009): 'The economics of low stabilisation: implications for technological change and policy' (part of the ADAM project)

Key elements of climate-change policies

- Making the polluter pay: pricing the greenhouse gas externality
- Making greenhouse gases an ethical issue
- Tackling the market failures (and policy distortions) standing in the way

Is now a good time? Implications of a major slowdown

- The global downturn makes tackling market failures easier (GRI, WRI, CAP, PIK/LSE)
  - Lower opportunity costs
  - Rationale for (temporary) increase in deficit-financed public spending (if exit strategy broadly credible)
  - Boost to growth
    - In short run, from the fiscal stimulus
    - In long run, from correcting neglected market failures and guarding against climate-change impacts
- Fiscal measures need to be tested against several criteria

Is now a good time?
Implications of a major slowdown

- Stronger case for spending on public goods?
  - Green ‘New Deal’ proposals
- Weaker case for Pigovian taxes?
  - Resistance to carbon pricing and tougher environmental regulation

Are activist fiscal policies warranted in response to the economic downturn?

- Comparative advantage of monetary policy now less
  - Interest rates near zero lower bound
  - Impact of ‘quantitative easing’ not fully understood
- Fiscal policy more effective if
  - Monetary policy stops interest rates rising in response
  - Action is taken internationally
- Lots of credit-constrained private firms and households
  - ‘Ricardian equivalence’ does not hold

Are activist fiscal policies warranted in response to the economic downturn?

- Empirical evidence
  - Estimates of fiscal multipliers
  - IMF cross-country studies
    - Recessions
    - Banking crises
  - Role of credit constraints
  - Role of public debt
    - Expansionary fiscal contractions

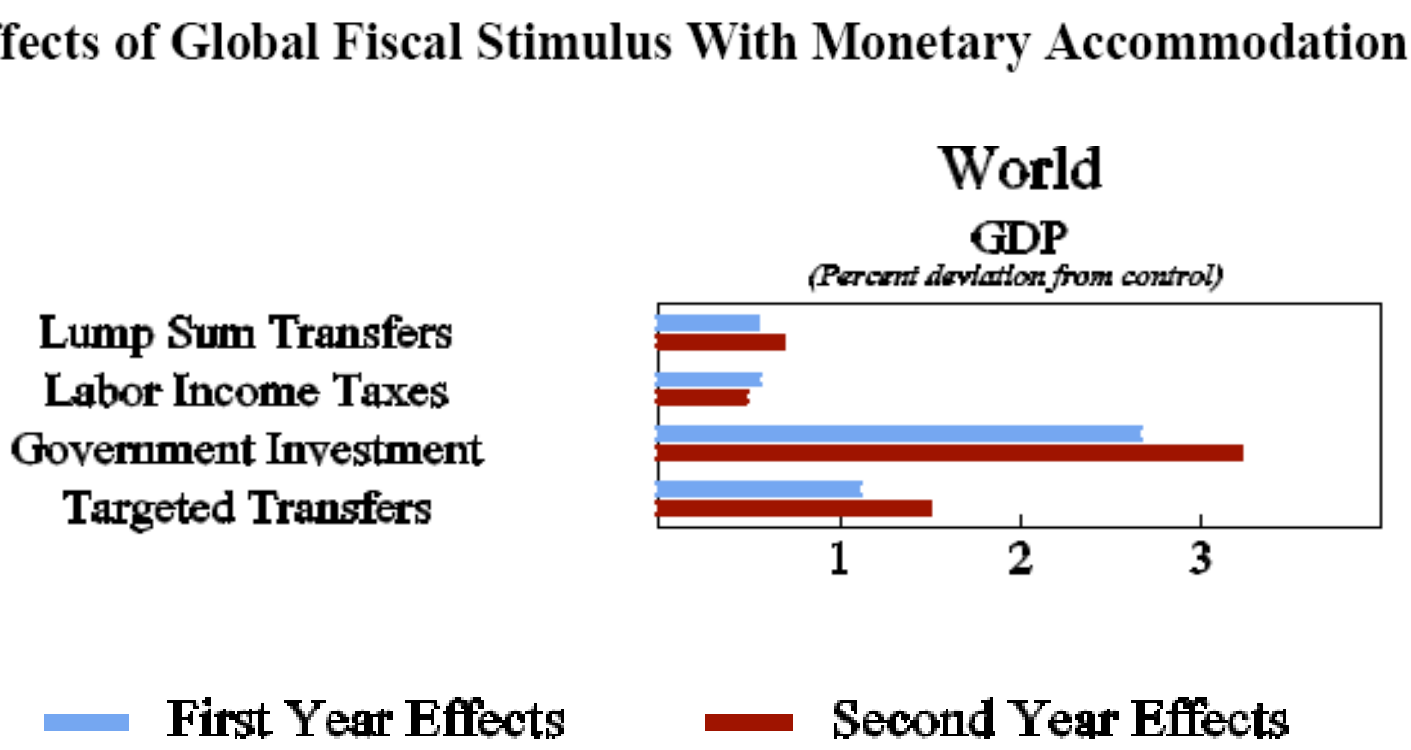
We are in a sharp demand-led global slowdown

Successive IMF Global Growth Projections for 2009 (Real GDP %)

Region/country	April 2008	July* 2008	Oct 2008	Nov* 2008	Jan* 2009	April 2009	July* 2009	Oct 2009
World	3.8	3.9	3.0	2.2	0.5	-1.3	-1.4	-1.1
Advanced economies	1.3	1.4	0.5	-0.3	-2.0	-3.8	-3.8	-3.4
Euro area	1.2	1.2	0.2	-0.5	-2.0	-4.2	-4.8	-4.2
US	0.6	0.8	0.1	-0.7	-1.6	-2.8	-2.6	-2.7
UK	1.6	1.7	-0.1	-1.3	-2.8	-4.1	-4.2	-4.4
Developing economies	6.6	6.7	6.1	5.1	3.3	1.6	1.5	1.7
China	9.5	9.8	9.3	8.5	6.7	6.5	7.5	8.5

***WEO Update report**
Source: IMF WEO

Bigger ‘bang for the buck’ with government investment



Source: IMF (March 2009)

Criteria for assessing deficit-financed measures

- ***Effectiveness against recession***
  - Timely (rapid) impact
  - A large 'fiscal multiplier'
  - Little crowding out of private sector spending: targeting sectors with slack
- ***Benefits in their own right***
  - High social returns in the longer term
  - What's cheaper to do now than later?
- ***An 'exit strategy'***

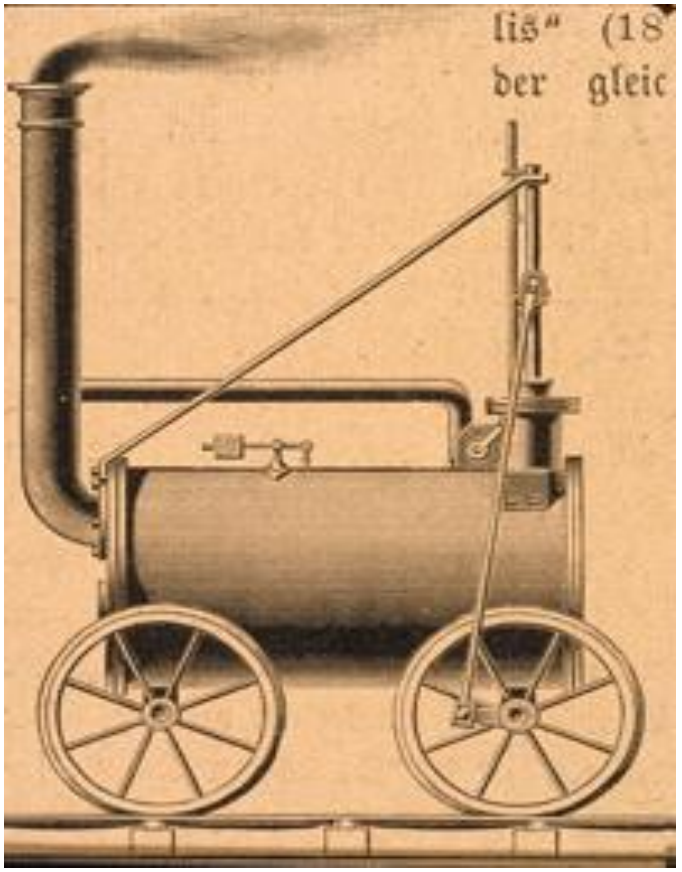
Assessing selected proposals

CRITERION	GOOD	NOT SO GOOD
Timeliness	Residential energy efficiency	Nuclear power
Long-term social return	Energy-efficient lighting	Tyre check
Positive 'lock-in' effects	'Smart' production techniques	Carbon capture and storage demos
Domestic multiplier/job creation	Energy efficiency measures in public buildings	'Smart' production techniques
Targeting areas with slack	Boiler replacement programme	Encouraging energy R&D
Time-limited/reversible	'Smart' electricity grid	Car efficiency standards

Based on ***"An outline of the case for a 'green' fiscal stimulus"*** – a Grantham Research Institute Policy Brief, February 2009

The difficulty of predicting technological winners

versus



Renewable energy more labour-intensive (but expensive)

Energy Technology	Source of Estimate	Average Employment Over Life of Facility (jobs/MWa)		
		Construction, Manufacturing, Installation	O&M and fuel processing	Total Employment
PV 1	REPP, 2001	6.21	1.20	7.41
PV 2	Greenpeace, 2001	5.76	4.80	10.56
Wind 1	REPP, 2001	0.43	0.27	0.71
Wind 2	EWEA/Greenpeace, 2003	2.51	0.27	2.79
Biomass Ğ high estimate	REPP, 2001	0.40	2.44	2.84
Biomass Ğ low estimate	REPP, 2001	0.40	0.38	0.78
Coal	REPP, 2001	0.27	0.74	1.01
Gas	Kammen, from REPP, 2001; CALPIRG, 2003; BLS, 2004	0.25	0.70	0.95

Table 1: Average employment for different energy technologies. "MWa" refers to average installed megawatts de-rated by the capacity factor of the technology; thus, for a 1 MW solar facility operating on average 21% of the time, the power output would be 0.21 MWa. References in parentheses and sources refer to the studies reviewed in the text. The biomass energy studies are a proxy for jobs that could derive from an expansion of biofuels (e.g. ethanol use) in regional or the national energy mix.

Source: Kammen (2007): 'Testimony to the US Senate Committee on Environment and Public Works'

More unskilled jobs?

Breakdown of job creation through green investments versus fossil fuels by formal credential levels

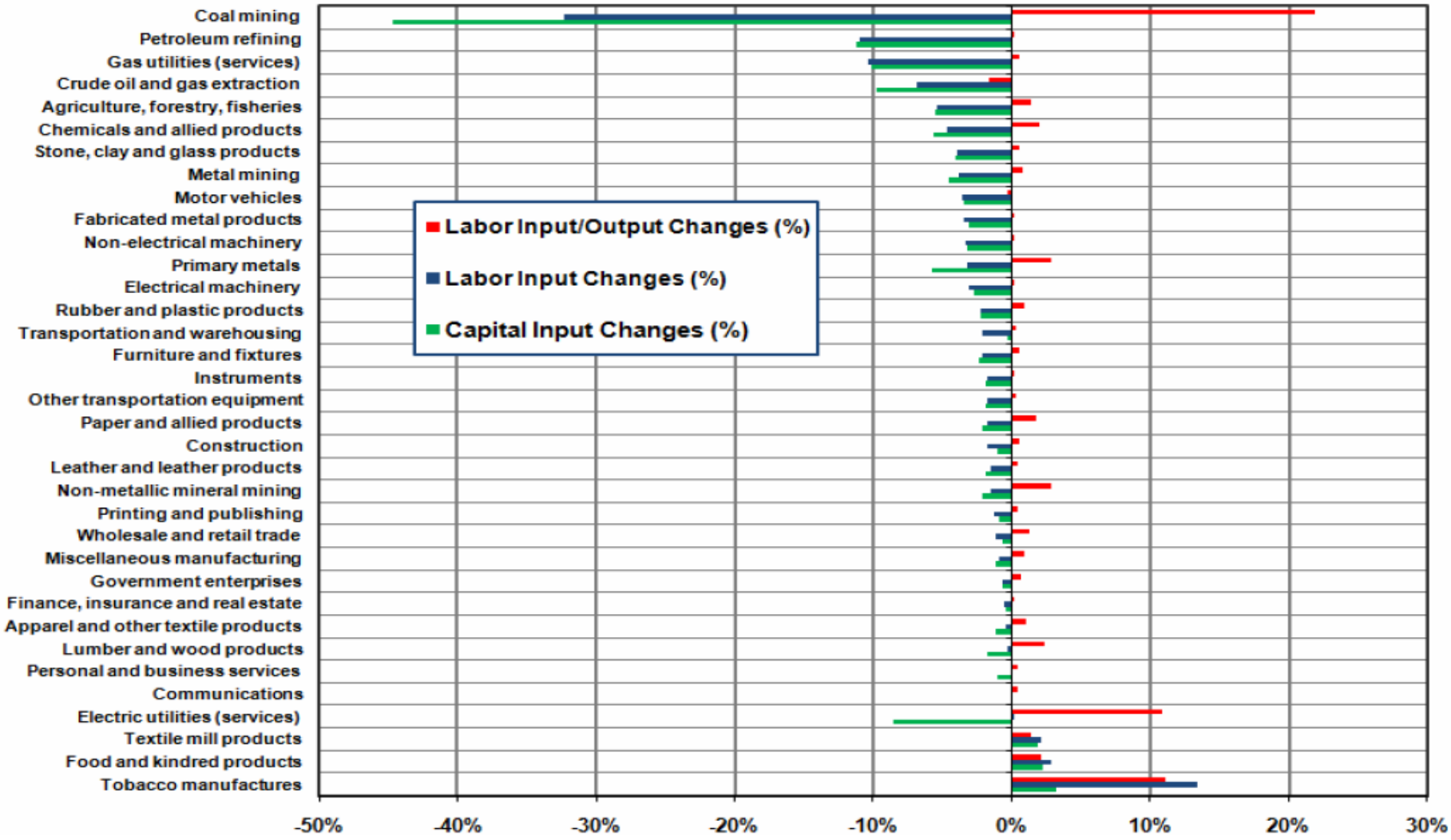
Based on $1 million of spending

	1) Green investments	2) Fossil fuels	3) Difference in job creation (= column 1–2)
Total job creation	16.7	5.3	11.4
High-credentialed jobs • B.A. or above • $24.50 average wage	3.9 (23.3% of green investment jobs)	1.5 (28.3% of fossil fuel jobs)	2.4
Mid-credentialed jobs • Some college but not B.A. • $14.60 average wage	4.8 (28.7% of green investment jobs)	1.6 (30.2% of fossil fuel jobs)	3.2
Low-credentialed jobs • High school degree or less • $12.00 average wage	8.0 (47.9% of green investment jobs	2.2 (41.5% of fossil fuel jobs)	5.8
Note: Low-credentialed jobs with decent earnings potential • $15.00 average wage	4.8 (28.7% of green investment jobs)	0.7 (13.2% of fossil fuel jobs)	4.1

Note: Average wage is the median wage for all workers across all industries within each of the credential categories listed above.

Source: Pollin, Heintz and Garrett-Peltier (2009): 'The economic benefits of investing in clean energy' CAP/PERI, June

Where are the new jobs going to be? Not necessarily where expected



Source: Goettle and Fawcett (2009): 'The structural effects of cap-and-trade climate policy'

Scale of recent fiscal stimuli

Region/ country	Overall fiscal balance (% GDP)				Average annual change in 2008-10 from level in 2007 (% points of GDP)			
	2007	2008	2009	2010	Overall balance	Automatic stabilisers	Discretionary measures	Other
G20	-1.1	-2.6	-5.9	-6.3	-3.8	-1.4	-1.2	-1.2
EU G20	-1.6	-2.7	-6.0	-6.9	-3.5	-2.2	-0.6	-0.7
China	0.9	-0.3	-3.6	-3.6	-3.4	-0.6	-2.1	-0.7
USA	-2.9	-5.9	-7.7	-8.9	-4.6	-1.6	-1.6	-1.4
UK	-2.7	-5.5	-9.5	-11.0	-6.0	-2.5	-0.5	-2.9

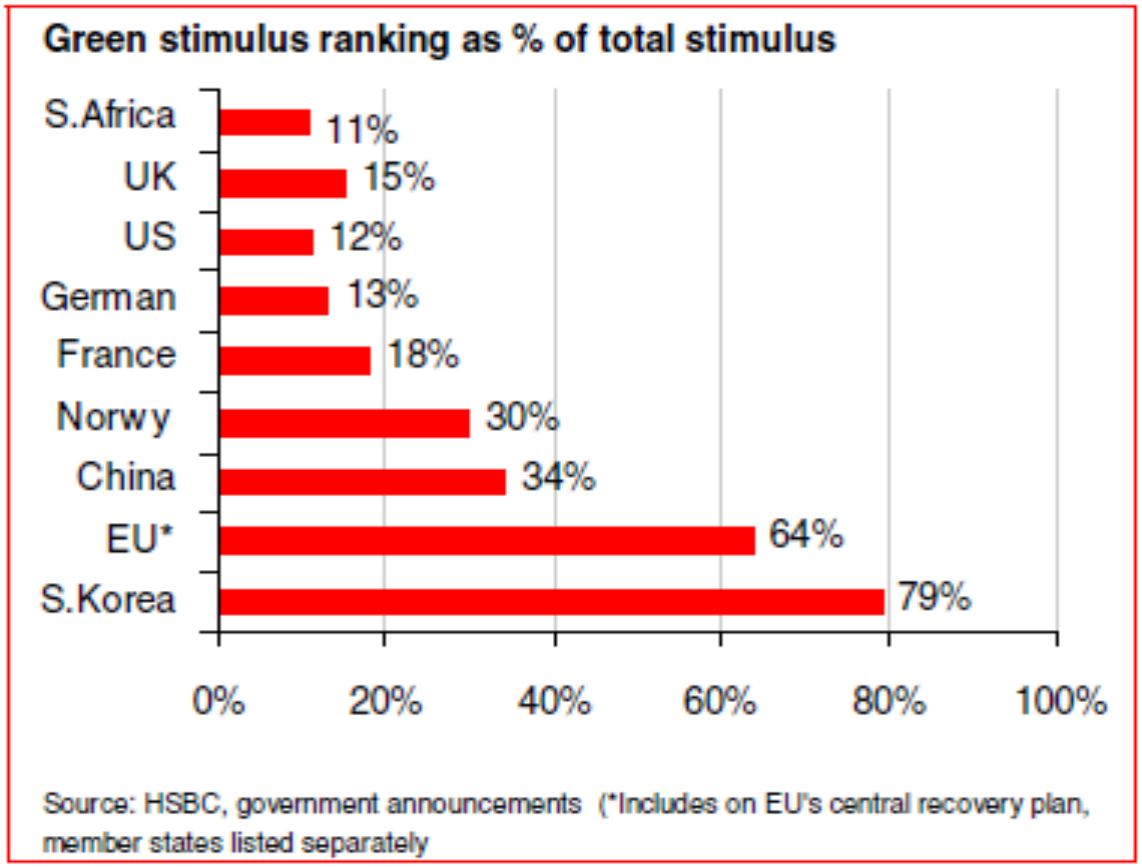
Source: IMF

‘Green’ content differs widely

Region/country	Total stimulus (US$bn)	Period (years)	‘Green’ stimulus (US$bn)	‘Green’ stimulus (%)
China	649.1	2009-2010	218.0	33.6
Japan	639.9	2009-	36.0	5.6
South Korea	76.1	2009-2012	59.9	78.8
Sub-total Asia Pacific	*1,558.5*		*334.1*	*21.4*
United Kingdom	34.9	2009-2011	5.2	10.6
Sub-total EU	*537*		*55.2*	*10.3*
US	976.9	10 years	117.2	12.0
Sub-total Americas	*1,024.1*		*121.2*	*11.8*
Grand total	3,130		512	16.4

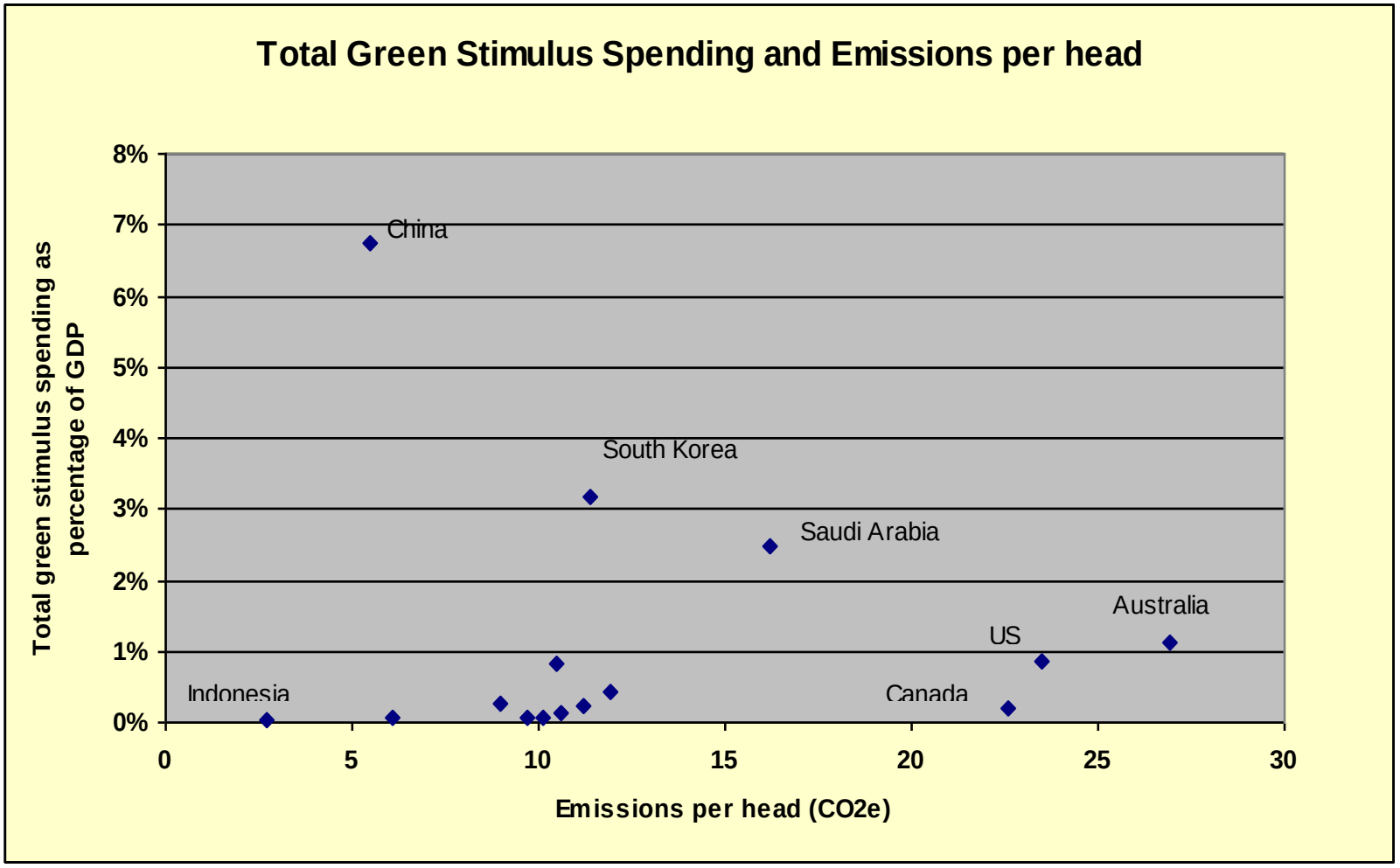
Source: HSBC

Fiscal stimuli: 'green' content varies widely



Source: HSBC (2009) 'A global green recovery? Yes but in 2010' 6 August

‘Effort’ versus carbon intensity



Source: HSBC (May 2009) and WRI CAIT

Environmental policies and business cycles in general

- Change in policy regime vs. change in instruments under a given regime
- Business cycles differ
- Business cycle propagation not fully understood, hence welfare implications of policy interventions not well understood either
- Business cycles difficult to predict
- Local vs. global; open vs. closed economies
- ‘Double dividend + rigid real wage’ literature; real business cycle literature

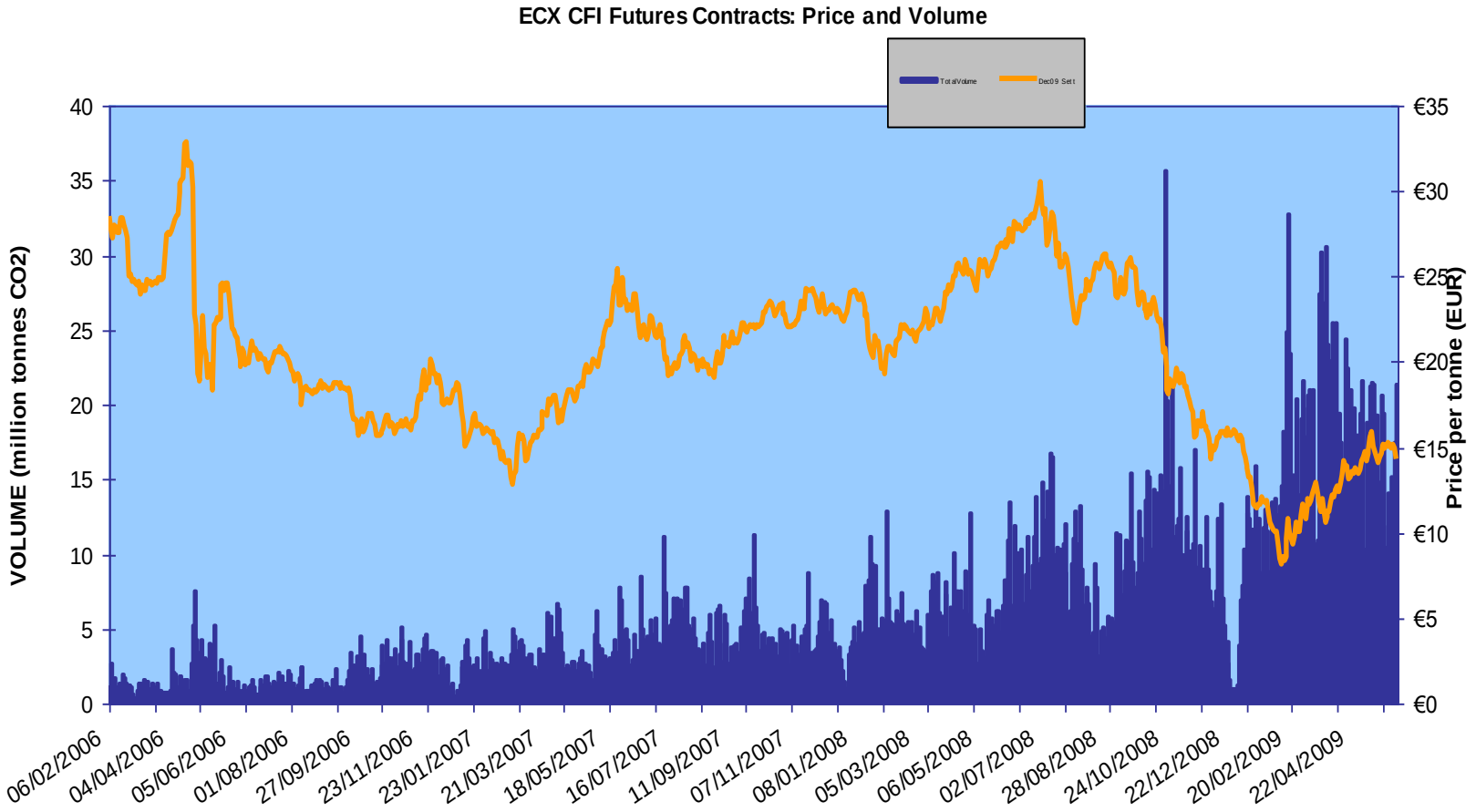
How might an economic slowdown affect other measures?

- ***Pigovian taxes***
  - Impact of the slowdown on the environmental phenomenon e.g. flow of pollutants
  - Impact of the slowdown on willingness to pay
    - Nature of the slowdown may matter, e.g. credit constraints

How might an economic slowdown affect other measures?

- The global slowdown is no excuse for ignoring the need for carbon pricing
  - Incentive for developing low-carbon technologies (Popp, 2002)
  - Incentive for changing patterns of consumption by households and input purchases by firms (Stanford Energy Modeling Forum 22)
  - Need to start establishing the credibility of climate-change policies
- However, large, unexpected slowdowns may warrant lower carbon prices
  - Current generation's income hit hard
  - Automatic stabiliser (Chang et al, 2009)
  - What's the source of the slowdown? (e.g. Bovenberg and Van der Ploeg (1996, 1998) on rigid real wages)

The carbon price in the EU ETS, 2006-09



Source: European Climate Exchange

……a weak and volatile signal?

How might an economic slowdown affect other measures?

- ***Pigovian taxes***
  - Impact of the slowdown on the environmental phenomenon e.g. flow of pollutants
  - Impact of the slowdown on willingness to pay
    - Nature of the slowdown may matter, e.g. credit constraints
- ***Financial intermediary of last resort***
  - Correcting market failures in the finance sector

Conclusions

- This downturn is a good time to ramp up environmental policies, especially those against climate change…
- …but not all policies are equal
  - Types of spending
  - Spending vs. other measures e.g. Pigovian taxes

Conclusions

- Fighting climate change
  - Vital
  - Do-able
  - Straightforward!

A Green New Deal: climate change mitigation as an economic stimulus

You can find out more about the work of the Grantham Research Institute on Climate Change and the Environment at:

http://www.lse.ac.uk/collections/granthamInstitute/

LSE the London School of Economics and Political Science

Grantham Research Institute on Climate Change and the Environment

We are in a sharp demand-led global slowdown

Successive IMF Global Growth Projections for 2010 (Real GDP %)

Region/country	January * 2009	April 2009	July* 2009	October 2009
World	3.0	1.9	2.5	3.1
Advanced economies	1.1	0.0	0.6	1.3
Euro area	0.2	-0.4	-0.3	0.3
US	1.6	0.0	0.8	1.5
UK	0.2	-0.4	0.2	0.9
Developing economies	5.0	4.0	4.7	5.1
China	8.0	7.5	8.5	9.0

***WEO Update report**
Source: IMF WEO