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# Macro-economic Environment for Green Investments


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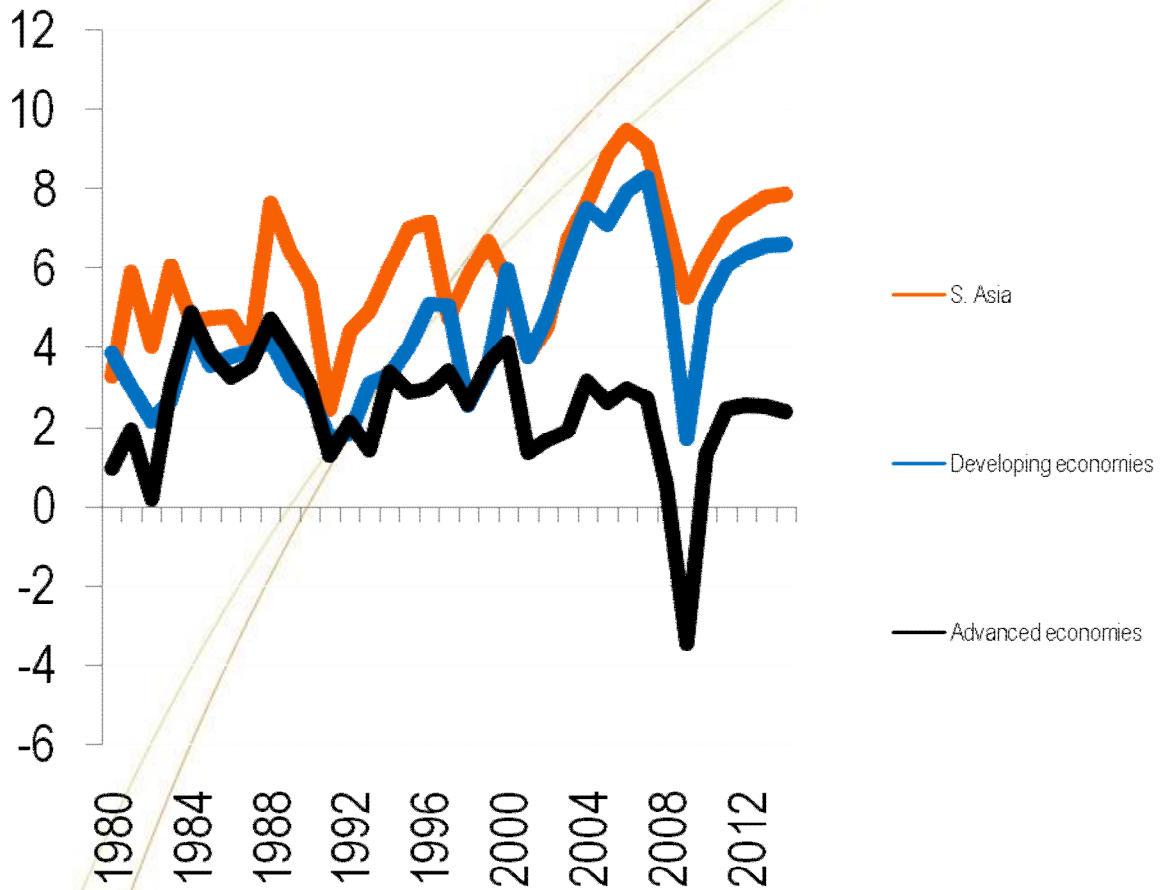
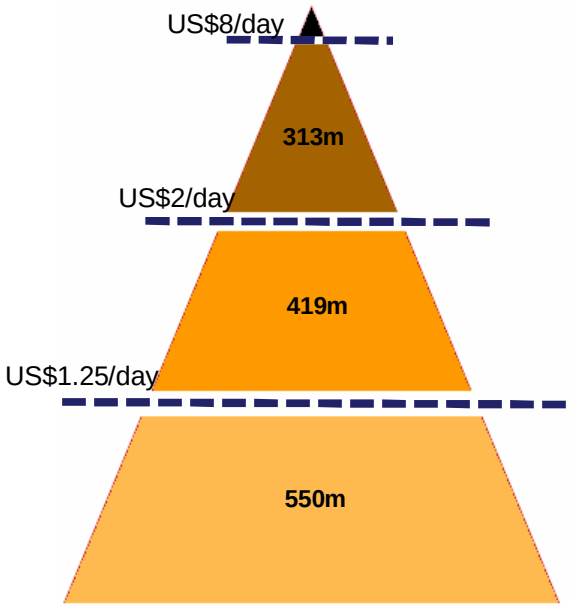
# Opportunities: GDP Growth & BOP

## Real GDP Growth (%)




Source: WEO

## BOP South Asia (2005)

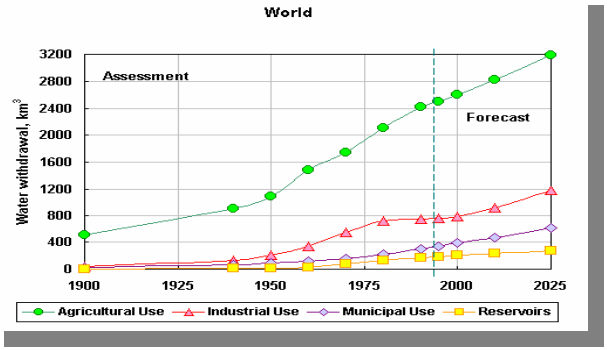



*Source: WB and compilation of various estimates*

# Water is Vital for Development and Economic Growth

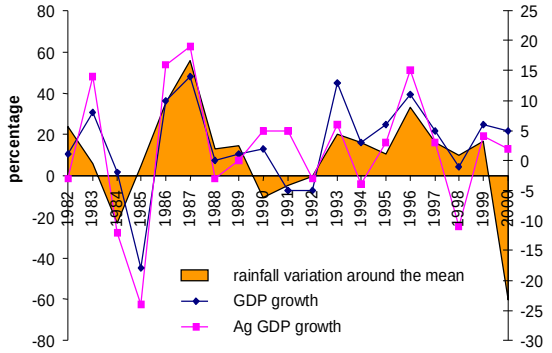
| | |
|---|---|
| **Population growth & urbanization** | • In 20th century, global population tripled, water use increased 6x<br>• By 2050 world population forecasted at 9.1 b, of which 60%+ in (mega) cities<br>• Water consumption positively correlated with improved lifestyle |
| **Rising demand for food – food security** | • Threat of wide-spread food shortages in absence of<br>  • more water efficient practices; &/ or<br>  • improved cropping intensities / yields<br>• Agricultural needs 8x more than industrial & municipal needs by 2050 (if food security met)<br>• Demand for agriculture water driven by<br>  • increasing population,<br>  • higher income levels |
| **Industrialization & energy production** | • Correlation between water consumption & development<br>• Energy huge water user<br>  • hydro-power; coolant for nuclear & thermal power plants; biofuels<br>• Linkages between power generation & water consumption key drivers of future growth |

**Demand growth is outpacing resource renewal**




*Source: UNEP*

**Direct correlation between water variability & GDP growth as experienced in Ethiopia**




*Source: World Bank*



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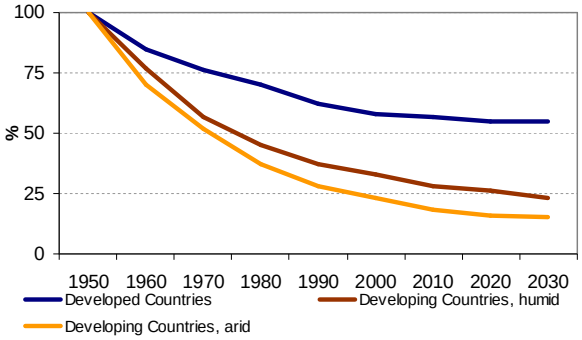
# Water Security, Water Stress and Scarcity

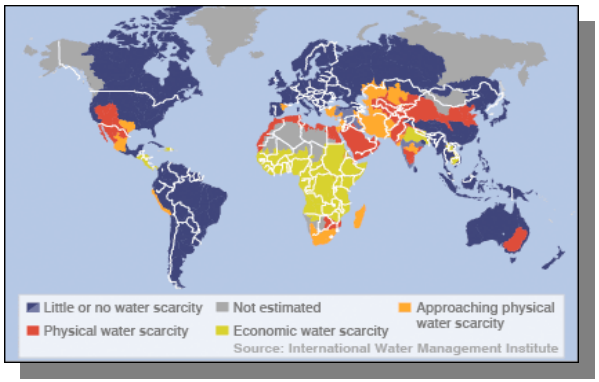
| | |
|---|---|
| **Locational imbalances** | • Freshwater not located near populations<br>  • Amazon -15% of earth's freshwater,1% of population<br>  • China - 20% of world population but just 7% of its water resources<br>  • Over half of South Asia's water supply is in just 3 monsoon months<br>• Solutions involve storage & conveyance infrastructure |
| **Over-use** | • Renewal of resource not keeping up with use<br>• Agriculture, industry limited water efficiencies<br>• Damaged ecosystems, biodiversity, groundwater |
| **Water Governance** | • Political and social obstacles<br>• Lack of Incentives for optimal water allocations<br>• Need to manage inter-related demands |
| **Limited Infrastructure** | • Old, limited distribution infrastructure<br>• Inadequate water treatment infrastructure<br>• Lack of institutional capacity |
| **Deterioration of quality** | • Agriculture runoff (fertilizers, pesticides, animal waste)<br>• Unregulated discharge of industrial effluents |

***Fresh Water is Decllining***




*Source: World Bank, 2002*

***Water scarcity by region[1]***




*Source: The Economist*

1 *Note:* ***(i)*** *Physical water scarcity when >75% of river flows allocated to agriculture, industries or domestic purposes;* ***(ii)*** *Economic water scarcity when < 25% of water from rivers withdrawn for human purposes, but human and financial capacity are limited.*



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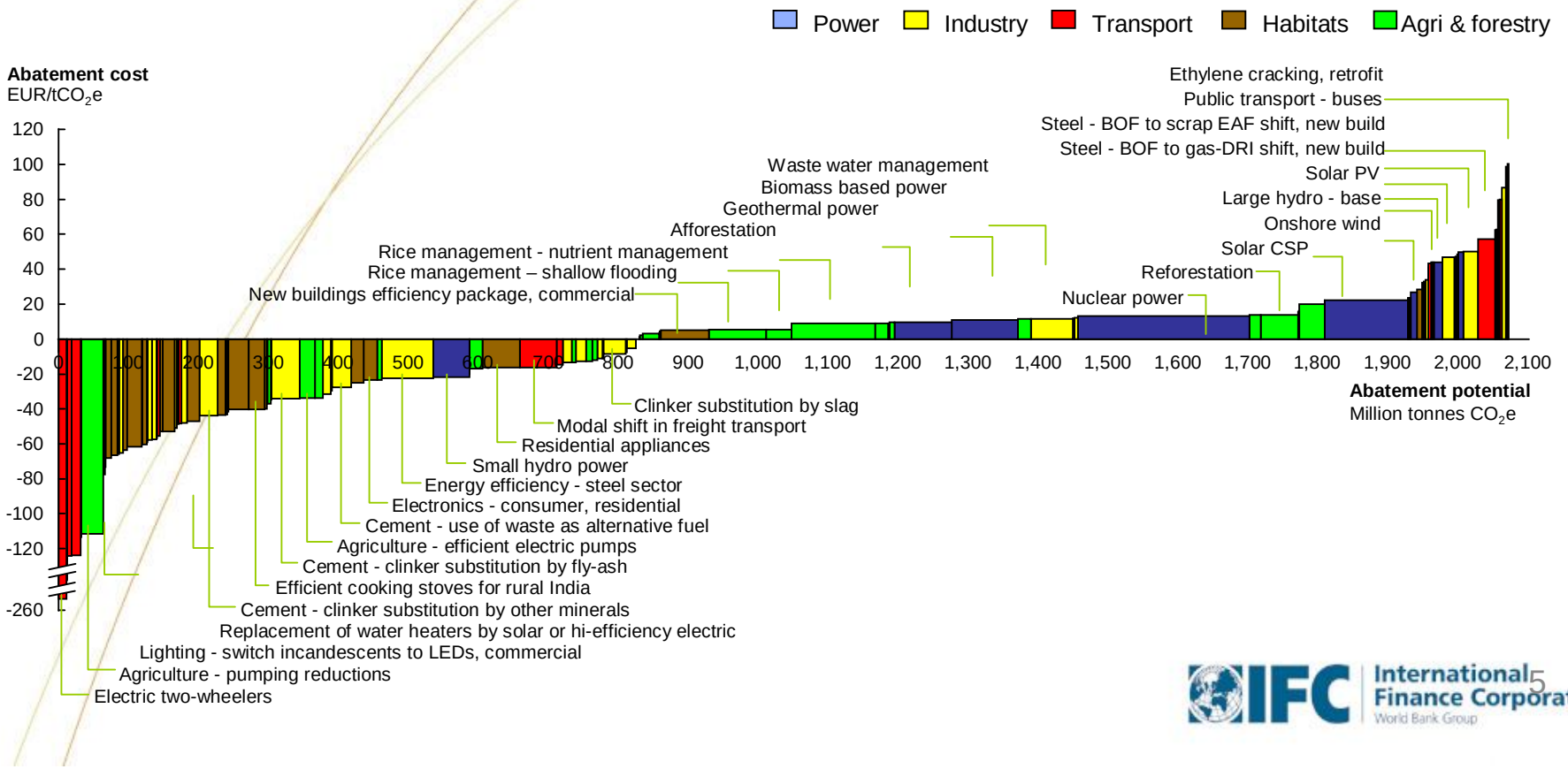
# India's GHG Abatement Curve

http://www.mckinsey.com/clientservice/sustainability/pdf/Environmental_Energy_Sustainability.pdf

**Nearly 3 billion tons/CO2e abatement potential**

Main areas:

- Power generation (36%)
- Industry (26%)
- Agriculture & Forestry (19%)
- Buildings & Appliances (16%)



# Climate Change Investment Potential in India

## Nearly 3 billion tons/CO2e abatement potential:

- Power 930 million tonnes (e.g.. T&D losses, Ultra super-critical coal, Nuclear, Solar PV and CSP, Biomass, Large hydro, Off-shore wind energy, Geothermal)
- Industry 680 million tonnes (e.g.. Energy Efficiency in steel, cement, chemicals etc, Clinker substitution, Fly-ash/slag in cement, Efficient furnaces, Cogeneration)
- Agriculture and Forestry 490 million tonnes (e.g.. Efficient irrigation techniques, high-efficiency pumps, cropland management in rice cultivation, afforestation)
- Buildings and Appliances 340 million tonnes (e.g.. Light switching to LEDs or CFLs, Efficient cook stoves, Energy Efficient appliances)
- Transport 160 million tonnes (e.g.. Freight modal shift, public transport, vehicle efficiency, bio fuels)

## 755,000 Million CuM water shortage (by 2030):

- Efficient agri processes (Reduced over irrigation, Rice intensification etc.)
- Drip irrigation
- Waste-water reuse

## Financing costs :

- Estimated US$ 1 trillion needed between 2010 and 2030 to achieve the above abatement potential
- US $ 6 billion per year to address water shortage

Source: McKinsey, Environmental and Energy Sustainability: An Approach for India, 2009, Charting our water future

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# Potential Size of the Climate Change Market in India

- Energy Efficiency: $15 billion by 2015 (20000 MW energy savings)
- Solar $ 3.5 billion by 2013 (1000 MW Power generation by 2013)
- Green Building: US $ 4 Billion by 2012
- Carbon market: $ 3 billion by 2012
- Water and waste management sector growing at 15-20% annually; expected to double in size to $4 billion by 2013

# Government Initiatives to Address Climate Change

- Target of mandatory 5% Renewable Energy purchase by State utilities in FY 10
- EE Trading Certificate Scheme: Indian companies will have to meet energy efficiency targets or pay penalties
- Supporting CDM projects~$ 3 billion market
- Incentivizing  installation and production of wind energy
- Incentivizing installation of drip irrigation
- Target of 20 GW solar power by 2020 through the National Solar Mission

# IFC's "Green" Investments: Instruments

- Direct investment (IFC provides financing to a renewable project)
- Through financial intermediaries (IFC provides financing to a local FI who then lends for EE/RE)
- Through funds (IFC takes a share in a PE fund which invests in clean technologies)
- Through risk-sharing mechanisms (IFC "incentivizes" action by others through credit enhancements, guarantees)
- Carbon transactions (Carbon Delivery Guarantee)
- Blended financing (IFC structures GEF, CTF financing to enable clean technology investment)
- Advisory services (IFC undertakes market transformation activities through TA and capacity building)

# IFC's "Green" Investments: Recent Examples

**$60m to Jain Irrigation, India (Adaptation, IS-AS)**

Water savings = consumption of 11 million households

**$0.35 m equity in Husk Power, Bihar**

Provides rice-husk based electricity to remote, rural, un-electrified villages of 200-500 households as a "pay-for-use" service; currently operates about 30 plants

**$3m CP loan to JK Paper, India (IS & AS)**

Reduction of > 67,000 tons of $CO_2e$/yr (12,000 cars off the road)

Savings of 3.4 MMC of water/yr(consumption of 75,000 households)

Savings of 30 GWh of electricity/yr(consumption of >9,000 households )

**$10 m equity investment in Azure Power (Solar)**

10,000 tons of GHG reduction/yr and replication of similar projects

**$50 million loan to MSETCL**

Reduction of 0.6 million tons of $CO_2e$/yr. Reduction of transmission losses

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