

## Towards universal energy access: regulatory dimensions



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# A rapidly changing regulatory landscape

## Existing Objectives

Design and Manage Electricity Tariffs

Maintain System Reliability, Meet Demand Growth, and Expand Electricity Access

Ensure Financial Health of Utilities

Facilitate Private Investment

Protect the Interests of the Poor

Support Technical Safety and Reliability of Power System

Enhance Energy Security and Manage Risk

## Emerging Objectives

Reduce Health and Environmental Impacts of Power System Operation

Meet Rapidly Growing Demand While Minimizing Environmental Impacts and Risk

Support Procurement of Renewable Energy

Integrate Renewable and Distributed Generation Resources to the Grid

Incentivize Energy Efficiency, Demand Side Management and Smart Grid Technologies

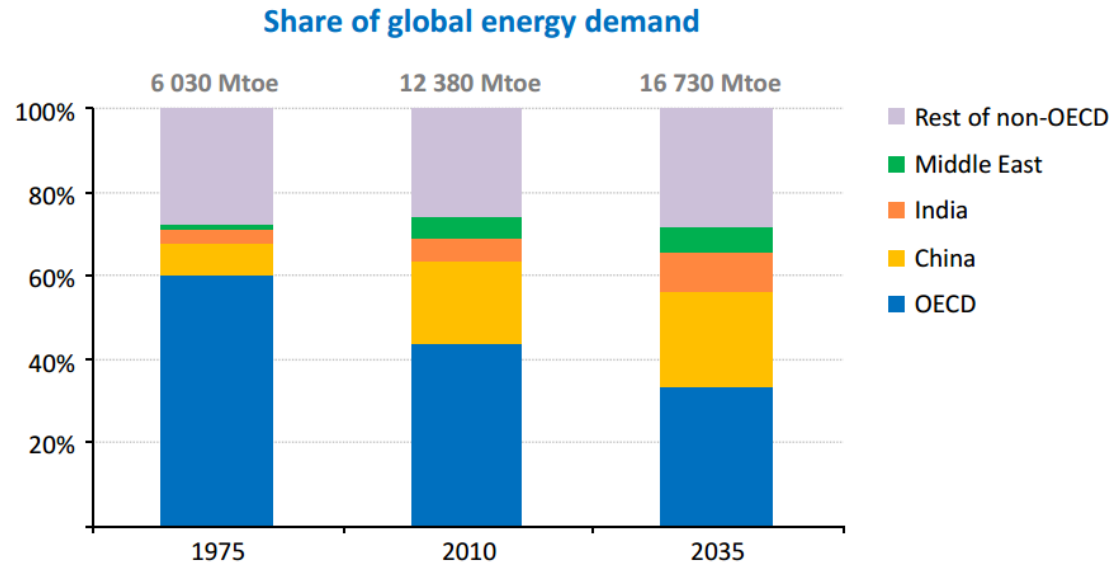
Utilize Microgrid Technology

Facilitate Consumer Participation in Power Markets

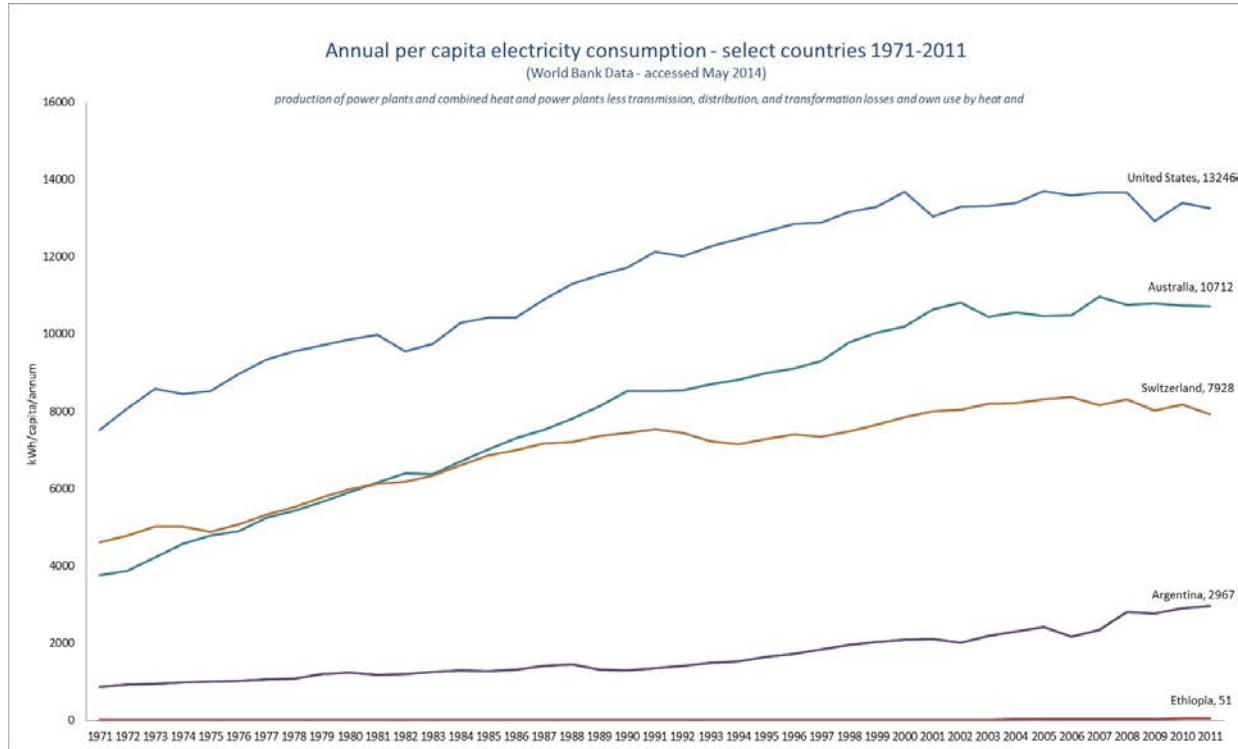
Enhance Cybersecurity and Protect Privacy

Manage Increased Interactions with Other Sectors

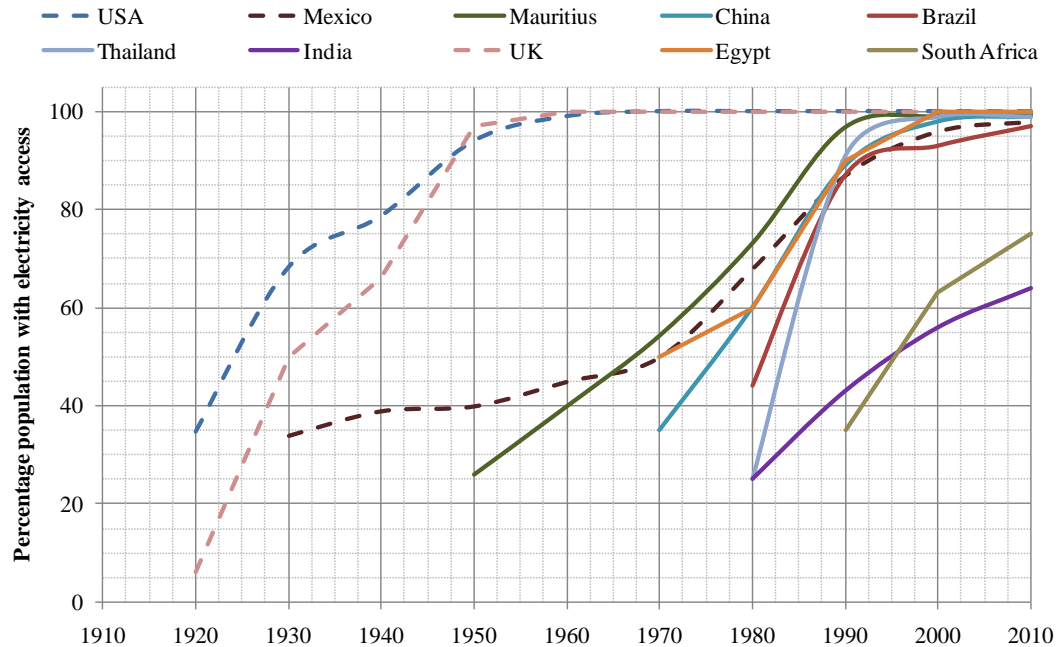
# Demand moving to Developing Economies



# Persistent Inequity



# Precedent of household electrification



Source: Pachauri, S., A. Brew-Hammond, D.F. Barnes, D.H. Bouille, S. Gitonga, V. Modi, G. Prasad, A.Rath, and H. Zerriffi. 2011: Energy Access for Development. In: The Global Energy Assessment: Toward a More Sustainable Future. IIASA, Laxenburg, Austria and Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

# UN Sustainable Energy for All initiative

One Goal: Achieving Sustainable Energy for All by 2030

Three Targets:



ENSURING  
*universal access*  
TO MODERN ENERGY  
SERVICES.

This target is highlighted with a blue oval border.



DOUBLING THE GLOBAL  
RATE OF IMPROVEMENT IN  
*energy  
efficiency.*



DOUBLING THE SHARE OF  
*renewable energy*  
IN THE GLOBAL  
ENERGY MIX.

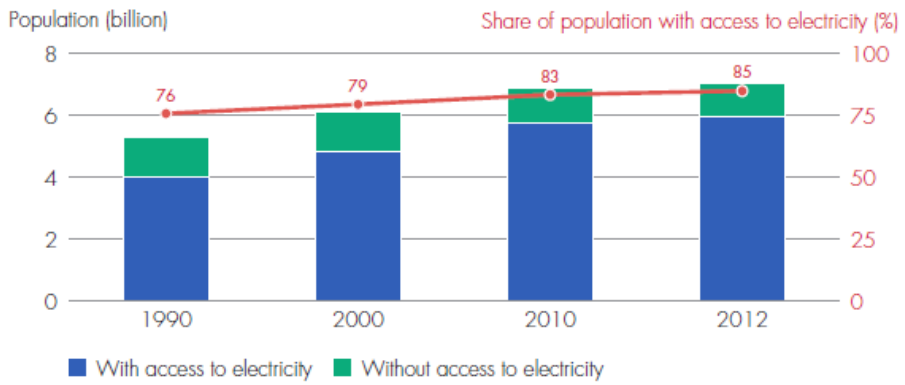
# Tracking and Enabling Environments



Global Tracking Framework (GTF) launched last week in NY

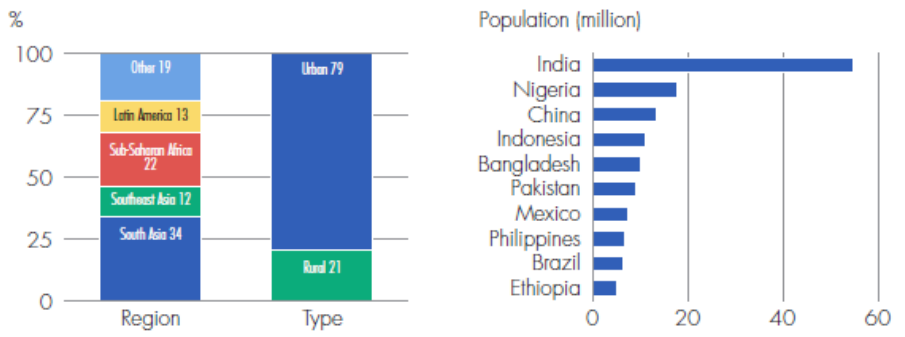
Readiness for Sustainable Energy (RISE) moving global in 2016

Figure O.1. Trends in access to electricity, 1990-2012



Source: World Bank Global Electrification Database 2015.

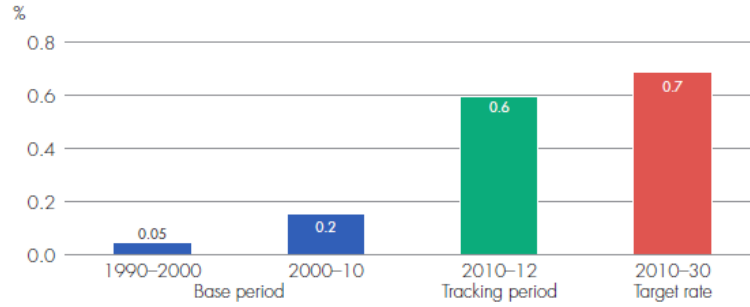
Figure O.2. Global access to electricity increment, 2010-12



Source: World Bank Global Electrification Database 2015.

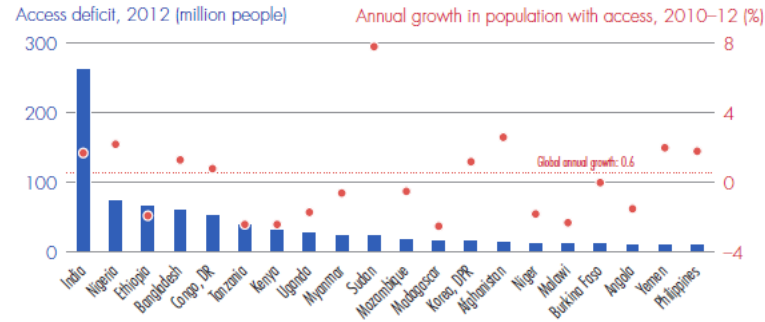


Figure O.3. Annual growth rate of access to electricity

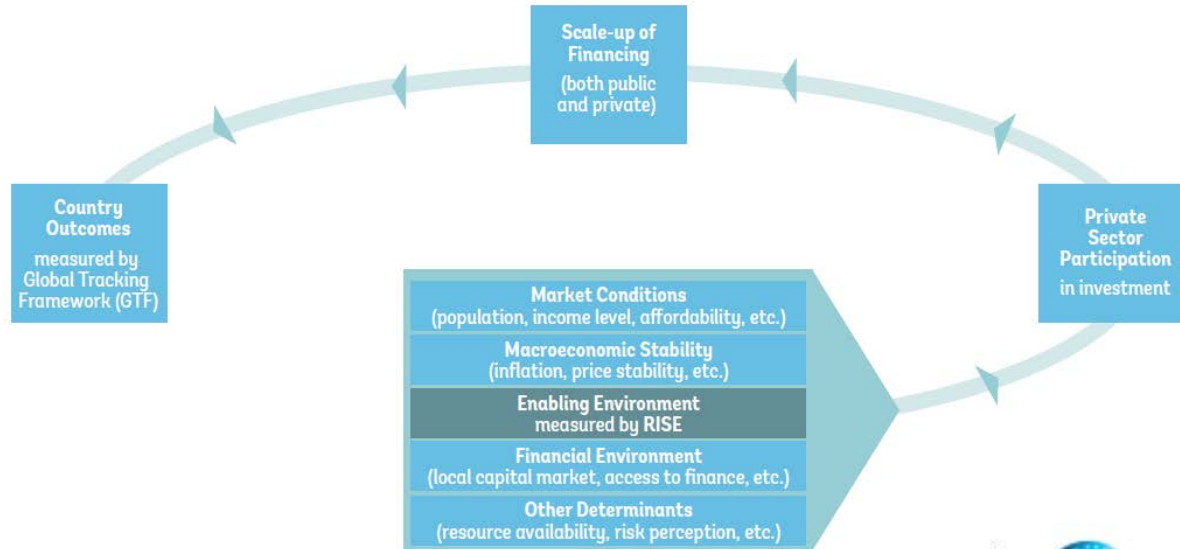
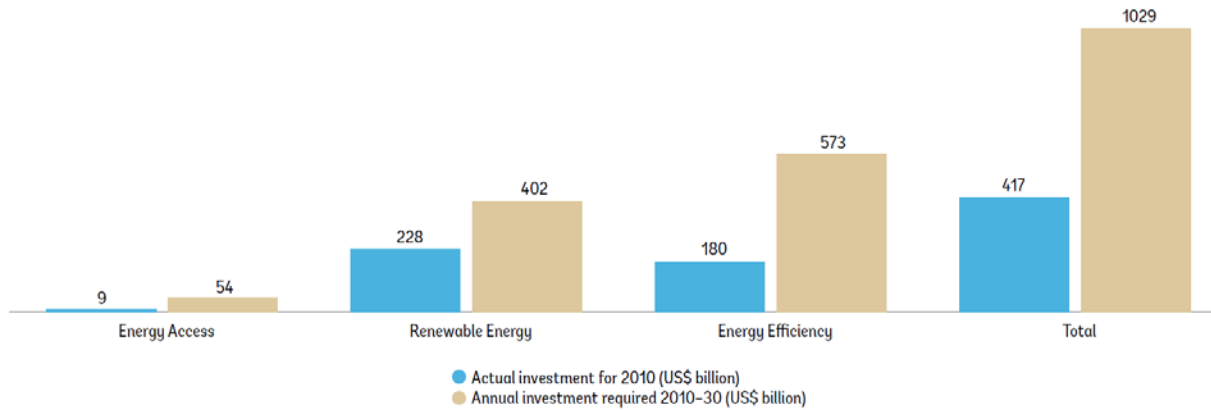


Source: World Bank Global Electrification Database 2015.

Figure O.5. Access to electricity: Access deficit and growth in the 20 high-impact countries, 2010-12



Source: World Bank Global Electrification Database 2015.



# RISE indicators in energy access

## Planning

- **Electrification Plan**
  - ..... National Plan
  - ..... Coverage of Grid and Off-grid
  - ..... Regular Update

## Policies and Regulations

- **Enabling Environment for RE Developers to Invest in Mini-grids**
  - ..... Existence of Regulations
  - ..... Regulation Attributes
  - ..... Standards
  - ..... Protection against Expropriation
  - ..... Subsidies or Duty Exemption
- **Enabling Environment for Standalone Home Systems**
  - ..... National Program
  - ..... Standards
  - ..... Subsidies or Duty Exemption

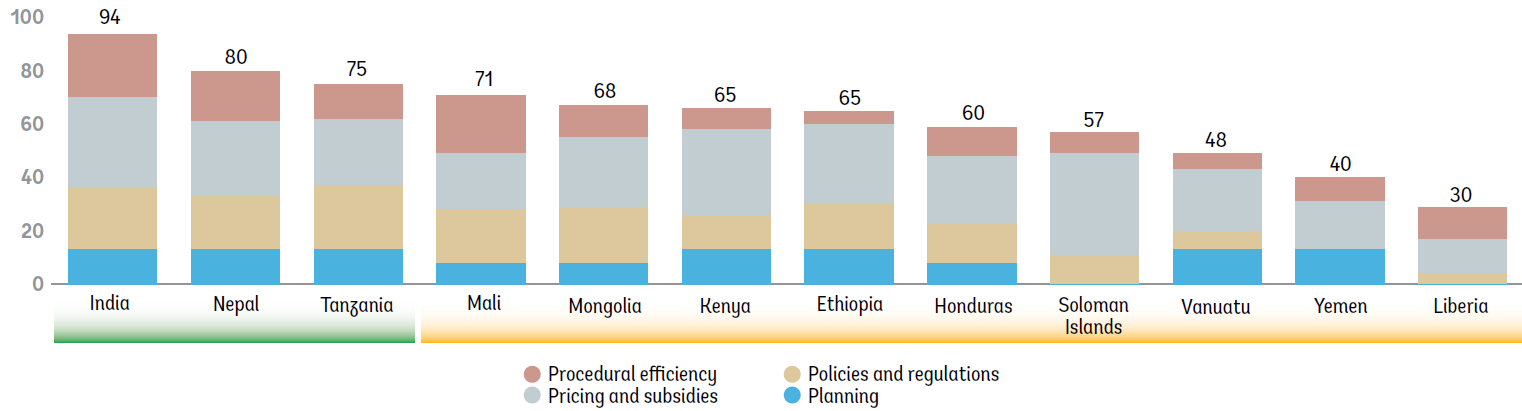
## Pricing and Subsidies

- **Funding Support to Electrification**
  - ..... Dedicated Funding
  - ..... Subsidy to Household Connection
  - ..... Subsidy to Grid Extension
- **Affordability of Electricity**
- **Utility Performance**
  - ..... Reporting Practice
  - ..... Financial Performance

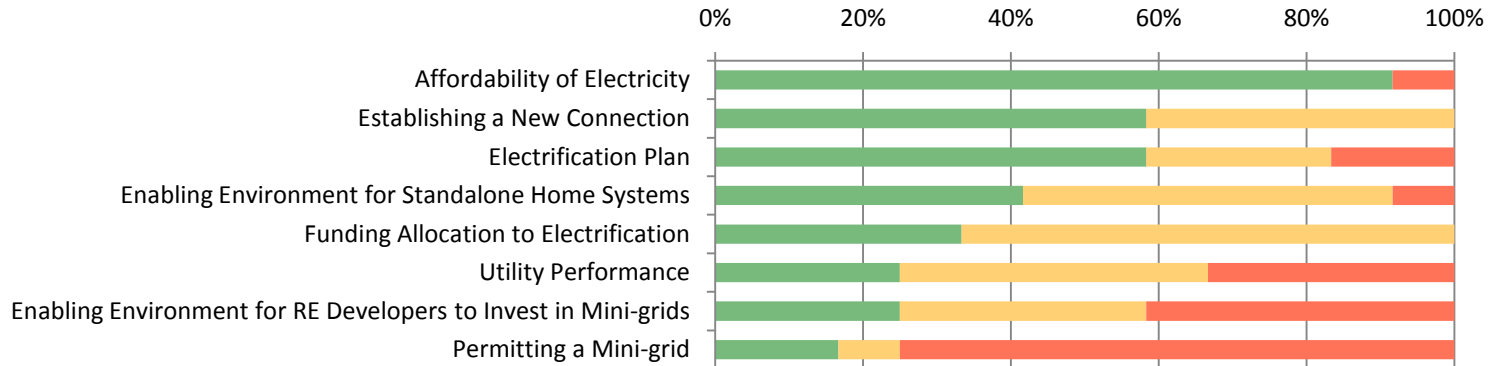
## Procedural Efficiency

- **Establishing a New Connection**
- **Permitting a Mini-grid**

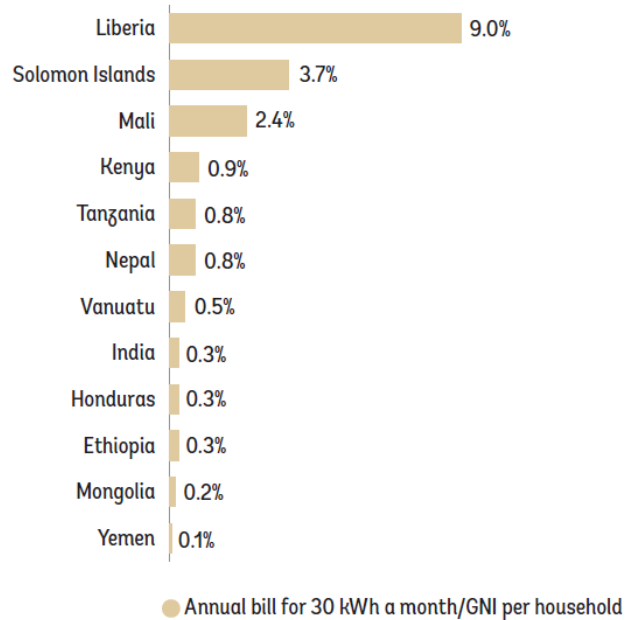
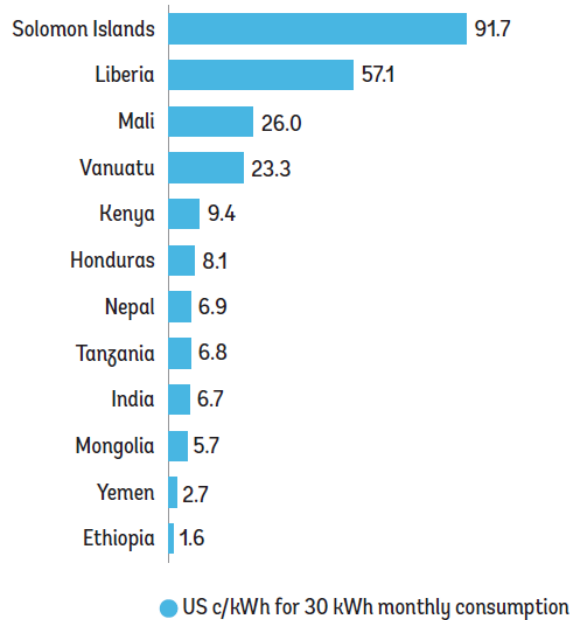
- Energy access indicators
- Cross-cutting indicators



## Proportion of countries by traffic lights



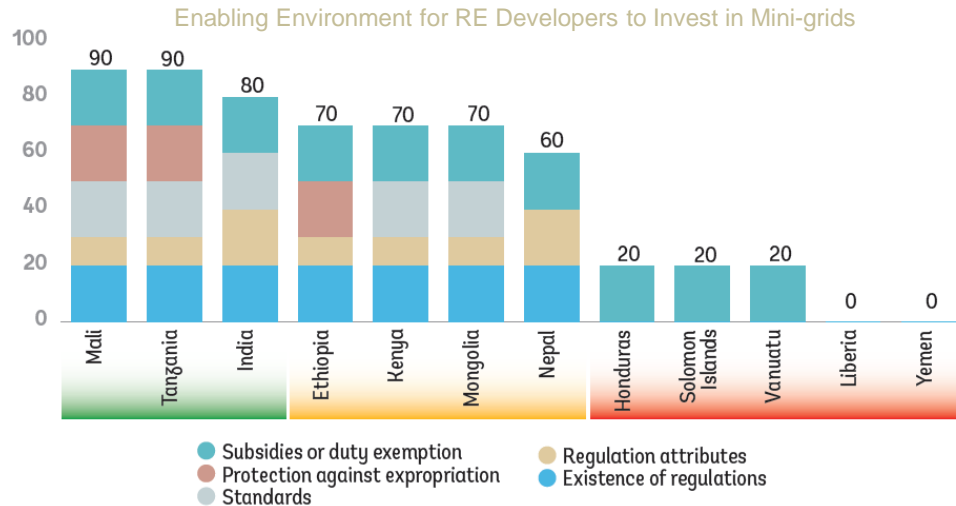
# Subsistence level of electricity



## Time/cost of getting a household electricity connection

Countries	Time (days)	Cost (\$)
Ethiopia	365	126
Honduras	17	156
India	8	74
Kenya	83	369
Liberia	14	20
Mali	18	86
Mongolia	21	10
Nepal	21	26
Solomon Islands	8	470
Tanzania	69	73
Vanuatu	28	675
Yemen	30	303

# Enabling environment for mini-grid needs to be improved



## Permitting a Mini-grid

Country	Time (days)	Cost (\$)	Number of agencies
India	90	48	1
Mali	181	-	2
Nepal	215	37	6
Tanzania	510	6,620	3

# Energy Poverty – Ethical dimensions

- Issues in technologies
  - Cookstoves or gas ranges, consumer choice
  - Effective pricing for fuel substitution and safety nets
- Accounting for large unmet demand
  - Non-linear growth needed and higher per capita consumption
  - Ensure this is accommodated in planning
- Looking beyond households
  - Full economies need energy services
  - Supply and demand aspects
- Tradeoffs with environment
  - Make them explicit
  - Link regulations as appropriate
- Linking to other motivators
  - Beyond development to geopolitical security
  - Water, Agriculture, Education, Gender, etc.



# Thank you

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