

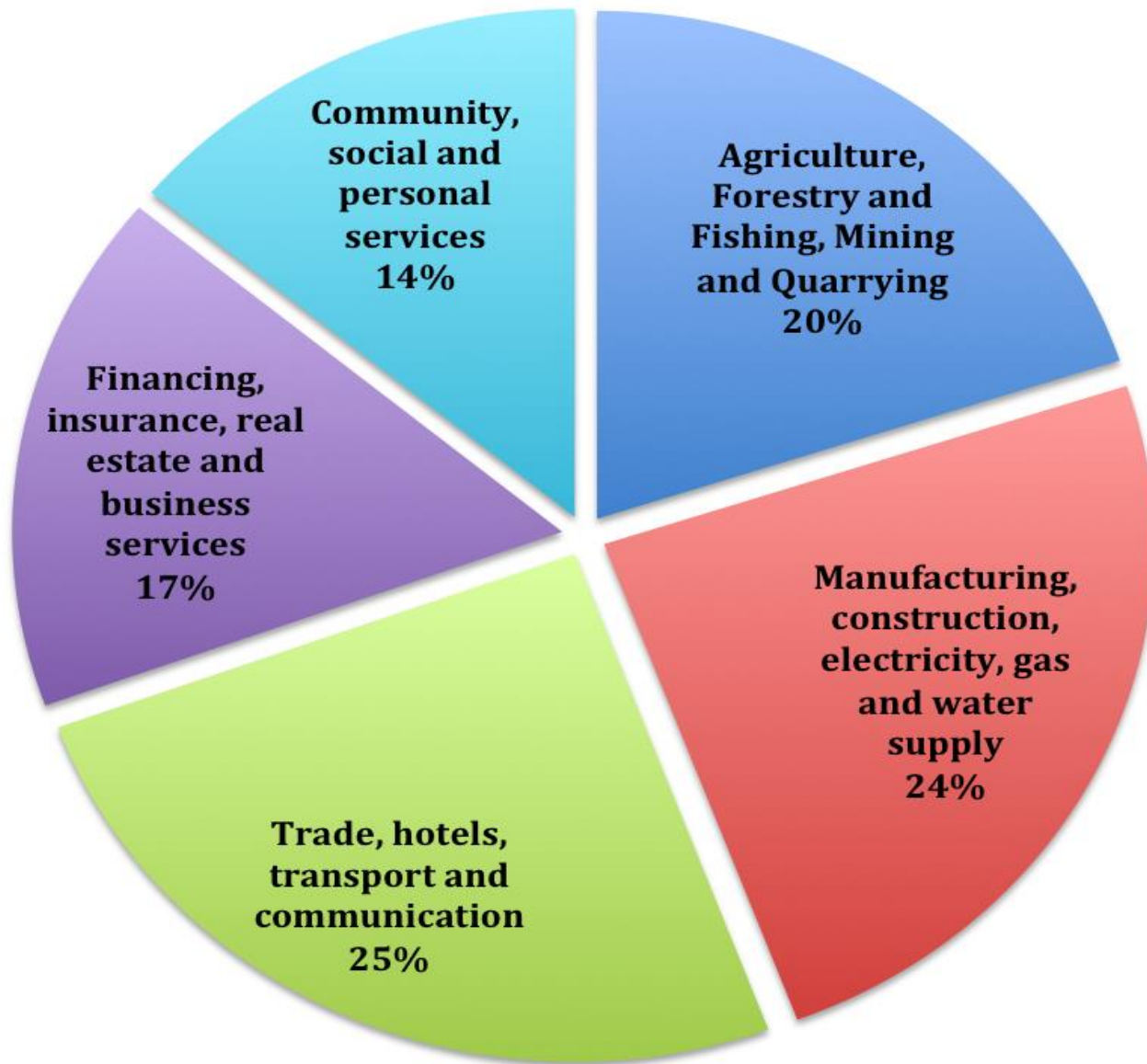
# Prospects of a low carbon energy transition



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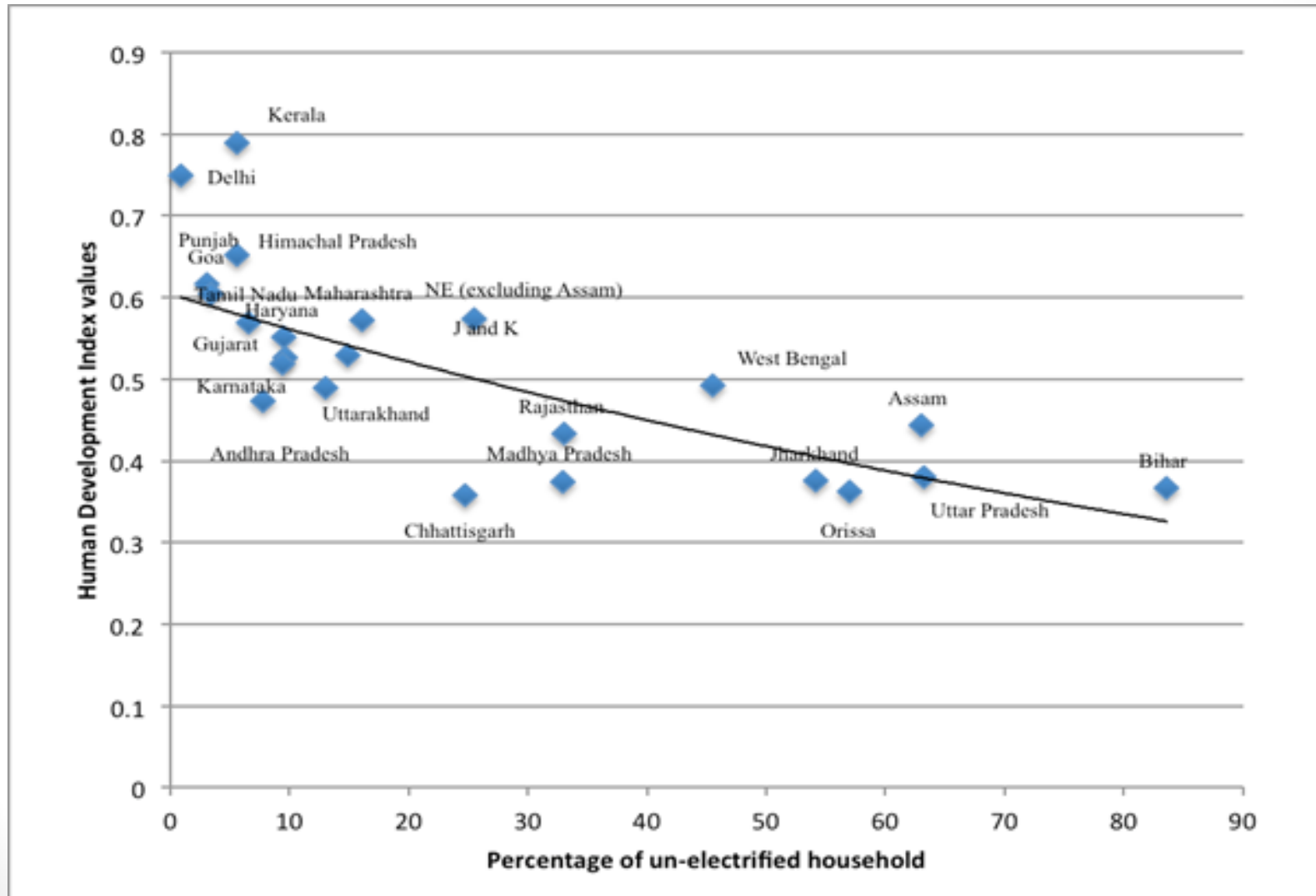
**Figure 1: Structure of the Indian Economy (2011-12)**



# Poverty

- ❑ India has 1/3<sup>rd</sup> of people living at less than \$ 1.25 a day
- ❑ Based on Planning Commission's data it is 354.7 mn
- ❑ IMR is 44 per 1000 population
- ❑ Institutional delivery is 40.8% per 1000
- ❑ 78.9% children are anaemic
- ❑ Over 40% children are stunted/underweight

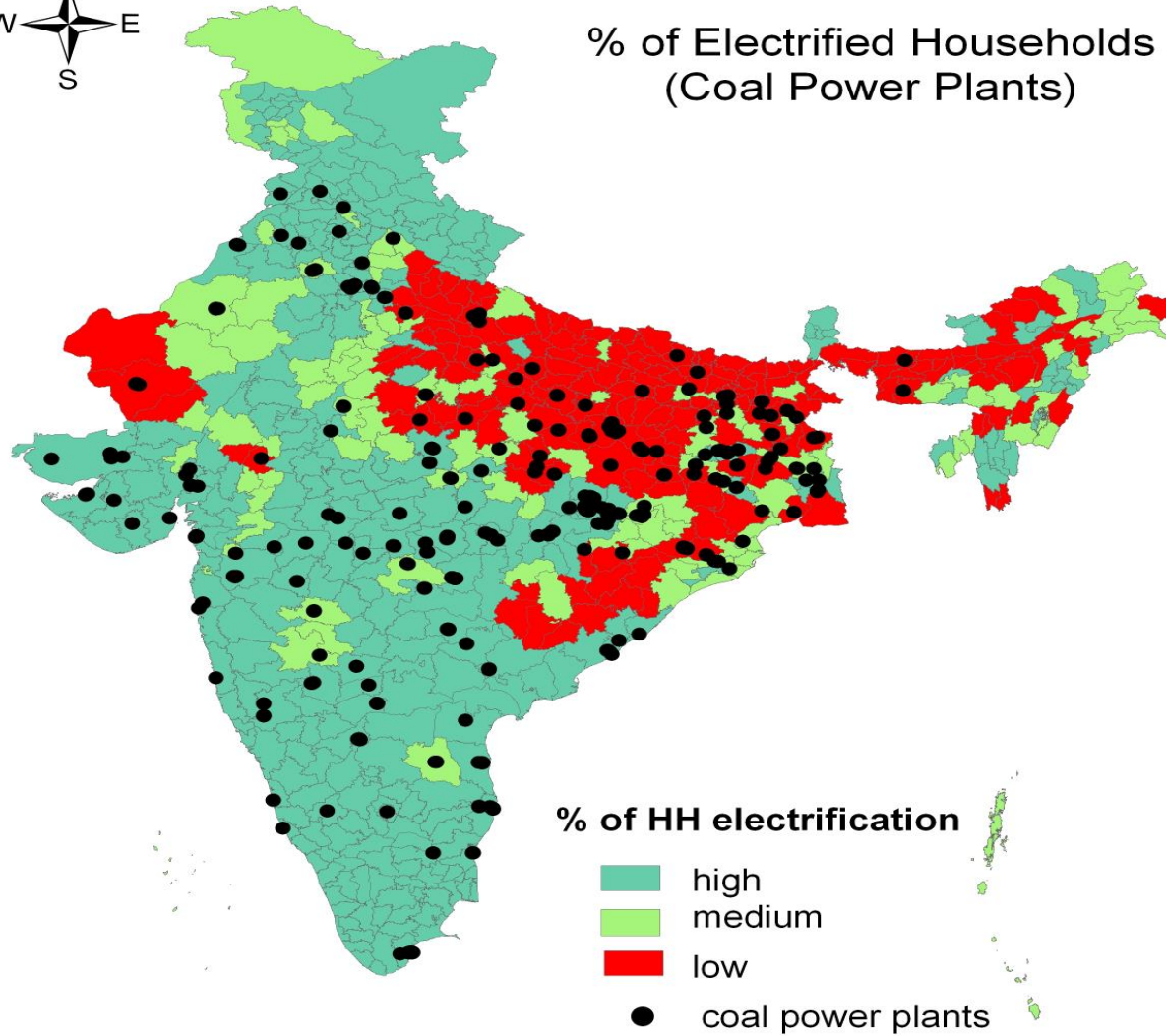
# Energy and development



# Unelectrified households around



% of Electrified Households  
(Coal Power Plants)



# India Energy Access scenario

- ❑ 32.7% Hh have no access to electricity
- ❑ 70% Hh rely on traditional biomass for cooking
- ❑ 65% PHCs are unelectrified
- ❑ 53% Govt. schools are unelectrified

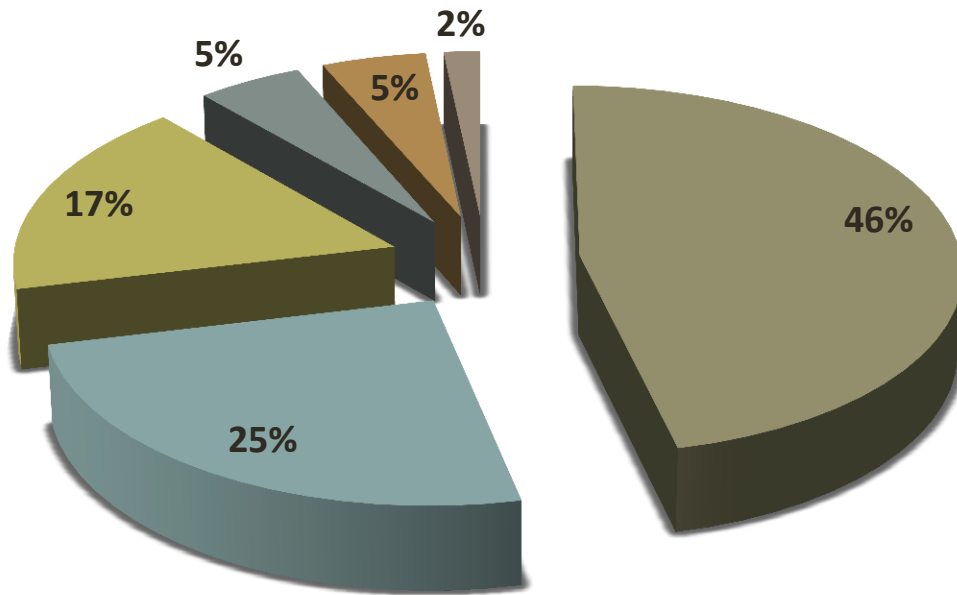
# The energy gap

Figure 1:- Extent of unmet energy needs in South Asia, as of 2011

Country	Population without electricity (millions)	Electrification rate %	Urban electrification rate %	Rural electrification rate %	Household dependence on traditional biofuels (primarily wood) -%
India	306	75	94	67	82
Pakistan	56	69	88	57	81
Bangladesh	61	60	90	48	89
Nepal	7	76	97	57	81
Sri Lanka	3	85	96	84	79.5

Source:- [International Energy Agency, World Energy Outlook, 2013](#)

# Indian Energy Demand (2012): Sectoral Shares



■ Industry

■ Cooking

■ Transport

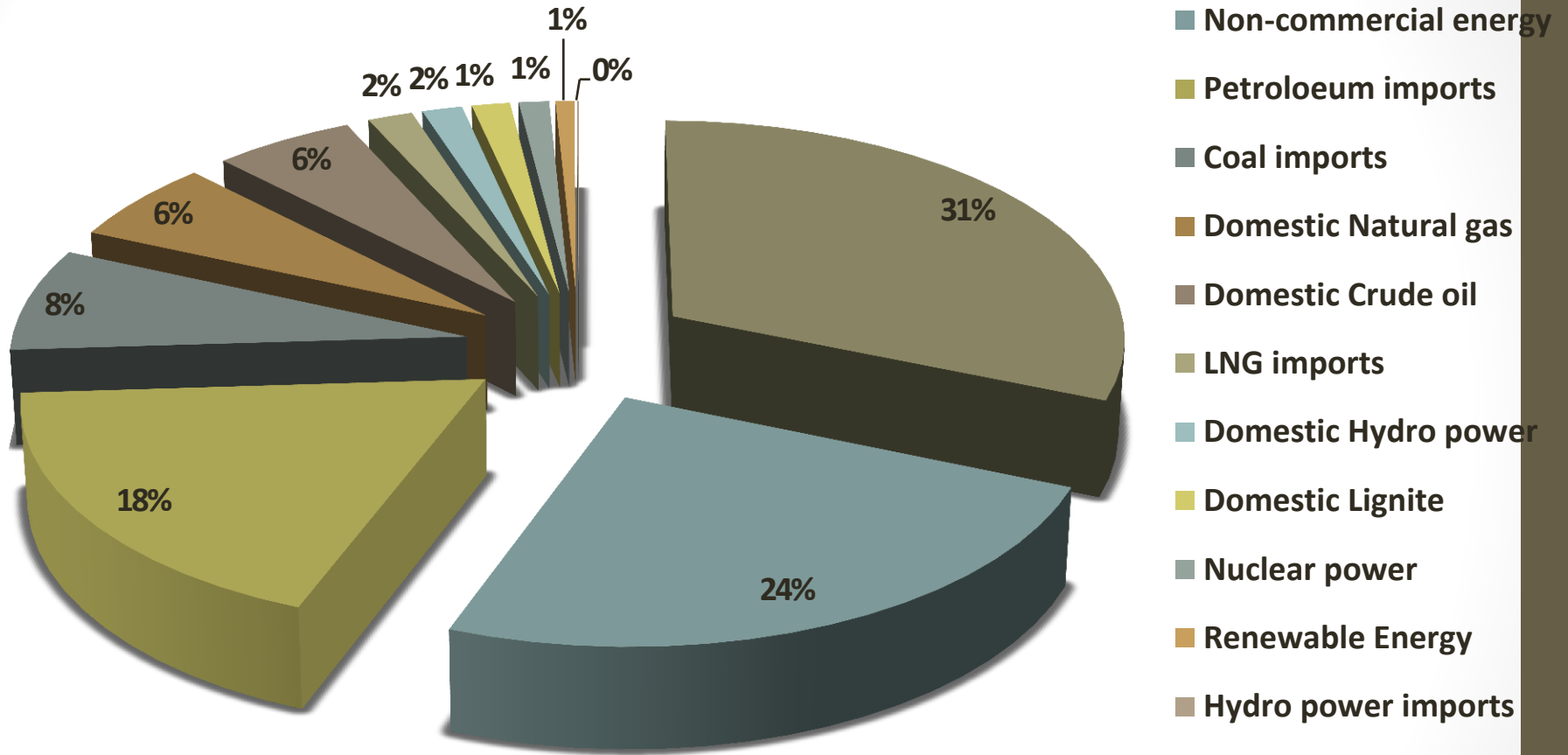
■ Lighting and  
Appliances

■ Agriculture

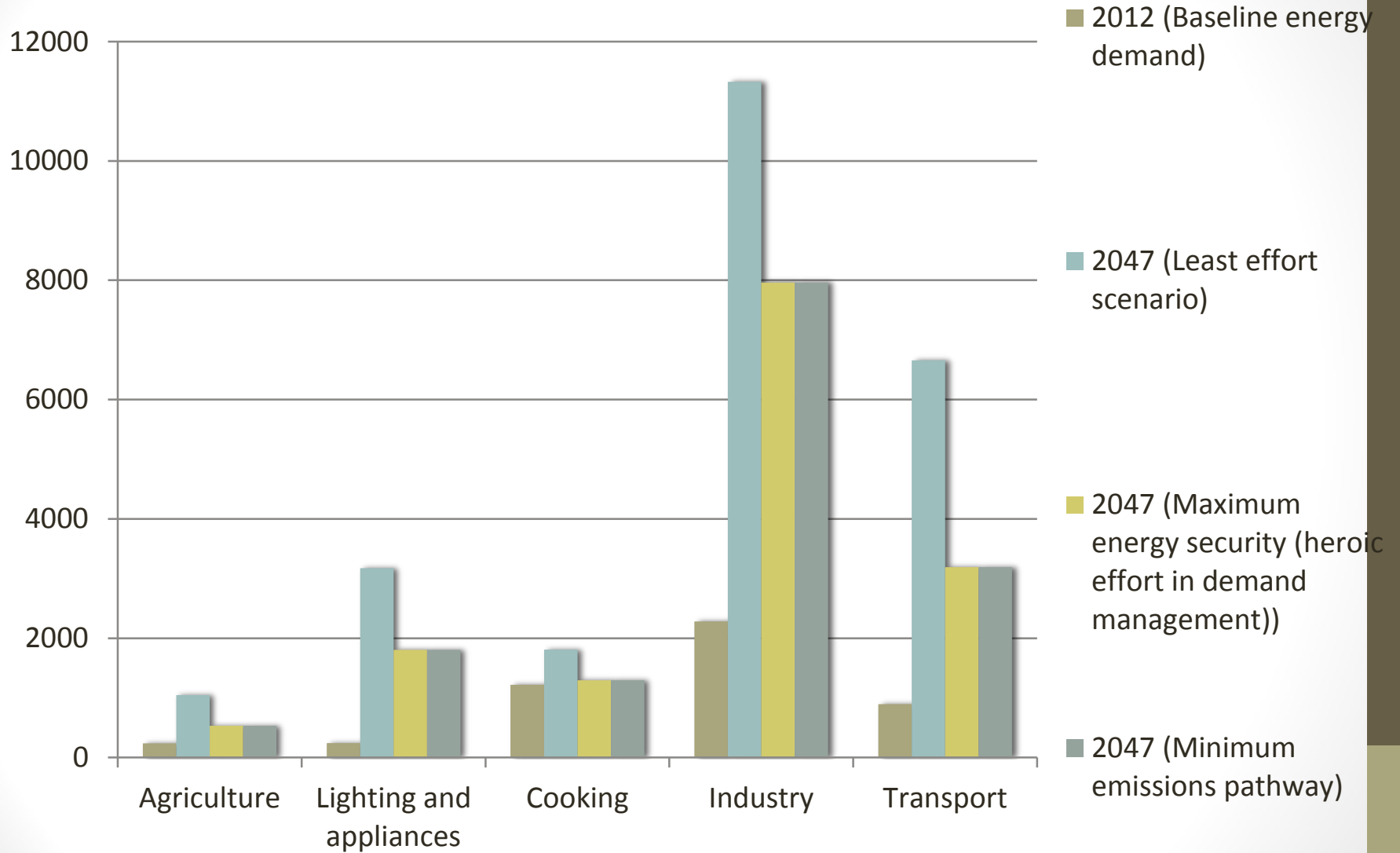
■ Telecom



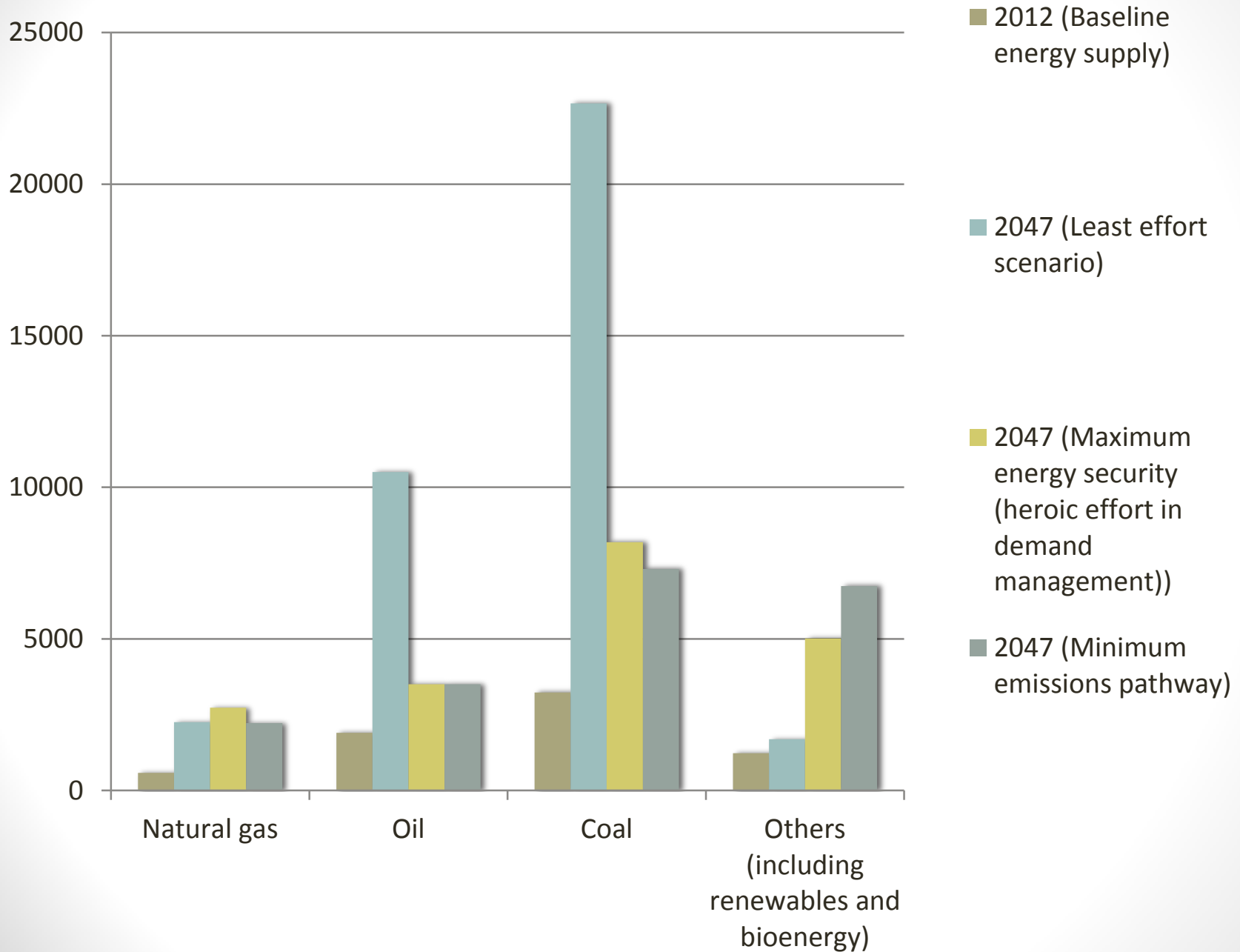
# India Energy Supply (2012): Sectoral Shares



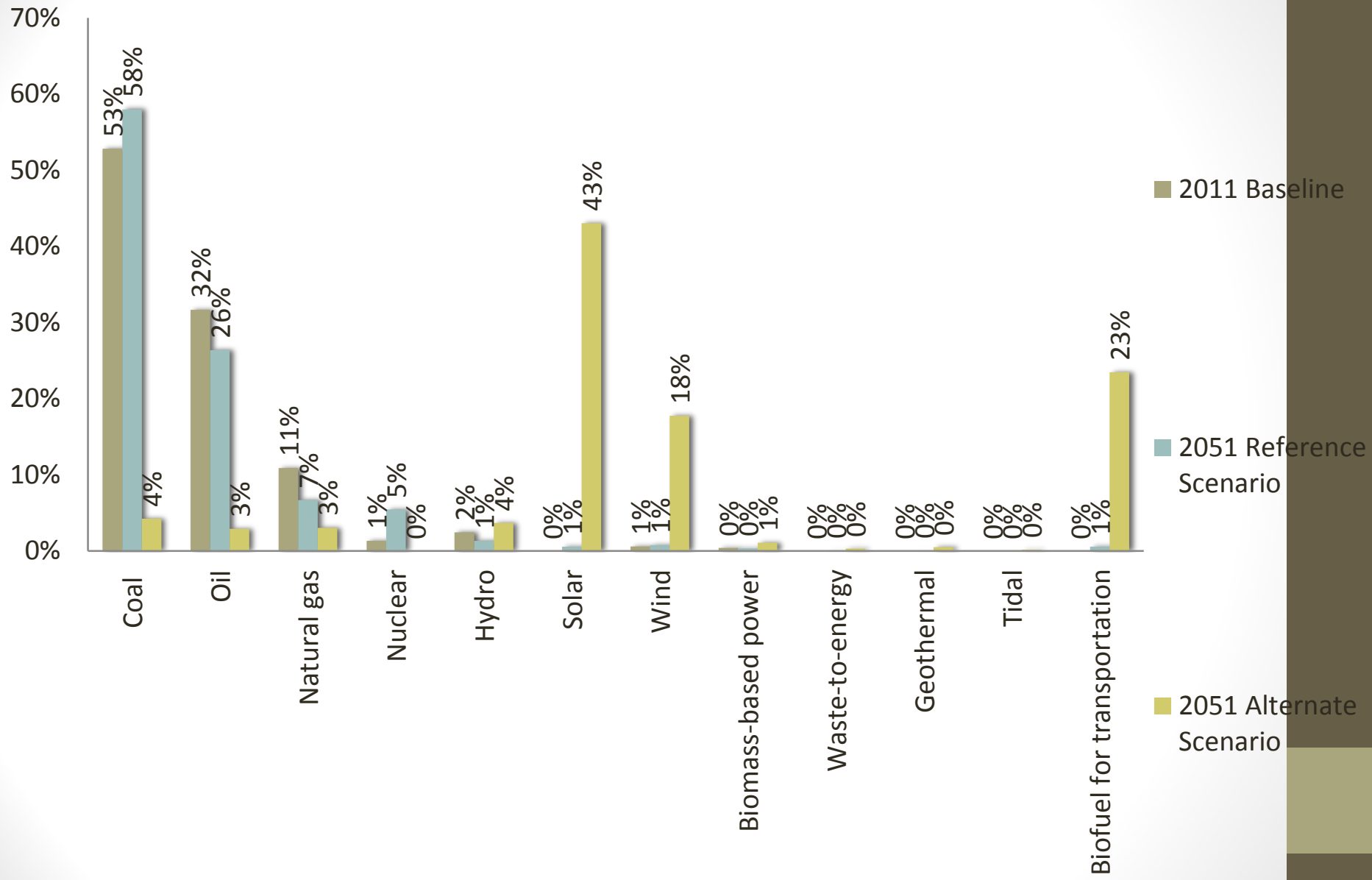
# Energy Demand Scenarios: Planning Commission (TWh/yr)



# Energy supply scenarios: Planning Commission (TWh/yr)



# Energy Supply Scenarios (Percentages): WWF-TERI



# Installed capacity

	2008-09 (in MW)	2030-31 (in MW)	
		BAU	LC
Coal-based power plants	81,606	3,40,000	2,80,000
Gas & oil-based power plants	18,256	50,700	50,700
Large Hydropower plants	36,885	84,500	84,500
Nuclear power	4,120	30,000	30,000
Solar PV	0	10,000	55,000
Solar thermal (CSP)	0	4000 – without storage 2000 – with storage	7,500 – without storage 15,000 – with storage
Onshore wind	10,891	40,000	40,000
Offshore wind	0	0	50,000
Biomass	1,752	20,000	50,000
Small hydropower plants	2,430	8,000	15,000
<b>Total</b>	<b>1,56,000</b>	<b>5,89,200</b>	<b>6,77,700</b>

# Challenges to Low Carbon Transition

## ❑ *Technological Barriers*

- ❑ Technology development and wide dissemination key to low carbon transition.
- ❑ Not just technologies in niche markets but technology across all sectors.
- ❑ Huge gap between the current state of RE and EE technologies and what they are expected to deliver.
- ❑ Technology transfer is critical to the proliferation of renewable energy, including
  - ❑ Development of a local manufacturing base and the associated supply chains;
  - ❑ systems for maintenance and marketing;
  - ❑ a labor force that can build, use, and maintain the technology; and,
  - ❑ in many cases, the adaptation of technology to local conditions.

# Challenges to Low Carbon Transition

## □ Finance

- IEA estimates USD 48 billion a year just to meet the cost of delivering an 'Energy for All'
- Investment required for providing 100% electrification to all in India alone would cost USD 135 billion during 2010-2030.
- Additional investment for clean cooking energy USD 25bn during 2010-2030 in developing Asia.
- IEA estimates USD 530 billion additional investment for mitigating climate change.
- World Bank estimates USD 475 billion annual investment in developing countries.
- In the case of India, estimated investments in the power sector around \$13 trillion over 2011–2051.
- Incremental investment required to shift to low carbon development is significant, way beyond present capacities of countries in South Asia.

# Challenges to Low Carbon Transition

## ❑ Financing

- ❑ Though some RE (wind) are near viable, other technology viable (Solar), and other still at development stage
- ❑ High initial capital investment requirements is a key challenge to RE
- ❑ General lack of financing and absence of proper financing mechanisms for clean technology development in the region.
- ❑ Mainstream financial institutions in South Asia have limited understanding of and expertise on renewable energy and energy efficiency projects and are not yet prepared to finance them.



# Indian policy measures for RE

- ❑ National Solar Mission and National Mission on Enhanced Energy Efficiency
- ❑ Renewable purchase obligations coupled with renewable energy certificates
- ❑ Generation based incentives and feed-in tariffs
- ❑ Long term purchase agreements

# Way Forward

## ❑ Phasing out Coal

- ❑ Energy is key to development, especially industrial development, which is important for countries to provide infrastructure for development and jobs.
- ❑ RE not mature enough to provide continuous, stable and affordable energy for all energy needs (households, industry, service, agriculture, etc.).
- ❑ But countries need a strategy and plan to identify phasing out coal and fossil fuels.
  - ❑ The strategy should focus on EE in the short run to reduce the growth in demand.
  - ❑ South Asia Regional cooperation to maximize the use of hydro potential, including environmentally safe large hydro projects.
  - ❑ Use of other RE sources, especially solar and wind in the region, to shave of to maximum technically possible potential in operating stable grids.

# Way Forward...

## □ *Policy*

- Appropriate policy environment is prerequisite for a paradigm shift toward a sustainable energy future. Setting goals and targets at highest policy level provides the necessary thrust and signal to markets, thus enabling a sustained change. Such strategic goals help integrate the sustainable energy focus within planning of sectoral and provincial plans.
- It is important that countries set goal in terms of GHG emissions for long term and use that as basis to identify in context of its sustainable development goals, what steps it would need to achieve the goal. Establishing the goal and pathways also helps identify what is feasible for countries on their own and support it would need to achieve these goals.
- A national dialogue for developing long term goal for decarbonization
- Integrating climate change into development planning and implementation and reflected in long term energy policies and development planning processes.
- Clearly outline for short term plans the financial and technology support needed.

# Way Forward...

## □ Finance

- Countries do need significant new investment in the development and deployment of clean energy technologies.
- Capacities and policy framework to include mainstream financing institutions (i.e., commercial banks), government institutions established for the promotion of such technologies, NGOs/private organizations, and international financial mechanisms.
- Establishing financial entities to promote low carbon transition. Some examples of public agencies in South Asia that can provide financing for renewable energy projects are the Indian Renewable Energy Development Agency Ltd., Nepal's Alternative Energy Promotion Center, and Bangladesh's Infrastructure Development Company Limited.
- Ensuring progress on mobilizing finance is tracking progress of integrating climate finance reading in the financing sector.

# Way Forward...

- ❑ Regional cooperation provides a major opportunity for South Asian countries to achieve energy security through large-scale development of clean energy resources.
- ❑ Intraregional energy trade is limited and expanding this cooperation can help countries significantly in achieving their development goals and also leap frogging to low carbon growth.
- ❑ Regional cooperation could be strengthened
  - ❑ Sharing of technology know-how,
  - ❑ Technology training programs,
  - ❑ Sharing of environmental monitoring and information (especially those relating to renewable energy resources),
  - ❑ Sharing renewable energy resources (trade)
- ❑ The most important initiative could be a regional renewable fund.



**Thanks!**