

Of monopolies and mini grids: the evolving governance of decentralised electricity in Kenya, Tanzania, Nigeria and **Senegal**

Dr Lucy Baker, Senior Lecturer in Environmental Geography,
The Open University, UK
and

Visiting Fellow, Science Policy Research Unit, University of Sussex



Baker, L., Sesan, T., Bhattacharyya, S., Pueyo, A., Bukari, D., Meena, S., Onsongo, E., Oyinlola, M., Sawe, E., Otu-Eleri, E., Uduka. U., Handem, Y., Onjala, B. and Katyega, M. (2022)

Of monopolies and mini grids: the evolving governance of decentralised electricity in Kenya, Tanzania, Nigeria and Senegal SIGMA working paper, July 2022

1. The political economy of a socio-technical system

The political economy of a socio-technical system

- While electricity is often perceived as technical and neutral, there are key tensions:
 - within the governance and ownership of electricity as a technological system, and the allocation of benefits;
 - in interactions between technological innovation and established relations of political, social and economic power;
 - in the way in which ‘disruptive’ technologies may challenge monopoly infrastructures of grid-connected electricity and related institutions;
- Factors such as population density, settlement patterns, socio-economic conditions, political ideologies, the role of the state, markets and institutions, all condition electricity supply and demand in important ways (Ulsrud et al 2018).
- Electricity is embedded within “an evolving set of political relationships” (Balls and Fischer 2019:474), a specific political economy (Baker 2014).

Governing electricity: monopoly v. market

- Standard model of power sector reform (Gratwick and Eberhard 2008, Foster).
- Electricity has proven to be one of the hardest network industries to reform. It has been difficult to *“replace the state with private enterprise because infrastructures usually display strong economies of scale, which arise through network interactions that are prone to natural monopoly”* (Victor and Heller 2007:1).



From monopoly to market and beyond

- From state-owned monopoly to liberalisation
- From centralised to decentralised
- From public finance to private investment

From monopoly to market and beyond

“It is increasingly clear that decarbonising the electricity system necessarily involves a combination of instruments” and it is therefore necessary to look “beyond the usual and simplistic alternative between ‘free markets’ and ‘utility regulation’, or ‘decentralised decisions’ versus ‘central planning’
(IEA 2016:18).

Mini grids: a game changer and a threat

- Third generation mini-grids: potential game changer for cost-effective, pro-poor, low-carbon, universal electrification (Sesan 2021, Knuckles et al 2014).
- Can bypass failing, often indebted, crisis-ridden, large-scale, capital-intensive utilities.
- As power producers and power distributors mini-grids have the potential to 'spatially reorganise' the electric grid (Boamah 2020).
- But, mini-grids pose significant threat to existing institutions of centralised electricity, particularly state-owned utilities and large-scale generation, distribution and transmission companies.



2. Electricity governance in Senegal

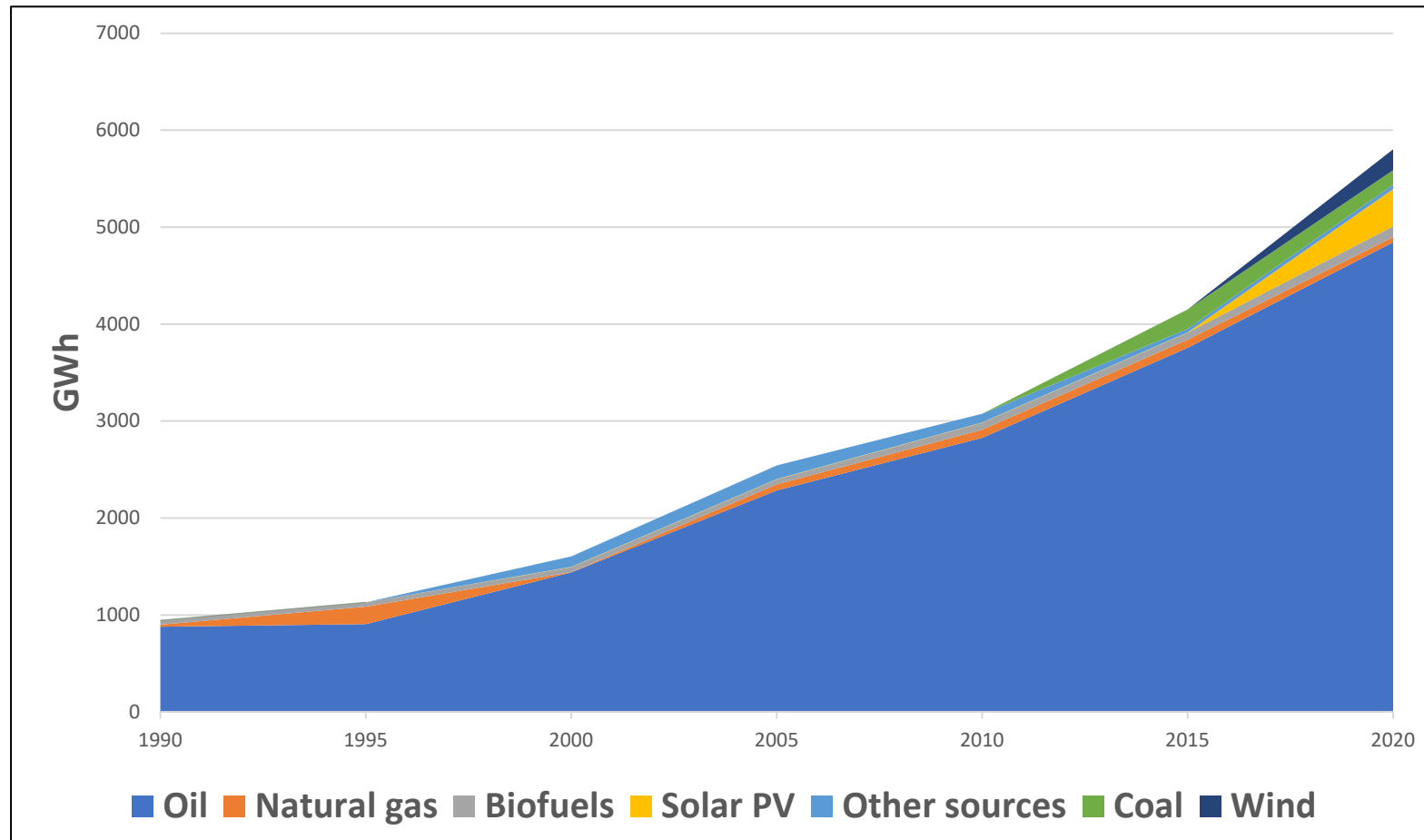


Electricity in Senegal

- State-owned utility **Sénélec** holds monopoly on transmission and distribution, just under half of generation. A partially liberalised electricity sector.
- Further generation from IPPs: sell exclusively to utility.
- 75% of electricity from (imported) heavy fuel oil/ diesel.
- Connectivity at 66% of population.
- Grid reaches most urban centres and large rural habitations. Considerable disparity between urban (93%) and rural (47%) electrification (Power Africa 2022).
- **Plan Sénégal Emergent (PSE) (approved 2014)**: obtain middle-income country status by 2035; target for renewables to meet 20% of power generation by 2017 (achieved end 2019); government commitment to achieve universal access to electricity by 2025.
- Improvement in electricity security, affordability and access since 2012.
- Senegal has highest electricity tariffs in sub-Saharan Africa after Ghana.



Electricity generation by source, Senegal 1990-2020



Source: <https://www.iea.org/countries/senegal>

Electricity governance: institutions and processes

- Power sector liberalisation began 1998. Start of breakup of Sénélec monopoly.
 - i) creation of regulator (CSRE) responsible for establishing and verifying tariffs;
 - ii) creation of L'Agence Sénégalaise d'électrification rurale (ASER), an autonomous agency for rural electrification.
- Renewable Energy Law 2010. Objectives: increase RE generation to 20% of total installed capacity by 2017; reduce cost of electricity generation and tariff; increase energy security.
- **Sénélec, ASER and CSRE** are under the supervision of the **Ministry of Petrol and Energy**, which has overall responsibility for strategy and policy.

Mini-grids in Senegal: current state of play.

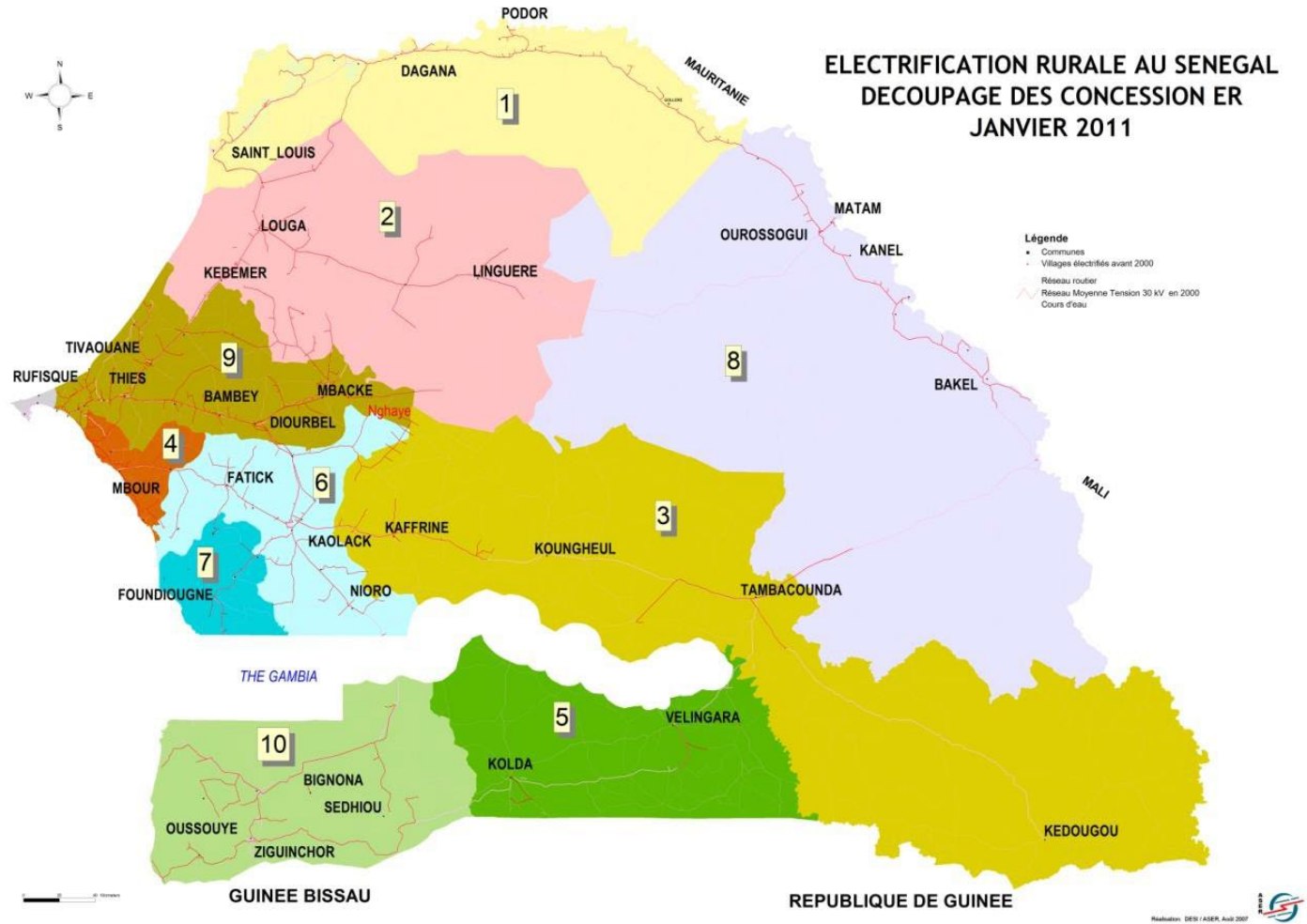
- According to ESMAP (2022) Senegal is in **top five** of planned mini grids: approx. 1200 third generation mini grids planned.
- And in **top ten** of installed mini grids, with 677 currently installed.
- However, many of these are presumed to no longer be operational.

3. Two main areas of rural electrification

1. Rural electrification: concession approach

- ‘Top-down approach’: Ten large concession areas for rural electrification set up in 2015 under National Rural Electrification Programme (PNER). Managed and implemented by ASER.
- Under bidding programme supported by DFIs and bi-lateral donors, international developers in JVs with Senegalese companies bid for concessions to construct a mix of grid extension and off-grid electrification.
- To supply local populations using a variety of technologies, **including mini grids**, under a 25-year mandate.
- To qualify for government subsidies, concessionaires must put together a business plan to CSRE.
- However, significant delays in awarding the concessions (World Bank 2015).
- Six concessionary areas allocated to private companies.
- Remaining four areas managed by S en elec due to lack of interest from private sector.
- Within its four concessionary areas, S en elec’s strategy has been more about extending the grid than installing mini grids.

Concessionary areas



1.	Dagana-Podor-Saint-Louis
2.	Louga-Kebemer-Linguere
3.	Kaffrine-Tamba-Kedoudou
4.	Mbour
5.	Kolda-Vélingara
6.	Kaolack-Nioro- Fatick Gossas
7.	Foundiougne
8.	Matam-Bakel-KanelRanerou
9.	Rufisque-Thies-Tivaouane Bambe- DiourbelMbacke
10.	Ziguinchor -OussouyeBignona- Sédhiou;

Tariffs and grid arrival

- Until 2015/6 concessionaires were able to charge cost reflective tariffs. But this changed with the introduction of a tariff harmonisation process that applies to all new mini grid projects.
- Government has been reluctant to formulate regulations for tariff-setting that could enable solar mini-grid developers to be economically sustainable in areas where the national grid is not yet established (Ulsrud).
- Legal requirement that mini-grid operators withdraw following the arrival of the main grid.
- Compensation for developers often provided, and/or the relocation of the project elsewhere.
- However, existing model acts as deterrent to many potential mini grid operators

2. Rural electrification: ERIL

- ‘Bottom-up approach’ (World Bank 2015).
- L’Electrification Rurale d’Initiative Locale (introduced 2015) focusses on rural electrification including third generation mini grids.
- In areas that are either outside of the ten regional concessions and/or in communities where there are no plans for grid-based electrification for the next three years (SEforAll and BNEF 2020:78).
- Approved and implemented by ASER.
- Under ERIL, mini grids have mostly been donor-funded through dedicated programmes.
- E.g ERSEN, supervised by the EnDev partnership (GIZ and others). Under this programme GIZ installed the highest number of mini grids that currently exist in the country.
- *But* half of the mini grids installed under ERSEN programme have been shut down and functioning mini grids have poor operational performance (Etienne 2022, and interviews).
- Perhaps more positively, in 2019 ASER signed a contract with German company Gauff Engineering to install 300 mini grids as part of ERIL.

Jan 2023: Nouveau Code l'Électricité

- Introduces major institutional and legal changes, including:
- Unbundling of Senelec into a holding company and three autonomous subsidiaries for generation, transmission and distribution.
- Introduction of a new model of rural electrification (l'électrification rurale décentralisé, ERD) to replace ERIL. Aim to generate more private sector interest.

4. Conclusion and future considerations

Conclusion

- Mission overlap and lack of coordination and accountability between multiple agencies that are involved in rural electrification, especially under the concession system and ERIL (Jaglin and Gillou 2020, Etienne 2022).
- Ambiguity of the position of some parts of government towards mini-grid development and conflict of interest between national institutions of electricity governance e.g Senelec, ASER.
- Tensions between state and private sector ownership; centralised and decentralised systems.
- Rural electrification efforts have been heavily dependent on public subsidy of some kind. Far more donor finance than private investment to date.
- Various deterrents to private investment in mini grids e.g arrival of centralised grid and tariff harmonisation.
- Some cultural resistance to mini grids in favour of centralised connection.

Thank you

- SUSTAINABILITY, INCLUSIVENESS AND GOVERNANCE OF MINI-GRIDS IN AFRICA (SIGMA) RESEARCH PROJECT
- Available at: <https://www.sigma-gcrf.net/resources/working-papers>