

Beyond 'Technology Transfer': Innovation Cooperation for Meeting Climate Challenges

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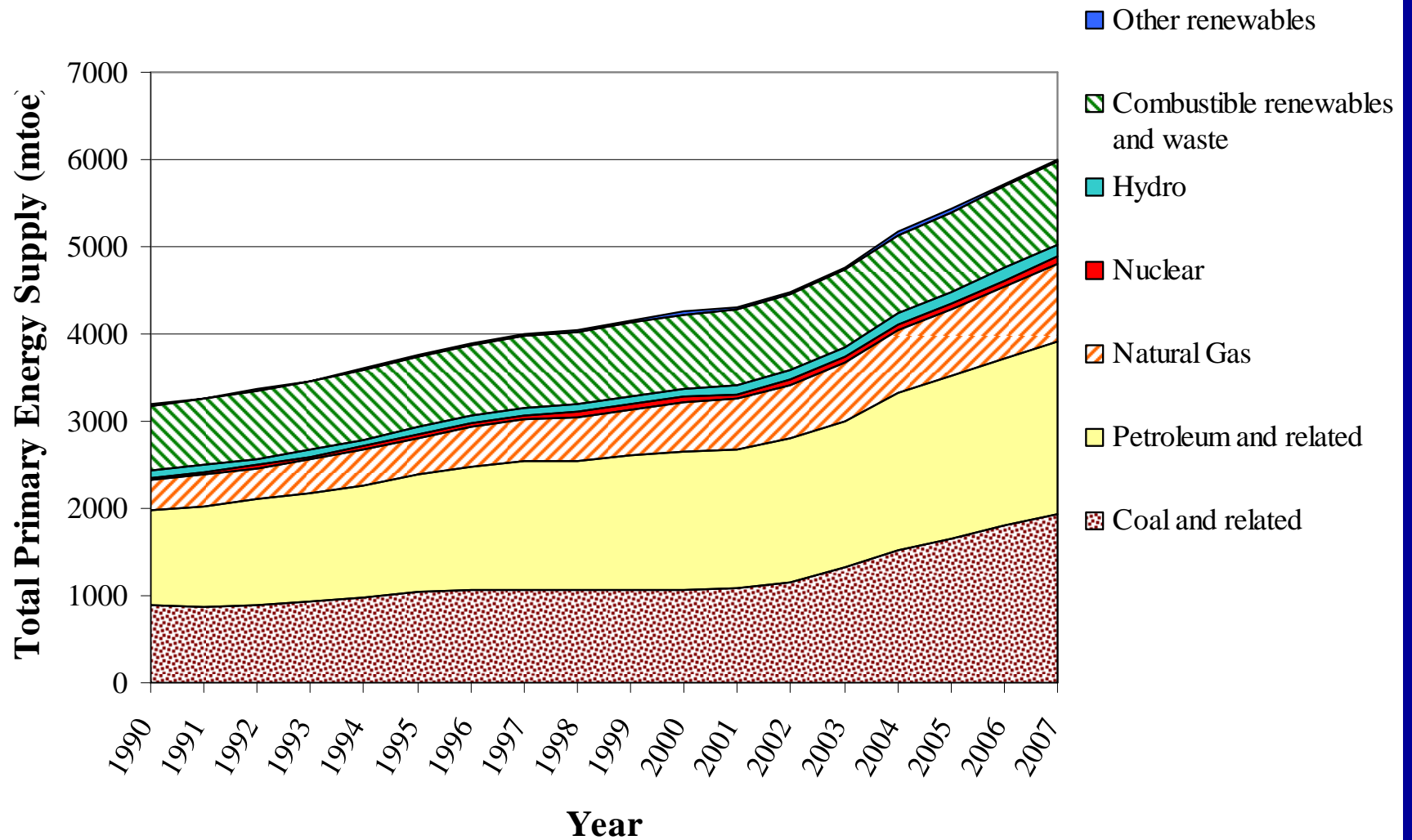
Outline

- Development and climate needs of developing countries
- Technology needs of developing countries
- Way forward
 - “Innovation Cooperation” rather than “Technology Transfer”

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Development needs of developing countries
(Focus on energy here)

Energy supply in developing countries



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Non-Annex-I countries accounted for almost 50% of the world's total primary energy supply (TPES) (with about 80% of the world's population).

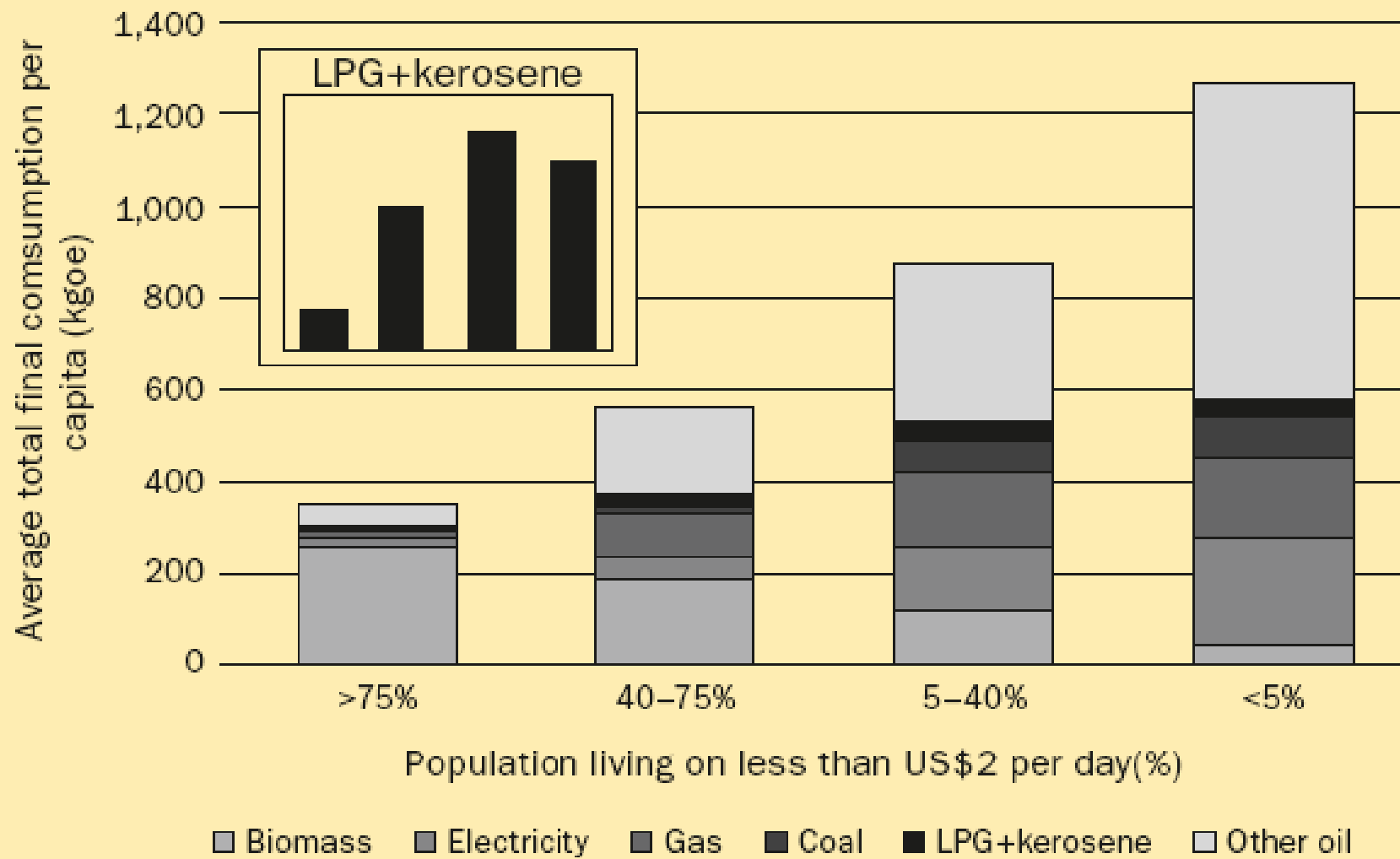
- Non-Annex-I countries rely heavily on fossil fuels (especially coal and petroleum) and this dependence is increasing
(Coal: China 73% of TPES; India: 55%)*
- Non-Annex-I countries still obtain almost 16% of their energy supply from combustible renewables and biomass
(China: ~ 12%; India: ~ 30%; Africa: ~50%).
- Poorer countries generally have less efficient energy economies and systems.
(Africa: 0.28 toe/'000 2000PPP\$; OECD: 0.18 toe/'000 2000PPP\$)
- Energy poverty widespread.
(1.6 billion people without access to electricity; almost 2.5 billion people rely on biomass for cooking)

Key energy indicators

	TPES/GDP toe/'000 2000 PPP\$	TPES/capita toe	Elec/capita kWh	CO2/capita tons
China	0.22	1.43	2040	4.3
India	0.15	0.51	503	1.1
Non-OECD	0.23	1.12	1401	2.6
OECD	0.18	4.7	8381	10.9
World	0.2	1.8	2659	4.3

Source: IEA

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Source: IEA

Improved, adequate, and affordable energy services are necessary for meeting the Millennium Development Goals:

- Growth and Income Poverty Reduction (MDG Target 1)
(income generation opportunities, reduced costs of energy services)
- Hunger (MDG Target 2)
(improved agricultural practices, cooking)
- Education (MDG Target 3)
(lighting, availability of time)
- Gender Equality (MDG Target 4)
(gathering fuelwood, exposure to pollution)

Improved and adequate energy services are necessary for meeting the MDGs (contd):

- Health (MDG Targets 5–8)

(morbidity and mortality from indoor air pollution; health care infrastructure; provision of health information)

- Environmental Sustainability (MDG Target 9)

(deforestation, local and global air pollution, water pollution)

- Water Supply and Sanitation (MDG Target 10)

The energy challenges facing developing countries can broadly be categorized into four inter-related areas:

- Expansion of affordable energy supply and services (*'adequacy' and 'affordability'*)
- Improving the efficiency of conversion of energy supply into energy services (*'efficiency'*)
- Replacing traditional energy technologies by modern, clean energy technologies (*'modernity'*)

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Climate needs of developing countries

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Even the most ambition climate measures cannot
avoid future impacts

But if no aggressive mitigation, impacts may be too
large to be manageable

=> Need both mitigation and adaptation

Mitigation adds a hard constraint to the energy and other sectors

- Decouple activities from GHG emissions

OR

- Reduce activities

Adaptation needs of developing countries

- Infrastructure
- Disaster prediction and management
- Agriculture
- Water
-

Key challenge is to meet both the development and climate needs of developing countries

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Technology needs of developing countries

Broad categorization of technology needs in developing countries pertain to:

- Accelerating transfer of commercial and emerging technologies (economics, other barriers)
- Adaptation of technologies to local conditions, e.g., building technologies
- Development and diffusion of technologies for “unmet” needs, e.g., improved cookstoves, small-scale biomass gasifiers, solar lanterns, etc.
- Long-term technology needs
- Deployment issues (economics, finance, information and trust, market organization, infrastructure, human and institutional capabilities)

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Way Forward?

Way forward?

1. Financial assistance for 'transferable' technologies:

- Necessary for a technological transition in non-Annex-I countries

- Allocation of financial assistance among countries?

Graduated financial assistance that depends on per-capita GDP of recipient country?

2. Accelerate technology deployment in Annex I countries:

Targeted policies aimed at key technologies (e.g., IGCC) need to be implemented sooner rather than later to reduce costs and technical risks

3. Technical cooperation for adaptation of technologies/products and development of technologies/products, especially for “unmet” needs
(IPRs a red herring?)

4. Knowledge sharing for enhancing deployment, where non-economic barriers hinder the deployment of technologies.

5. Capacity-building in non-Annex-I countries

Must build local capacity to overcome lacunae in local energy innovation systems – critical for underpinning long-term technology transition

Innovation Cooperation (#3-5):

» Need technology innovation that is shaped by local needs and rooted in local context to meet developmental AND climate challenges

» Need technology development & diffusion capacity in developing countries in order to meet these challenges effectively and efficiently in the long term

Cooperative innovation program that is informed and driven by technology needs of developing countries rather than the technology agenda of industrialized countries.

=> Climate Innovation Centers (CICs)

Range of CIC activities?

- **State-of-art engineering product development**
 - Refinement and adaptation of commercial technologies to meet local conditions
 - Joint applied R&D on emerging technologies
 - Development of technologies and products to advance provision of energy services for energy poor and rural areas
- **Development of appropriate business models**
 - Exploration and development of innovative delivery models to overcome lack of 'traditional markets'
 - Training entrepreneurs, incubating enterprises
 - Capacity building: create local capability in technical and business skills, facilitating networks
- **Policy & market research/analysis: support regulatory and policy development; capacity building**

Many questions to be answered

- Scale and scope of activities
- Funding
- Governance
- Geographical scope
- Greenfield or incremental
- Linkage to global, regional, and domestic programs (and firms)
- Prioritization and allocation of effort
- Intellectual property
- Capacity-building aspects
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