Countering energy insecurity: The case for Africa-India collaboration

Conference on Africa and the Geopolitics of India's Energy Security

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Energy Security

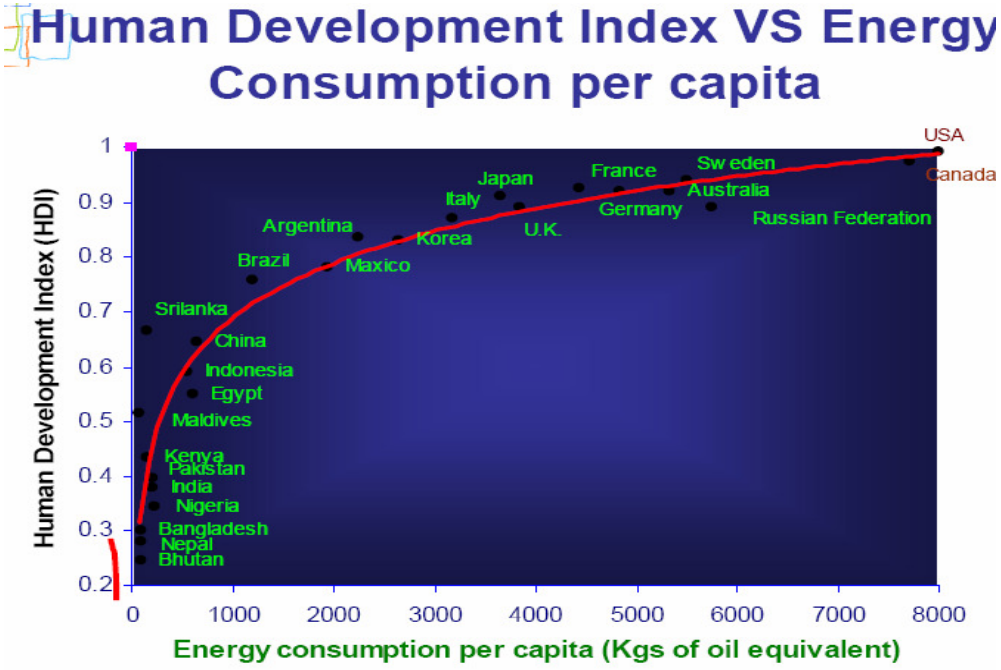
"The ability to supply lifeline energy to all citizens irrespective of their ability to pay for it as well as meet their effective demand for safe and convenient energy to satisfy their various needs at competitive prices, at all times and with a prescribed confidence level considering shocks and disruptions that can be reasonably expected".

(Integrated Energy Policy, GOI, 2006)

Energy Contexts in Africa and India

- Low energy access to a large part of its population
- Lack of access to modern energy leads to a low HDI
- Energy needs to deliver growth are humungous

Energy use and HDI linkages



http://europa.eu.int/comm/research/energy/pdf/18_sayigh_en.pdf

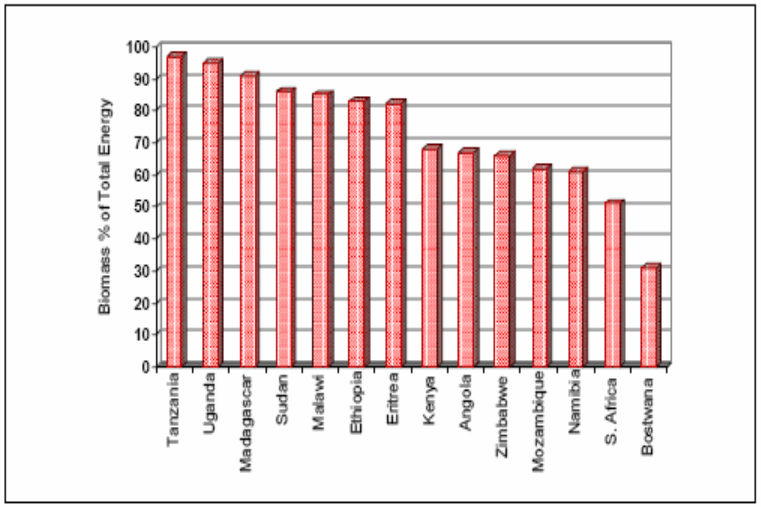
India

- **Low access to modern energy sources**: Over 500 million (40%) without electricity and 700 million dependent on traditional fuels; a per capita annual consumption of 650 units
- **High electricity shortages**: estimated at nearly 10% in energy terms and over 13 % in peak demand
- **Humungous projected energy resource needs** to deliver 8% growth
- **High dependence on fossil fuels and imports**: 70% of its oil is imported; 11% of its coal and 17% of its natural gas
- **Carbon concerns:** an additional constraint

Africa

- **Low access to modern energy sources: I**n rural areas varies from 3-5%; **Biomass energy** forms the bulk (47%) of Africa's total final energy supply; 70-90% in SSA
- **Rich in energy resources but little power:** Share of world reserves: 9.7% of oil; 7.8% gas, 5.6% coal; 17% of hydro potential; but 457 kWh/c/a; without SA this is 124 kWh/c/a
- **Energy exports:** Nearly 60% of commercial energy produced is exported out of the continent
- **Concentration**: Over three fourths of energy produced and consumed is in a few countries, primarily: South Africa, Egypt, Algeria, Nigeria and Libya
- **Carbon concerns for South Africa :** an additional constraint

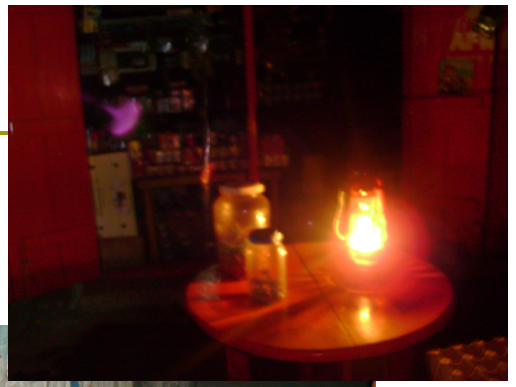
Biomass dependence



Source: AFREPREN, 2002

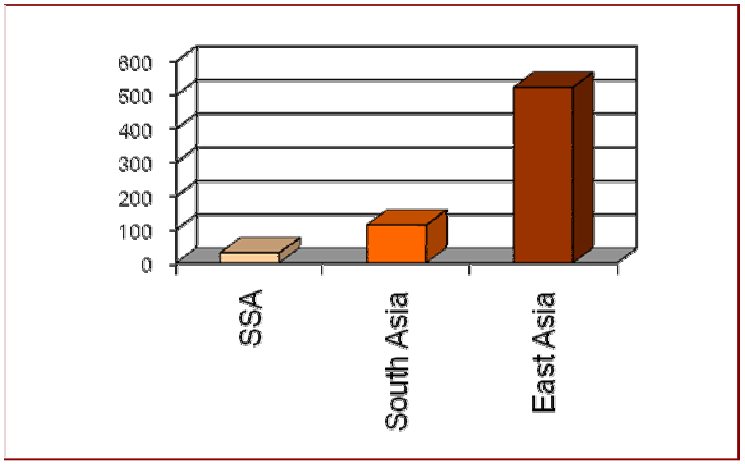
Electricity Situation in Africa

- Only 22% rural population have access to electricity
- About 589 million people without electricity access
- More than a third of on-grid population remain “under-electrified”
- Kerosene is the primary alternative for off-grid lighting (4-5 lit/HH/month),
- Other lighting fuel/devices include small generators or dry cell based lighting devices
- TERI Field study in Sierra Leone, Liberia, Ethiopia and Kenya indicate community spend about $ 5-8 per month on lighting fuel



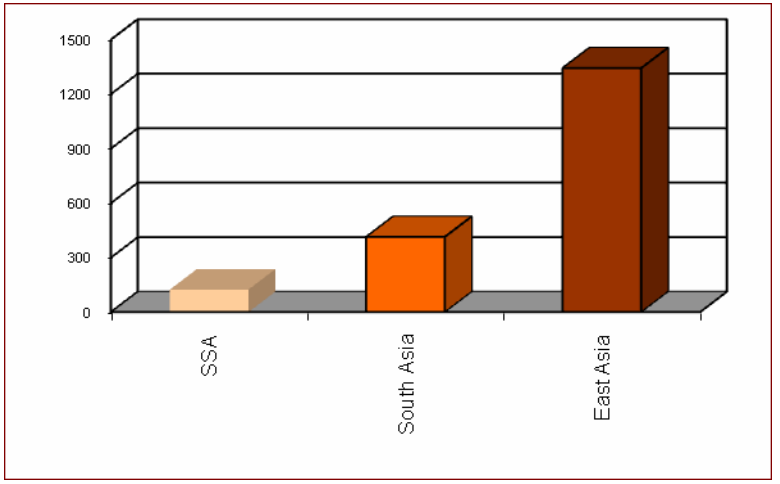
Electricity Gaps relative to India, Asia

Generation capacity (MW /mln population)



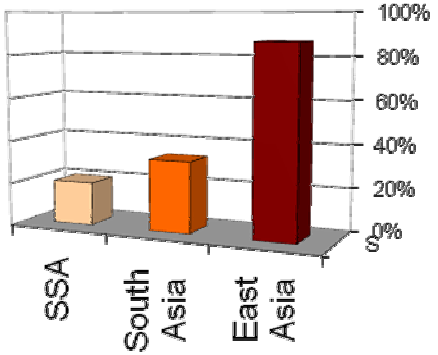
India: 123

Electricity consumption (kWh/capita/yr)



India: 650

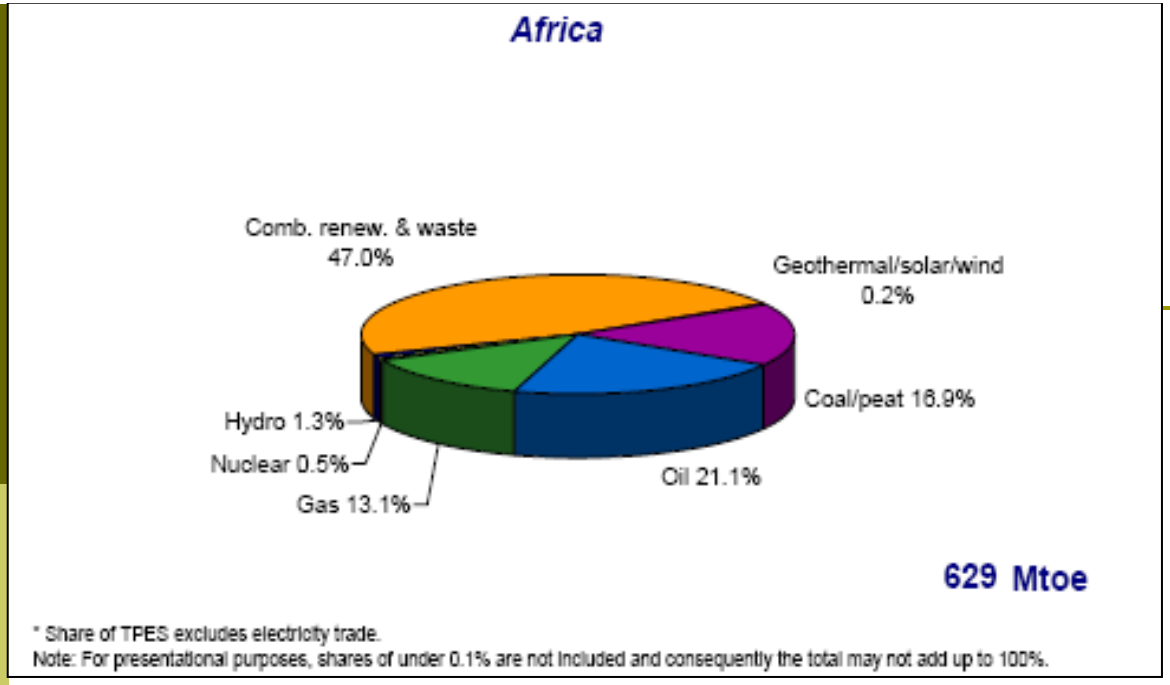
Access (% of households)



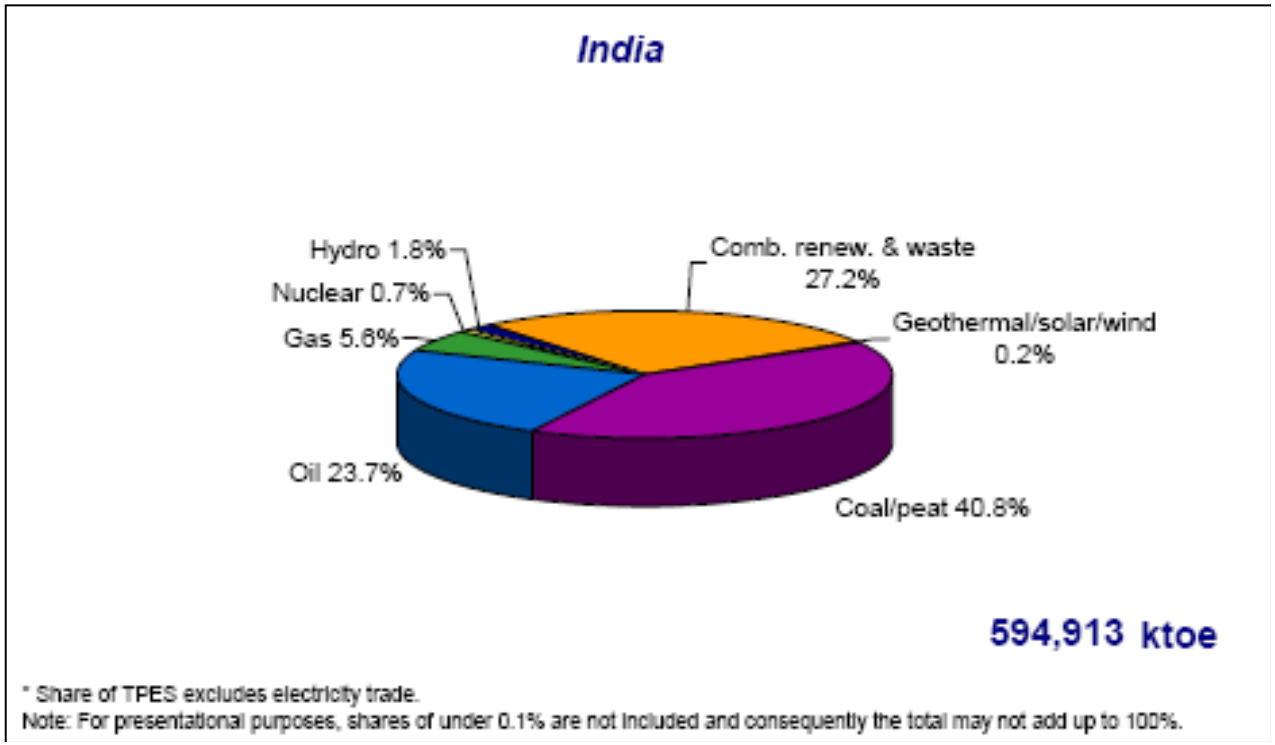
India: 60%

Source: AIDC, 2009

Share of total primary energy supply, 2007



Heavy dependence on coal and biomass



Source:
IEA, 2007

India's energy resource needs

2002-2031/32
(for 8% growth p.a)

2002-2030

- Coal – 2 fold (300)
- Gas – 4 fold (29)
- Oil – 2.3 fold (148)
- Hydro – 3.6 fold (13)
- Nuclear – 5.8 fold(24)

IEP, 2006

(figures In brackets, mtoe)

Range of Imports in 2031

- Fossil fuel imports: 387-1010 Mtoe; (Import dependency: 29-59%)
- Coal imports : 72-462 mtoe; (Import dependency:11-45%)
- Oil import: 315-451 MT; (Import dependency: 90-93%)
- Natural Gas import: 0-97 Mtoe (Import dependency: 0-49%)

Where from?

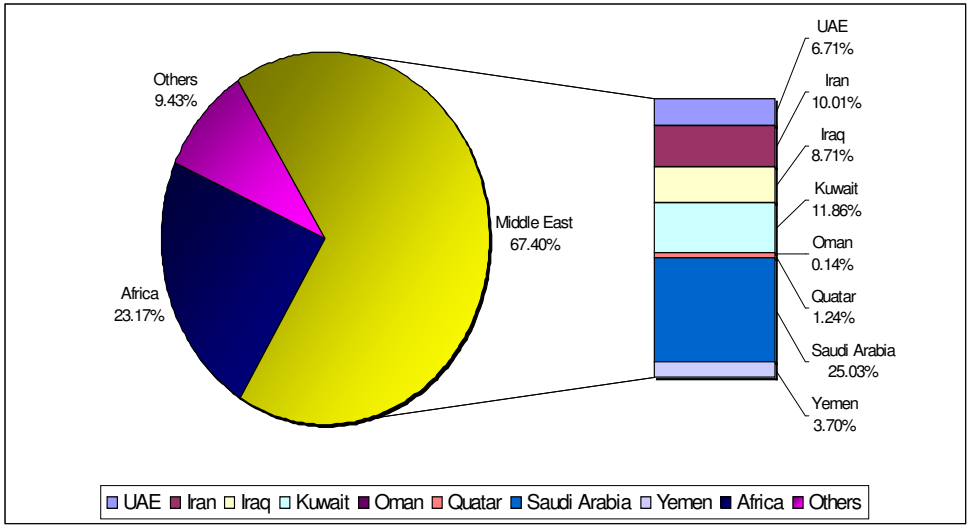
Current imports (% Requirements)

70% Oil

17% Natural gas

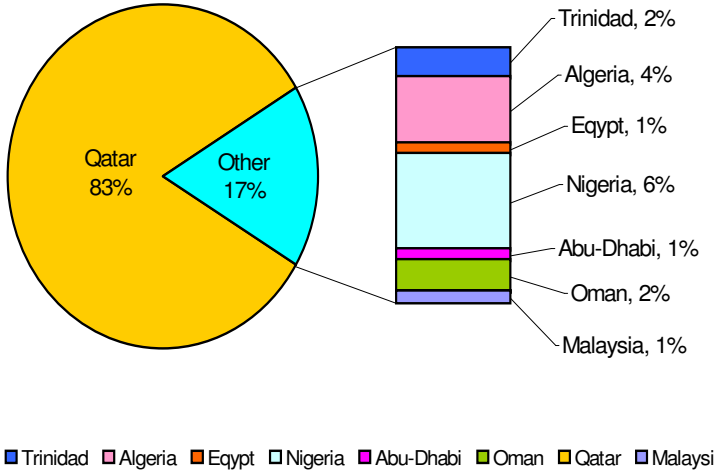
12% Coal

Oil



Source, IEP, 2006

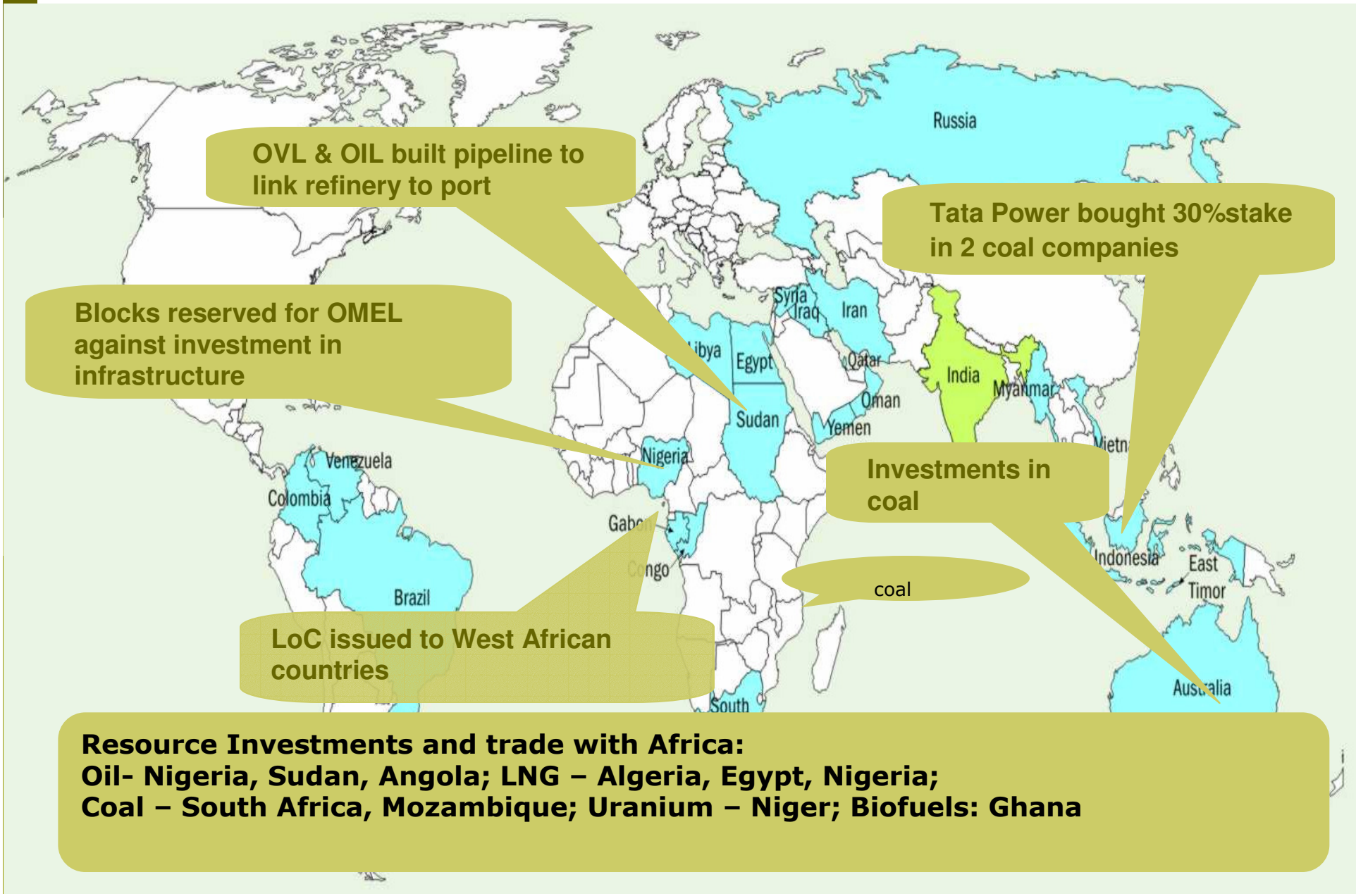
LNG



Coal: Australia, Indonesia, China, Mozambique and South Africa

Source: CEDIGAZ, July, 2008

Overseas Energy Investments by India



Resource Investments and trade with Africa:
Oil- Nigeria, Sudan, Angola; LNG – Algeria, Egypt, Nigeria;
Coal – South Africa, Mozambique; Uranium – Niger; Biofuels: Ghana

Conflicts exist in both Africa and Indian resource rich regions; accessing such resources can become problematic despite availability

Most studies of conflicts in resource rich regions tend to suggest that these are due to

- Weak states, erosion of boundaries & boundary intrusions
- The phenomenon of “resource curse” and the “Dutch disease” that impacts economic diversification and eschews good governance
- But, insufficiently address the vertical inequity and distributive conflict that emerges because of revenue sharing and compensation arrangements

The case for energy cooperation

Similarities

- Energy poverty conditions in Africa and India are similar:
  - While current per capita consumption in India and Africa is low, this will change, needs to change in terms of increased energy services
  - While the emergence of domestic capitalism and a growing middle class demands scale and efficiency in energy supplies, democracy necessitates attention to the provision of basic energy services
  - Lack of energy hinders the provision of basic services such as water, health and education in most parts of Africa and India

Experience sharing would be useful

The case for energy cooperation cont…

Complementarities

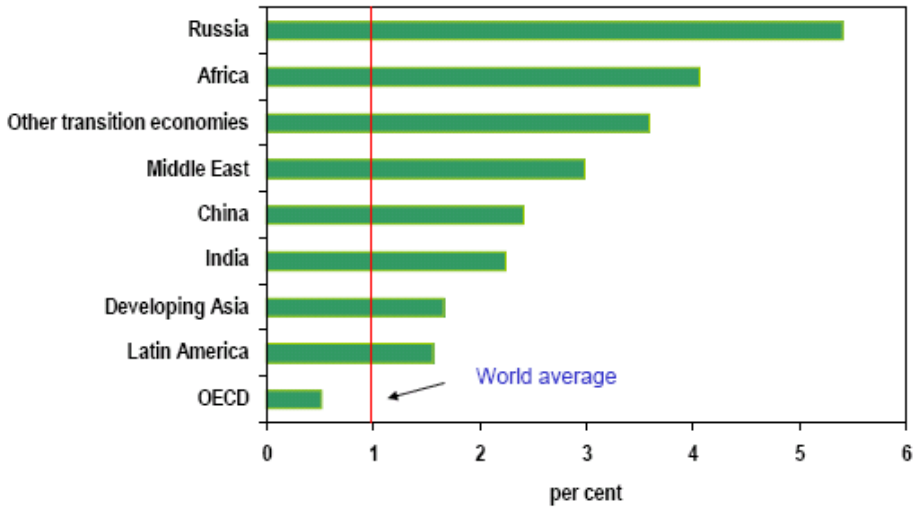
- India is dependent on imports of energy resources for its sustained growth. Africa with its rich resources is a good energy partner for India. There is need to ensure symmetric relations of power and inclusive resource development paths
- Africa is yet to exploit and utilize its energy resources for its own development and exports 60% of its commercial energy sources; India has technical know how that can be used to build capacity in African companies to be able to develop resources for own use
- India and China in Africa create sites for competition, but also potential for creative tripartite collaboration in Africa

Creative and out of the box thinking on equitable resource securing strategies and collaborations needed

The case for energy cooperation cont…

- Huge needs of investment capital
- Require
  - Strong energy sector institutions
  - Regulatory policies
  - Cross border trade in power to join resource regions to economic centers and obtain scale economies
  - Revisiting energy subsidies to free resources for investments
  - Cross sectoral investments

Energy Investment Share in GDP
2001-2030



The share of energy investment in the economy is much higher in developing countries and the transition economies than in the OECD

Source: IEA

Exchange of experiences, training, capacity enhancement

Working together to develop norm based resource investment frameworks

- Stable fiscal and contractual systems
- Sharing value or wealth from resource development with project affected people
- Transparency and accountability in permitting and licensing procedures with independent regulatory authorities
- Capacity building for national and local institutions to manage revenues

Fair redistributive mechanisms are a necessary component of resource security.

Renewable Energy cooperation possibilities

Upscaling isolated, scattered experiments

Resource information and mapping

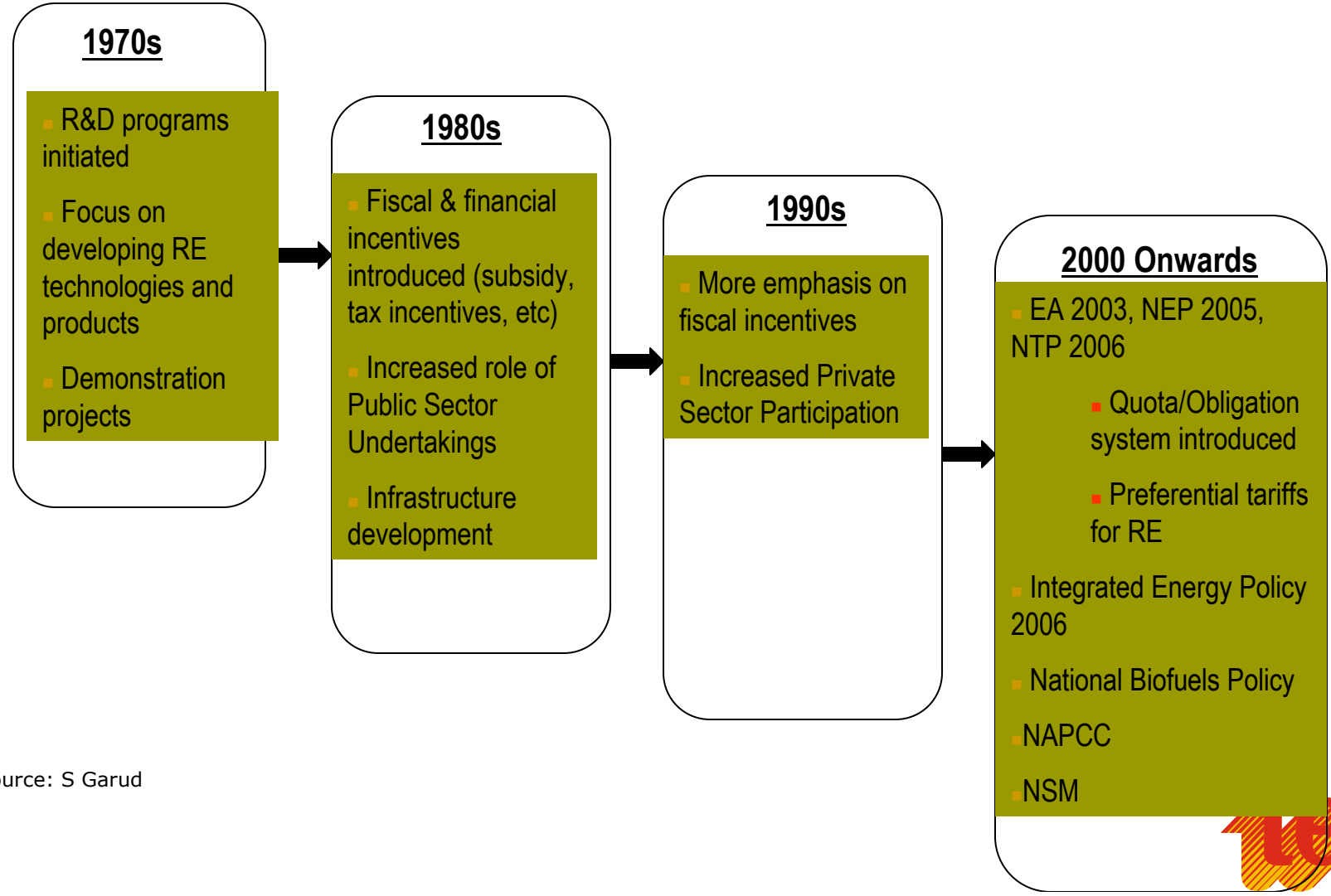
Focus and support for application oriented R & D (e.g. wind forecasting, energy storage technologies)

Capacity building to access international funds (climate constrained world)

Sharing technologies

Sharing Policy experience

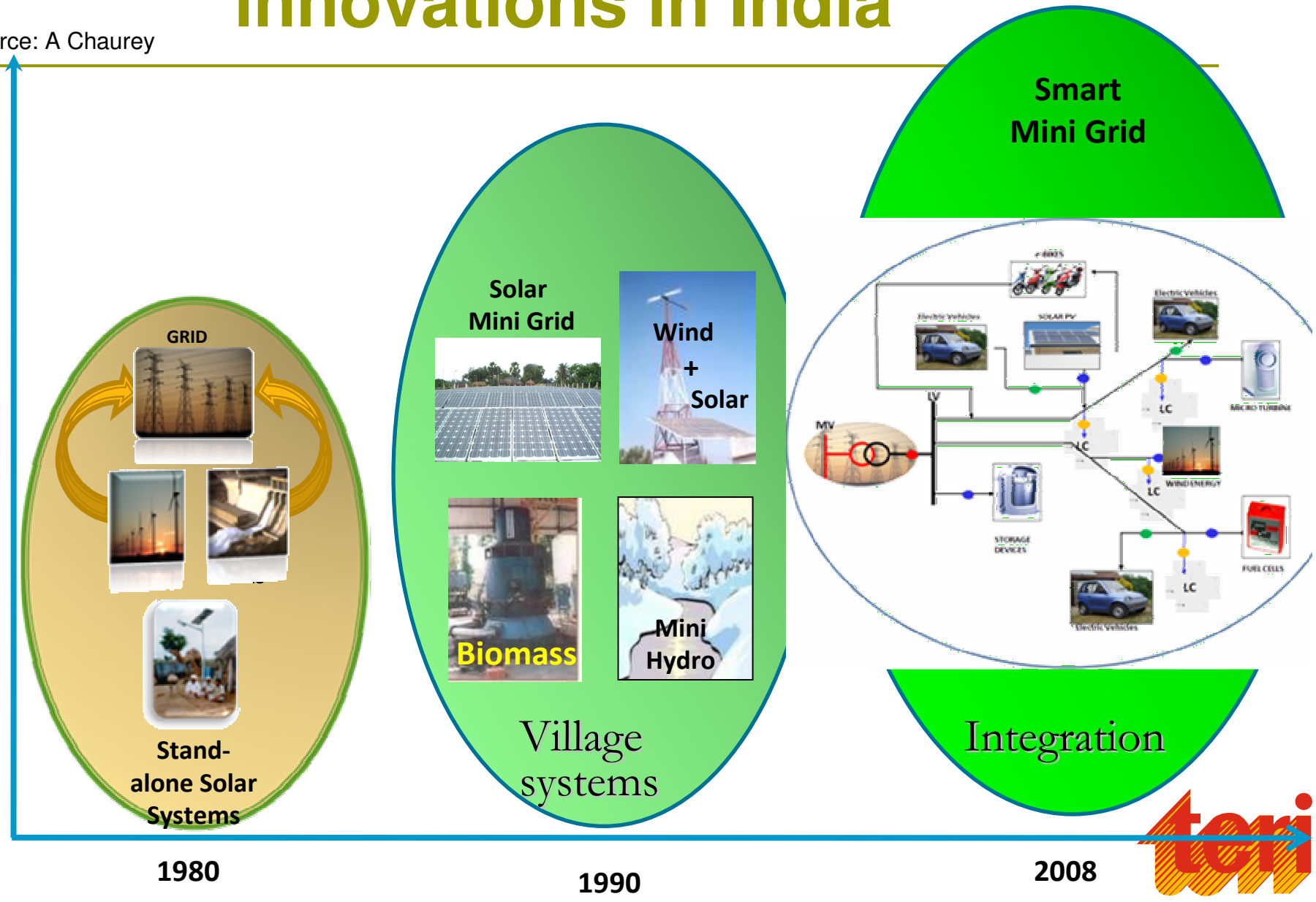
Renewable energy sector policy story in India



Source: S Garud

Trends in RET Systems innovations in India

Source: A Chaurey



Appropriate technological solutions:

Biomass Gasifier applications in small industries

Silk reeling

Biomass gasifier

Dyeing

Rubber drying

Large scale cooking

TERI initiatives in Africa

Grass Root Level

Field demonstration projects (clean Technology applications)

For lighting - Nyabyeya Forestry College

For cooking King's College, Bedo

Reclamation of soil eroded Land

Institutional Level

Assisting UNIDO, ECA

capacity building through tailored ITEC courses

ITEC Courses

- **integrated approach towards sustainable development,**
- **Biotechnology and its regulation,**
- **Climate change and sustainability,**
- **decentralized energy solutions,**
- **trade and sustainable development** and
- **renewable energy and energy efficiency**

TERI's 'Lighting a Billion Lives' Initiative

Setting up solar charging stations (SCS) in villages and renting charged solar lanterns to rural households

Providing solar lanterns to facilitate and advance activities - education, health, livelihoods

Identifying and training to operate the charging stations and provide repair & maintenance services

Facilitating creation of energy enterprises on supply and demand side

LaBL coverage & impacts

Punjab
Solar panels powering the lanterns

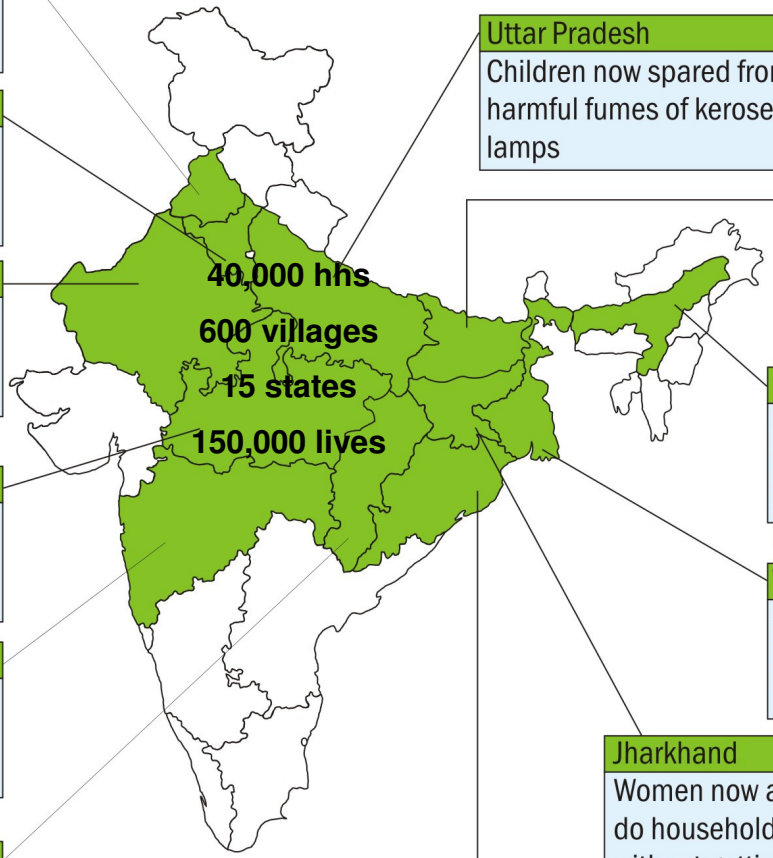
Haryana
Evening tuitions benefitting the students

Rajasthan
Lanterns help small-scale industries to grow

Madhya Pradesh
Entrepreneurs trained to repair lanterns themselves

Maharashtra
Remote inaccessible villages benefitted by LaBL

Chattissgarh
Lanterns facilitating education in a residential school



Uttar Pradesh
Children now spared from the harmful fumes of kerosene lamps

Bihar
Lanterns bring a new ray of light for women

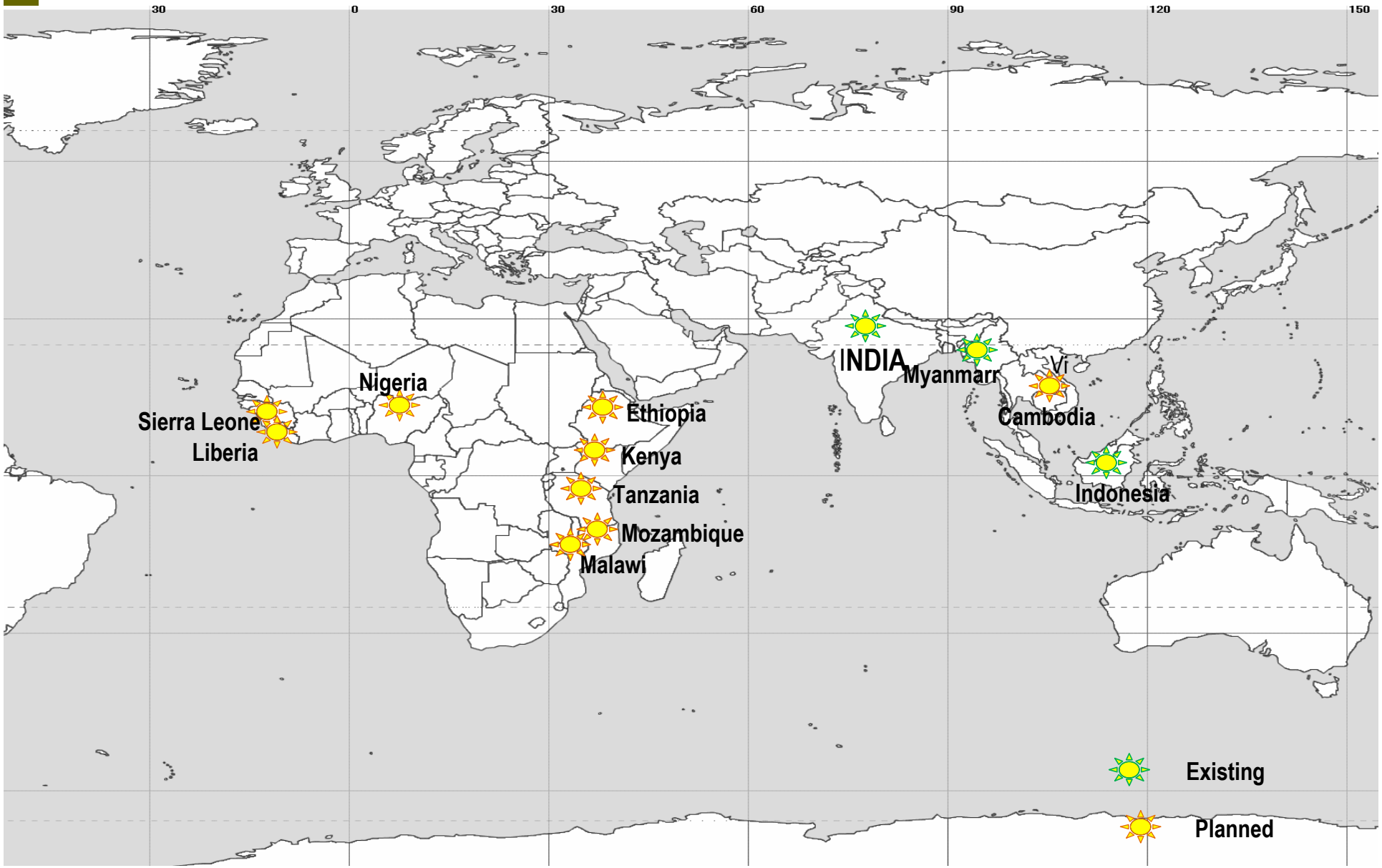
Assam
Women are now empowered operating & managing a Charging Station

West Bengal
Beetel leaf farmers can now sort and grade their produce in the night

Jharkhand
Women now able to do household chores without getting choked

Orissa
Lanterns enhancing livelihood opportunities

Extending LaBL to Africa



Conclusion

Countering energy insecurity in Africa and India requires us to work together to evolve an energy order that is inclusive, transformative, equitable and sustainable.

Thank You