



# Improving Energy Access and Beyond

## *Role of Regulations*

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# Energy Access Challenge



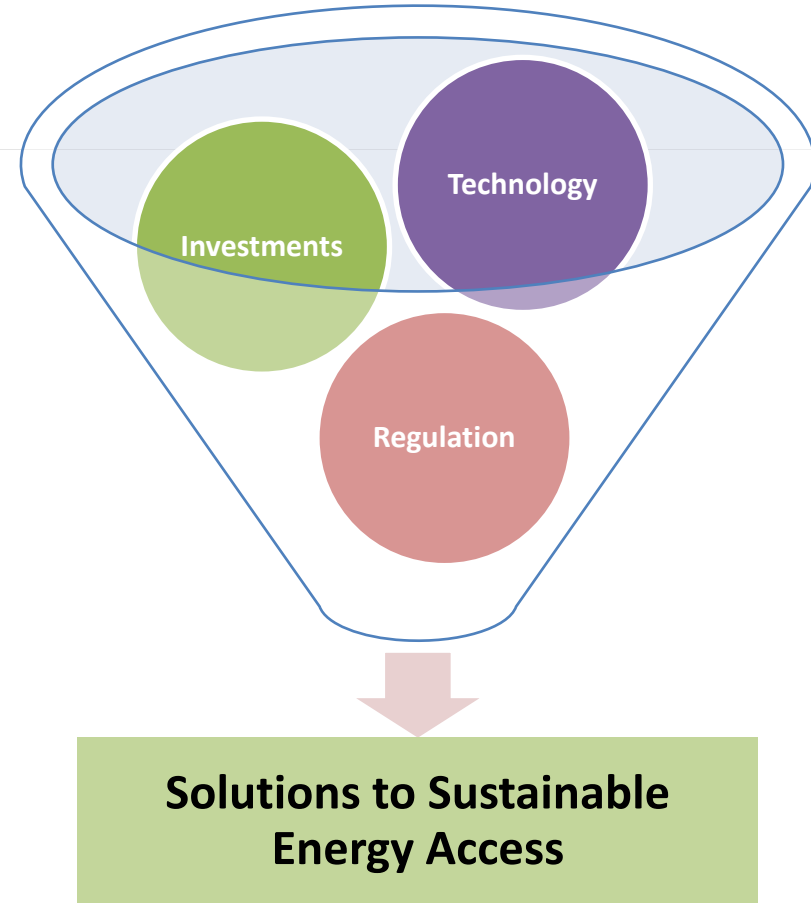
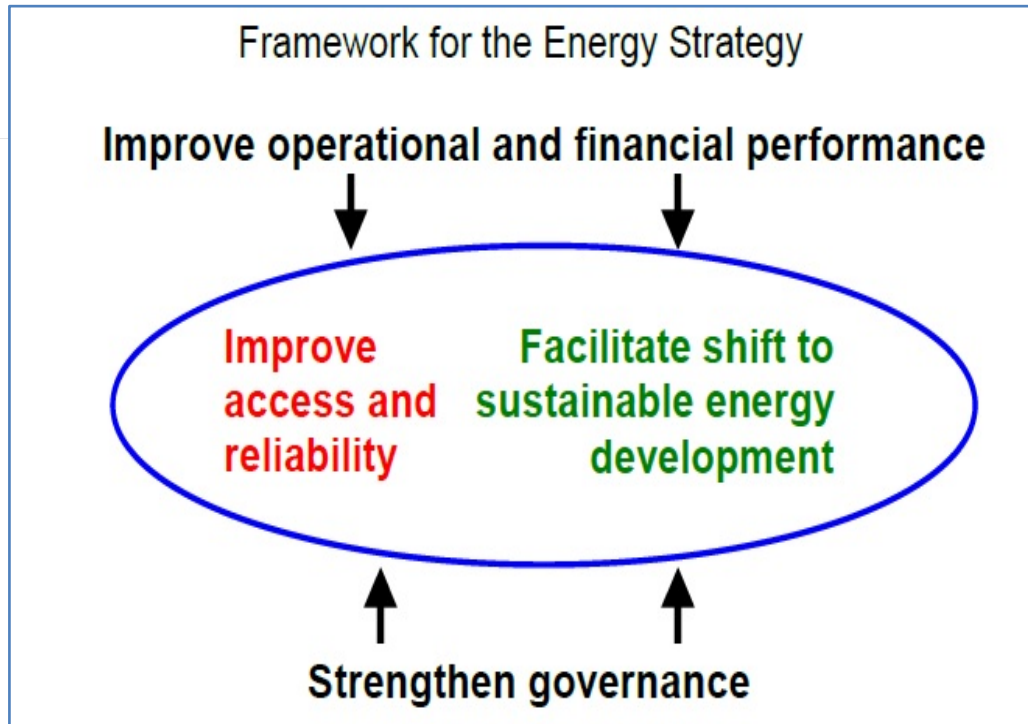
## IEA Energy Access Database

- 1,3 billion people without electricity (Sub-Saharan Africa & Developing Asia)
- 2,7 billion people rely on traditional biomass use for cooking

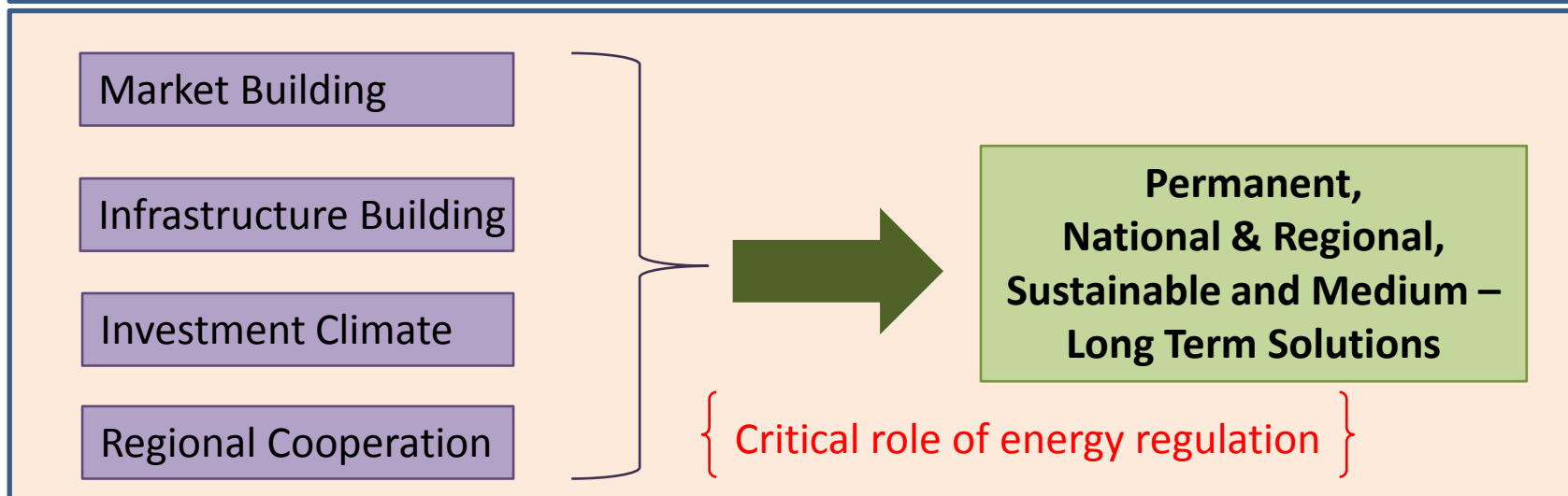
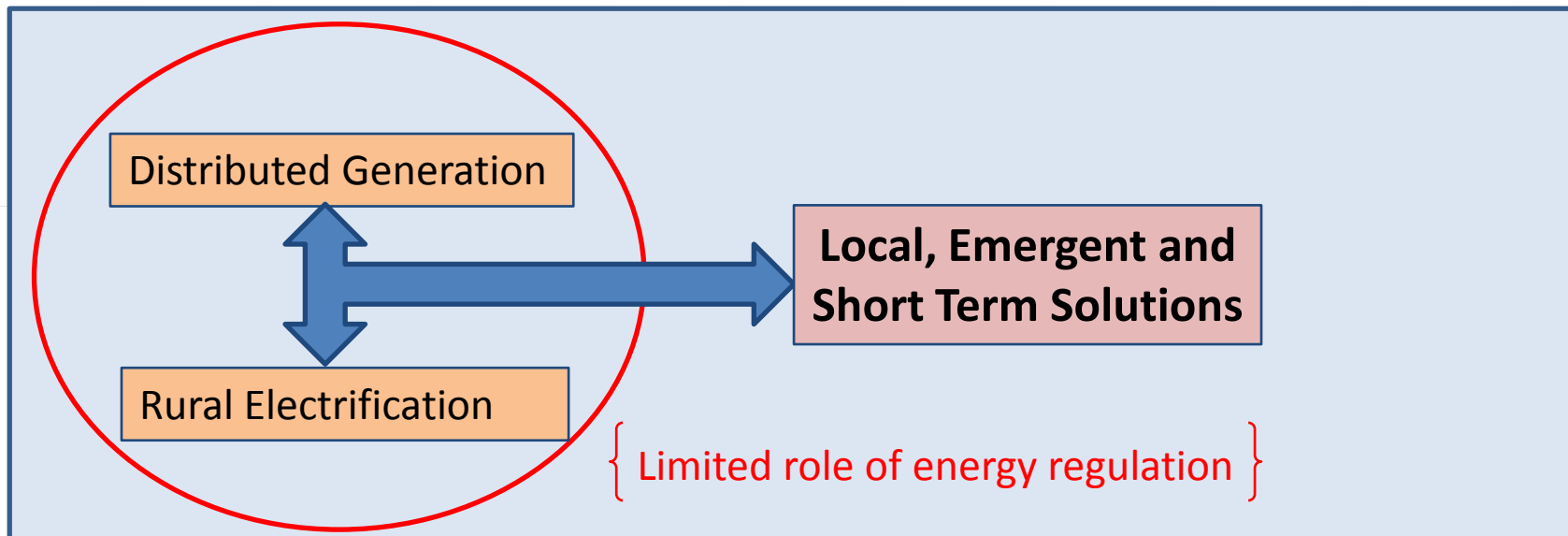
## IEA 2014 Africa Energy Outlook

- Of the extra 230 million people that gain access to electricity by 2040, 70 % are in rural areas, the supply coming primarily from mini-grid and off-grid systems

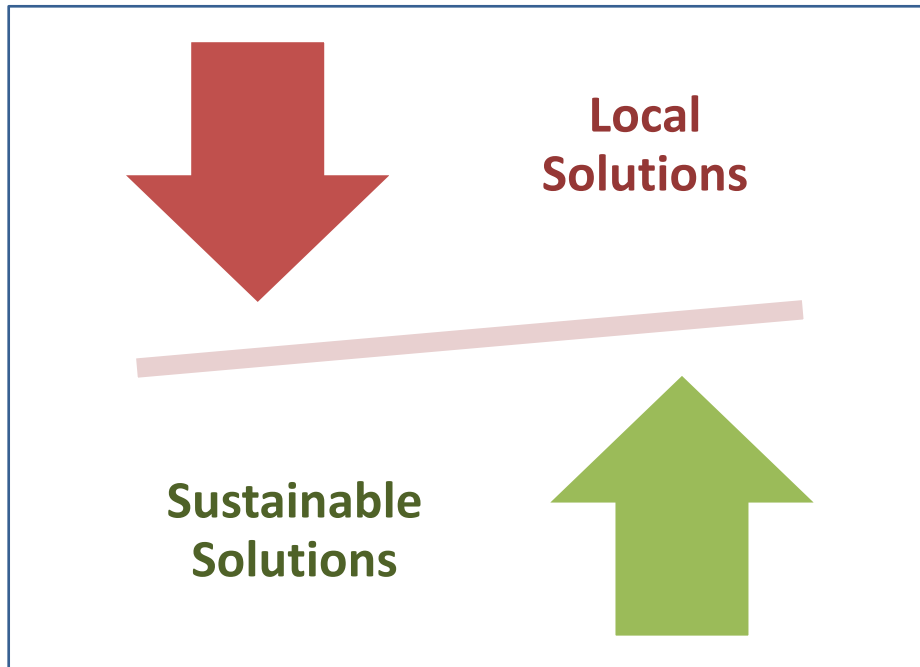
# Energy Access = Investment



# Role of Regulations



## Striking the Balance



## Active Involvement

- ✓ UN
  - ✓ WB
  - ✓ Development Banks
  - ✓ International Organizations
- &
- Regional Regulatory Associations
  - Other Regulatory Authorities
  - Investors

# Interconnecting... and Done?

|                          | Downward adjustment*                                     |     | Upward adjustment*   |     |
|--------------------------|--|-----|--|-----|
| Flexible operation of DG | Temporary production decrease<br>(e.g. wind curtailment) | - P | Temporary production increase<br>(e.g. from backup generators) | + P |
| Electric energy storage  | Charging   | + C | Discharging  | + P |
| Electric vehicles        | Charging (smart charging)                                | + C | Discharging (vehicle-to-grid services)                         | + P |
| Demand response          | Temporarily consuming more                               | + C | Temporarily consuming less                                     | - C |

\* Limited potential in all cases, to be discussed

- P ... producing less // + P ... producing more  
- C ... consuming less // + C ... consuming more

(Distribution Networks to Smart Distribution Systems: Rethinking the Regulation of European Electricity DSOs, European University Institute Think Report, 2013)

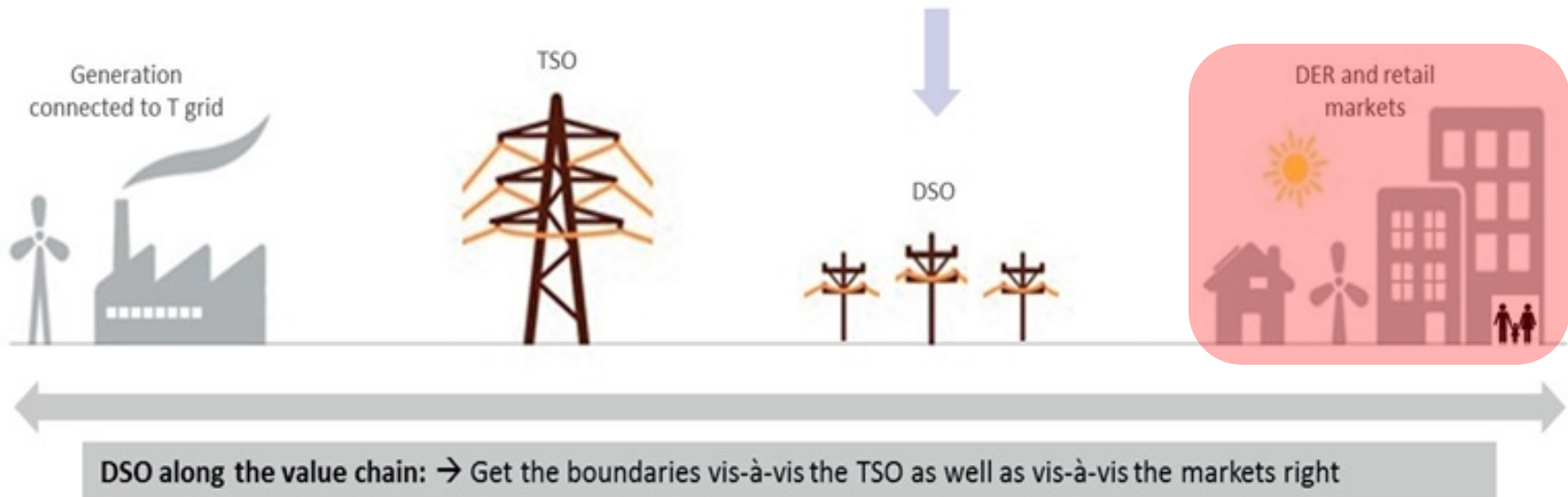
## *New challenges for today's systems*

- Volatility of net and peak demands
- Reverse flows from the distribution to the transmission
- Energy trades at the local level
- Related markets (e.g. ICT) needed

*... and for newly interconnected systems*



# New Approach from the Start



- Determining regulated remuneration (system owner & player hats)
- Design of distribution network charges (collecting revenue)
- Functions and level of unbundling of DSOs (conflict of interests)
- Relationship between distribution and transmission system operators



# Thank you for your attention!

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