Deploying robust energy policy choices for LDCs

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LDCs

• Energy -> **Enabler**

- Food Security
- Conservation
- Clean Water
- Micro-Enterprise
- Internet
- News
- Drip Irrigation
- Education
- Women’s Empowerment
- Health
Energy Access

• Avoid mistakes

Brazil, 1990s Photovoltaics programm—no local value chains, full import dependence, captive market, limited technological maturity and capacity.

Solar cookstoves: unreliable, inconvenient, large upfront costs.

Ethanol stoves: fuel costs and availability, large upfront costs, missed gender aspects.
Learn from examples

• Micro-hydro in Nepal

Mewa plant (1MW), Nepal, 2016

Smart finance is crucial!
Energy Security

Reliable, Affordable and Accessible

Source: IEA
Biofuels?

• Significant success in Brazil
  – Ethanol and Biodiesel became globally traded products over last 15 years
  – Attempts to replicate biofuel-for-transport systems met with limited success elsewhere
    • Malawi (E10), Mozambique (E10) Ethiopia (E5), Angola (E10)

• LDCs needs are different: Biomass for electricity production

Source: Biofuelsdigest, UNDP
Opportunities

• LDCs have high liquid fuel prices
  – Opening for green alternatives which require less subsidies
  – Future opportunity for Biofuels?
    • Depends on developments of electric mobility tech.
High tech not always the best

- Clay / cob ovens

- Design / illumination
  - Services & education
    - Bottle lamps: BR -> India, Bangladesh, Tanzania, Fiji.

- SafeMotos Rwanda
  - Energy efficiency
Rethink «energy policy»

- Renewable energy + energy efficiency
  - Only part of solution
- Secondary markets (Circularity)
  - Embedded Energy
  - Reusage, recycling: major energy savings
  - 70% of world uses 2nd hand clothes
  - Opportunity for cultural shift – «recycled the new trend»
  - Opportunity for SMEs and technology / it enabled applications.

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<table>
<thead>
<tr>
<th>Waste type</th>
<th>Price on secondary markets €/ton</th>
<th>Indicative recycling rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textiles</td>
<td>386.1</td>
<td>15%</td>
</tr>
<tr>
<td>Plastics</td>
<td>321</td>
<td>26%</td>
</tr>
<tr>
<td>Paper</td>
<td>142</td>
<td>72%</td>
</tr>
<tr>
<td>Steel</td>
<td>125.85</td>
<td>88%</td>
</tr>
<tr>
<td>Glass</td>
<td>51</td>
<td>73%</td>
</tr>
<tr>
<td>Wood</td>
<td>-17.55*</td>
<td>74%</td>
</tr>
</tbody>
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Source: HCSS (2016)
Energy Policy <-> Economic diversification

• LDCs: Limited economic diversification and small share of services
  – Problem for circularity
    • Double problem: Energy intensive production + government revenue dependent on primary material extraction and exports
      – E.g. Mozambique aluminium and titanium exports: 7.81% of GDP, 20.4% Government tax base.
      – Reduces government interest in circular business models, which are often numerous and dispersed.

• Developed countries play a role
  – High demand for primary material imports.
  – If EU turns more circular, demand for primary materials tend to fall.

Source: based on HCSS (2016)
GDP and tax reliance
High Embedded energy

Primary resource markets

International markets (e.g. EU) → Circular Economy Package (2015)

Secondary resource markets

Lower LDC primary resource exports

LDCs:
- Grow businesses in secondary-resource markets
- For strategic and environmental reasons.
Conclusions

• Cost: affordable, matching local needs
  – Finance: involve local equity

• Technology choice: Reliable, affordable and accessible
  – Transport, electrification, cooking – different needs

• Gender-inclusive

• Demand-side (efficiency) actions as important as clean energy supply

• Embedded energy and strategic economic considerations as world turns to secondary resource markets