



# Energy planning in Africa: Challenges and opportunities for insourcing capabilities

Philipp Trotter

Smith School of Enterprise and the Environment  
University of Oxford, UK  
[philipp.trotter@smithschool.ox.ac.uk](mailto:philipp.trotter@smithschool.ox.ac.uk)

Long-term Energy Scenario (LTES) Forum  
Berlin, Apr 12<sup>th</sup>, 2019

# In most African countries, energy planning focuses on SDG 7

UN SDG 7: “ensure access to **affordable**, **reliable**, **sustainable** and **modern energy for all**”

①

②

③

④



Price of electricity in rural Africa can be **20 times** that of Germany



Sub-Saharan African firms experience **8.5 power outages** on average per month



Only **20%** of Africa’s electricity comes from renewables (falling trend)



**650 million** people in Africa lack access to electricity

1. ENERGY PLANNING IN AFRICA IS OFTEN FOCUSED ON INCREASING ENERGY ACCESS

# Additional capacities are needed for energy planning in Africa

## Current energy planning in Africa...

- ... is sometimes limited to **one future scenario**
- ... usually features **unreliable** demand projections, supply potentials and cost data
- ... focuses on analysing national power systems **in isolation**
- ... does sometimes **not include** key technological choices (e.g. off-grid electrification)

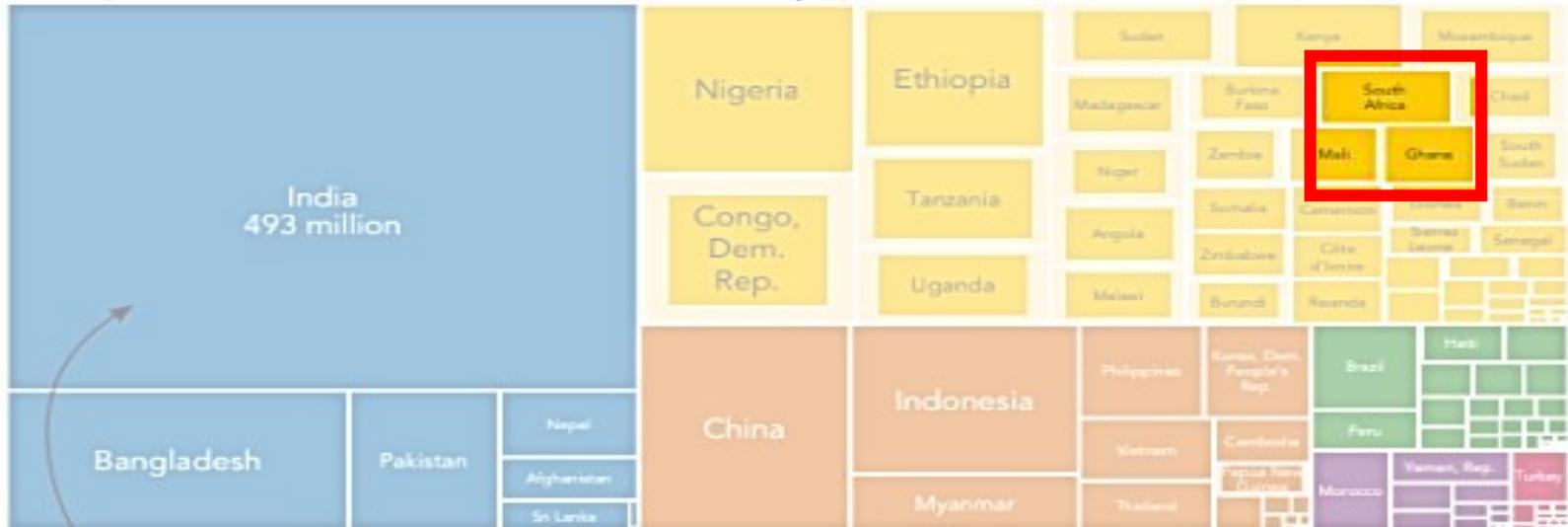
*Highly case-dependent, energy planning is sophisticated in some African countries*

**2. CAPACITIES FOR ENERGY PLANNING IN AFRICA NEED TO BE INCREASED**

# In South Africa and Ghana, there are fewer unelectrified people now compared to 1990

## People without access to electricity

1990



2016



# Energy planning is a governmental task in South Africa and Ghana

Detailed next



## South Africa

Planning source

- Internal

Setup

- Energy planning by **Department of Energy** (state-owned utility Eskom as a technical affiliate)
- **Feedback loops** with other Ministries and the public

Planning tool

- **Bottom-up approach:** PLEXOS

Reasons for insourcing

- Strong historic **political preferences** for internal, centralised planning



## Ghana

- Internal

- Planning within **Energy Commission** (internal consultant to Ministry)
- **Feedback loops** with other Ministries

- **Bottom-up approach:** LEAP

- Competitive elections made energy a **political priority**

3. SOME OF AFRICA'S ENERGY ACCESS SUCCESS CASES HAVE INSOURCED ENERGY PLANNING

# Ghana insourced energy planning using a staged hybrid model



⬇️ Internal energy planning      ⬆️ External energy planning

**Stage 1: onset**

*Late 90s – early 00s*

- **Budget restrictions** (staff, training, software licenses)

- **UNDP:** instant availability of **required capabilities**

**Stage 2: building capacities**

*Early 00s – late 00s*

- Ramp-up of **budget** and **staff for planning** within Energy Commission

- **Training** and later **co-development of plans** with Energy Commission
- Partnership with **Stockholm Energy Institute** (LEAP software)

**Stage 3: internal energy planning**

*Since early 10s*

- Energy Commission is **fully responsible**
- Competence is a **source of pride** (RE Masterplan)

- Limited **technical support** for LEAP, and **financial support** by UNDP

**4. COMBINING INTERNAL AND EXTERNAL PLANNING IN STAGES HAS ENABLED SUCCESSFUL INSOURCING IN GHANA**

# Conclusion: Four messages

1. Energy planning in Africa is often focused on increasing **energy access**
2. Capacities for long-term energy planning in Africa **need to be increased** in several ways
3. Some of Africa's energy access success cases have **insourced** energy planning
4. Combining internal and external planning **in stages** has enabled successful insourcing in Ghana



# References

- International Energy Agency (2018). World Energy Outlook 2017. Paris, France: International Energy Agency.
- Ma, S., & Urpelainen, J. (2018). Distributed power generation in national rural electrification plans: An international and comparative evaluation. *Energy Research & Social Science*, 44, 1-5.
- Mentis, D., Howells, M., Rogner, H., Korkovelos, A., Arderne, C., Zepeda, E., . . . de Roo, A. (2017). Lighting the World: the first application of an open source, spatial electrification tool (OnSSET) on Sub-Saharan Africa. *Environmental Research Letters*, 12(8), 085003.
- Russo, D., & Miketa, A. (2019). Benefits, Challenges, and Analytical Approaches to Scaling Up Renewables Through Regional Planning and Coordination of Power Systems in Africa. *Current Sustainable/Renewable Energy Reports*, 1-8.
- Trotter, P. A. (2016). Rural electrification, electrification inequality and democratic institutions in sub-Saharan Africa. *Energy for Sustainable Development*, 34, 111-129.
- Trotter, P. A., McManus, M. C., & Maconachie, R. (2017). Electricity planning and implementation in sub-Saharan Africa: A systematic review. *Renewable and Sustainable Energy Reviews*, 74, 1189-1209.
- World Bank. (2018). Atlas of Sustainable Development Goals 2018 From World Development Indicators. Washington, DC.