

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

**UNCTAD**



# TECHNOLOGY AND INNOVATION REPORT 2011

*Powering Development  
with Renewable  
Energy Technologies*



**Padmashree Gehl Sampath**  
**Division on Technology and  
Logistics**  
**UNCTAD**



# How do we reduce energy poverty while mitigating climate change?

---

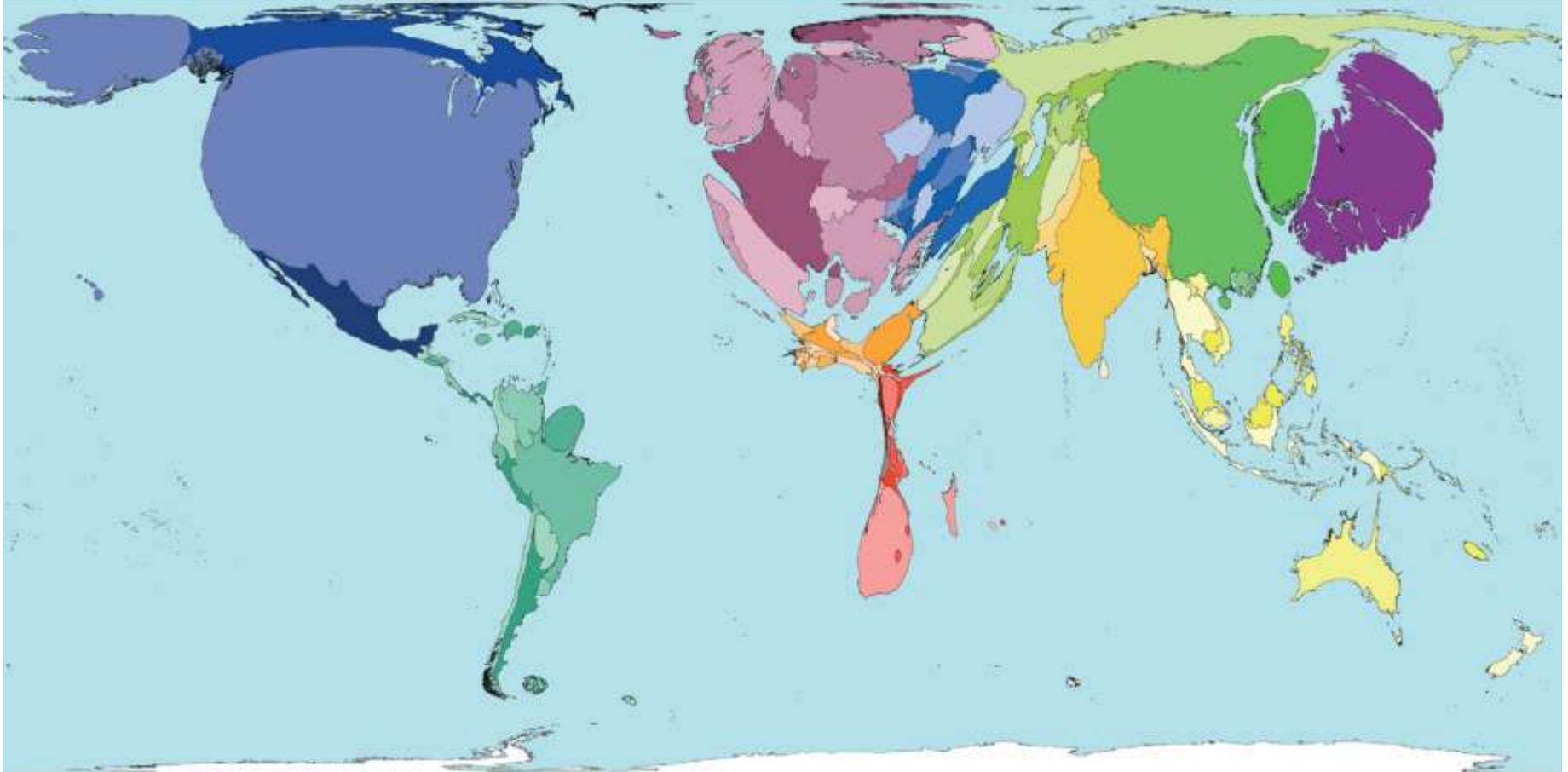
- The **dual challenge** of reducing energy poverty and mitigating climate change can be tackled jointly.
- Focus of the Report is on the important role of technology and innovation in expanding the application and wider acceptance of RETs.
- There is a new urgency to explore RETs from four different perspectives:
  - Energy perspective
  - Climate change perspective
  - Development perspective
  - Equity and inclusiveness perspective

# Contents of the Report

---

- Renewable energy technologies, energy poverty and climate change
- Renewable energy technologies and their growing role in energy systems
- Technology and innovation capacity and renewable energies
- International policy challenges
- National policy frameworks

# The world *resized*



**Territory size is proportional to the percentage of world electricity production that occurs there.**

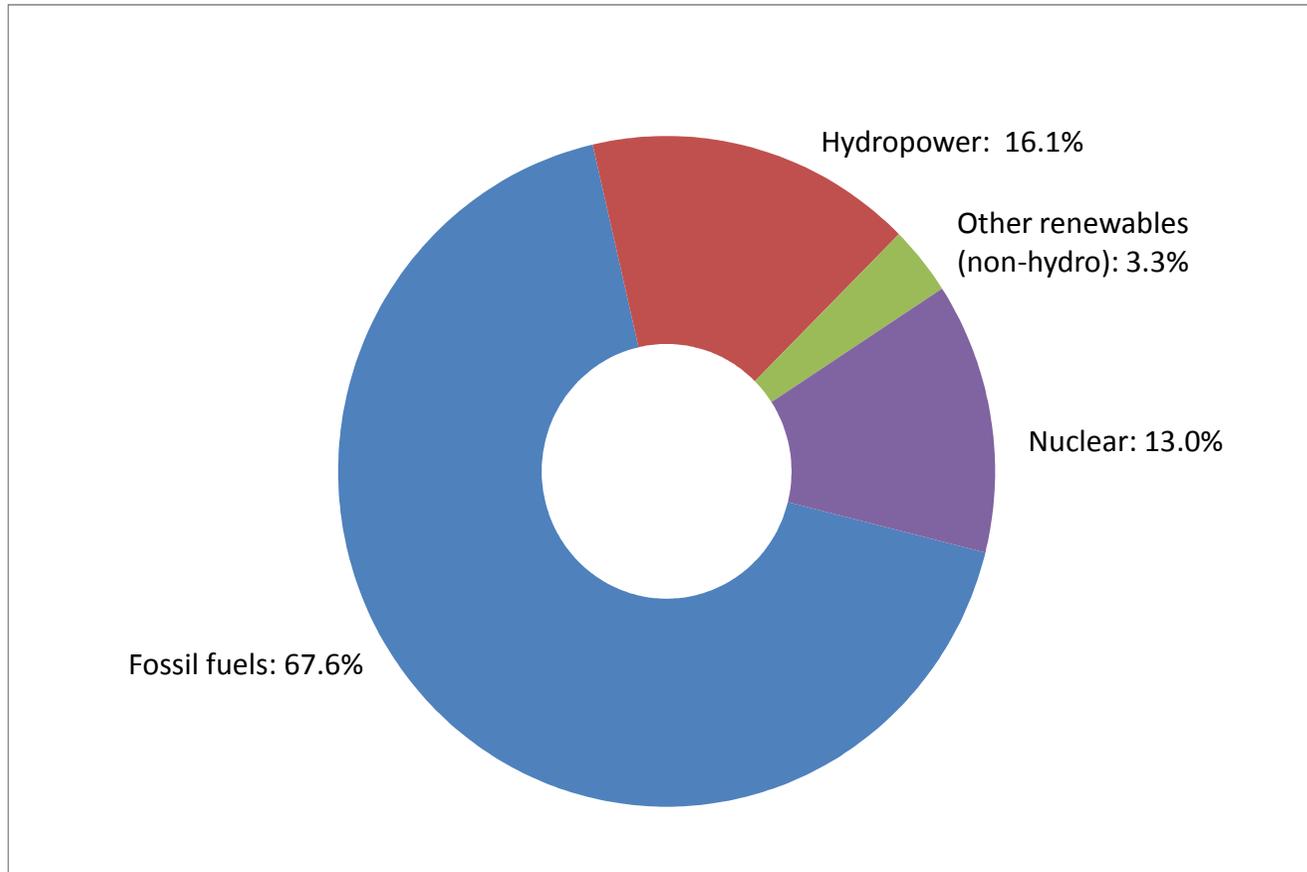
# The role of RETs in alleviating energy poverty is growing...

---

- Over 20% of global population had no access to energy (1.4 billion people) in 2010, mostly in South Asia and Sub-Saharan Africa.
- RETs offer new hope because:
  - They can be combined with conventional energy sources.
  - Through mini-grid or off-grid applications, they can reach poor local communities who cannot be connected by grid.
- RETs based on wind, solar and biomass are already being deployed increasingly globally and in developing countries.
- Projections show significant increase by 2030.



# Global electricity supply by energy source, 2010



## Technological progress and greater investments are lowering costs...

---

- Cost competitiveness of RETs vis-à-vis conventional energy is increasing.
- For instance, between 2009 and mid-2010, the cost of solar photovoltaic systems fell rapidly.
- Demand for modern energy in Africa, Latin America and Africa have led to a greater use of RETs in mini-grid and off-grid systems.
- Growing investments and rising oil prices are also contributing to this trend.

# There is a strong relationship between technology and innovation capacity and the wider use of RETs

---

- Local technological and innovation capacity is critical
  - Not only to produce new RETs or innovate at the frontier
  - But also for absorption, adaptation, maintenance, dissemination and use of existing RETs
- The success of RET-related based technology transfer initiatives depends on the ability of actors in developing countries to absorb and apply the technologies.
- The absence of limited technological and innovation capacities is likely to constantly undermine national strategies promoting the greater use of RETs.

Technology and Innovation *and* energy are intricately linked

## Technological capacity in developing countries is fairly heterogeneous...

<i>Technology</i>	<i>Technological sophistication and entry points</i>	<i>Developing countries with significant capacities</i>
Solar photovoltaic installations	Highly sophisticated, but with increased opportunity to specialize in niches along the value chain	Brazil, China and India
Multi-megawatt offshore turbines (wind)	Highly sophisticated	
Small turbines (wind)	Relatively sophisticated, with increased opportunity to specialize in niches along the value chain	China, India
Biofuels	Relatively sophisticated, especially for large-scale production	Brazil, the Philippines, Thailand, Indonesia, Malaysia, China and India
Biomass	Low sophistication, easy applicability	Bangladesh, Kenya, India and China
Low head turbines (hydropower)	Relatively sophisticated, potential opportunity for expansion exists but is currently limited by the low level of use in developing countries <sup>a</sup>	China <sup>b</sup>

## National governments will need to tip the balance in favor of RETs by...

---

- Specific policy support targeted at RETs :
  - To substitute current patterns to more RETs based one (i.e. through government agencies, specific RE programmes, etc)
  - To make RETS viable solutions
  - To enable enterprise development in and through RETs
  - *Technological capacity*
- Each time investment is made into generating RETs-based energy, not only is there a shift in the energy base, it impacts on the ability of RETs to generate energy economically.

# The international discourse needs to be framed more positively...

---

- ...with a focus on climate change *and* energy poverty.
- Central to the repositioning is the triangular relationship between: equity, development and environment.
- Obligations for mitigation of climate change should be framed equally in terms of creating *developmental opportunities for all*.
- This means a commensurate focus on RETs within the international technology discourse with financing and investment measures.

# The international financial support needs to be strengthened and targeted:

- Currently RETs financing is not an explicit agenda within ongoing international negotiations on climate change.
- Report considers in detail three areas of international policy: 1) financing 2) technology transfer and diffusion and 3) the green economy and Rio+20.
- On the question of financing :
  - Estimations of climate change adaptation and mitigation outdo by far the existing available commitment of resources.
  - Renewable energy financing should be a priority in the international discourse.
  - The role of the private sector in developing countries should be strengthened.
- Technology transfer and diffusion
  - Many RETs are off patent, but cannot be accessed due to lack of absorptive capacity and information.
  - Trends show increasing patenting in clean energy which may impact further on access to RETs in the future.
- The green economy and Rio+20
  - Market based standards (carbon footprinting and border carbon adjustments) should not be used in ways that are inimical to developing countries.

Need for support measures to help developing countries and LDCs to transition to RETs and the green economy in a strategic and sustainable manner

## Targeted mechanisms are required to promote technological leapfrogging through RETs

---

- Diffusion of RE technologies involves much more than simply transferring technological hardware. It is much more than simply making technologies available.
- Keeping in mind the current difficulties in technological learning related to RETs, the Report proposes four international support mechanisms:
  - An International Innovation Centre for LDCs, with a RET-specific focus
  - Regional Research Funds for RETs Deployment and Demonstration
  - An International Technology Transfer Fund for RETs
  - An International Training Platform for RETs

## Several policy instruments are important for RETs....

---

- **Innovation policy based:**
  - Clusters, green economic zones, research grants
  - Flexibilities in the intellectual property regime
- **Renewable energy based:**
  - National renewable energy targets and strategies
  - Renewable portfolio standards and feed in tariff policies (Philippines and Kenya)
  - Training programs for RETs (Botswana and Bangladesh)
  - Elimination of conventional subsidies (with social safety nets)



## RETs can power development and a greener catch-up process

---

- Developing countries will face different problems in RETs use, adaptation, production and innovation depending on their starting points.
- Developing countries should consider energy regimes that deploy renewable energies depending on their specific contexts
- Success in eliminating energy poverty does not require large scale investments, small investments can go a long way.
- Creating an innovation policy framework as outlined in the Report should not be considered a daunting exercise.
- A few incentives can already go a long way to achieve significant results and can be slowly incorporated into a full-fledged policy framework.

---

THANK YOU

[www.unctad.org](http://www.unctad.org)