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Climate Change  
Economics and Policy



Grantham Research Institute on  
Climate Change and  
the Environment

# Green growth and employment

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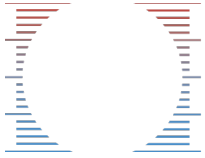
**Green Growth Knowledge Platform Inaugural Conference,  
Mexico City,  
12-13 January 2012**





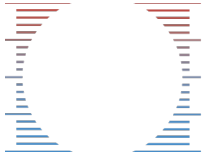
## Main points

- ‘Green jobs’ difficult to define
- Much scope for *gross* job creation in the transition to green growth
- But policy-makers seeking co-benefits should focus on *net* job creation
- Studies for high-income countries not necessarily a good guide for developing countries
- We need to know more



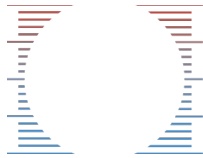
## Definitions and scope

- Industry versus occupation
- Scope:
  - Direct
  - Indirect
  - Induced: macroeconomic responses
- Time horizon
  - Changing prices, inputs capital stock and technology
  - Long-term Schumpeterian growth?
- Gross versus net



## Opportunities for job creation

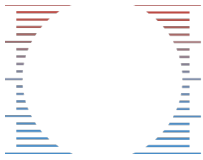
- Green jobs around 1.7% of total paid employment in Europe (EC, 2007) on OECD/Eurostat definition of the environmental goods and services industry (OECD, 1999)
- 0.25% of global employed labour force of around 1.8 bn on UNEP 'green jobs' definition? (UNEP, 2008)
- But jobs in renewables from 2.3 mn in 2006 to 20 mn in 2030?
- 'Clean energy economy' 0.5% of US jobs (Pew, 2009)
- Environment industry responsible for 1.6% of Korean employment directly and indirectly (GGGI, 2011)



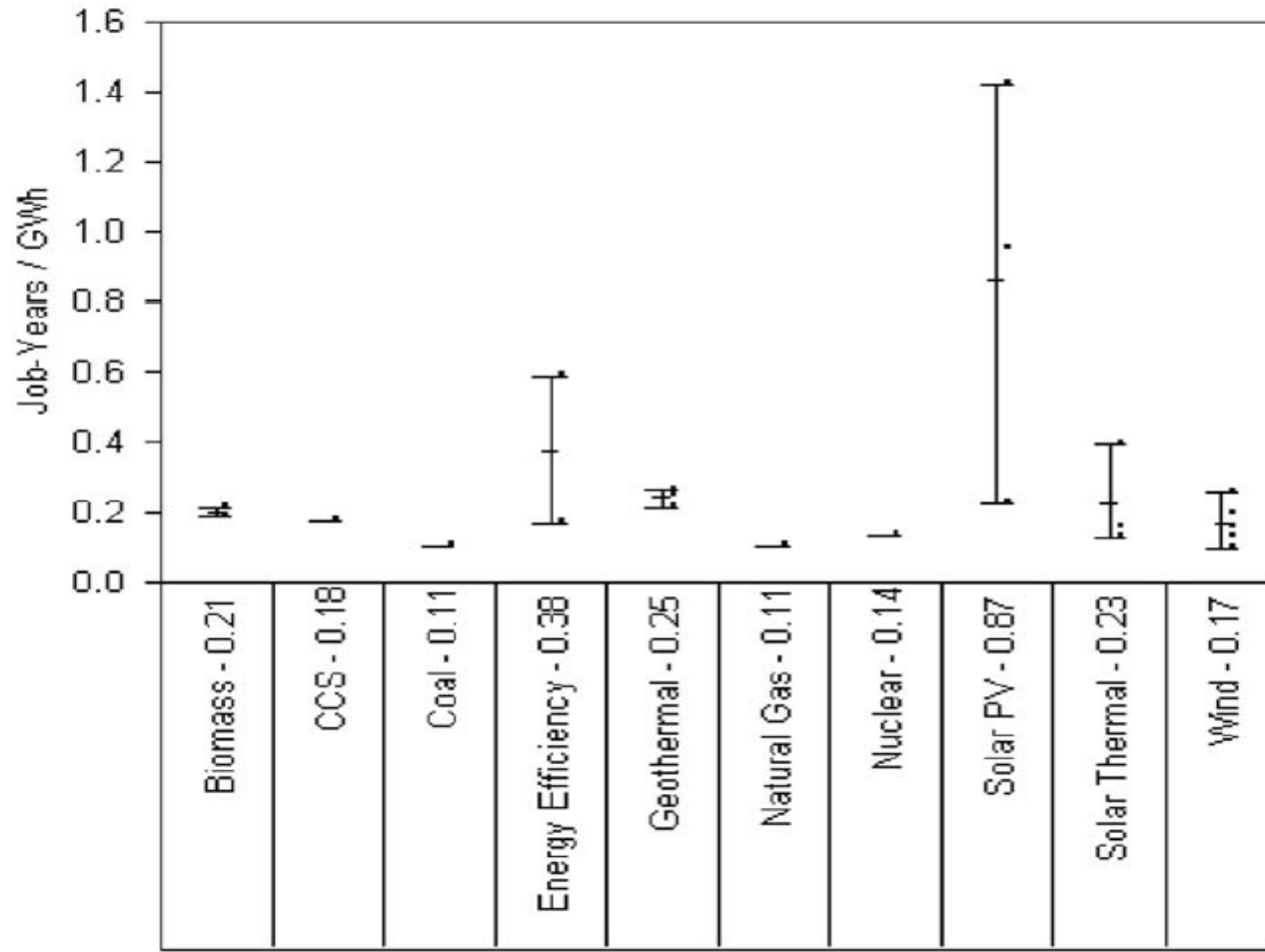
## Not all measures equally 'jobs-friendly:' the Korean stimulus

Spending item	Total Employment Increase	Total Planned Spending (US\$ m)	Employment Increase/US\$ Bn Added Expenditure
Mass transit	138,000	7,005	19700
Energy conservation	170,000	5,840	29100
Vehicles and clean energy	14,300	1,490	9600
Env friendly living space	10,800	350	30900
River restoration	200,000	10,500	19000
Forest restoration	134,000	1,750	76600
Water resource management	16,000	685	23400
Resource recycling	16,000	675	23700
Green information	3,000	270	11100
Total	703,000	28,600	24600

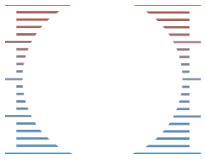
Source: Barbier (2009).



# Job creation or low productivity?

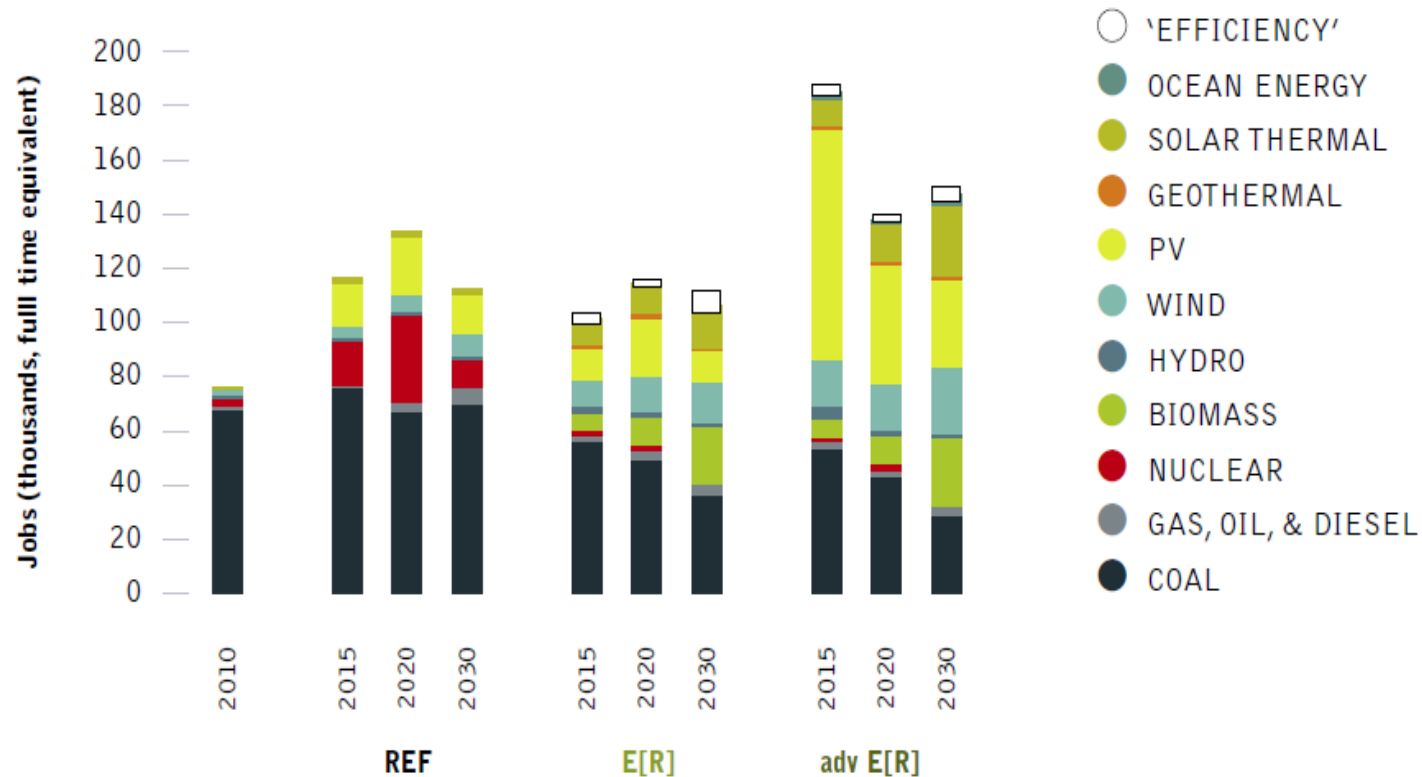


Source: Wei et al (2010) "Putting renewables and energy efficiency to work"

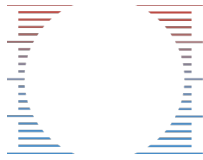


# Net vs. gross: South Africa

figure 7.1: jobs by technology under three scenarios



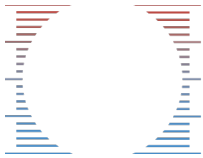
Source: Rutovitz (2011), Ch. 7 in 'The Advanced Energy [R]evolution: A Sustainable Energy Outlook for South Africa'



## **‘Green’ jobs: the macro context**

- Neoclassical full employment CGE models
- Multiplier models with Keynesian unemployment
  - Debate about the size of the employment multiplier in different circumstances (exchange rate, Ricardian equivalence, etc)
- Finance
- ‘Double dividend’
  - Payroll taxes





# Costs of adjustment in labour markets

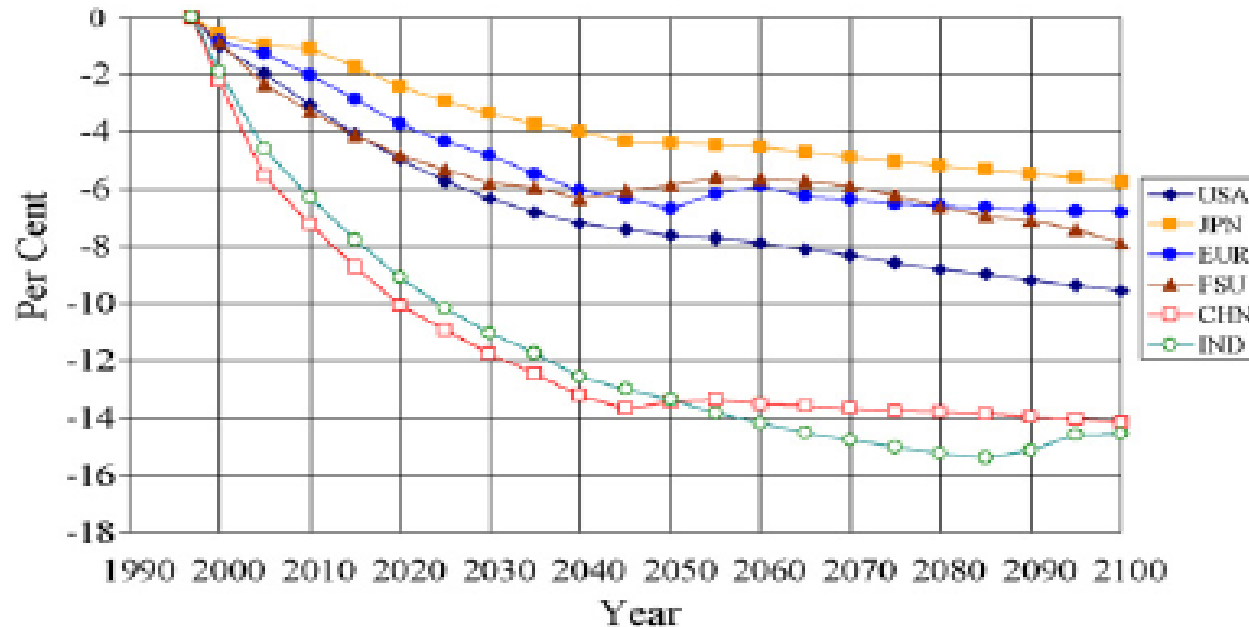
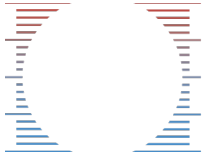


Fig. 7 – Differences in GNP with emissions restrictions policy in solutions with sector-specific labor and rigid wages compared to solutions with flexible labor and flexible wages.



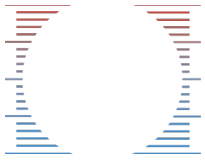
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# Danger of extrapolating conclusions to developing countries (1)

- Less known
- Uncertainty greater



# India: wind

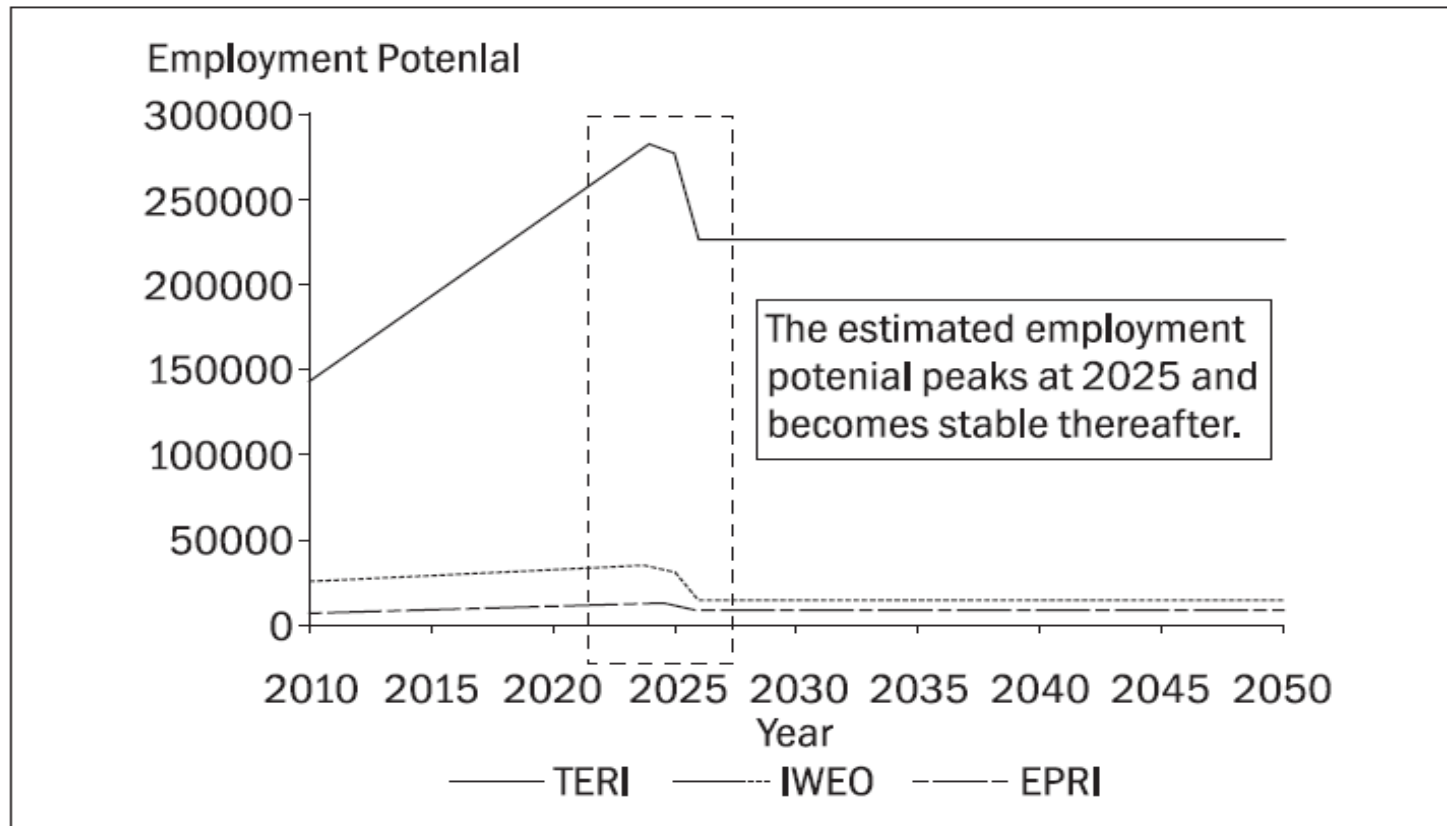
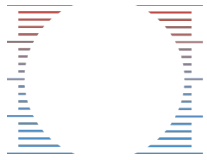
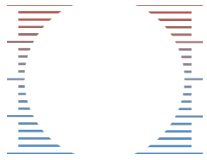


Figure 1 Employment Potential for High Growth Scenario



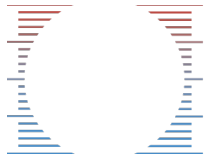
# Danger of extrapolating conclusions to developing countries (1)

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- Starting position different
- Environmental challenges greater



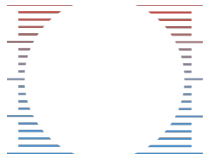
## Erosion of natural capital

	Energy depletion	Mineral depletion	Net forest depletion	CO2 damage	Particulate emissions damage	Total
East Asia/ Pacific	3.3	0.3	0.0	1.0	0.7	5.3
South Asia	2.1	0.9	0.9	0.9	0.5	5.3
World	2.0	0.3	0.0	0.4	0.2	2.9



# Danger of extrapolating conclusions to developing countries (1)

- Less known
- Uncertainty greater
- Starting position different
- Environmental challenges greater
- **Wider variety of industrial structure**
- **Endowments vary**



## **Danger of extrapolating conclusions to developing countries (2)**

- Labour markets may work very differently
  - Segmented labour markets
  - Formal vs. informal sectors
  - Household labour supply decisions
  - Marginal vs. average productivity
  - May be more exposed to shocks to terms of trade



## Research needs

- Labour intensity of green projects in a wider range of industries over different time scales
- More sophisticated macro modelling of labour markets
- Better understanding of sources of labour market failures in different countries
- Better understanding of the role of labour market policy interventions, including taxation, and how they interact with green policies