



Deep Decarbonization in Industries what does it mean for India?

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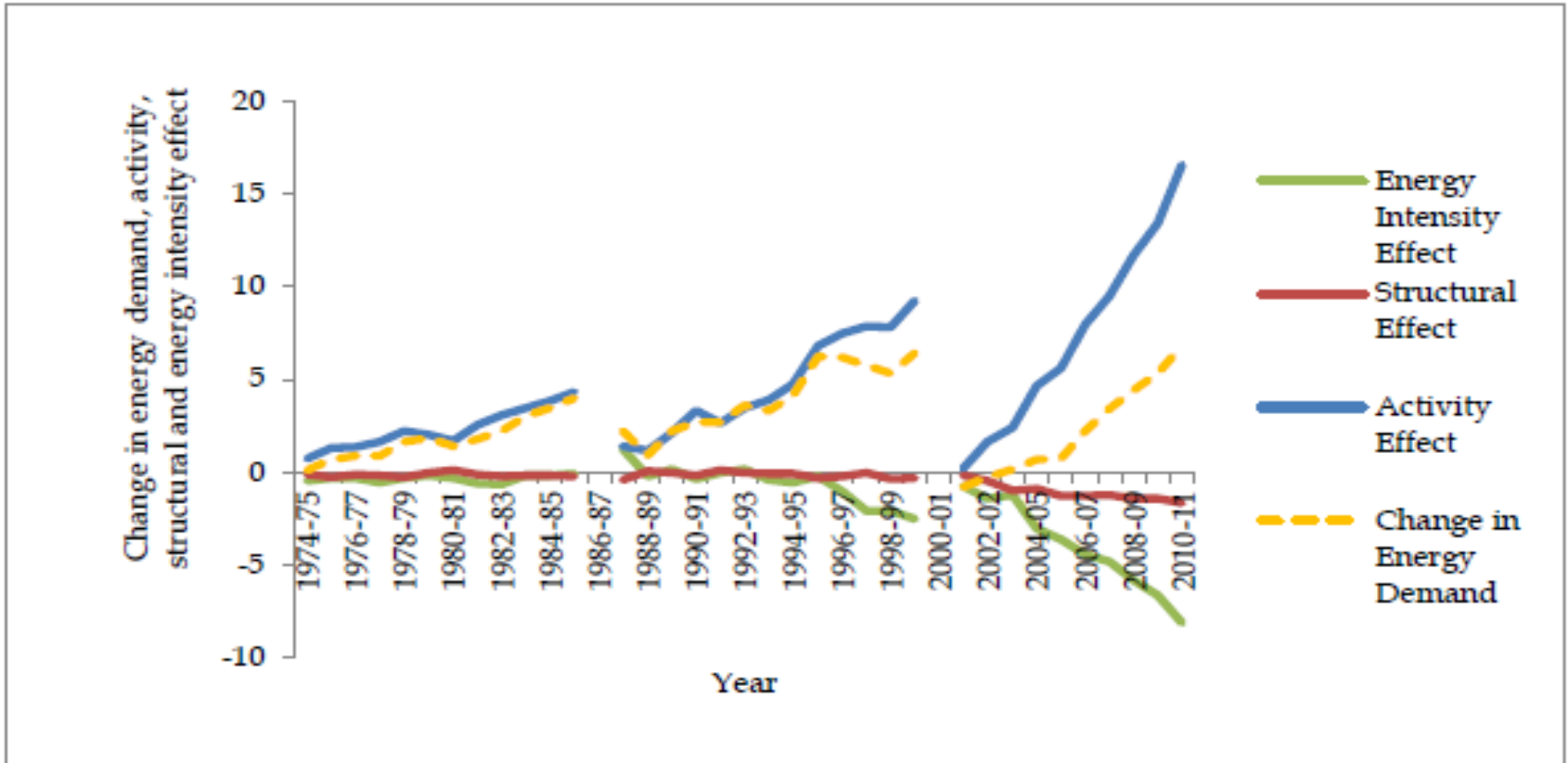
Global Change Programme, Jadavpur University, Kolkata

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Energy Efficiency: Important Green Growth Criterion

Decomposition of energy demand -Indian manufacturing industries



Based on Annual Survey of Industries, India 1973-74 – 2010-11



Behavioural Response

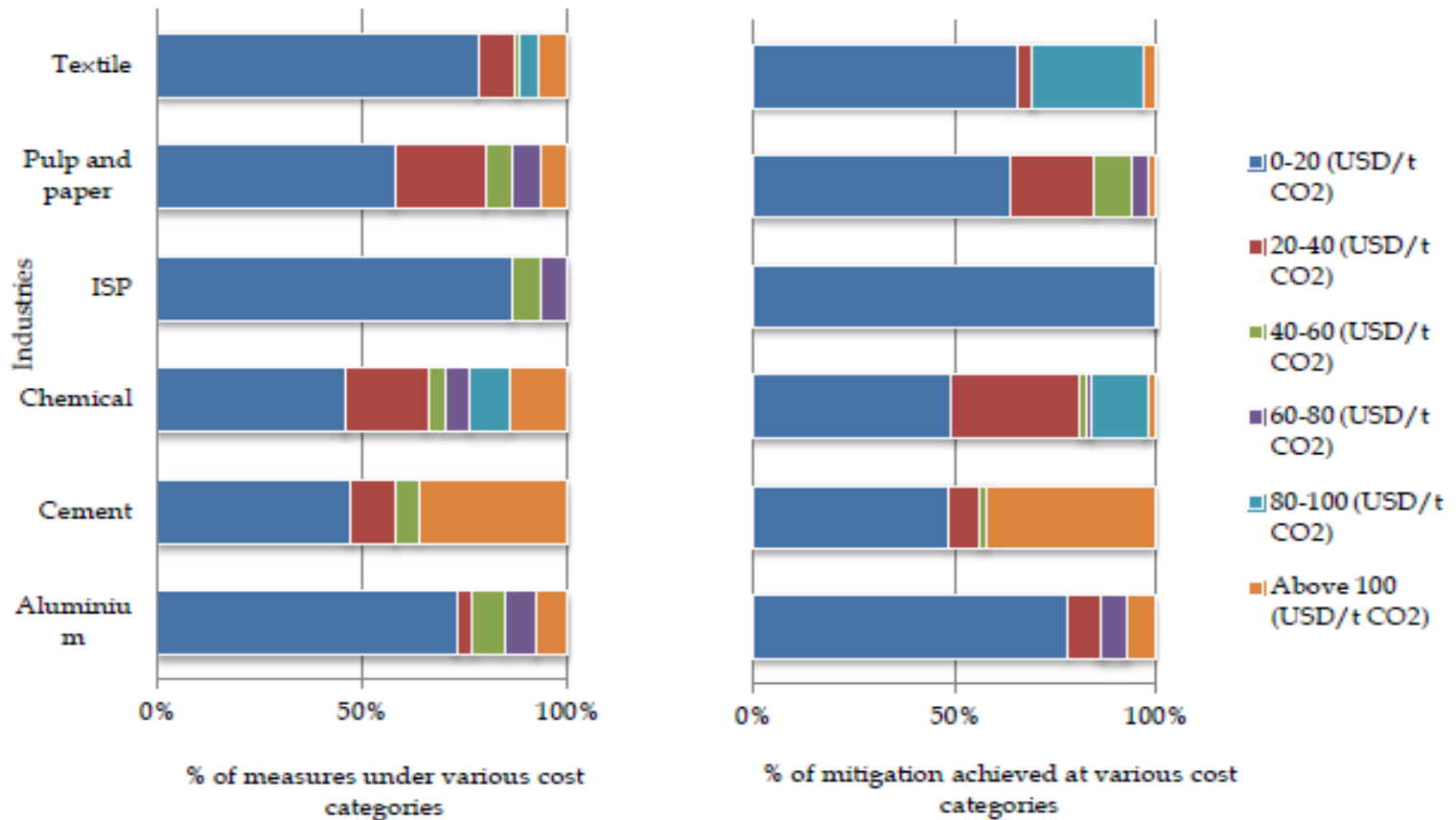
Inter-factor substitutability of inputs and own price elasticity of energy input

Factors	1973-74 to 2010-11	1973-74 to 1985-86	1986-87 to 1999-00	2000-01 to 2010-11
Capital- Labour	Complement	Substitute	Complement	Substitute
Capital - Material	Substitute	Substitute	Substitute	Complement
Capital-Energy	Substitute	Substitute	Complement	Substitute
Labour- Material	Substitute	Substitute	Substitute	Substitute
Labour- Energy	Substitute	Substitute	Substitute	Substitute
Material- Energy	Substitute	Substitute	Substitute	Substitute
Own price elasticity of energy	-0.22	-0.60	-0.74	-1.22

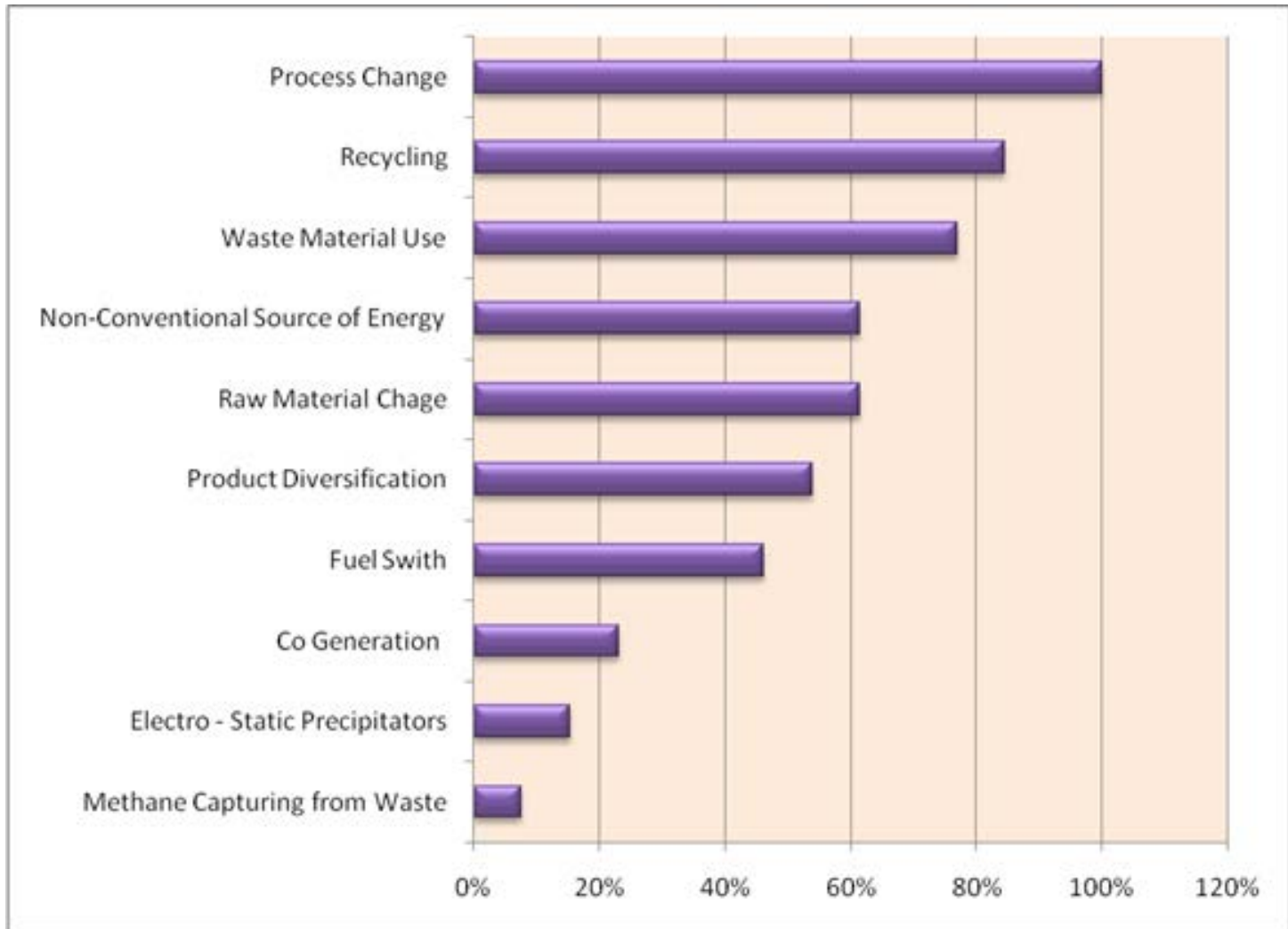
- ✓ Technological progress evolved to substitute energy input, especially by material inputs
- ✓ But, this along with a technological bias towards material input seeks attention
- ✓ Own price elasticity of energy input is negative with an increasing magnitude
- ✓ Price based intervention is expected to be effective to pull down the energy use further with far reaching implications towards reduction of emission as well.



Initiatives ranged from low to high cost

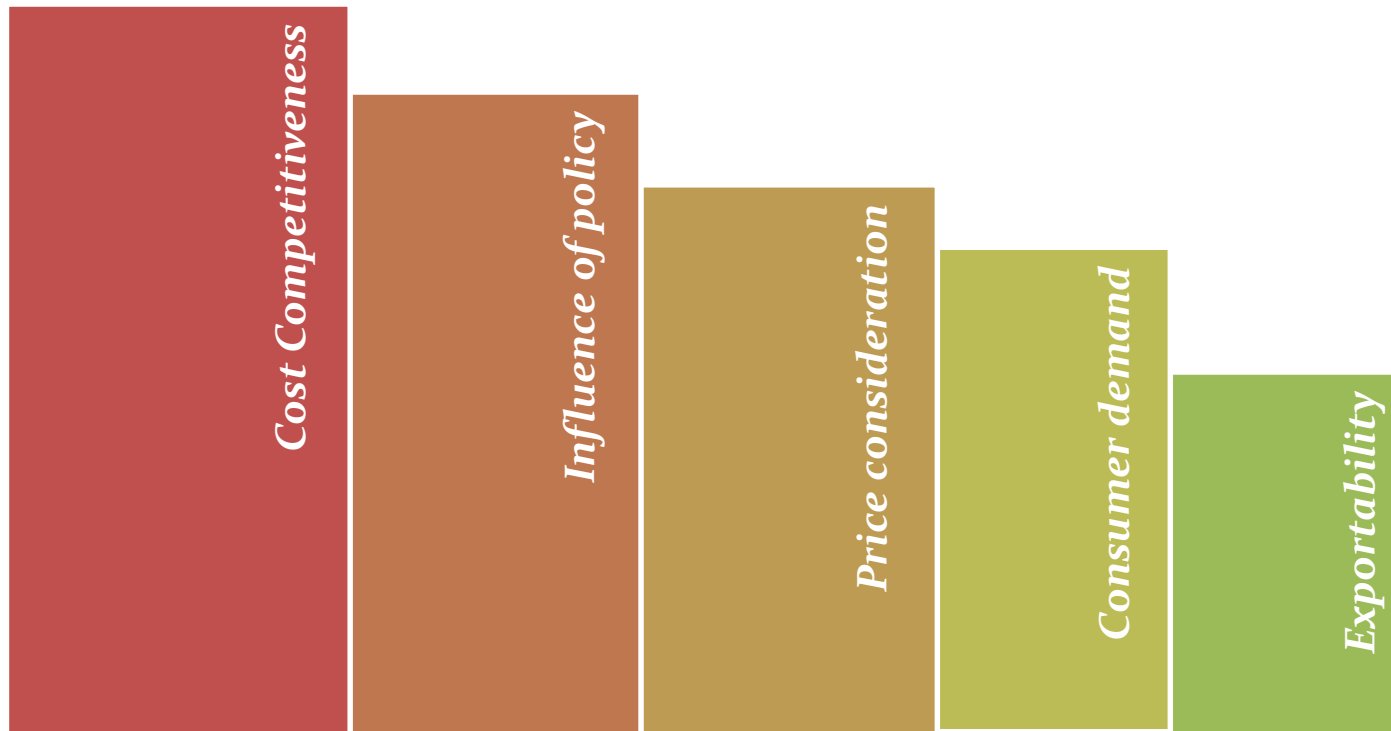


What industries are doing?





Driving forces behind actions



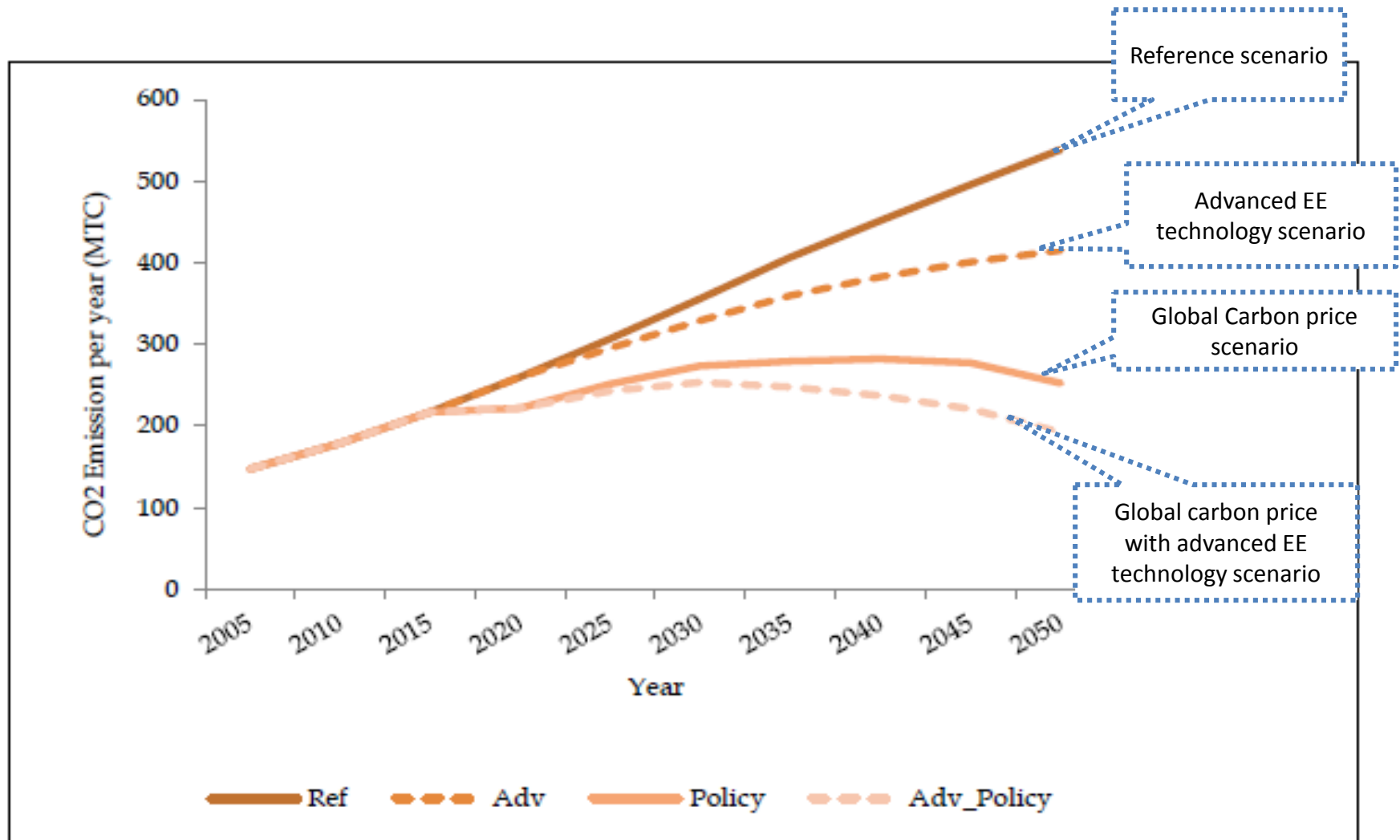
Source: Chakraborty & Roy 2012

New Potential





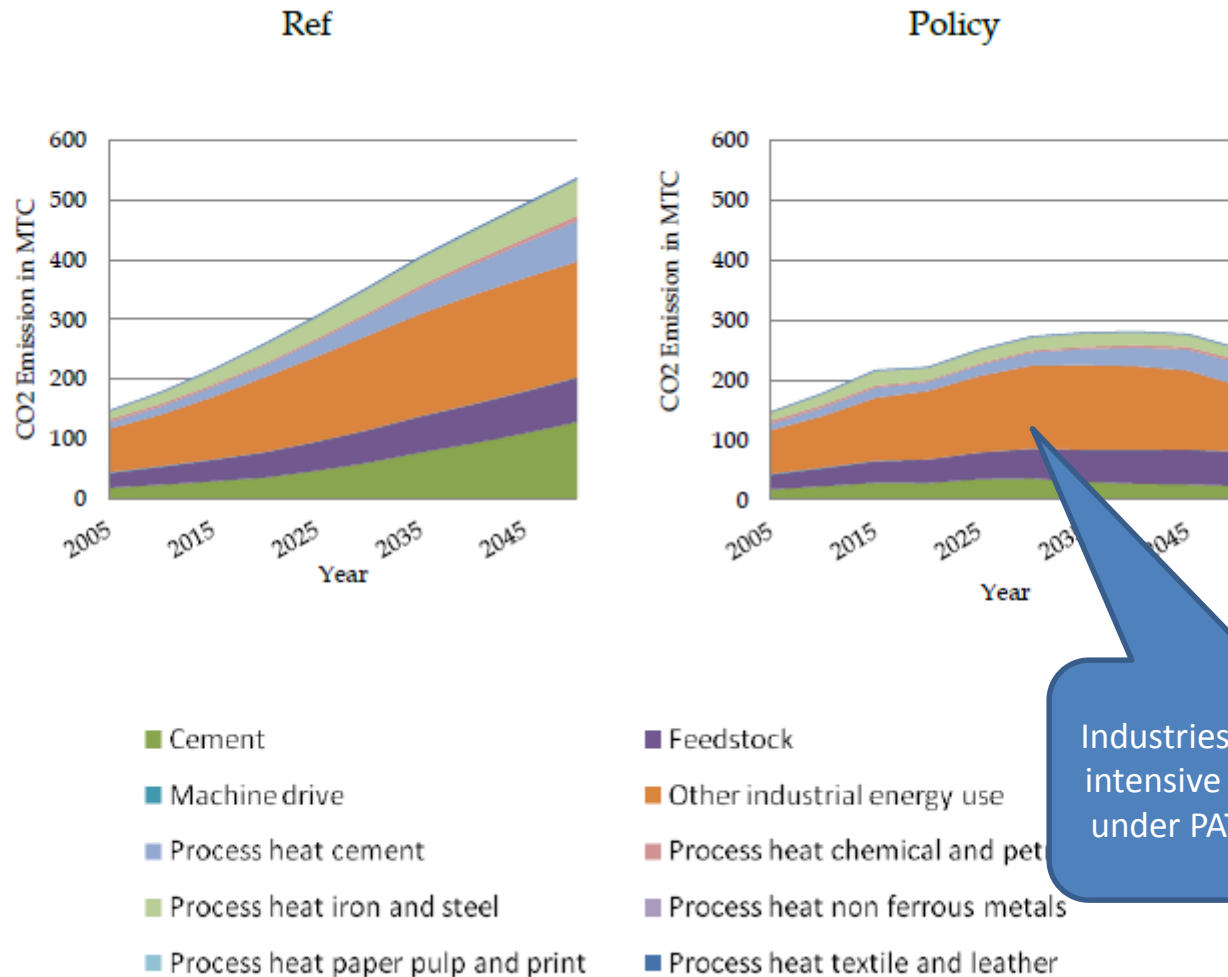
Results from GCAM



Source: Dasgupta, Roy et.al (2015) Unpublished



Potential beyond energy intensive industries

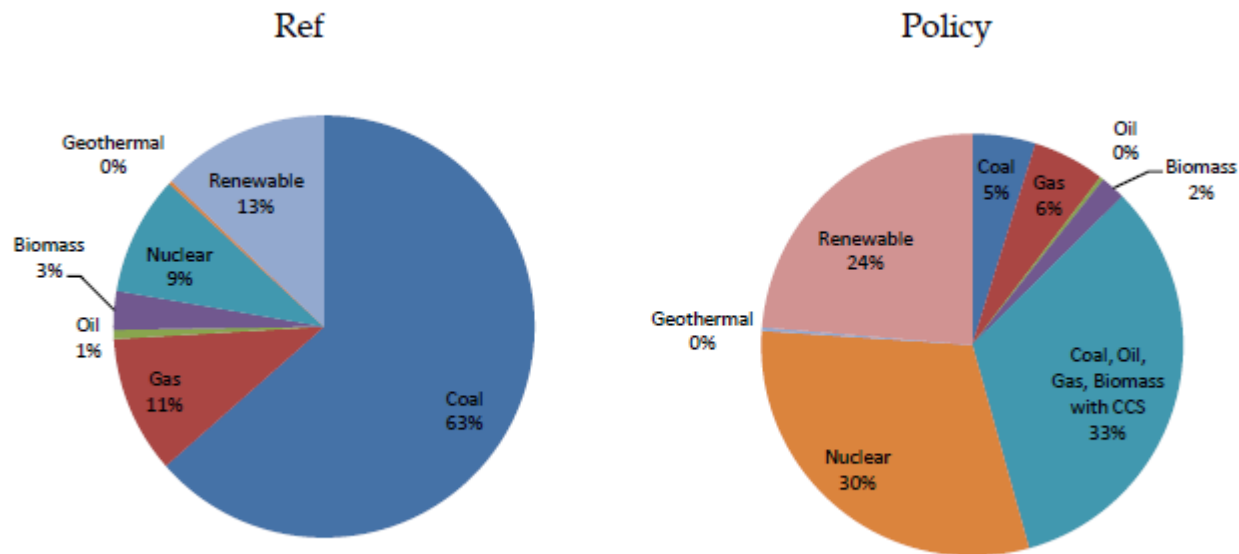


Source: Dasgupta, Roy et.al (2015) Unpublished



Implications for power generation

Long run green growth in industry requires large scale electrification



Projected consumption of fuel use for electricity generation in Indian in 2050: comparison of Reference scenario and green growth policy scenario

Source: Dasgupta, Roy et.al (2015) Unpublished



Acknowledgement

Global Change Programme Research Team

<http://juglobalchangeprogram.org/>

Jadavpur University



Thank you