



Exploring different Financing Mechanisms for Mini-grid Deployment in Africa

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An aerial photograph of a solar farm in a dry, arid landscape. The solar panels are arranged in neat, parallel rows. In the background, there is a small building with a corrugated metal roof, a few vehicles, and some utility poles. The overall scene is dimly lit, suggesting either dawn or dusk.

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Background – logistics

- Among the 68 African countries, 46 have access to electricity rate less than 85%. On average 63%.
- There's a need to scale up the deployment of mini-grids to reach the last mile customers who are off-grid.

Country Coc	Region	IncomeGrou	TableName	access rate
TCD	Sub-Saharan Afi	Low income	Chad	10.87641621
MWI	Sub-Saharan Afi	Low income	Malawi	12.7
COD	Sub-Saharan Afi	Low income	Congo, Dem. Re	19.09363174
NER	Sub-Saharan Afi	Low income	Niger	20.04190445
LBR	Sub-Saharan Afi	Low income	Liberia	21.48886871
UGA	Sub-Saharan Afi	Low income	Uganda	22
SLE	Sub-Saharan Afi	Low income	Sierra Leone	23.4
MDG	Sub-Saharan Afi	Low income	Madagascar	24.07539177
SSD	Sub-Saharan Afi	Low income	South Sudan	25.38207054
BFA	Sub-Saharan Afi	Low income	Burkina Faso	25.47374344
GNB	Sub-Saharan Afi	Low income	Guinea-Bissau	26.04734802
MOZ	Sub-Saharan Afi	Low income	Mozambique	27.42547035
CAF	Sub-Saharan Afi	Low income	Central African F	29.9820385
TZA	Sub-Saharan Afi	Low income	Tanzania	32.8133316
SOM	Sub-Saharan Afi	Low income	Somalia	32.94651413
LSO	Sub-Saharan Afi	Lower middle inc	Lesotho	33.73075867
RWA	Sub-Saharan Afi	Low income	Rwanda	34.1
GIN	Sub-Saharan Afi	Low income	Guinea	35.44121552
ZMB	Sub-Saharan Afi	Lower middle inc	Zambia	40.3
ZWE	Sub-Saharan Afi	Lower middle inc	Zimbabwe	40.42136765
AGO	Sub-Saharan Afi	Lower middle inc	Angola	41.88623047
MRT	Sub-Saharan Afi	Lower middle inc	Mauritania	42.91231918
BEN	Sub-Saharan Afi	Low income	Benin	43.07774734
MLI	Sub-Saharan Afi	Low income	Mali	43.08983994
ETH	Sub-Saharan Afi	Low income	Ethiopia	44.3
TGO	Sub-Saharan Afi	Low income	Togo	48
ERI	Sub-Saharan Afi	Low income	Eritrea	48.42378998
NAM	Sub-Saharan Afi	Upper middle inc	Namibia	52.50118256
NGA	Sub-Saharan Afi	Lower middle inc	Nigeria	54.4

Background – two financing mechanisms

- Auctions: competitive procurements or minimum subsidy tenders
 - Agreement based, competitive selection, usually have lots or specific sites
- Results-based financing (RBF): output-based aid or performance-based grants
 - Based on output connections made, non-competitive selection
- Hybrid: different in selection and disbursement.

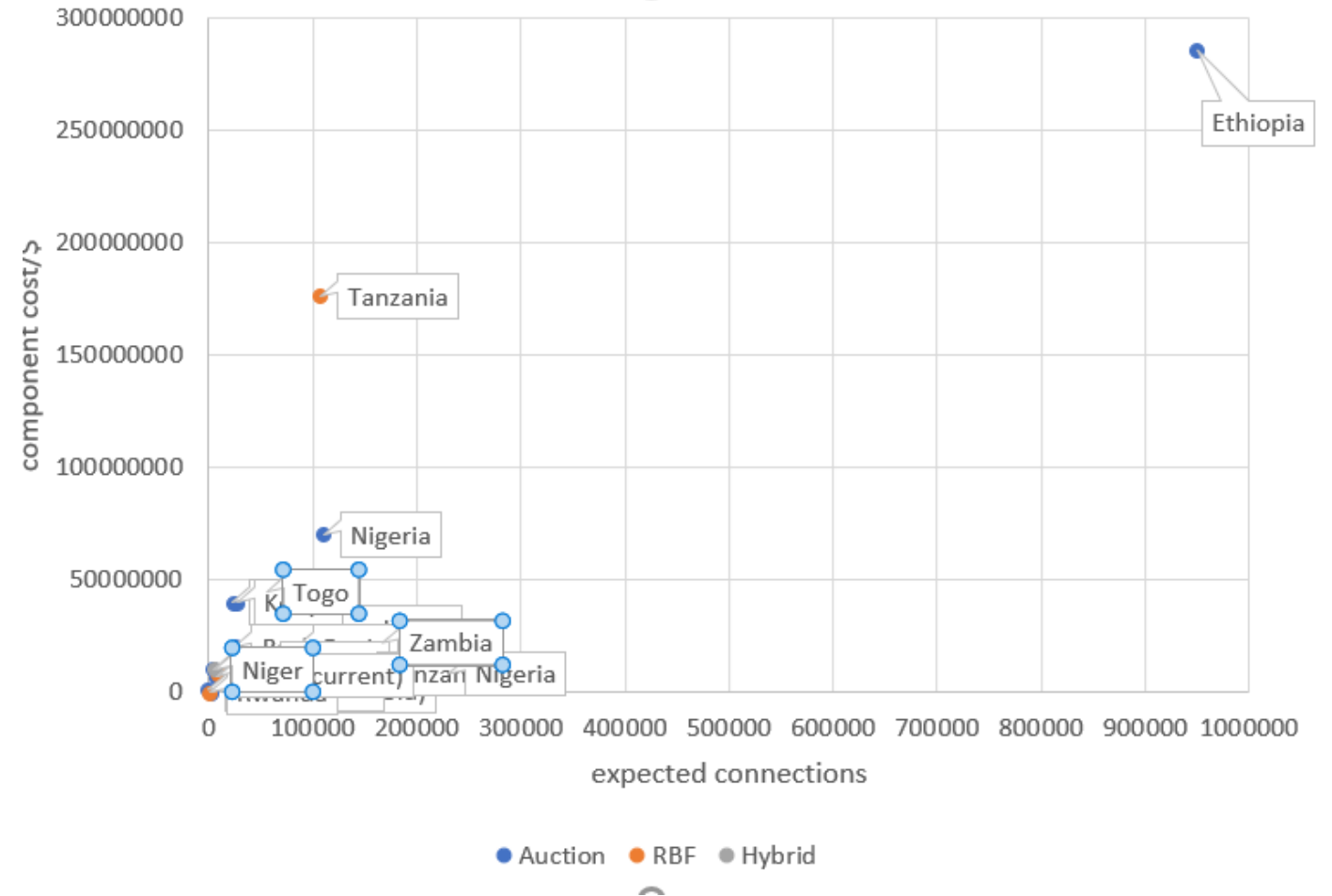
Project overview

- Local governments and international organizations need to have supportive programs to reduce risk for developers and lower connection costs for rural customers.
- Subsidies disbursed via auctions or RBF are important financing support to the nascent mini-grid market in Africa.
- How and When to apply and choose between the different financing mechanisms is an important question to answer.

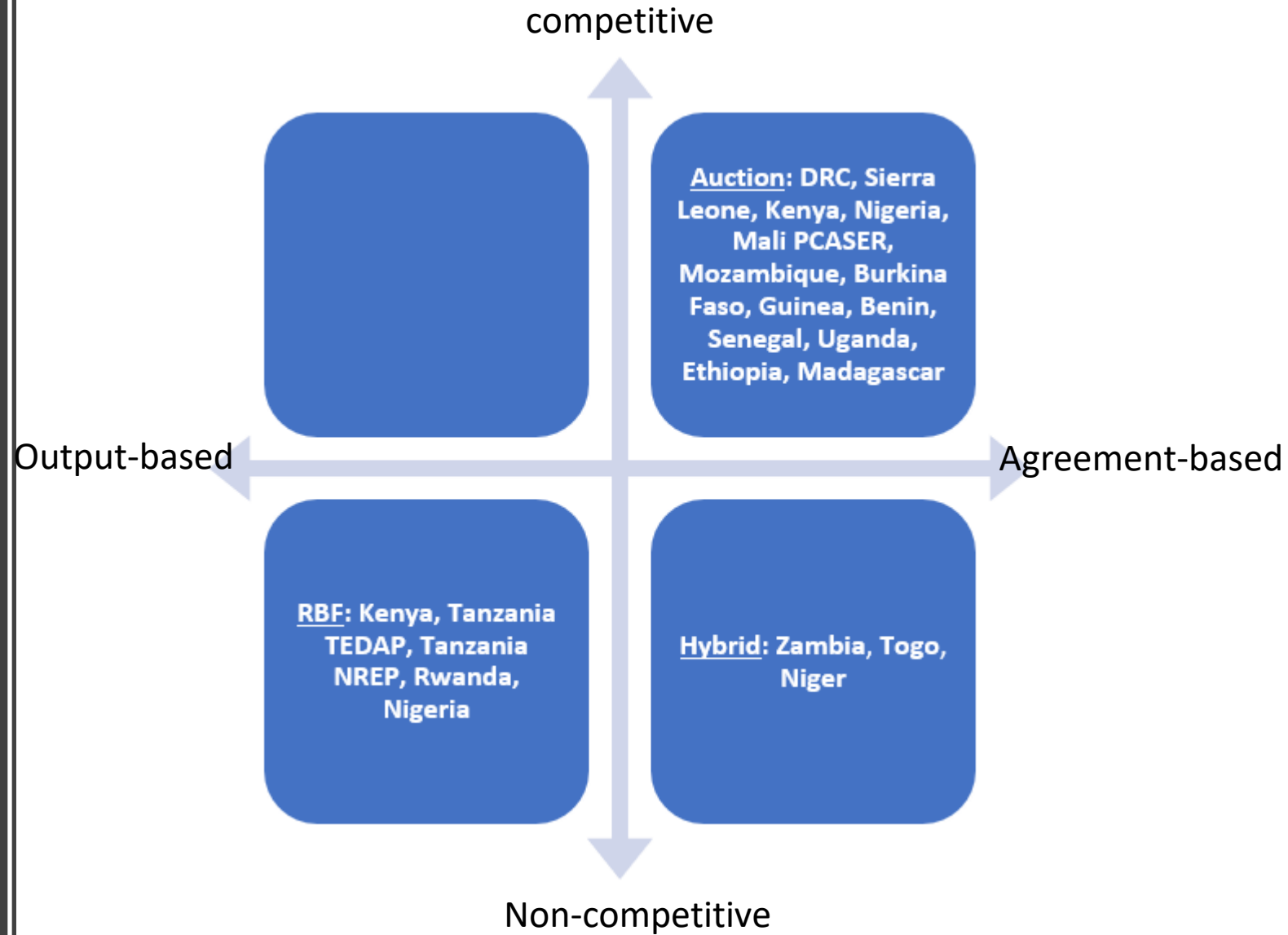
Methods

- Identified 22 least connected countries in sub-Saharan Africa, exploring their costs, goals, and experiences to finance mini-grids.
- Summarize the key factors as important statistics and ask key questions, analyze the results according to different financing mechanisms (auction/RBF/hybrid)
 - Expected connection
 - Component costs
 - Types of target developers (international/local)
 - Site selection methods (top-down/bottom-up)
 - Funding body
 - Technical assistance
 - etc

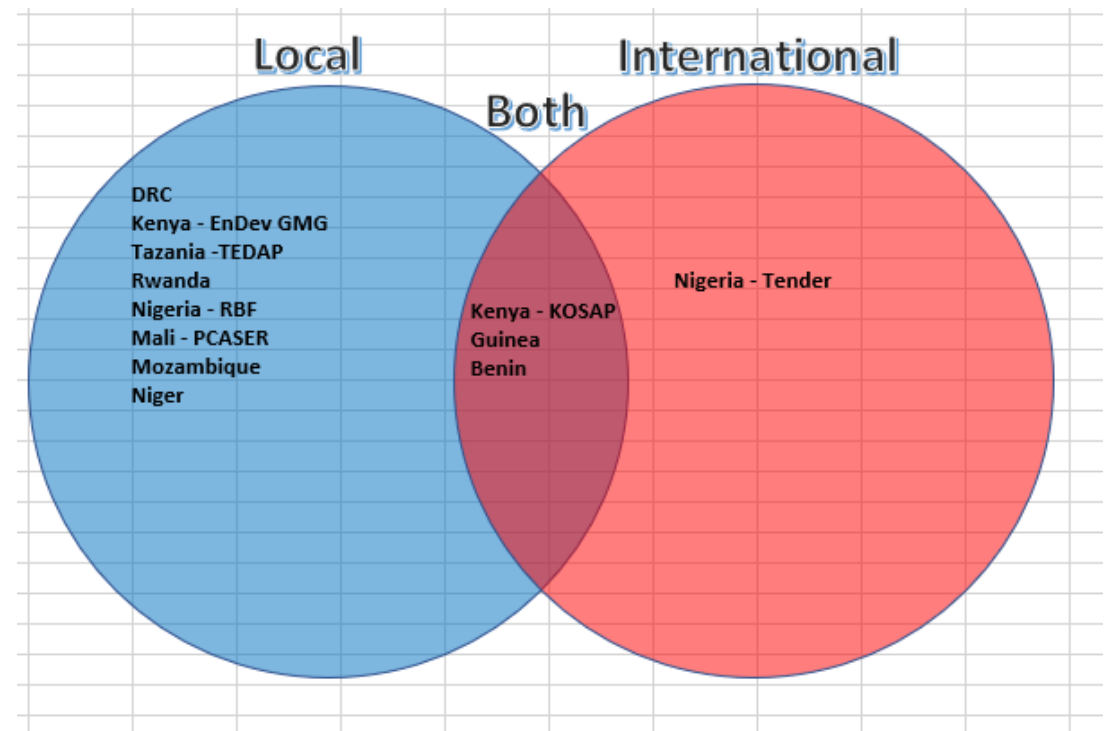
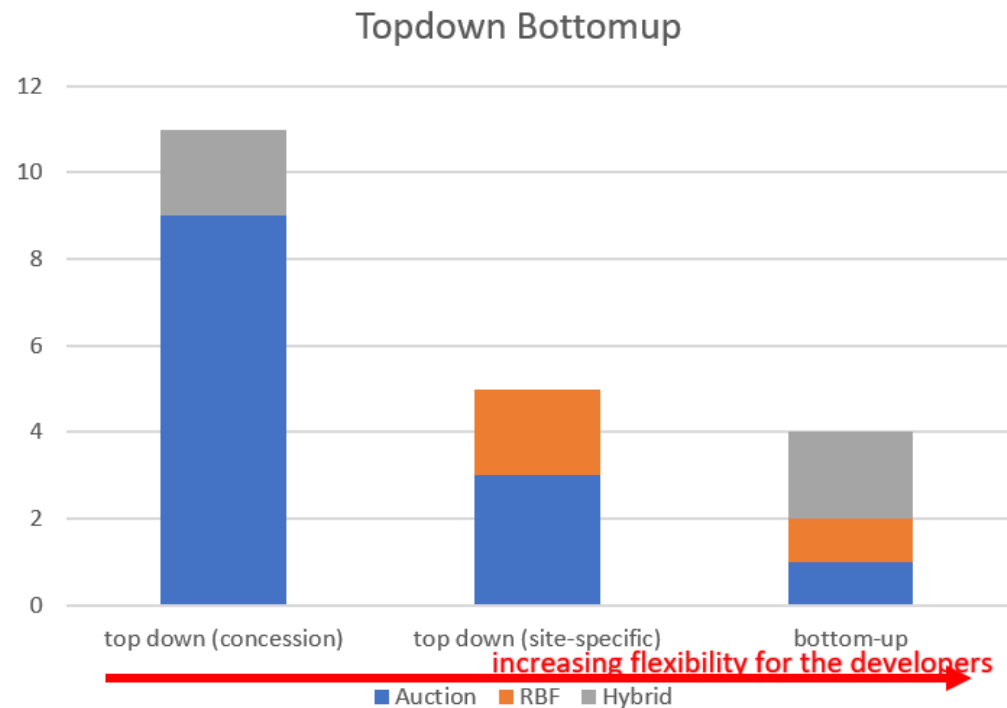
Deliverables – stats and graphs



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Hybrid case summaries

- Overall it's hard to draw conclusion on whether RBF or Auction is better, since most projects are under early development
- Project design of hybrid cases can produce useful lessons
 - Zambia-BGFZ
 - Togo-Rural electrification project
 - Niger - Niger Solar Electricity Access Project

Country	Program Name	Auction vs R	Competitive vs I	Agreement-based vs out	Start D.	End D.	Funding Body (WB)	Program Des	Component	Component Cos	Expected Connect	Component Cost/Connect	Quoted Subsidy	Why was the approach selected?	Did this program work? Why, why not?	Lessons learned from the
DRC	AfDB-GCF Green Mini-Grid	Auction	competitive	agreement-based	2018		AfDB	"The sponsors for NA		40000000	23300	\$1,716.74		"Long-term and concessional financing provided by the Bank and the GCF will enhance the commercial viability of the project. For rural health centres, government does not have the money to quickly build mini-grids. In the past, electricity challenges can be summed up as a lack of assistance for planning, if the same time and regard is subject to a high level of competition, RBF may work best if a mini-grid is established or if these barriers are addressed.		
Sierra Leone	Rural Renewable Electricity	Auction	non-competitive	agreement-based?	2016	2021	DFID	"3. The program	Component 2	28638282	71428.571	\$401.00				
Kenya	EnDev GMG Kenya	RBF	non-competitive	output-based	2014	2019	GIZ	RBF		€22515000 (for the value of the project)		#VALUE!		The RBF project for mini-grid support While a slow start was primarily due to difficulties for the private sector.		
Tanzania	TEDAP	RBF	non-competitive	both	2007	2017	WB	performance based		8140000	144.622	56,28465932	\$500.00	There are structural weaknesses in the mini-grid sector. The projects at Andoya, Ikondo-Matembeu, TEDAP generated a set of best practices to address this barrier. The program's success is due to the support of the Government of Tanzania, which established a clear regulatory framework for the sector. Seven SPPs benefited from the Green Growth Fund (GGF) established a clear regulatory framework for the sector.		
Tanzania	NREP	RBF	non-competitive	output-based?	2016	2022	WB	RBF		176000000	107635	\$1,635.16		"The performance grants provided under TEDAP proved useful in assisting the SPPs build their own networks. The performance grants provided under TEDAP proved useful in assisting the SPPs build their own networks.		
Rwanda	Hybrid mini-grid in Gatsi	RBF	non-competitive	output-based	2018	2024	EnDev Rwanda, GIZ	RBF			500	0		EnDev's RBF project in Rwanda had to deal with several challenges. Eventually both challenges were addressed.		
Zambia	BGFZ	Hybrid	competitive	output-based?		2021	SIDA, Power Africa, REE	grant is per connection		22000000	167000			The core of the BGFZ approach is a combination of a public-private partnership (PPP) and a public utility company (PUC). In the year prior to contracting with BGFZ, When a funding window is open, the PUC will invite private developers to bid for the project.		Rather than a distinct physical asset, the BGFZ approach is a combination of a public-private partnership (PPP) and a public utility company (PUC).
Kenya	KOSAP	Auction	competitive	agreement-based: PPP	2017	2023	WB	PPP		4000000		\$1,148		The justification for choosing PPP model is that the total capital costs for 120 sites is estimated to be US\$48 million. Risk: the total capital costs for 120 sites is estimated to be US\$48 million.		
Nigeria	Nigeria Electrification Program	Auction	competitive	agreement-based	2018	2023	WB	Auction		70000000	110000	\$636.00		This Component aims to catalyze mini-grid deployment at scale and kick-start the development of large international companies. Given the substantial number of sites and preliminary market analysis, this tender is expected to attract a large number of bidders.		
Nigeria	Nigeria Electrification Program	RBF	non-competitive	output-based: connection	2018	2023	WB	RBF		80000000	230000	\$348.00	\$350.00	The NES has approximated about US\$2.5 billion incremental investment needs to reach universal electrification. In the bottom-up approach, spontaneous AMADER, with help from the World Bank, Mali's success with bottom-up approach.		
Mali	PCASER	auction?	competitive	agreement-based	2004	2015	AMADER	subsidy is given to private sector		5000000	78000			In the bottom-up approach, spontaneous AMADER, with help from the World Bank, Mali's success with bottom-up approach.		
Togo	Rural electrification project	Hybrid	competitive	pilot auction-agreement based: PBF subsidies-output based?	2019	2030	AfDB	Tender & RBF		44728432	55000	\$813.24		To achieve universal access, Togo re-organized the 'Minigrad Pilot Auction' (PPP) associated with the private sector owns equipment and infrastructure.		
Mozambique	Renewable Energy for Rural Electrification	Auction	competitive	agreement-based	2018	2023	WB, Funae, Enabel	Tender PPP		10000000	4000	\$2,500.00		This arrangement will enhance private participation in rural electrification. FUNAE will be responsible for the implementation of the project. In order to increase the attractiveness of the project, FUNAE will be responsible for the implementation of the project.		
Niger	Niger Solar Electricity Auction	Hybrid	competitive	output based	2017	2024	WB	"Component 2 will be implemented in Component 2: Rural Electrification		10000000	6000	\$1,866.67		"Subsidies will be distributed to private companies. Solar companies will sell and service individual solar systems and will be part of the project. A careful approach is needed to ensure the success of the project.		

Thank you!