



# Global Energy Challenge

Gary Stuggins

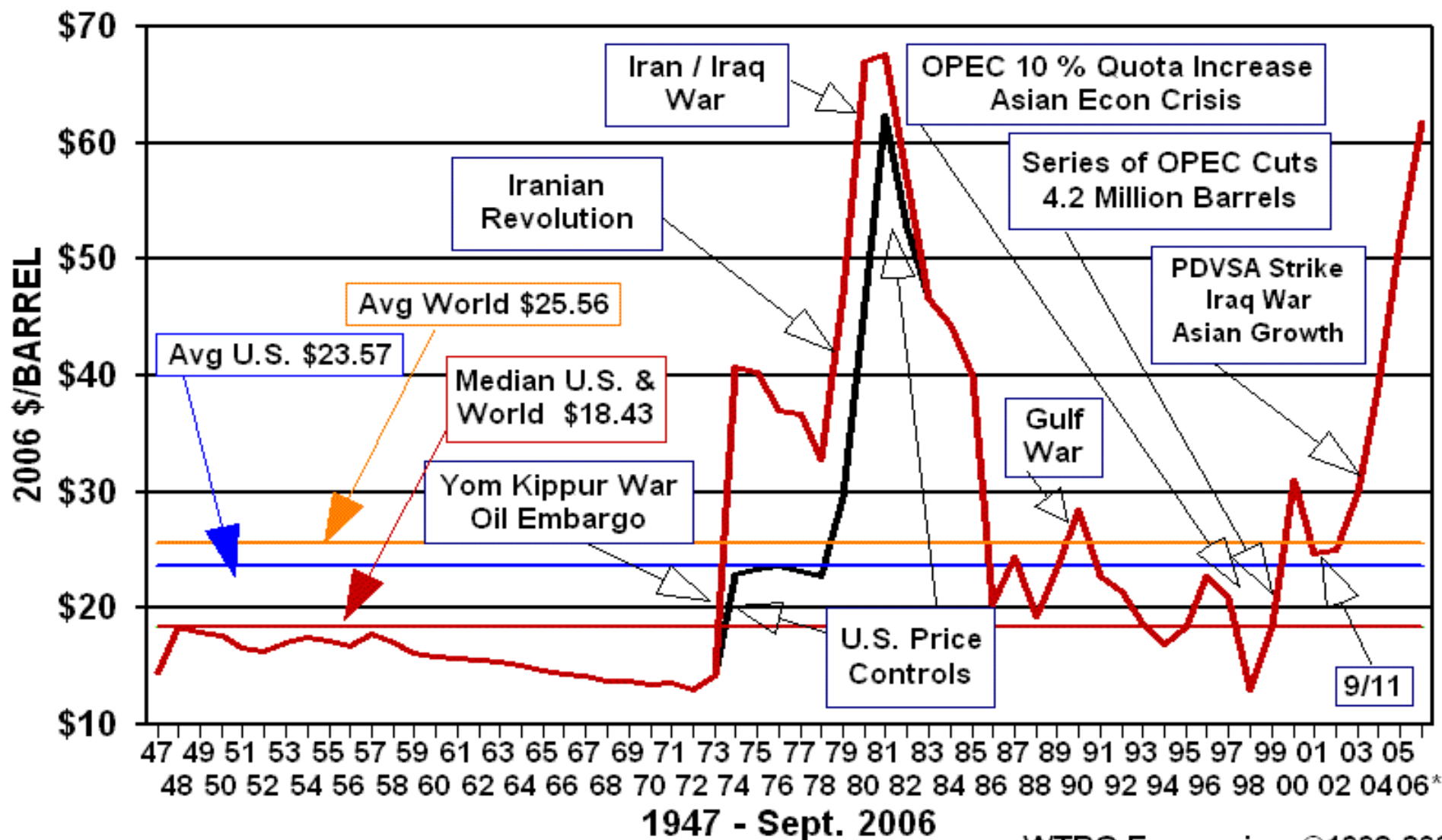
January 15, 2007

# Trends in Global Energy Needs

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- Needs
  - Poverty Reduction
  - Economic Growth
  - Decreased Environmental Impact
- Barriers
  - Subsidies
  - Energy Efficiency Bottlenecks
- Opportunities
  - Developing Country Growth
  - Low Carbon Economy

## Crude Oil Prices 2006 Dollars



WTRG Economics ©1998-2006

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(479) 293-4081

# Impact of Oil Prices on Net Oil Importing African Countries

Countries Grouped by Per Capital Income as Percentage of GDP (2003 base)

<i>Per Capita Income range</i>	<i>Oil Vulnerability</i>	<i>Effect of 33% Oil Price rise on GDP</i>	<i>Effect of 72% Oil Price rise on GDP</i>
<US\$200	0.044	1.4	3.0
US\$200-US\$300	0.028	0.9	1.9
US\$300-US\$1000	0.034	1.1	2.3
>US\$1000	0.030	1.0	2.1
All countries	0.032	1.1	2.2

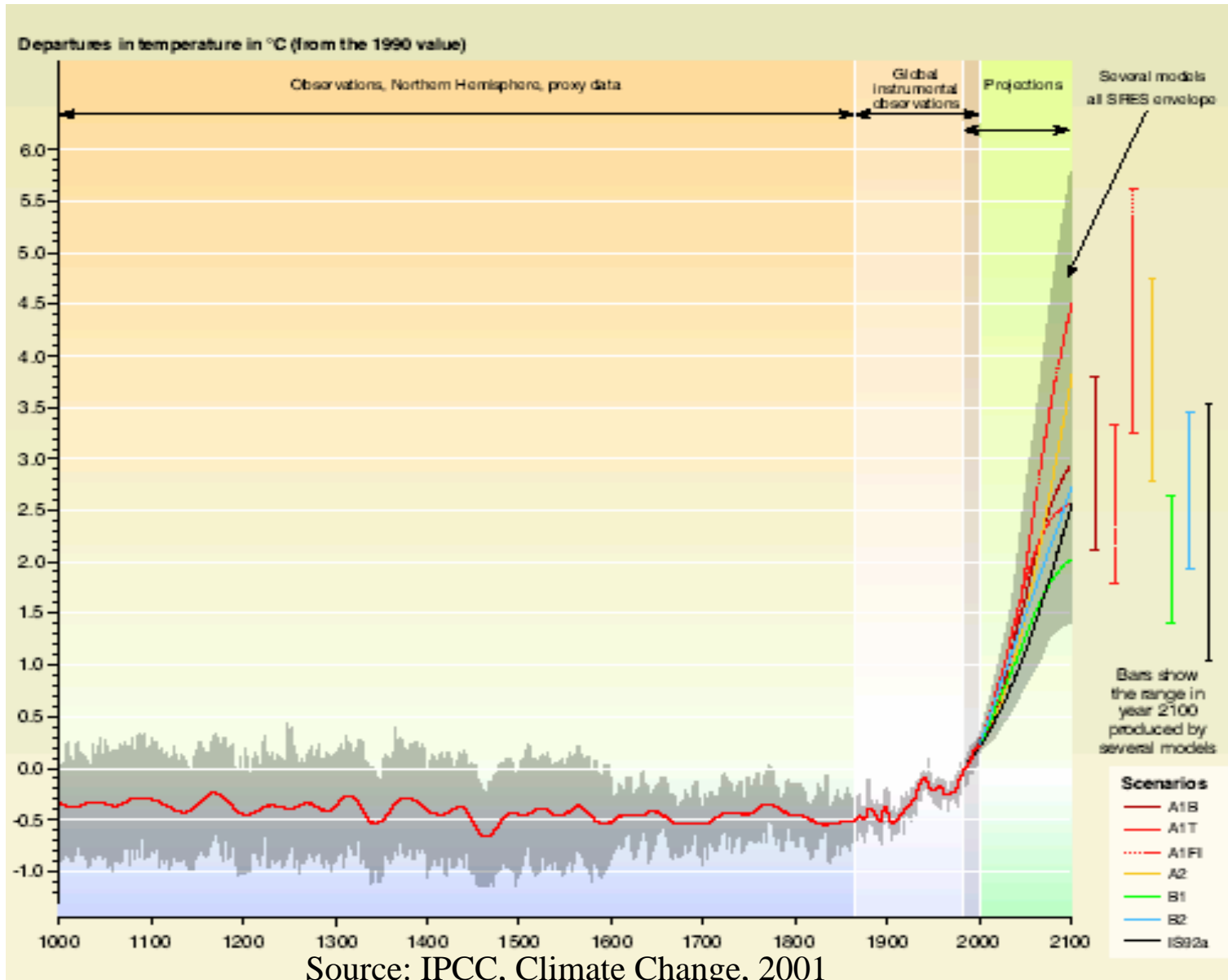
Source: Robert Bacon and Adib Mattar, ESMAP, August 2005

Oil Vulnerability is defined as the ratio of the value of net oil imports as a percentage of GDP

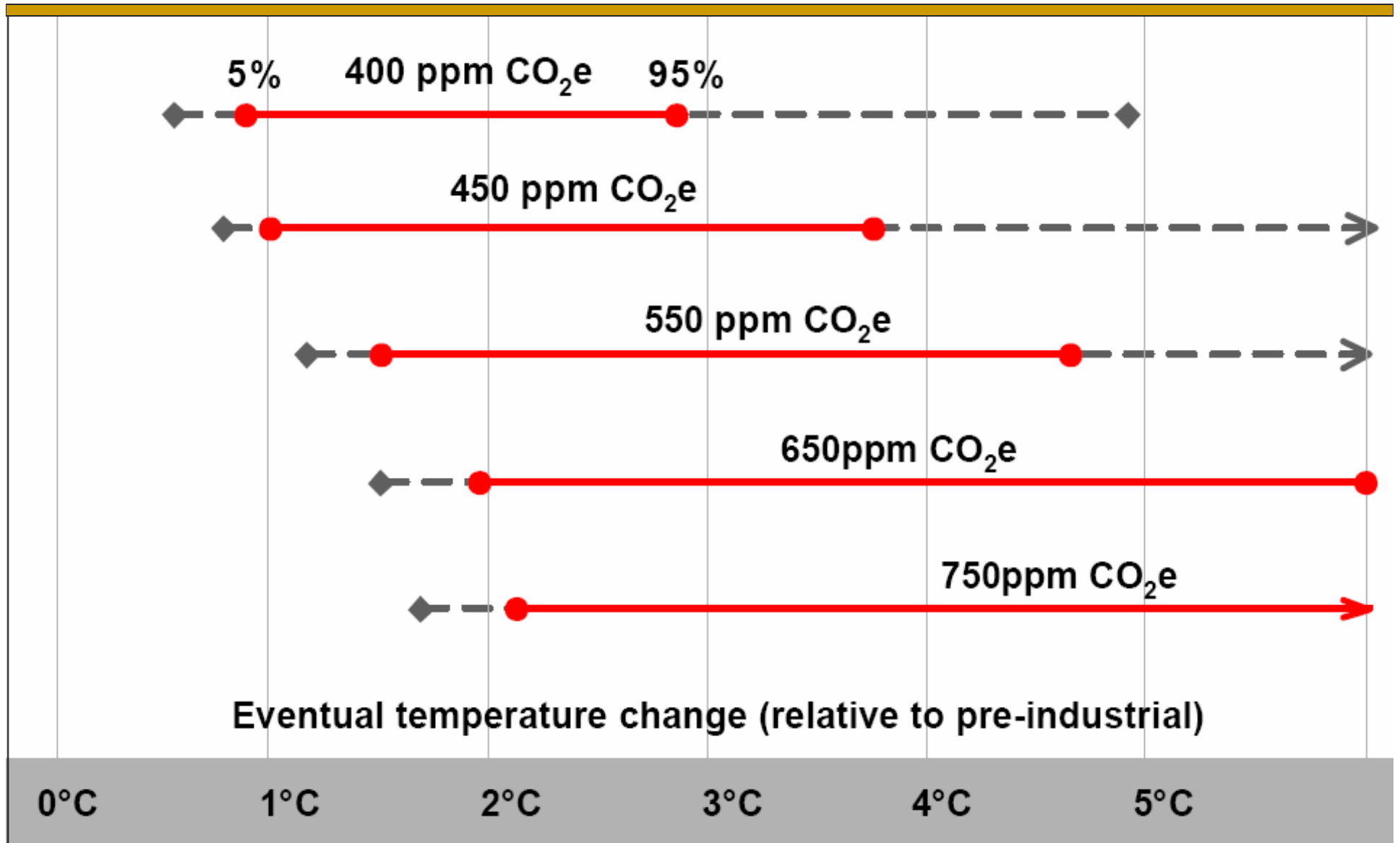
# [ Energy Security ]

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- Limited Sources of Primary Energy
- Grid-Based Renewable Energy is Expensive
- Energy Efficiency has Checkered Success

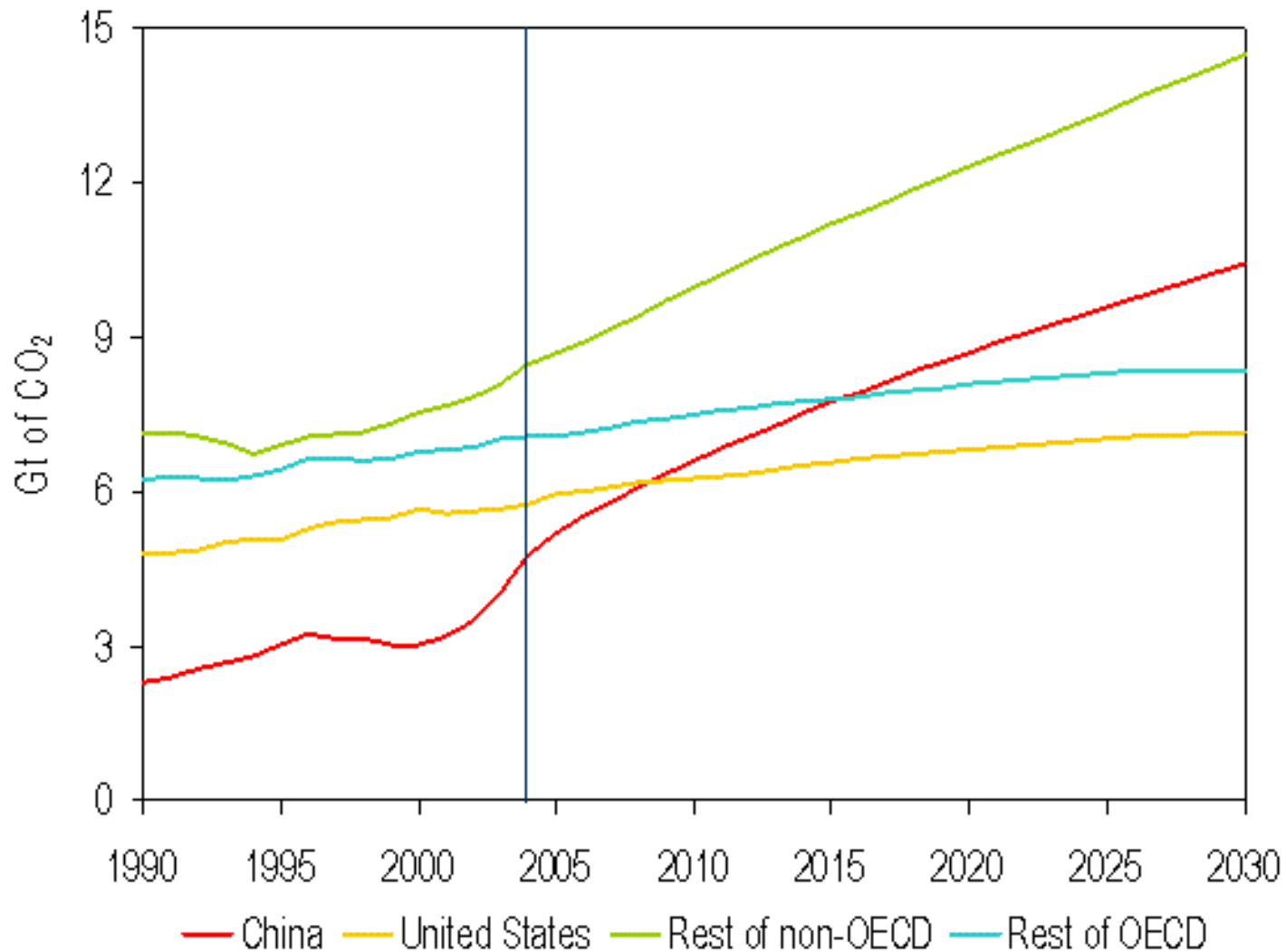


# Emissions Paths to Stabilization



Source: Stern Review on the Economics of Climate Change

# CO<sub>2</sub> Emissions Trends



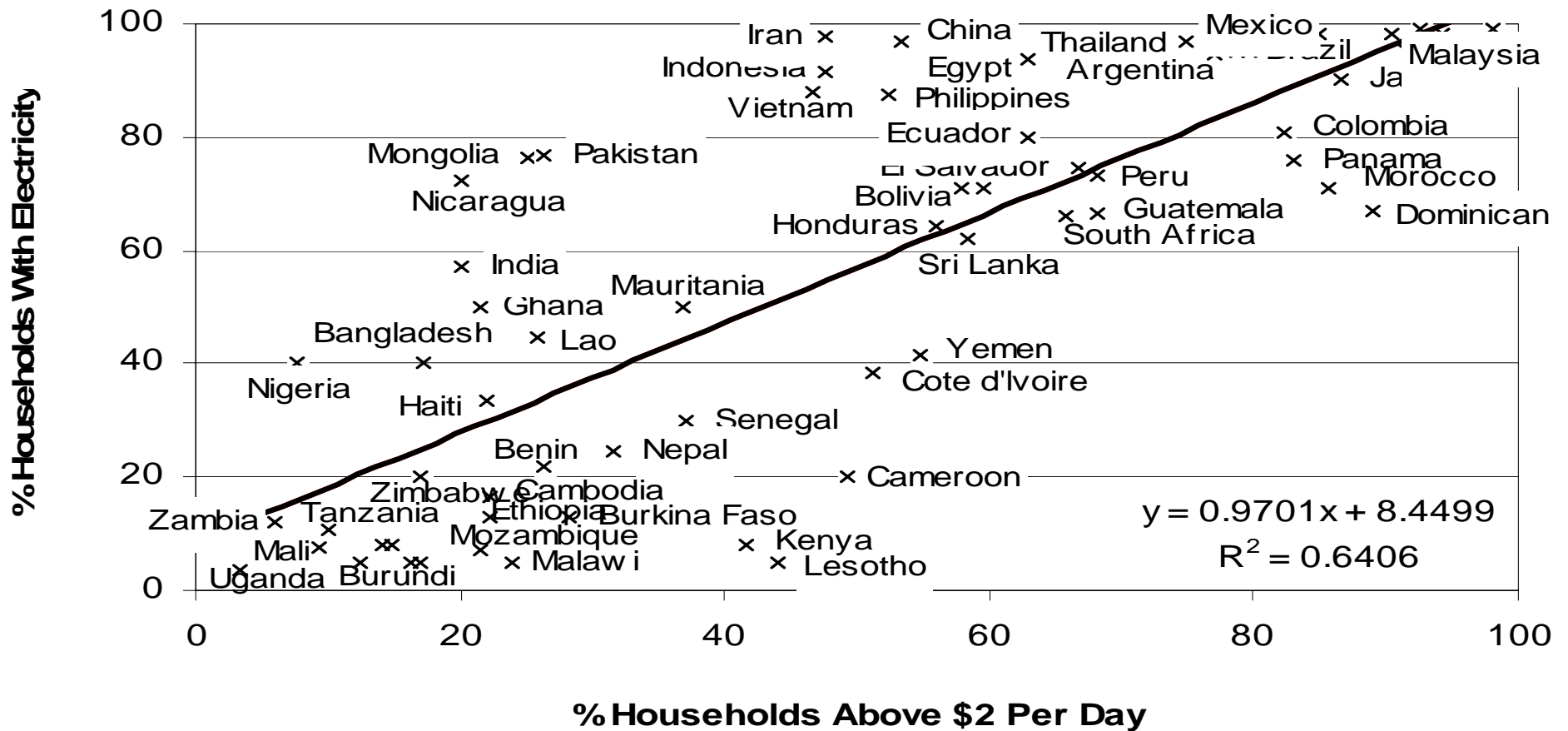
Source: IEA WEO, 2006

# [ Developing Country Issues ]

- Low Income Countries
  - 1.6 Billion without Access to Electricity
  - IEA Forecast of 1.4 Billion by 2030
- Middle Income Country Agenda: Growth
  - China sets the Example
  - India's Growth Accelerating

# Poverty Rate & Household Electricity Access

Poverty Rate & Household Electricity Access





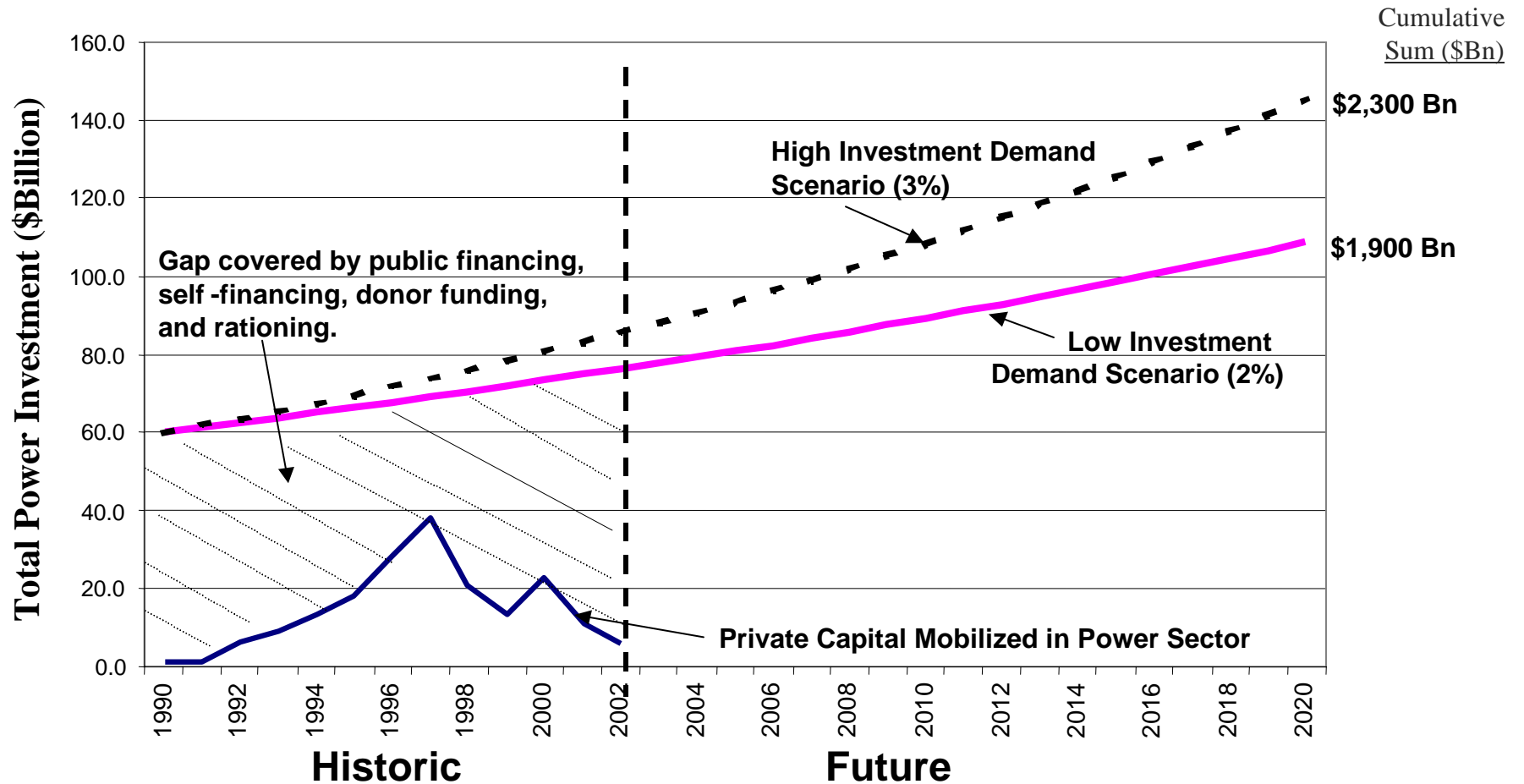
# The Financing Challenge

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- Need \$11 Billion p.a. for Access
- Power Sector Needs About \$160 Billion
  - Readily Identifiable Funding about 50%
- Low Carbon Energy Needs: ~\$40 Billion
  - Low Hanging Fruit to 2020, then cost increases

# Growing Investment Needs, and a Growing Financing gap

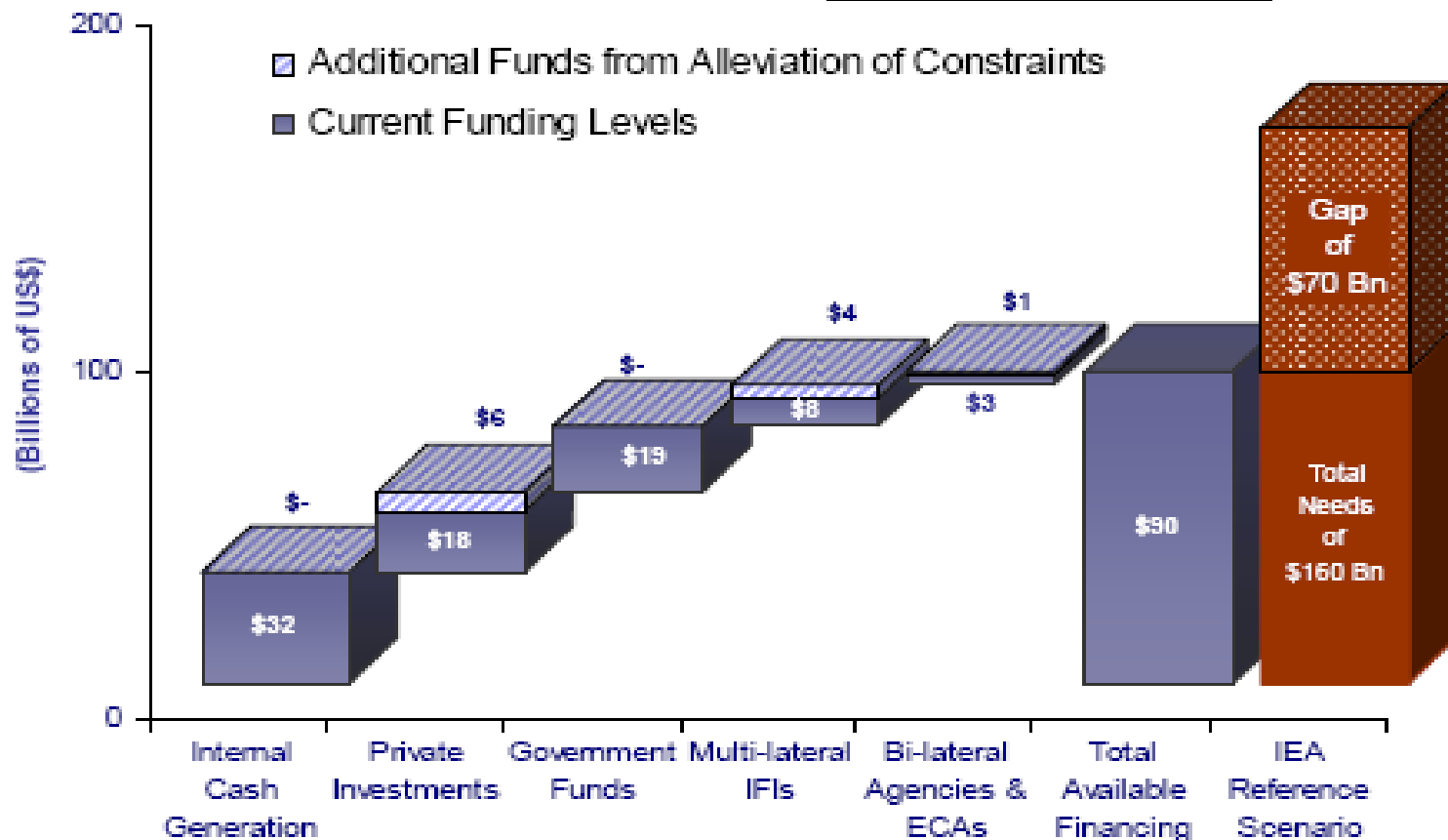
Financing required for the Power Sector in Emerging Markets 1990 - 2020



# The Financing Challenge

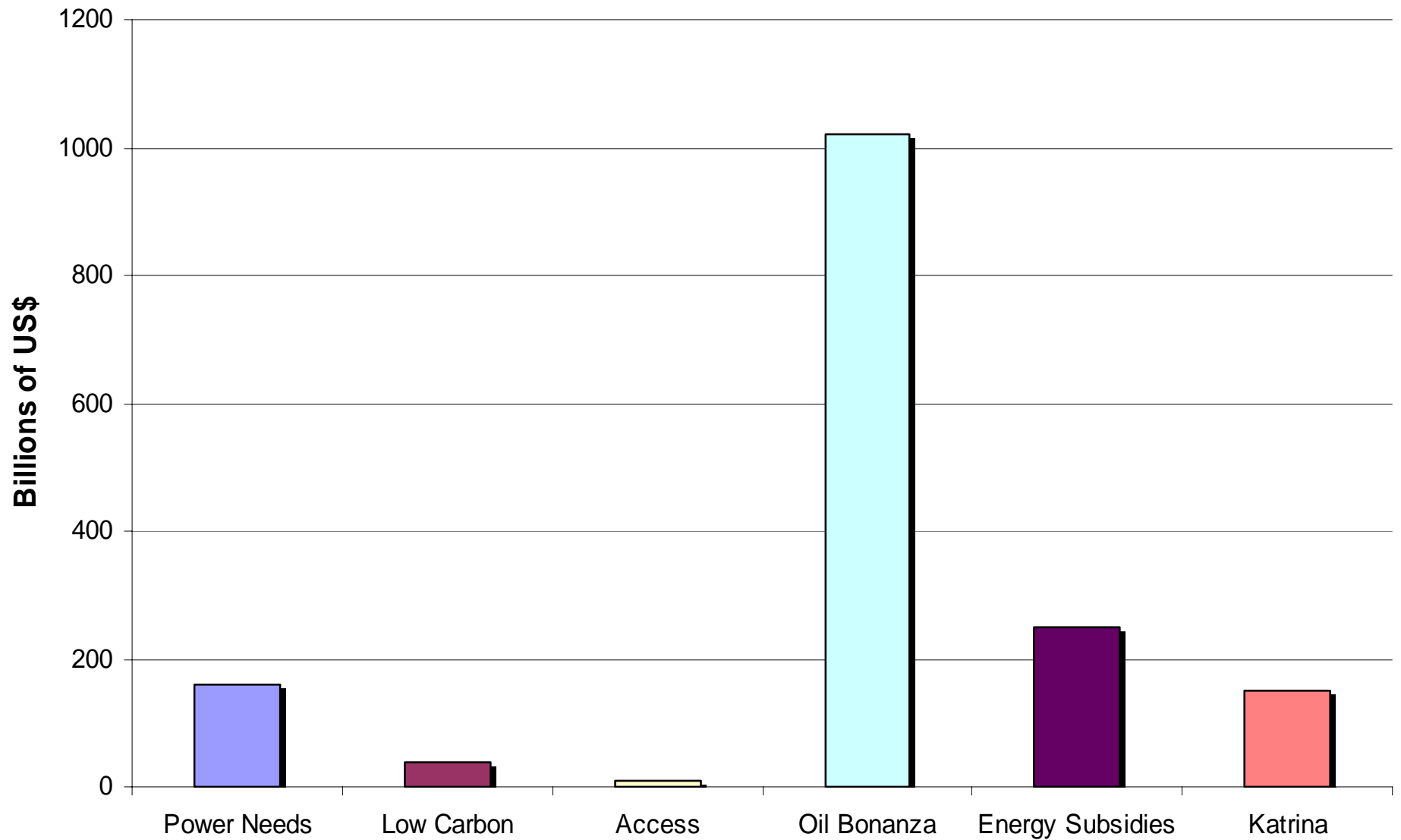
**Figure 1. Short-term Electricity Financing before and after Scaling up**

Estimate of potential financing gap in Non-OECD countries for scaling electricity access (IEA Reference Scenario)



# Energy "Costs"

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# [ Energy: What Matters ]

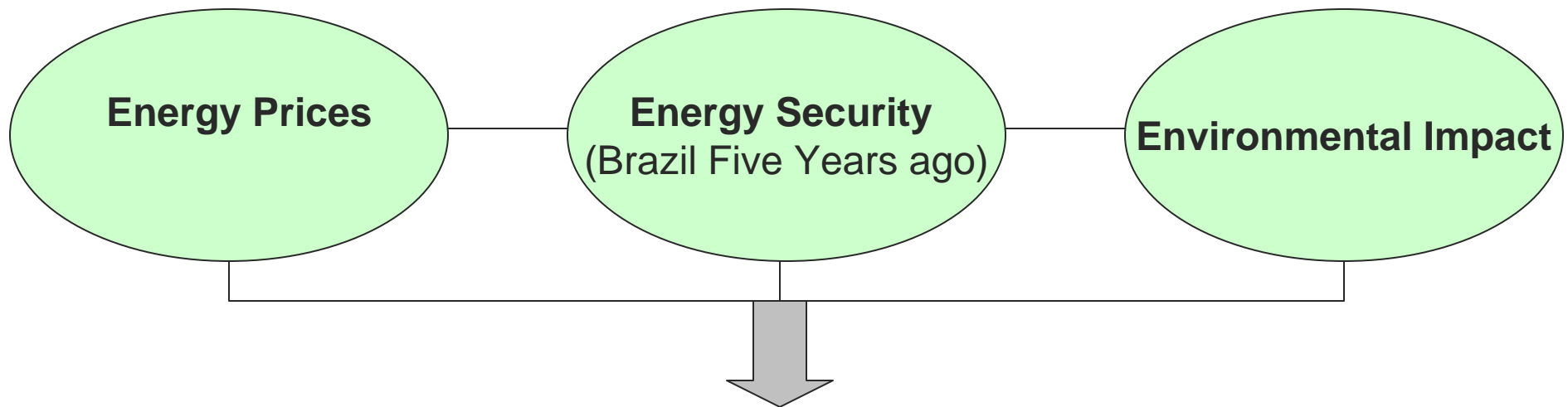
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- Energy Security/Reliable Supply
- Improved Financial Viability
  - Better Governance
  - Private Sector Needed to Gap Fill
- Better Use of Technology
  - Accelerate R&D
- Improved Role of Energy Efficiency

# Energy Efficiency: The Missing Link

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**Impact on:**



**Approach Requires Three-Tiered Attack:**



# [ What is the World Bank Doing? ]

- Support for China's EE Policy
  - Replicable Example
- Cooperation with IEA
  - Energy Efficiency Indicators
  - Policy/Sectoral/Equipment Agenda
- Implementing Lessons Learned
  - CFL Program in Uganda/Rwanda
  - LED Program in SSA

# Energy Efficiency in Serbian Schools



**CFL Lighting for  
energy consumers  
in East Timor**

# [ EE Isn't "THE" Answer ]

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- But important to all three Hot Buttons
- Investment in diversifying Sources
- Smarter Distribution links to Customers
- R&D: Renewables, Biofuels
- Accelerate Carbon Capture, Storage