

Deploying robust energy policy choices for LDCs

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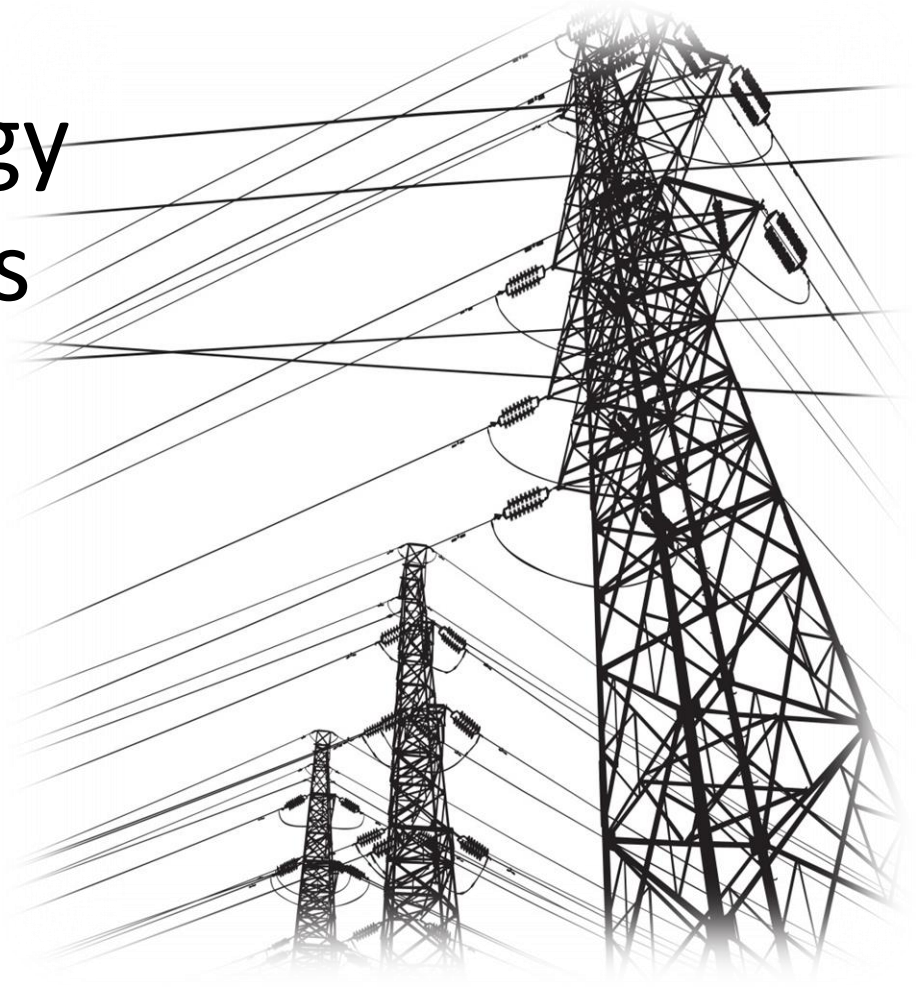
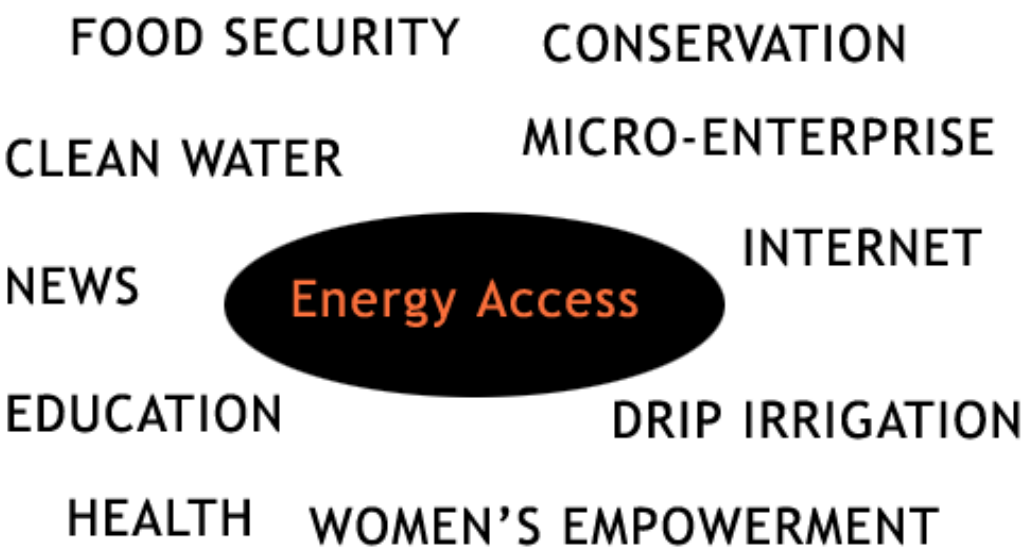


LDCs

- Energy -> **Enabler**



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

Energy
Volume 36, Issue 4, April 2011, Pages 2194–2201
5th Dubrovnik Conference on Sustainable Development of Energy, Water & Environment Systems

Financing off-grid rural electrification: Country case Nepal

Brijesh Mainali, Semida Silveira
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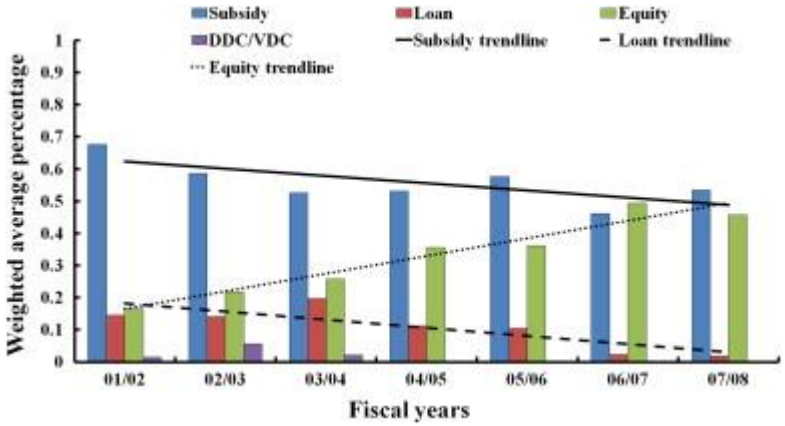
Mewa plant (1MW), Nepal, 2016



Smart finance is crucial!

Energy Security

Reliable, Affordable and Accessible

Source: IEA

Biofuels?

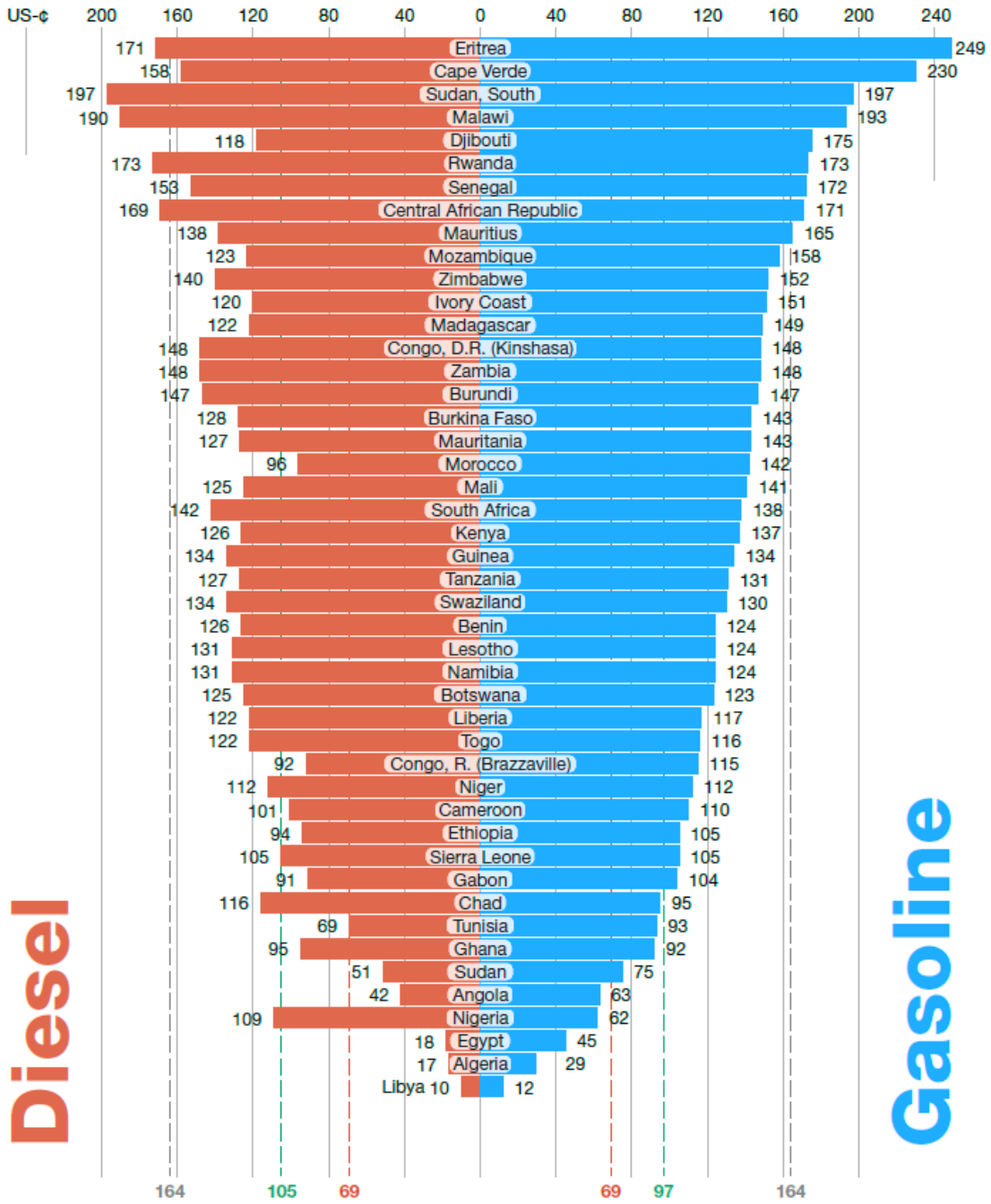
- Significant sucess in Brazil
  - Ethanol and Biodiesel became globally traded products over last 15 years
  - Attempts to replicate biofuel-for-transport systems met with limited success elsewhere
    - Malawi (E10), Mozambique (E10) Ethiopia (E5), Angola (E10)

Source: Biofuelsdigest, UNDP

- LDCs needs are different: Biomass for electricity production

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.



- Crude prices
- US prices
- Luxemburg prices

GIZ, 2013

High tech not allways the best

- Clay / cob ovens

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

- SafeMotos Rwanda
  - Energy effiency

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.

Waste type	Price on secondary markets €/ton	Indicative recycling rate
Textiles	386.1	15%
Plastics	321	26%
Paper	142	72%
Steel	125.85	88%
Glass	51	73%
Wood	-17.56*	74%

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)

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

exports

Secondary resource markets

Lower embedded energy

Lower LDC primary resource exports

LDCs

Primary resource markets

GDP and tax reliance

High Embedded energy

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