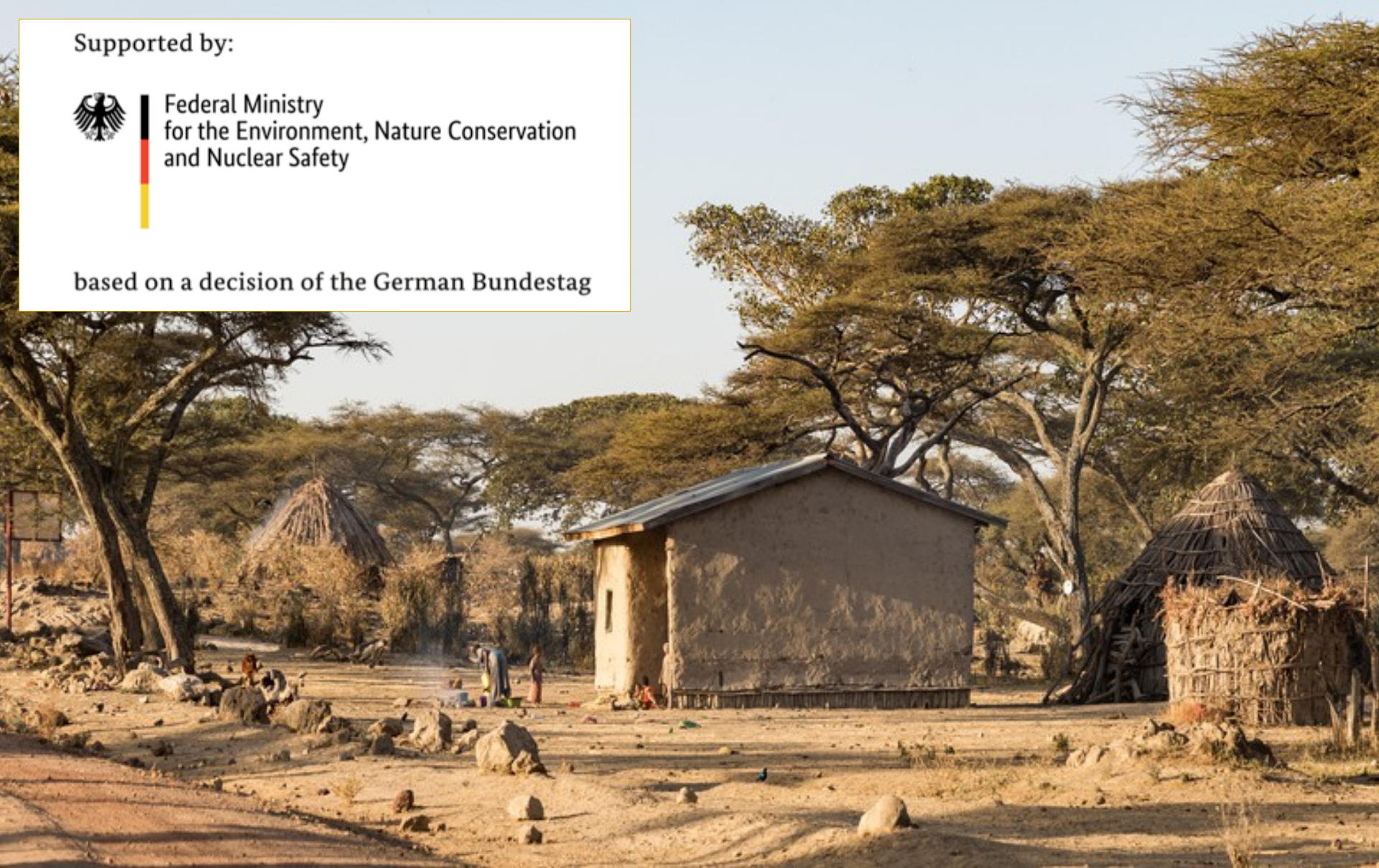


Supported by:



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag



Ethiopia: Supporting rural mini-grids

Ethiopia: Opportunities created by ambitious climate action

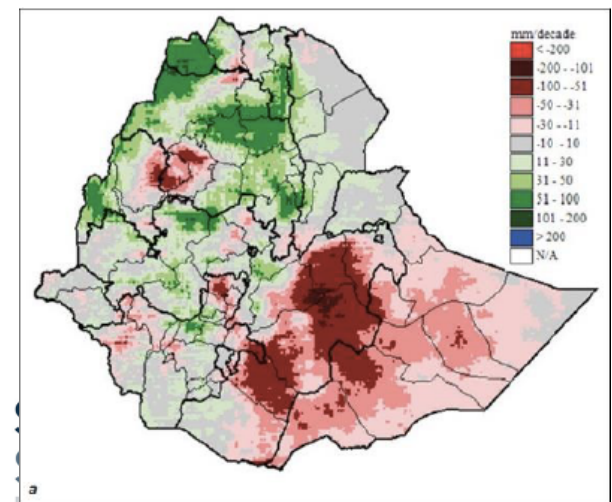
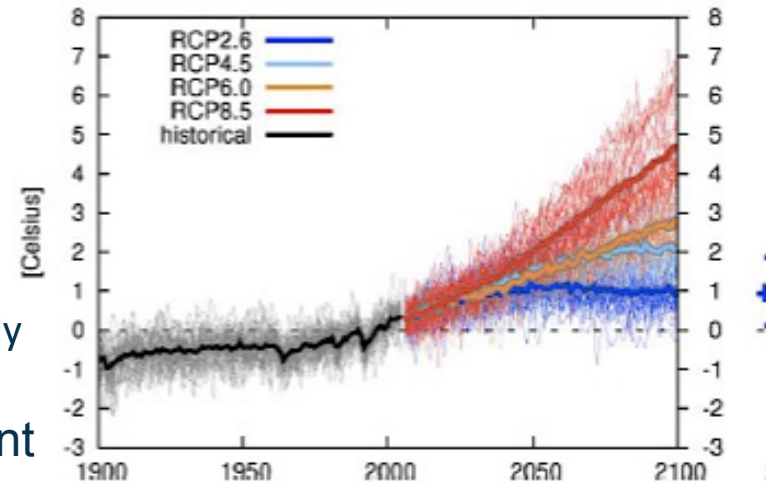
Significant Climate Change Risks

- Hotter, drier, more water stressed
- Vulnerable due to limited capacity to adapt and due to water-related climate shocks
- Land degradation due to unsustainable agricultural practices likely to worsen as the climate crisis evolves
- Sustainable use of water sources, such as groundwater, acting as a buffer and to supplement surface water supply

NDC requires international support and investment

- The CRGE - Ethiopia's climate strategy for both adaptation and mitigation.
- Increase resilience of agricultural - productivity, minimize food insecurity and increase rural livelihoods.
- Prioritize renewable energy to increase energy access in rural areas.
- A focus on sustainable land management practices in agriculture and forestry creates opportunities for both adaptation and mitigation projects.

Temperature change Ethiopia Jan-Dec wrt 1986-2005 AR5 CMIP5 subset



Climate & Development
Knowledge Network

NORTH
TOWARDS CLIMATE RESILIENCE

Agriculture Clusters are the primary target

Hypothesis: Productivity gains will fund the PPA's

Agricultural Commercialisation Clusters

- Strategy driven by government to improve food security and the rural economy
- Several thousand clusters in Ethiopia
- Use cases
 - Irrigation,
 - storage,
 - agri-processing
- Aligned with Government policy objectives (NEP II, GTP II, CRGE)
 - Building a resilient rural economy
 - Supporting food security in the face of climate change
 - Clean renewable energy for off-grid electrification
- Strong climate change mitigation and adaptation benefits
- Alignment with SDGs



Climate & Development
Knowledge Network



SOUTH
SOUTH
NORTH
TOWARDS CLIMATE RESILIENCE

LEDS
GLOBAL PARTNERSHIP



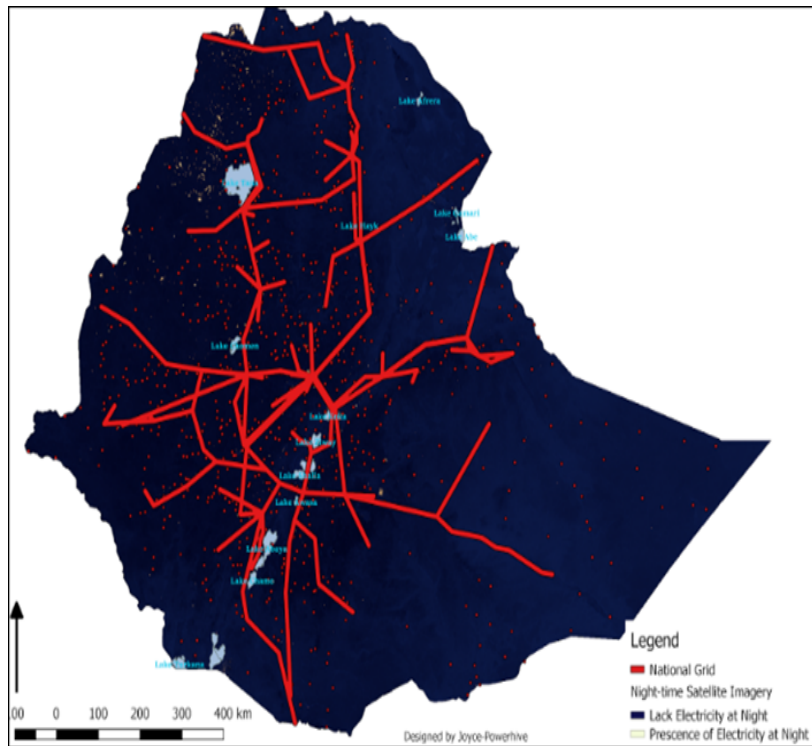
Horticulture crops: avocado, banana, mango, onion, tomato

Electricity increases productivity

- Irrigation
 - multiple crop cycles in one year
 - Increases plant height, germination rate and overall yield increasing productivity
- Storage & temperature control after harvest
 - maintains the quality
 - increase the shelf life
 - keeps pests away
 - Increases revenue
- Small scale processing for extracting oil and juicing

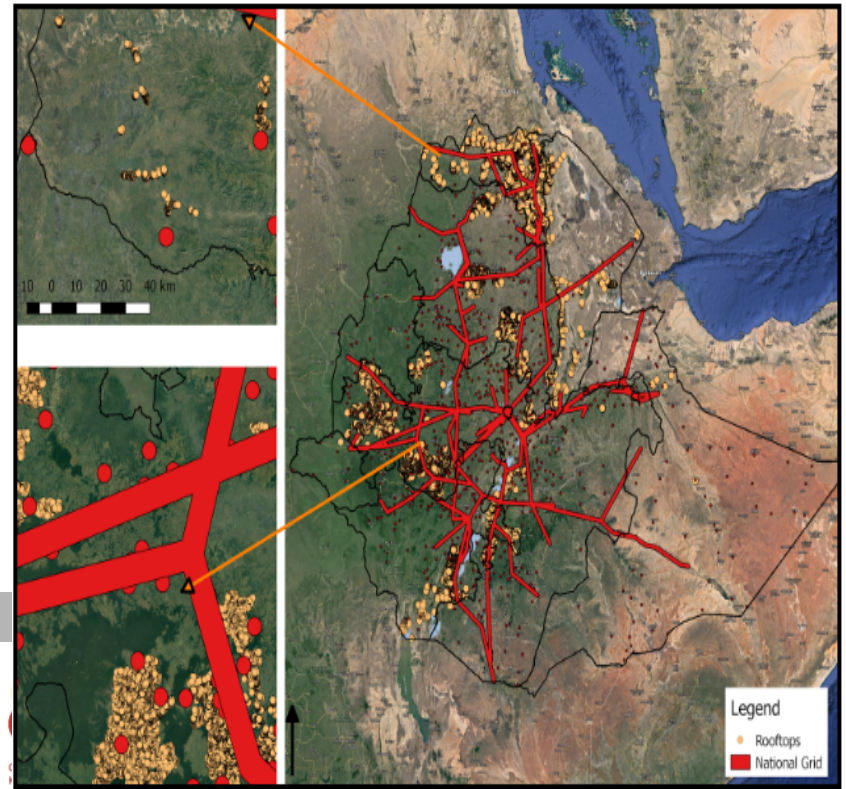


Using GIS – National grid and rooftop data

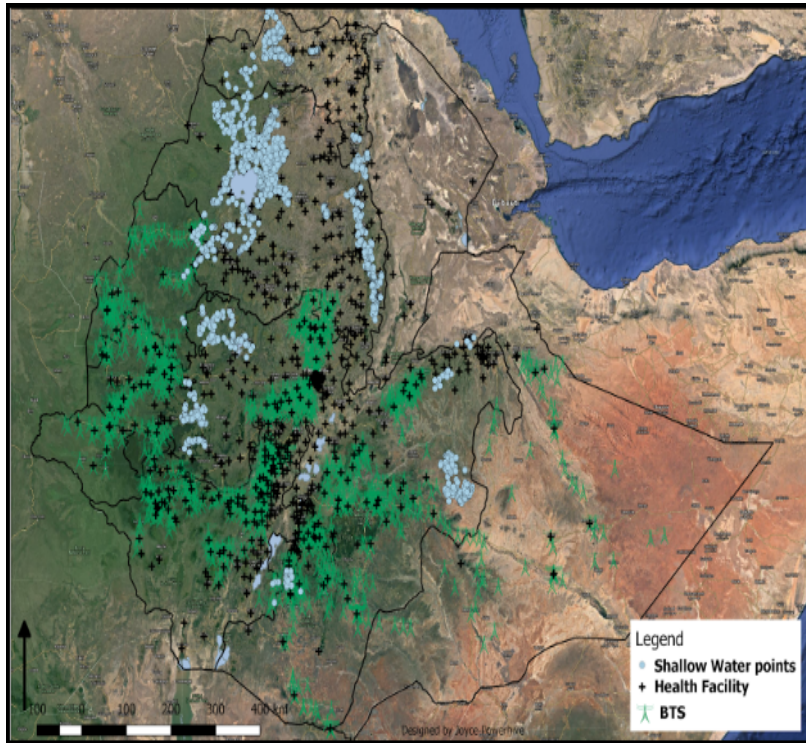


- The **national grid** was compiled using **medium voltage** and **low voltage** lines, data on **population density** and **BTS towers** (on-grid), **NASA's black marble** technology to capture artificial lightening.

- The grid data was then used to identify areas with higher concentration of **rooftops**.
- Many of the **concentration points** were found in **Afar, Tigray, Amhara** and **Oromia** regions.

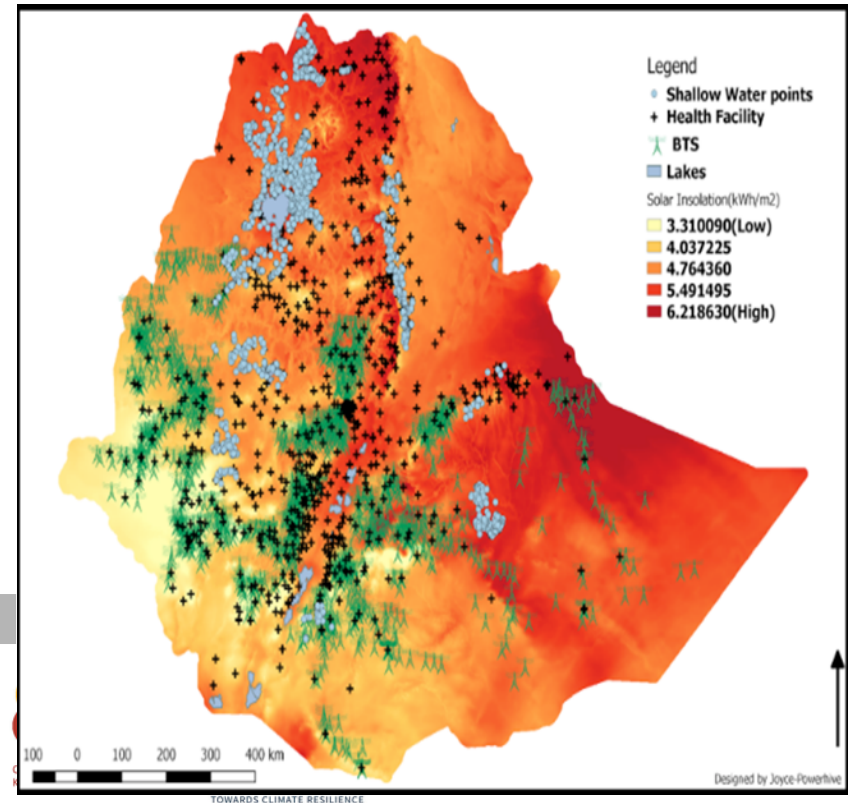


Using GIS to identify sites – ground water, BTS, health facilities



- Datasets of ACCs, **BTS towers**, **social amenities** and **shallow ground water** points were overlaid.
- **BTS towers** and **health facilities** mostly overlap.
- But **shallow groundwater points** overlap little with the **health facilities** and **BTS towers**.

- Then, **solar irradiation** data was added to the data that had been overlaid.
- Higher insolation was registered in **northern, middle** and **eastern** parts of the country and numerous overlap points were found in those areas.



Business Models...

EPC + O&M

All works are conducted in service of the public as the primary owner

BOT

Private sector designs implements & ensures successful operation for limited time then transfers to public

BOOT

Private operator develops & operates for duration of concession, then transfers assets at no cost to public

BOO

A fully privatized utility

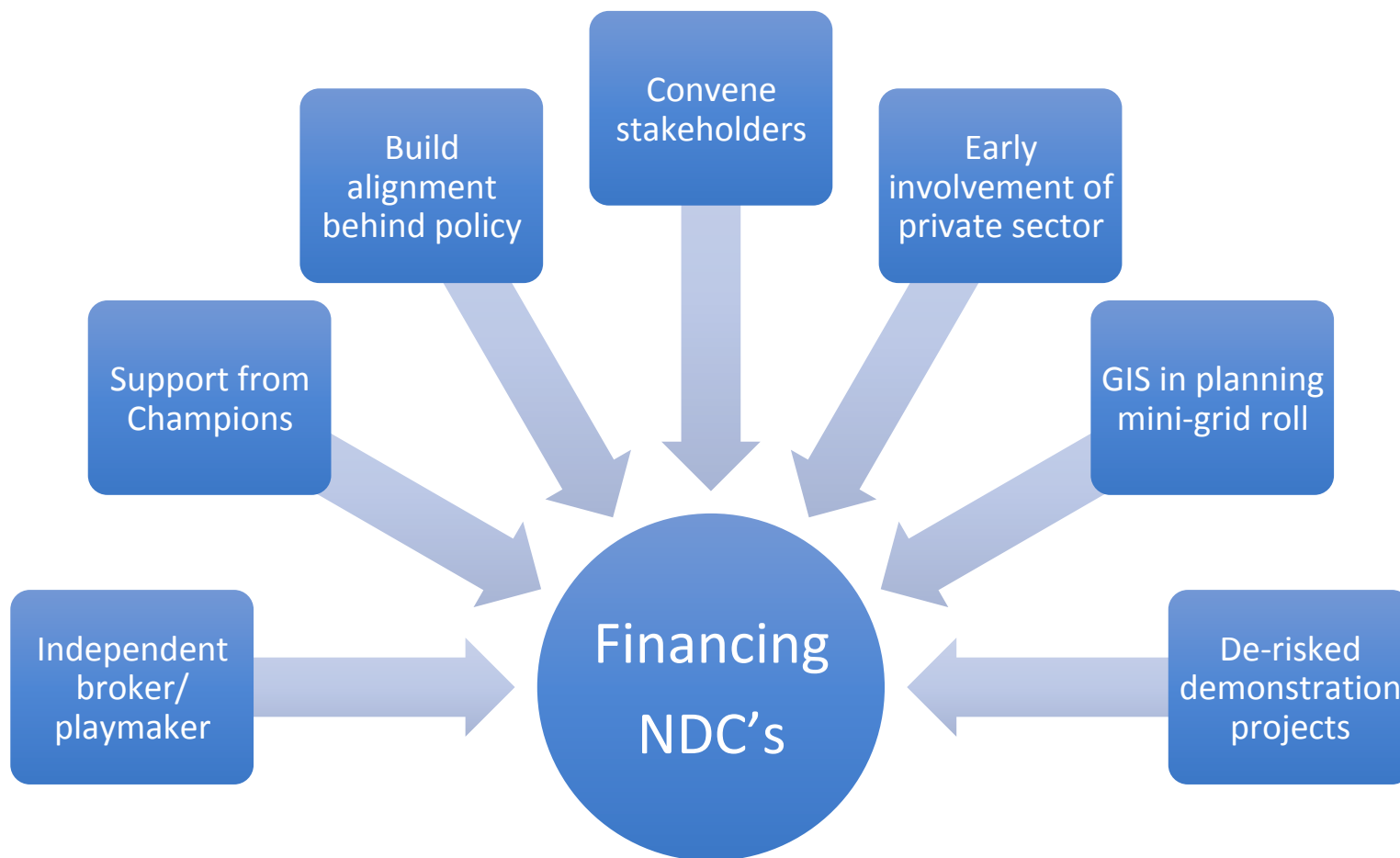
Public sector involvement

Alignment of interest

Private sector service provider
Risk carried by government
Maximum public funding
Lower efficiency
Lower cost to end-user

Private sector is long-term partner
Risk carried by private sector
Minimal public funding
Greater efficiency
Higher cost to end-user

Lessons from the Ethiopia experience



What next?

10 Demonstration projects - de-risked
Learn and test business models

Investment cases and pre-feasibility studies on 10 sites, present at investment forums.
Strong M&E lens to feed in to adaptive management, & collect robust data

Broader roll-out once barriers removed
& financial viability proved

There are a number of outstanding questions

- ✓ Ownership models - PPPs or fully privately owned?
- ✓ Cost-reflective tariffs for business off-takers?
- ✓ Regulatory barriers – licensing, restrictions on foreign investors, repatriation of returns



Thank you