

IREK

Innovation and Renewable Electrification in Kenya

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Nordic Folkecenter

Seminar: Best Practices – Way Forward

Ydby, 16 September 2017

Introduction

- IREK is a five year research project funded by Danida (2015-2019) – see www.irekproject.net
- Participating institutions
 - Aalborg University (Department of Business and Management, Department of Planning)
 - Moi University (Department of Business and Department of Engineering)
 - African Centre for Technology Studies (ACTS)
- 10 Researchers, including 3 PhDs
- Focus is on capacity building in solar and wind energy in Kenya
- Research mobility and interaction is key!

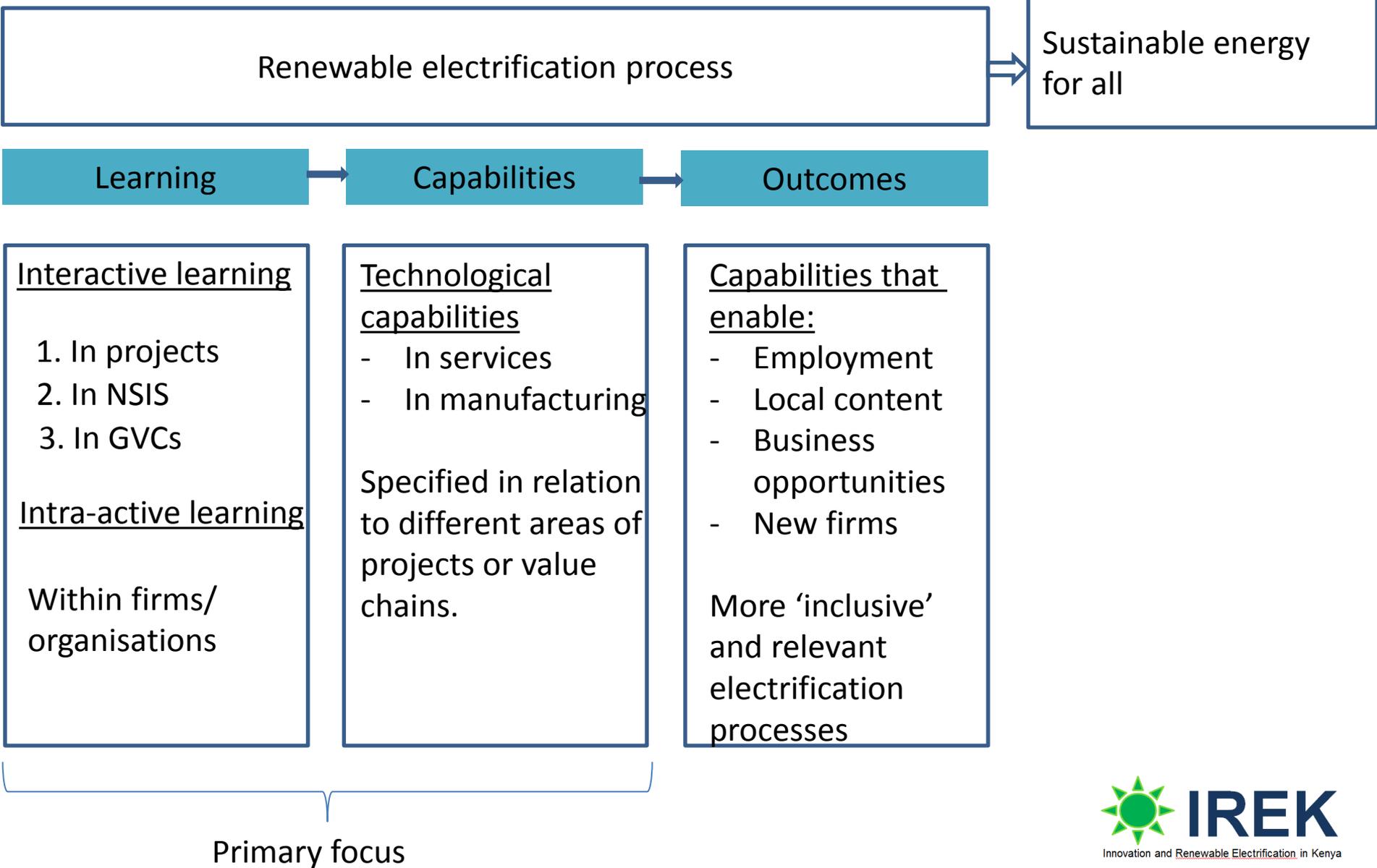
Background

- **Ministry of Energy/Kenya** aims to increase electrification from an estimated 35% in 2015 to 70% in 2020 (grid extensions, mini-grids and home systems; use of low carbon technologies)
- Kenya is one of the **fastest growing promoters of solar and wind** power in Africa. But so far the contribution of RE sources to Kenya's installed generation capacity has remained insignificant
- Wind and solar energy development projects provide opportunities to **build capabilities** at different levels along the manufacturing and deployment chain.
- IREK project aims at investigating **barriers and opportunities** for increased use of renewable energy in electricity production and supply while analyzing barriers and possibilities to use these value chains to build capabilities at different levels of society.

High-level Questions

- How can **domestic policies and strategies** and **international cooperation** on low carbon technologies be shaped and transformed to meet development objectives?
- **The role of local policies and institutions:**
 - What policies will be needed to ensure that the process of renewable electrification in Kenya is shaped to maximise local job creation and business development?
 - What incentives will be necessary to increase the relevance of these technologies?
 - What types of capacity building are most urgently needed?
- **The role of global technology collaboration:**
 - Where will the most ‘relevant’ technologies for wind and solar driven electrification in Kenya come from (South-South versus North-South)? Who are the partners?
 - How important is the ‘software’ element of this technology cooperation (business models and capabilities) compared to ‘hardware’ element (equipment)?
 - How should collaboration be organised?

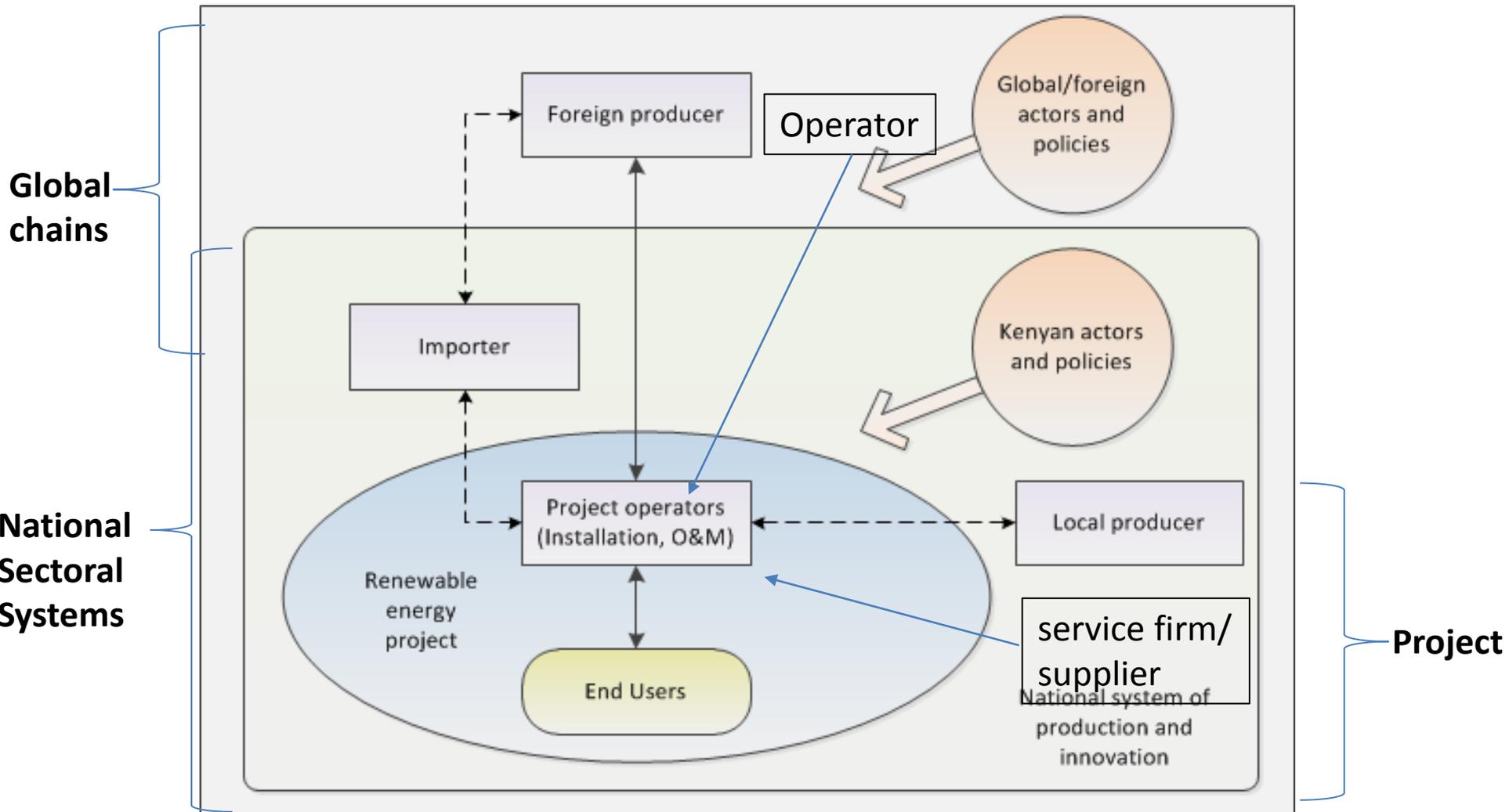
Conceptual framework



Research design and focus

- Technologies: **Solar PV** and **Wind Power**
- Pathways: **Small scale** (mini-grids) versus **large scale** (grid connected, national grid)
- Research in **Kenya** and in ‘**producer locations**’ (e.g. **Denmark, Germany, China**)
- Combining research on **interactive learning** at various ‘scales’: renewable energy **projects**, sectoral/technological **systems** of innovation and global value **chains**.

Framework for understanding interactive learning (GVC and NIS)



Where are we in terms of project progress?

- Project now half way through the project period – should finalise by the end of 2019
- Three PhD candidates doing their field work and studies of critical projects have started
- First stakeholder survey completed and first policy brief on ‘Building capabilities in the wind and solar sectors in Kenya’ available here: http://irekproject.net/files/2017/06/AAU-IREK-Policy-Brief_web.pdf
- First reports and papers published and/or submitted for publication (check www.irekproject.net)
- Continuous efforts being made to ensure coherence between different research elements in the projects – this is a challenge!
- Interactive learning is key concept in the project. We are studying it – and doing it!

Study tour to Nordic Folkecenter



Jane, Faith and Rasmus discussing solar energy at the center in May 2017

The small wind turbines in Ydby made a strong impression on our visitors from Kenya!



Findings from stakeholder survey (1)

- Most important parameters for selecting energy technology: quality of equipment, O&M requirements, service and training by supplier, tech-specific financing options, capital cost up-front and other reasons (to be investigated)
- About 88% of respondents agree or strongly agree that Europe is the best source for energy technology. In solar, China comes second, then USA. In wind, USA comes before China.

Findings from stakeholder survey (2)

- Stakeholders find that RE has potential for fostering economic growth and job creation, solving climate change challenges, reduce energy poverty and create better energy security
- They generally find that capabilities in Kenya in solar and wind are strong as far as project development; construction & installation and O&M is concerned – and weaker when it comes to equipment manufacturing.
- Survey revealed need for more training of policy makers and at university/vocational training levels particularly in areas of Kenya with large numbers of RE projects (but need to further investigate the specific training needs)

Findings based on mapping and analysing solar and wind value chains

- The two value chains (solar and wind) differ significantly – especially for small wind and small solar):
- Small solar: central node of importers of solar panels, but numerous local actors involved downstream (wholesale, retail, to distribution and local sales outlets)
- Small wind: includes a number of local (informal and formal) manufacturers of small-scale wind turbines; but no similar pattern of interconnected retail and distribution networks
- Large scale solar and wind: often project based with foreign lead firms playing a major role and local companies mainly engaged in construction activities, operation and engineering consultancy

First recommendations

1. Policy makers and other stakeholders including researchers should look into ways of building capabilities in technology equipment manufacturing and O&M capabilities.
2. The government should promote policies that enhance local capability building, build strong local innovation systems.
3. Government and policy makers should also support development of relevant educational curriculum that promotes training at research, universities and technical and vocational colleges.
3. Stakeholders should support platforms for sharing knowledge and experiences.

Reflections for practitioners

- When designing projects reflect on:
 - what is the nature and extent of capabilities?
 - who has these capabilities?
 - what relevant actors do not have these capabilities?
- Capability is not just about generation of technology but also about diffusion of products and knowledge

Our preliminary findings – and how our thinking has changed.....

H1: The first hypothesis is that emerging economies are in a particularly strong position to advance relevant and affordable technologies because conditions in BRICS are more similar to those in poor countries.

- China and India are NOT as dominant in renewable electrification beyond the solar home system market than we thought (notwithstanding Garissa project and interaction with minimal amounts of one-off use of Chinese technologies e.g. large power surge protector in LTWP)
- The issue isn't so much about appropriate technologies from S-S or N-S transfer as it is about how any technology is taken up (project organisation)

H2: The second hypothesis is that even the most 'relevant' technologies developed abroad will need to go through a process of transformation in order to become both efficient and inclusive in the specific context of Kenya.

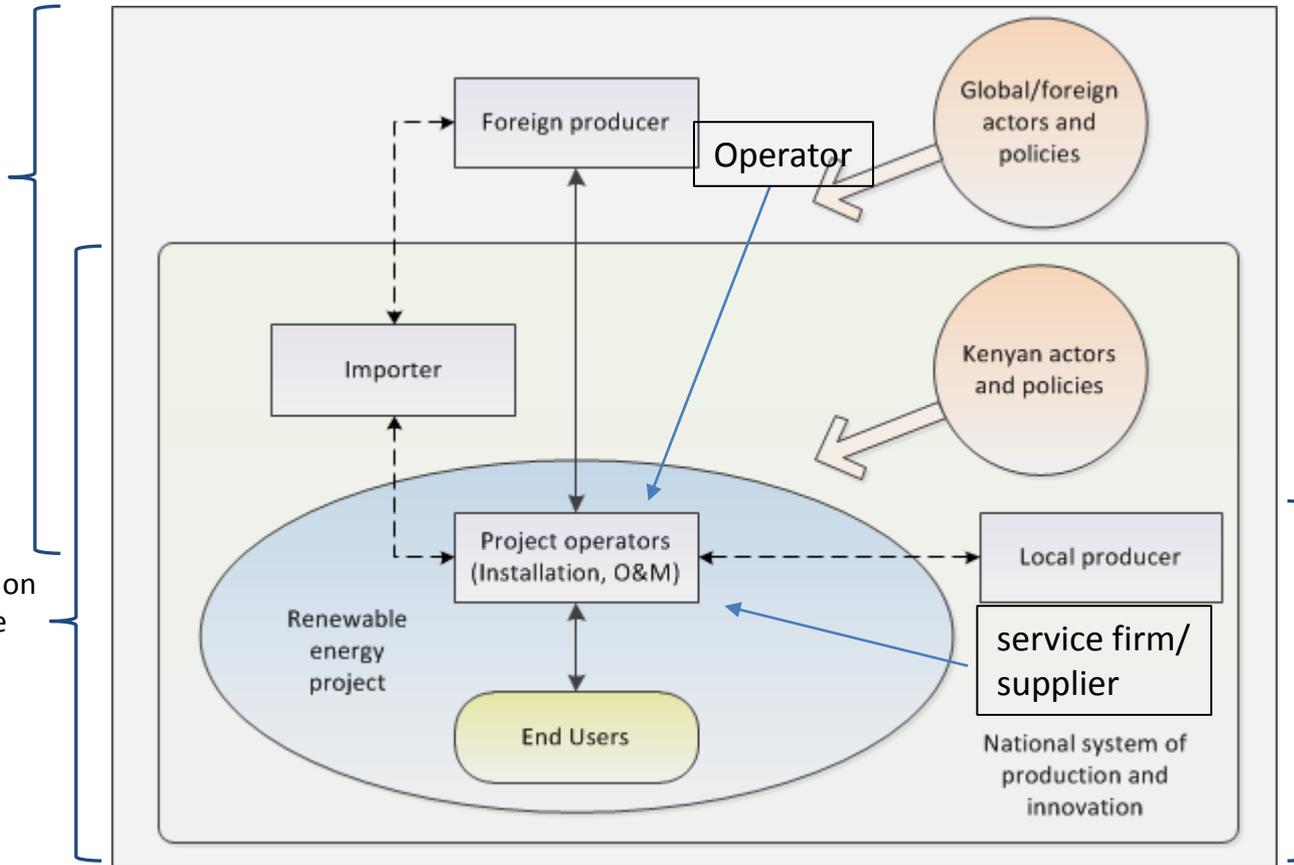
- This is the key hypothesis!
- Building domestic capabilities is key

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New/ revised IREK project hypotheses at a glance

Hypothesis 1:
Outcomes depend on source of technology and producer strategy

Hypothesis 2:
Outcomes depend on 'the transformative power' of the national-sectoral innovation



Hypothesis 3: Small is beautiful: Outcomes depend on size

Hypothesis 4:
Outcomes depend on the local organisation of the project (including absorptive capacity)

Thinking about domestic capabilities – next steps



Source: <http://renews.biz/105033/feet-up-for-vestas-in-kenya/>;
http://www.the-star.co.ke/news/2016/10/18/lake-turkana-wind-farm-to-light-up-one-million-homes-by-june_c1439711

In-depth case studies of different projects



<http://solarpv.tv/index.php/2016/08/11/powerhive-at-kisii-county-kenya-resilient-energy-infrastructure-for-off-grid-communities/>

Thanks and contact info



Check out IREK project at www.irekproject.net or follow us on Twitter. Or contact mha@business.aau.dk