



# Aligning Domestic Progress on Energy and Climate Issues in India

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# Framework for Engagement

## *Aligning Interests, Capabilities, and Leverage*



*The only serious and viable approach for India's engagement in global efforts to tame global warming is one that aligns with India's own core interest*

- Interests: Economic development and Energy security
- Capabilities: Outside help needed?
- Leverage: Ability to successfully implement programs

Rai, V and Victor, D. G., "Climate Change and the Energy Challenge: A Pragmatic Approach for India", *Economic and Political Weekly*, 44(31), p78-85, August 2009

# Applying the Framework

## *Areas for Action*

- Transportation reforms and taxation
- Mandatory Building Conservation Efficiency Code
- Population control
- Advanced cookstoves and atmospheric brown clouds
- Efficiency of India's coal-based power generation
- Electricity reforms and CO<sub>2</sub> reductions

# IEA Energy Demand Projections

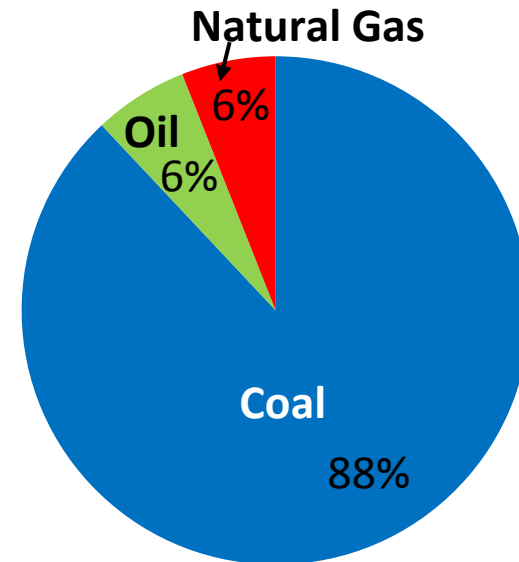
*Ref. Scenario: Moderate Growth Rate*

	1990	2000	2005	2015	2030	Mtoe 2005- 2030*
Coal	106	164	208	330	620	4.5%
Oil	63	114	129	188	328	3.8%
Gas	10	21	29	48	93	4.8%
Nuclear	2	4	5	16	33	8.3%
Hydro	6	6	9	13	22	3.9%
Biomass	133	149	158	171	194	0.8%
Other renewables	0	0	1	4	9	11.7%
<b>Total</b>	<b>320</b>	<b>459</b>	<b>537</b>	<b>770</b>	<b>1 299</b>	<b>3.6%</b>
<i>Total excluding biomass</i>	<i>186</i>	<i>311</i>	<i>379</i>	<i>599</i>	<i>1 105</i>	<i>4.4%</i>

Source: IEA WEO 2007

# Coal in India

India's Fossil Fuel Reserves by Type

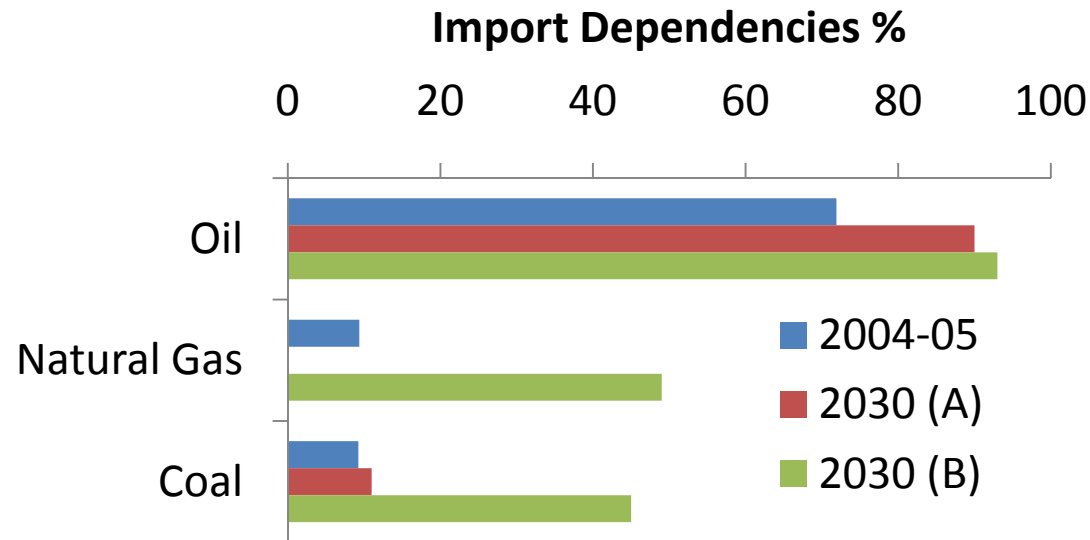


Source: BP Statistical Review of World Energy 2007

- Coal is India's sole significant domestic source of fossil energy
- India is the world's third largest coal producer
- Low quality: High ash (>40%), high moisture, low CV; but low sulphur
- State-run Coal India Ltd., the world's largest coal company, produces 75% of India's coal (~380 MT in FY 2007-2008)

- Coal mined from OC mines : 87%
- Coal mined from UG mines : 13%
- R/P ratio (2030 level) : 50

# Coal Demand in India



Scenario A: Minimum requirement, maximum domestic production

Scenario B: Maximum requirement, minimum domestic production

Source: Integrated Energy Policy, Government of India (2006)

# Obstacles to Ramping Up Coal Production

- India's Major Coalfields Zones



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the I.A.

Source: CIA, 2002.

- India's Major Forest Areas

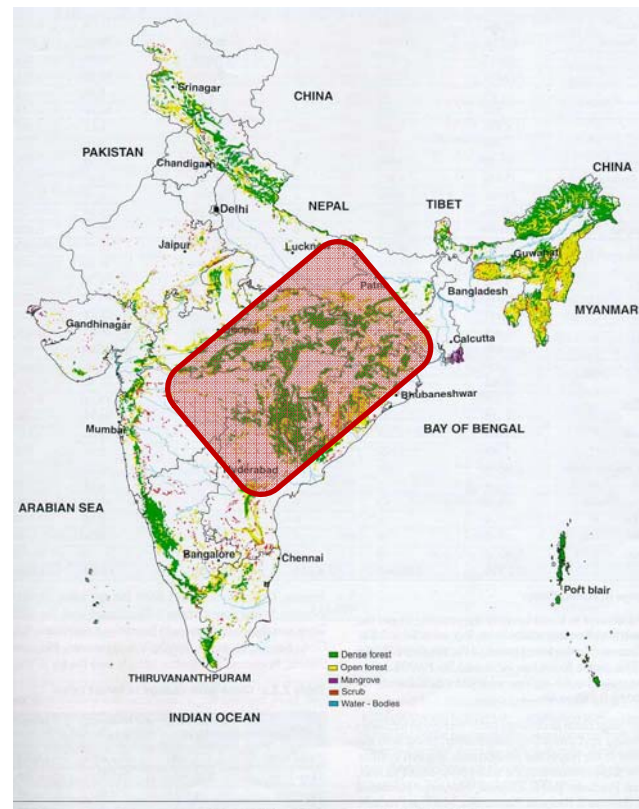
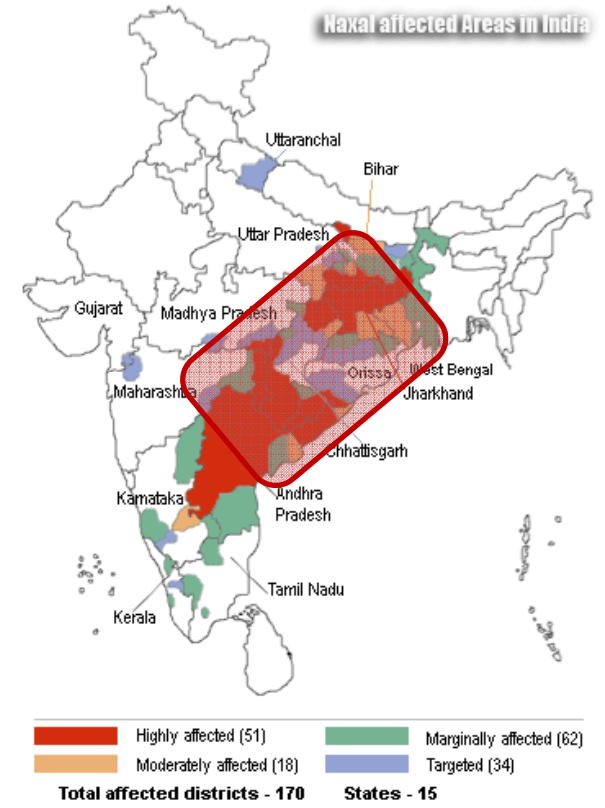


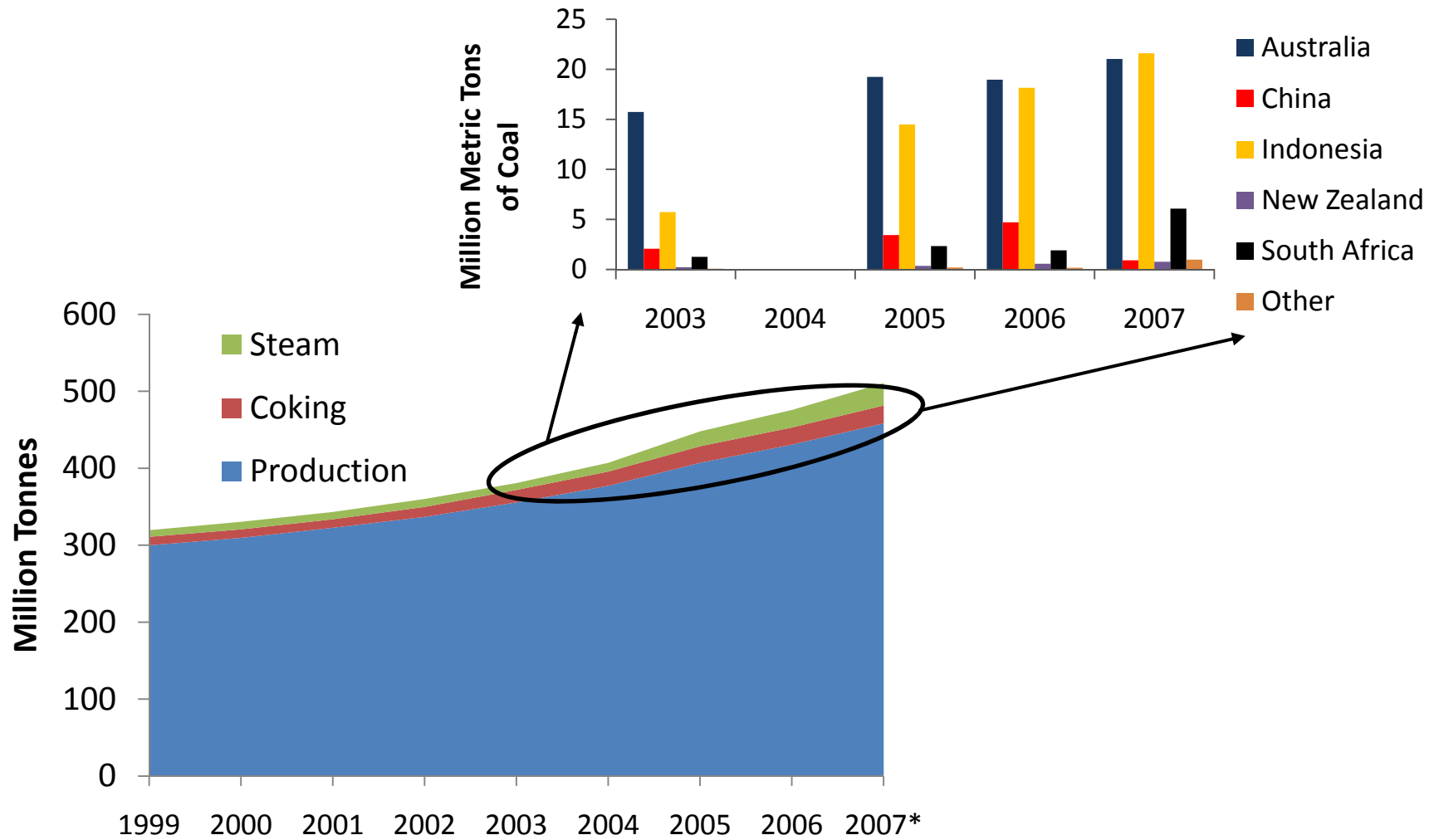
Fig 2.2 : Distribution of Forest Cover in India

Source: IBNLive.com, Maps of India, Orissalink.com  
Courtesy: Jeremy Carl, Stanford University

- India's Major Conflict Zones



# Coal Imports are Rapidly Increasing

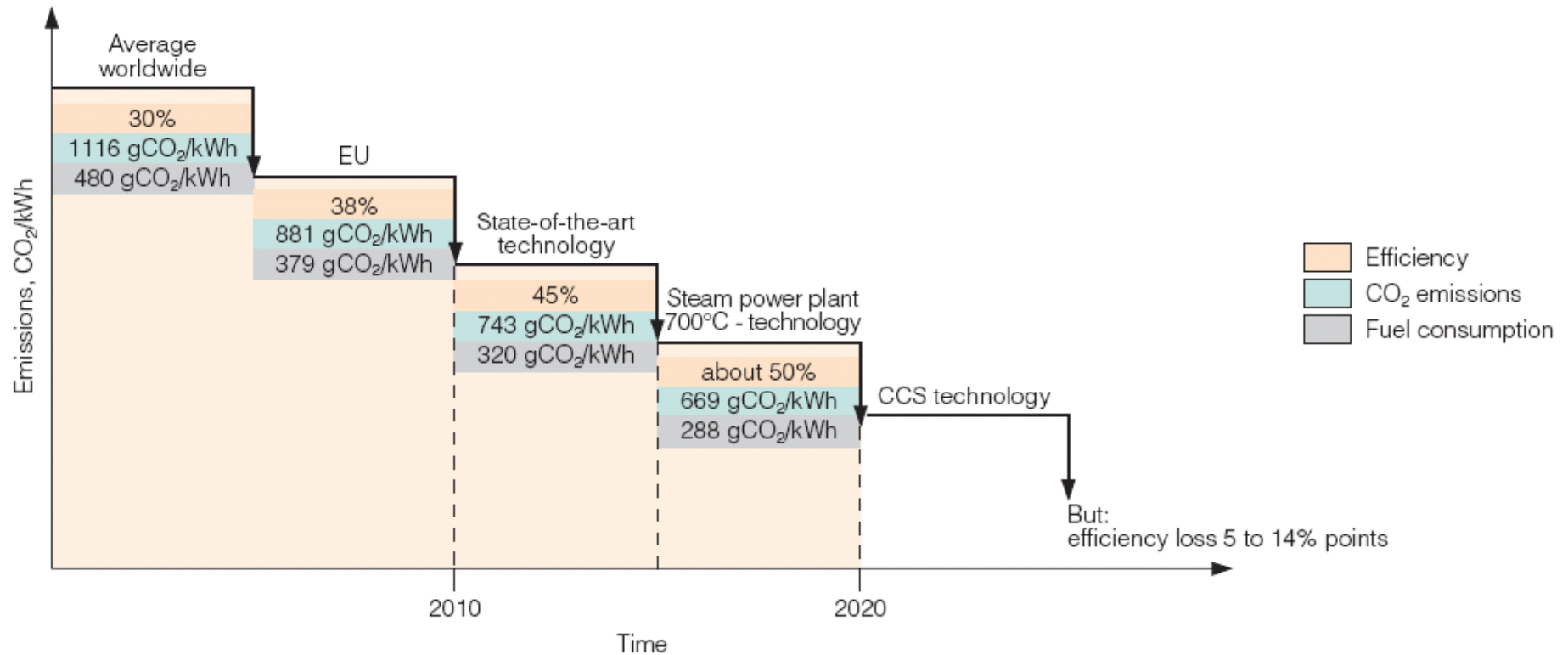


Source: McCloskeys and CIL Annual Reports



# Efficiency of Coal-based Power Plants

## *Lower Coal Demand and CO<sub>2</sub> Emissions*



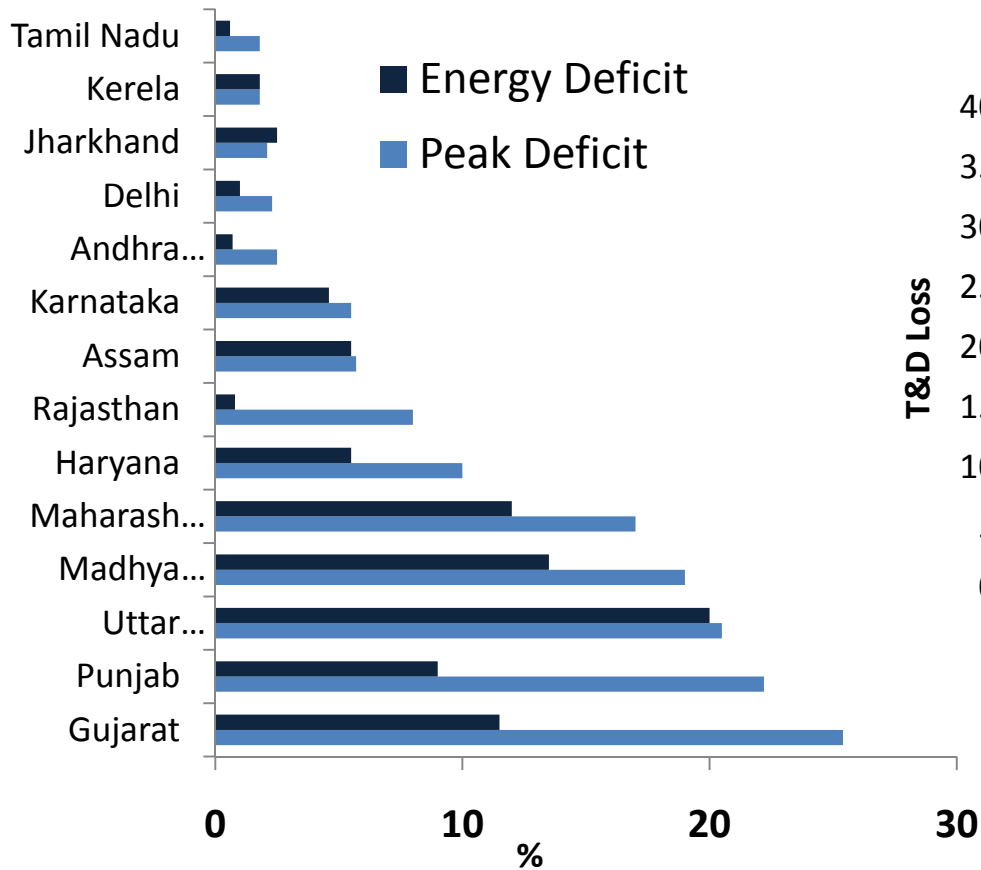
Source: "Competitiveness of Coal-fired Power Generation", IEA (September 2008)

# Indian Coal-Efficiency (ICE) Program

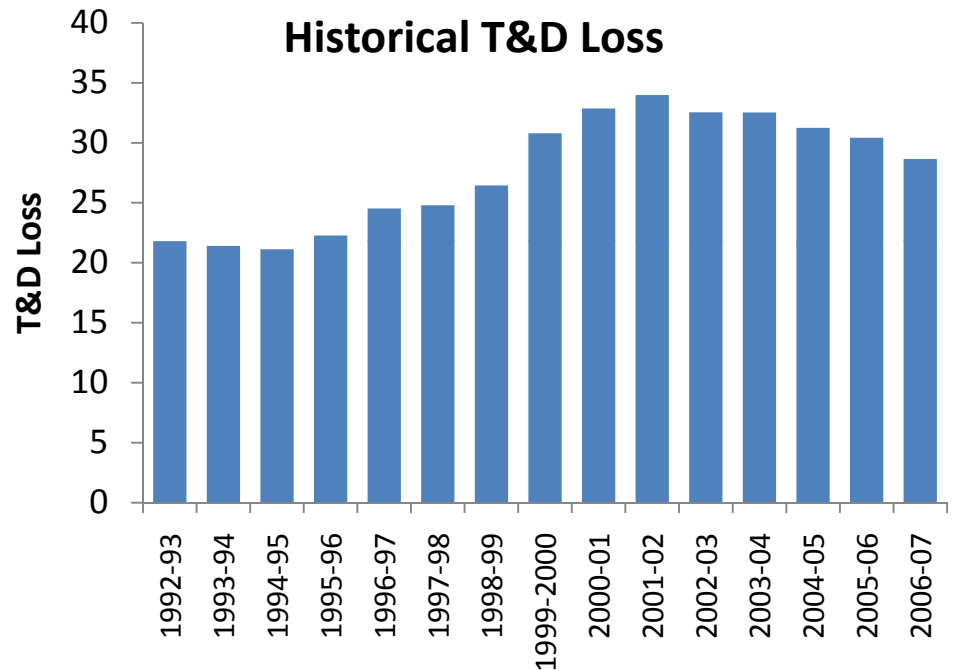
Program to improve efficiency of coal-fleet from 30% to 40% over two decades (2010-2030)

- Impact by 2030 (conservative scenario)
  - Over 400 MtCO<sub>2</sub>/yr reductions
  - 250 Mt/yr less coal needed
  - 90 GW less installed capacity
- Outsiders can play an important role
- Success of the program will be a measure of how serious outsiders are in engaging India

# Electricity Woes of India

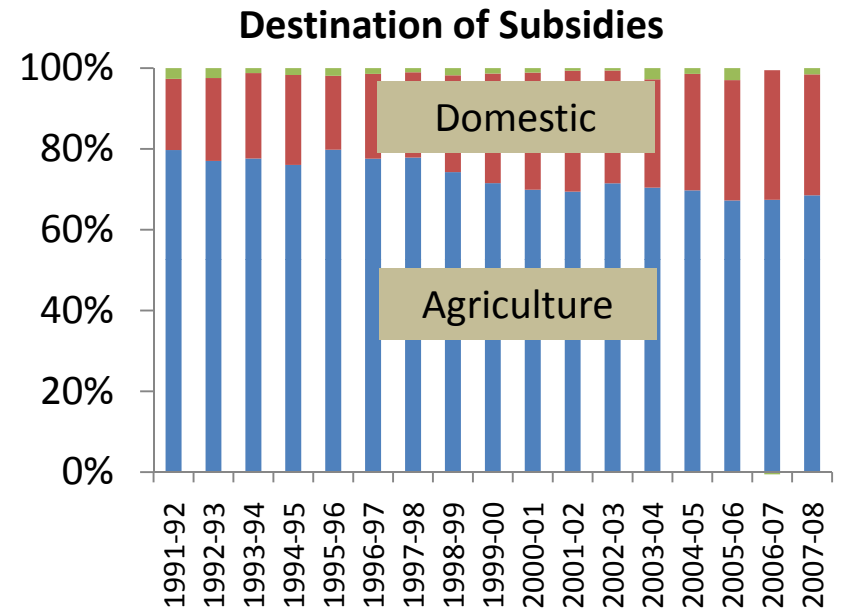
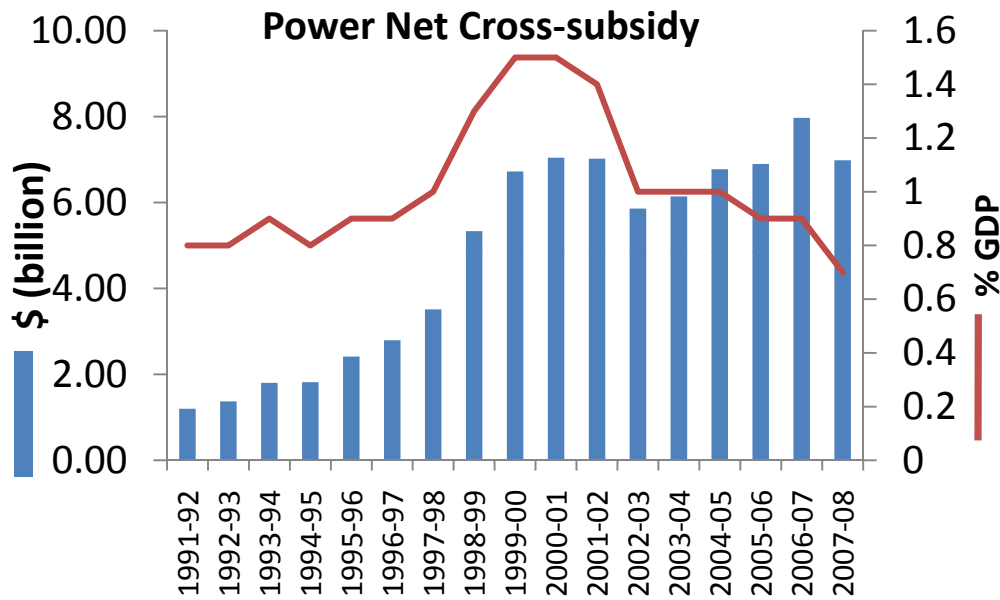


Source: Integrated Energy Policy, Government of India (2006)



Source: Planning Commission, State Electricity Boards

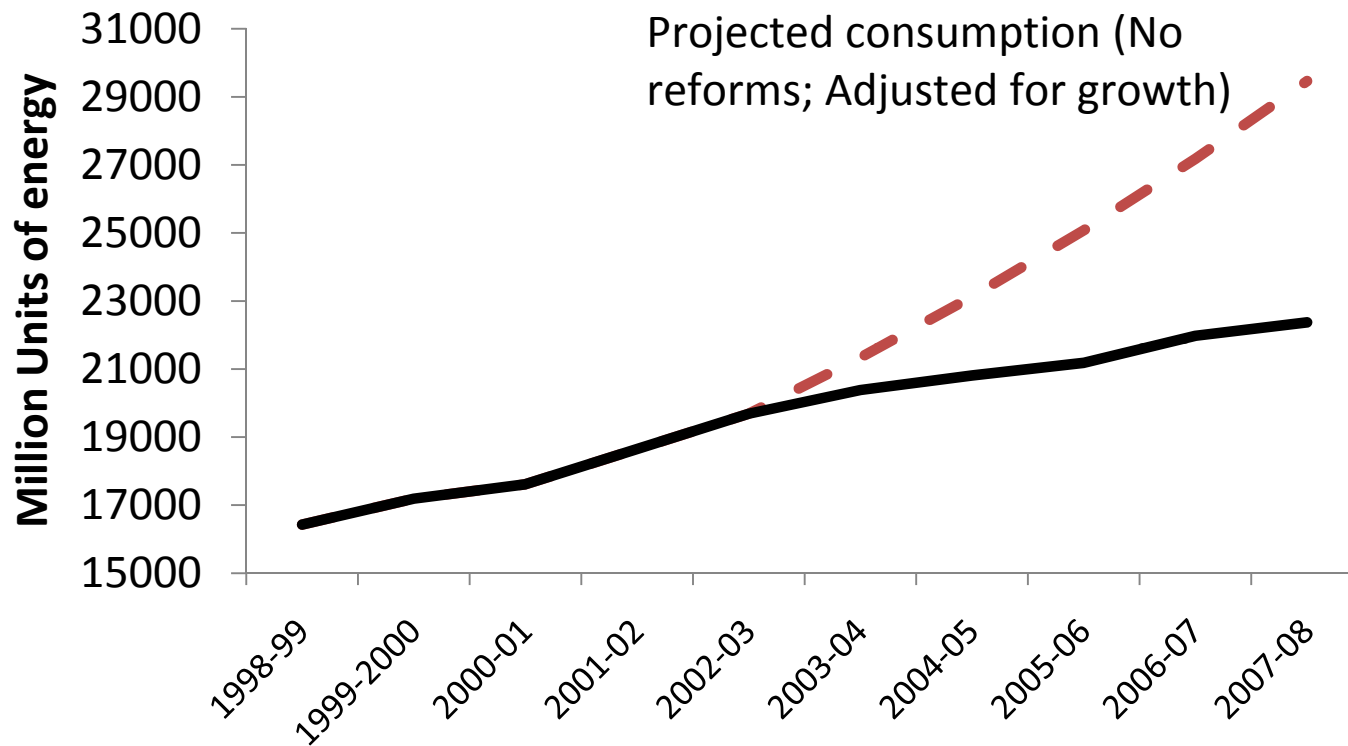
# Power Subsidies



Data: "The Power Sector in India", Bhattacharya and Patel, July 2007

# Electricity Reforms Reduce Electricity Demand

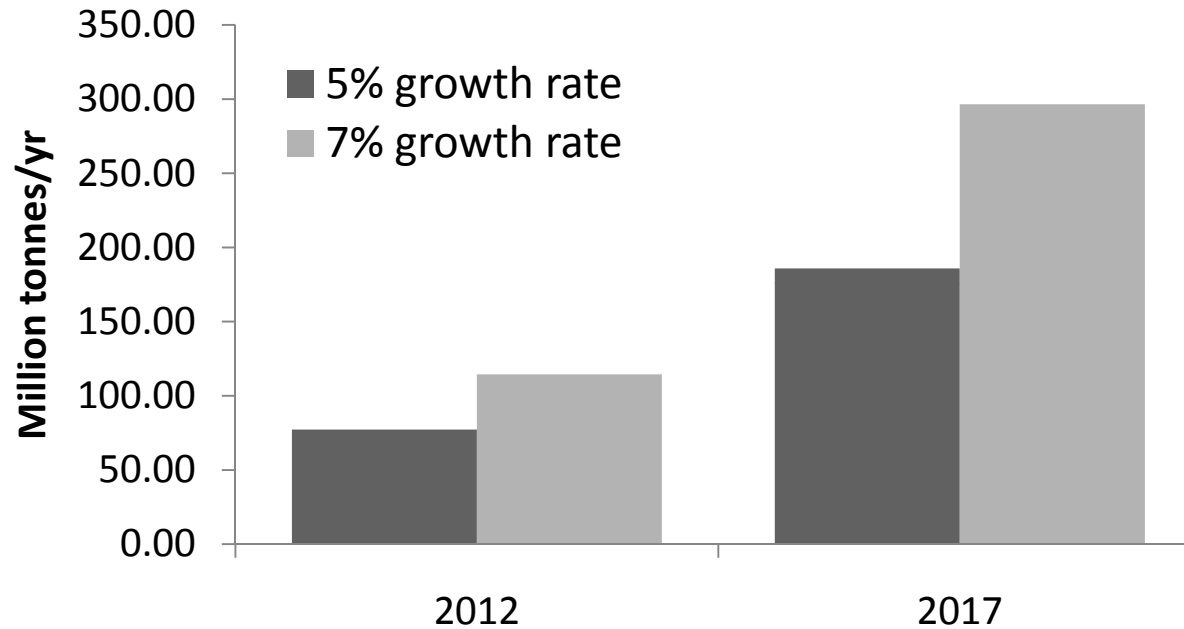
## *The Curious Case of Delhi*



Cumulative emissions reductions between 2003-04 to 2007-08 for Delhi amounts to 15.6 Mt CO<sub>2</sub>

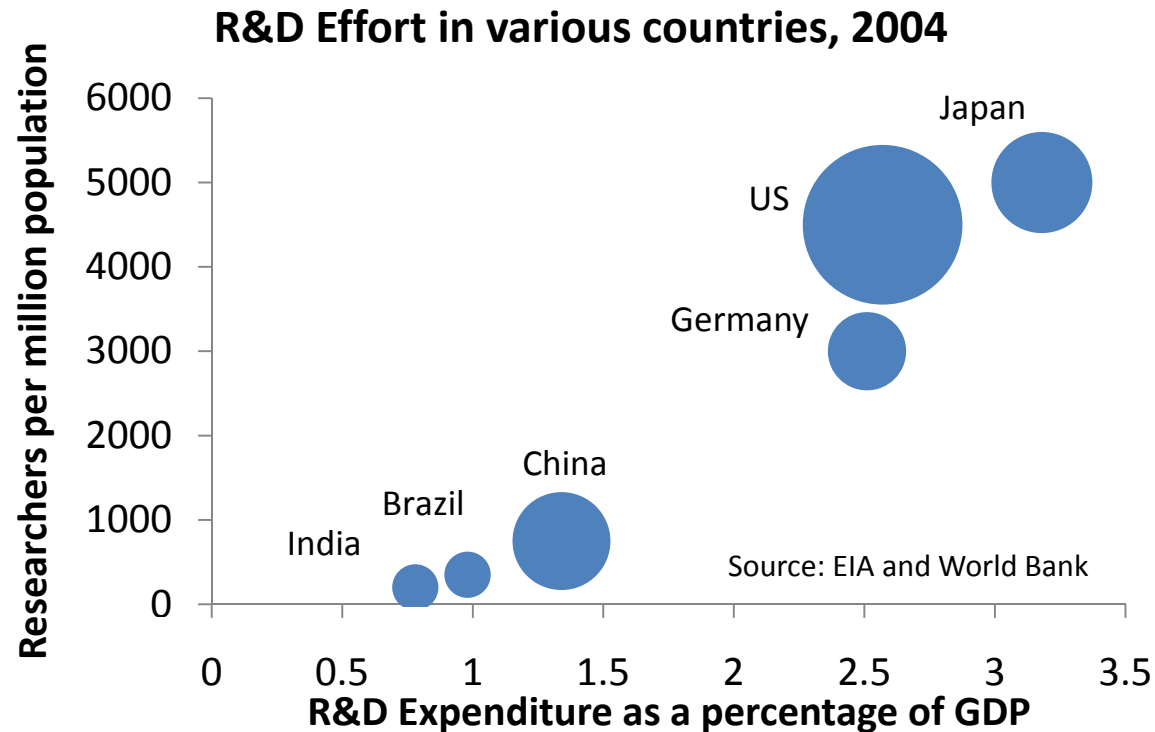
# Electricity Reforms and CO<sub>2</sub> Reductions

## *Projections for India*



For the 7% growth rate scenario, cumulative emissions reductions by 2017 is over 1 Gtons CO<sub>2</sub>

# Advanced Technologies and R&D



- Energy-related R&D will be enabling for India to spearhead its own technology-based mitigation response
- Results will take a long time (>2-3 decades), so R&D not a near-term response strategy

## Other Action Items

- Need to create a National Information Administration for Energy (NIAE) that would serve as the central repository of all energy-related data in India
- Globally coordinated R&D on major green technologies

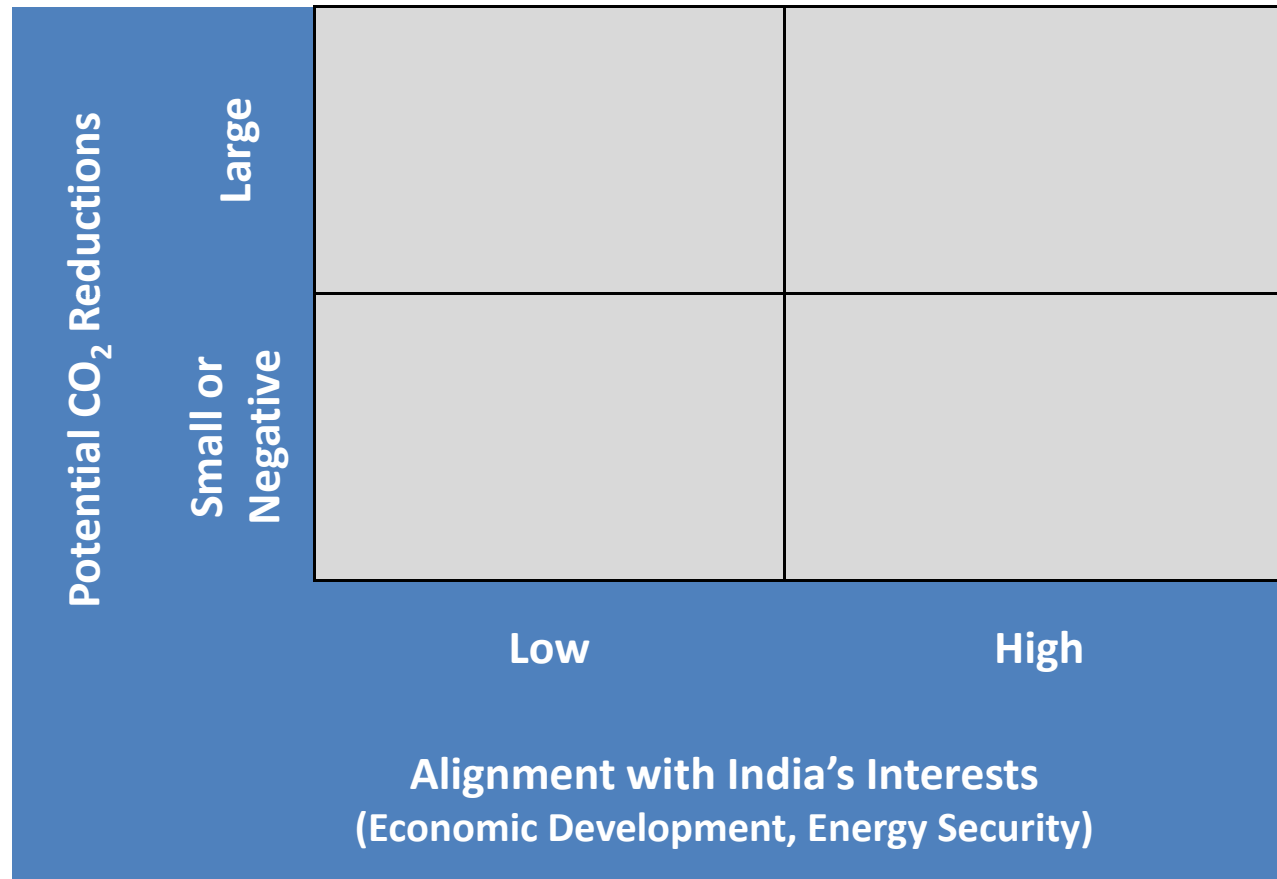


# Conclusion

- Aligning India's core interests with mitigation action key to the success of any engagement strategy
- Contrary to conventional wisdom, cost of engagement not high

# CO<sub>2</sub> Reductions and India's Interests

*Framework for Potentially Viable Options*



# CO<sub>2</sub> Reductions and India's Interests

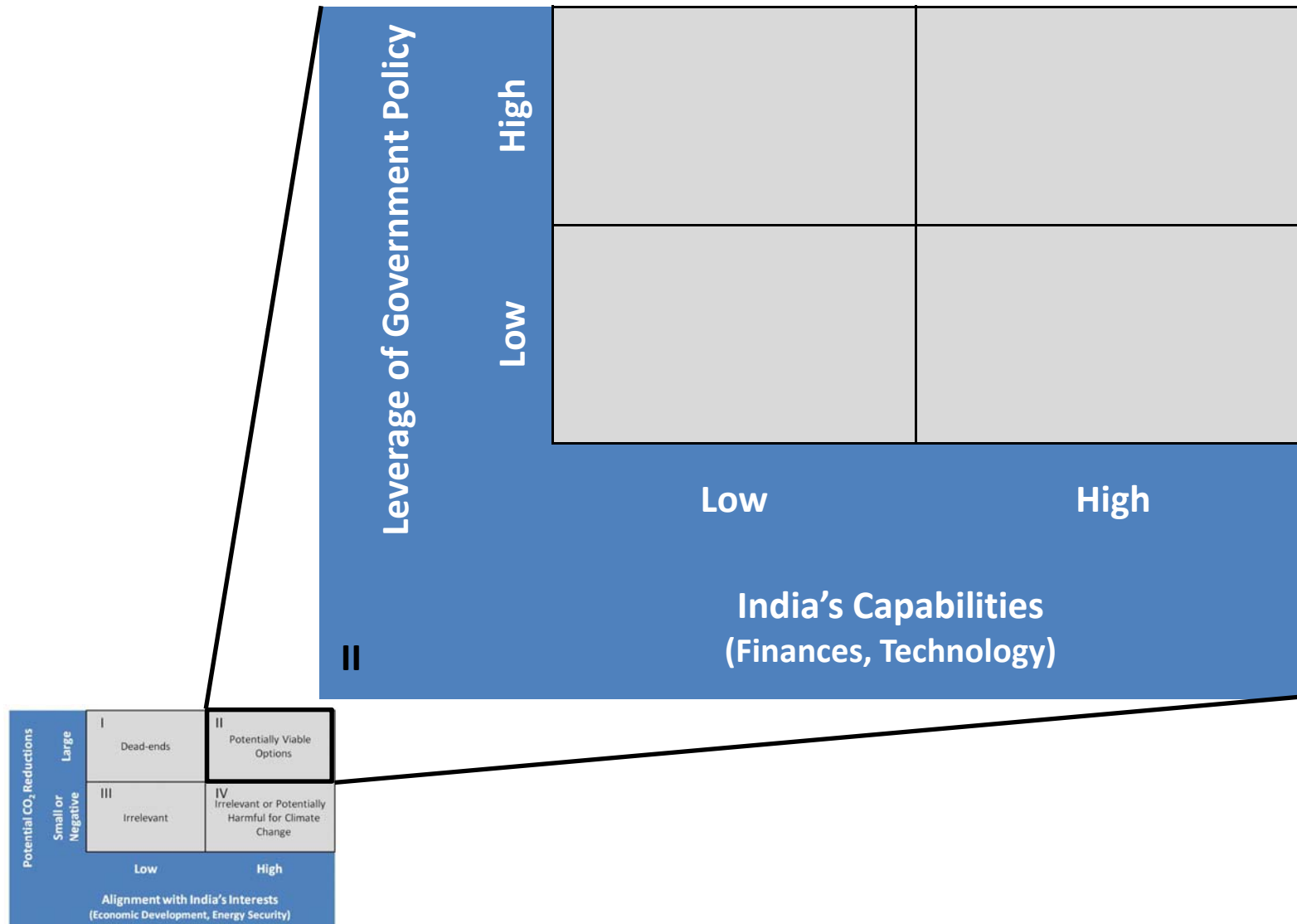
## *Framework for Potentially Viable Options*

Potential CO <sub>2</sub> Reductions	Large	I Dead-ends	II Potentially Viable Options
	Small or Negative	III Irrelevant	IV Irrelevant or Potentially Harmful for Climate Change
		Low	High
<p align="center"><b>Alignment with India's Interests</b> (Economic Development, Energy Security)</p>			

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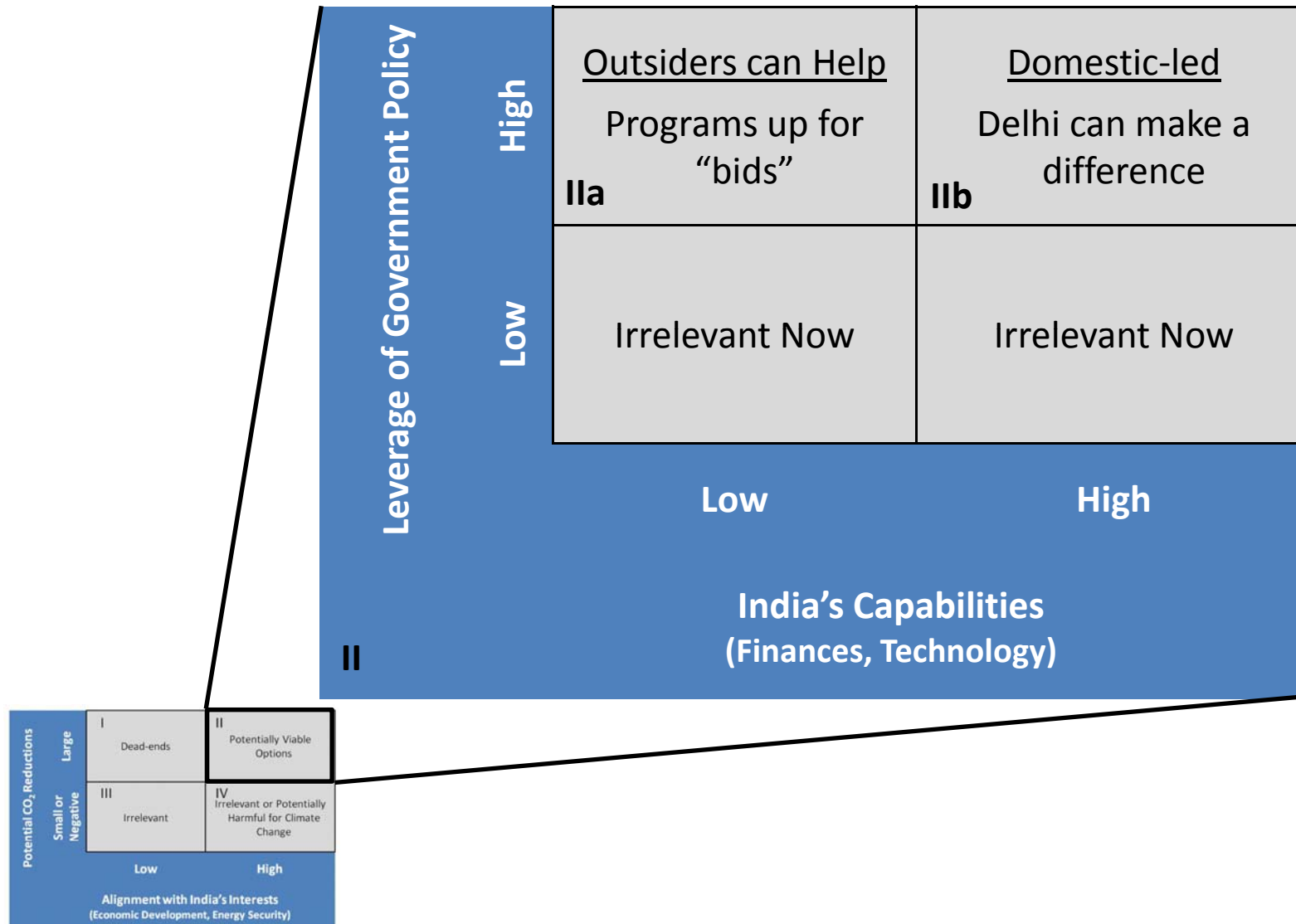
# Leverage and Capability

## *Viable Options*



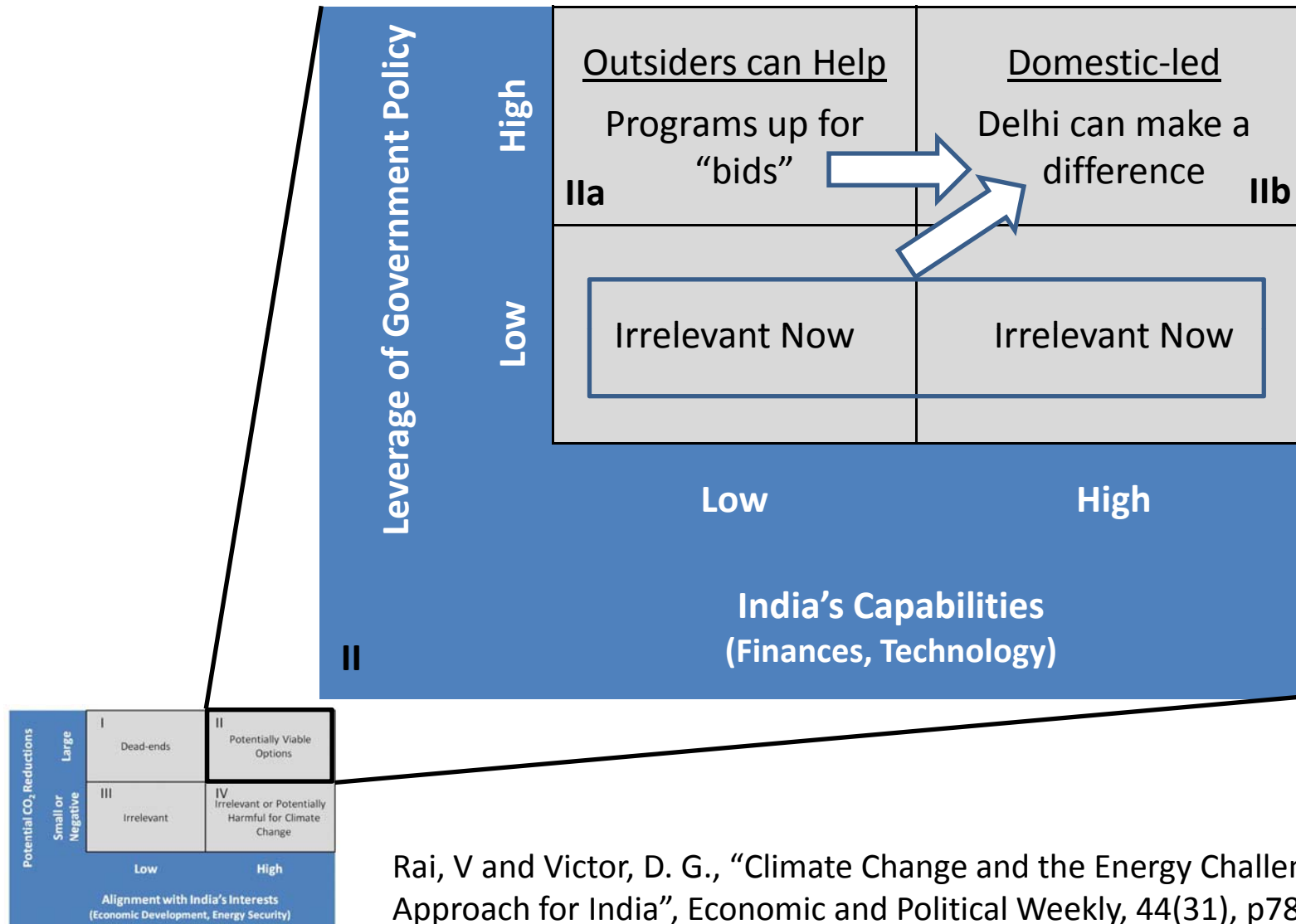
# Leverage and Capability

## *Viable Options*



# Beyond Boxes IIa and IIb

## *Building Capability and Future Leverage*



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