Building better policy & finance through data.

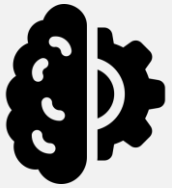
AMDA: Who we are

We are a Trade Association that acts as the voice for Mini-Grids & Decentralized Utility Companies in Africa:

29 members across 6 countries
(estimated 65% of active developers in Africa)

Minigrid Companies that develop and operate minigrids

Service Level uptime of more than 20 hours a day



INDUSTRY INTELLIGENCE

Provide a platform that enables transparency in industry performance through comprehensive market data and analytics in order to establish, evaluate and promote key financial, business and policy solutions to overcoming the major barriers to growth for the sector

ADVOCACY

Collaborating with industry, policy-makers, government authorities, donors, and other stakeholders to advocate for optimal policies and efficient capital deployment that will benefit the mini-grid sector and the people it serves

COORDINATION

Serving as the voice of the mini-grid development industry in Africa to promote the growth and sustainable development of the mini-grid sector and act as a unified focal point for stakeholders to engage the sector

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Why Mini-grids in Africa

Mini-grids = *more connection impact per investment dollar with Rapidly declining costs*

$938 per connection

Estimated Costs for 2018, including generation costs

6 Weeks

Minigrids can be deployed in as little as 6 weeks

Solar PV Mini-grids

Can be deployed anywhere in the country and are not limited to particular geographic locations

19% APEX

reduction between 2017 & 2018

97.8%

Reliability and customer service for end-users Current Service Level

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Why Mini-grids in Africa

Mini-grids = *more connection impact per investment dollar with Rapidly declining costs*

Goal #7

Ensure access to affordable, reliable, sustainable and modern energy for all.

144 Countries

have electrification rates above 75% - only 7 of these are in SSA

100 Million and 300 Million

Between 100 million and 300 million are best electrified using mini-grids (IEA, UNDESA and Cross Boundary)

573 Million people in SSA

The global electrification rate is an impressive 89% but still 573 million people in SSA do not have access.

30 Countries

have electrification rates below 50% - all but 2 are in SSA

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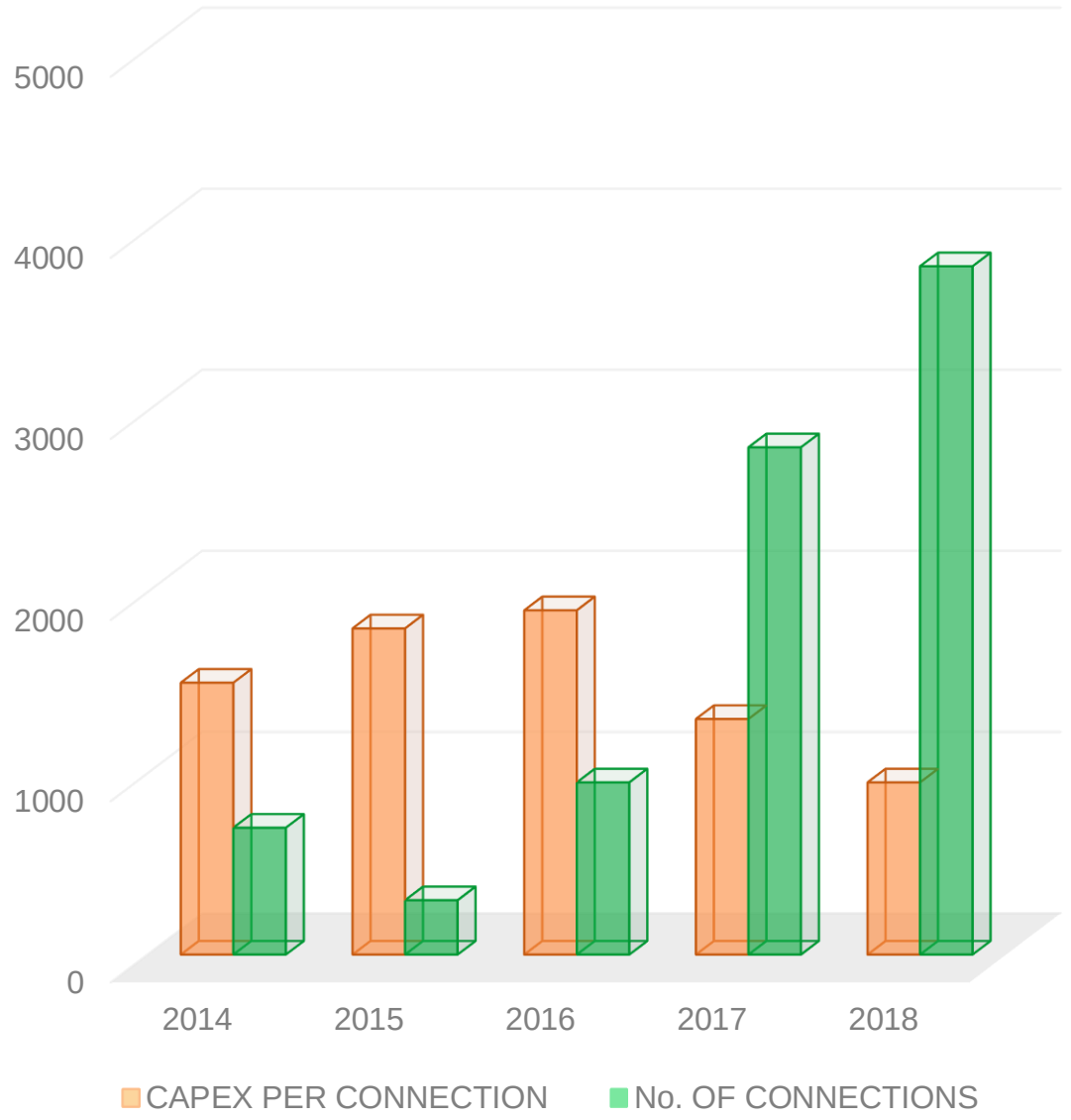
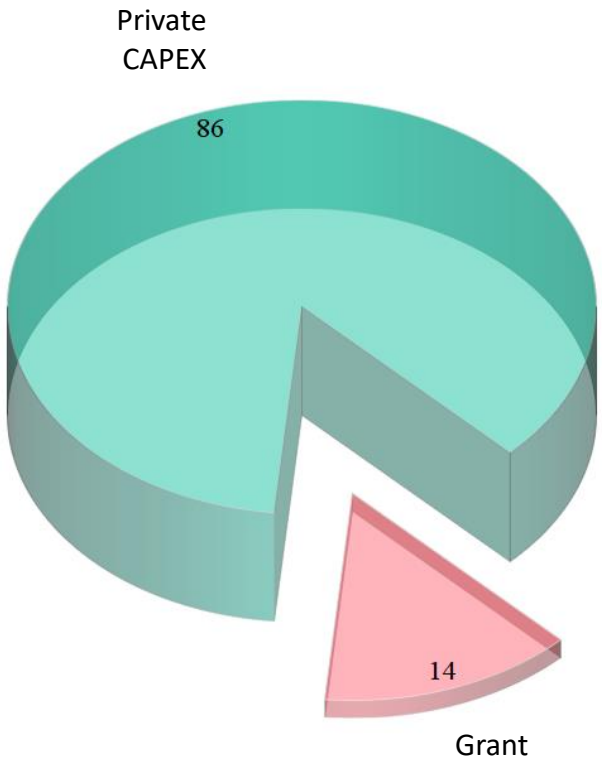
Declining cost with scale

Significant cost reduction as numbers of connections increase

- 2017: $1,163/connection
- 2018: $938/connection
- 2020 (estimated): $600 to $700/connection





Initial AMDA Data insights – Sector Funding

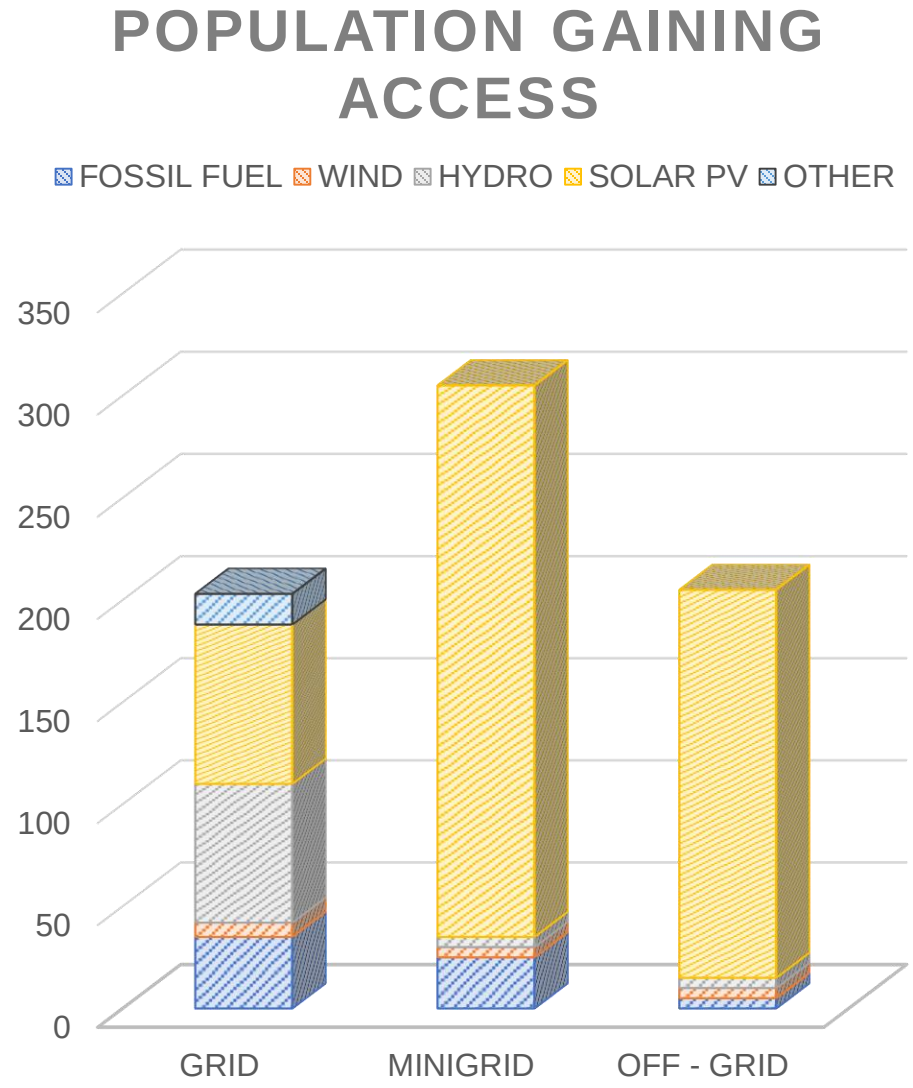
Mini-grids = *more connection impact per investment dollar with Rapidly declining costs*

- Estimated Costs for 2018 are $938 per connection including generation costs
- 19% CAPEX reduction between 2017 & 2018
- Reliability and customer service for end-users Current Service Level is 97.8%
- Mini-grids can be deployed in as little as 6 weeks
- Solar PV MiniGrids can be deployed anywhere in the country and are not limited to particular geographic locations

Mini-grids Potential

IEA says that with supportive policy and finance, mini-grids can serve 450 million people

Mini-grids and other decentralized renewables are most affordable option for 75% of the un-electrified



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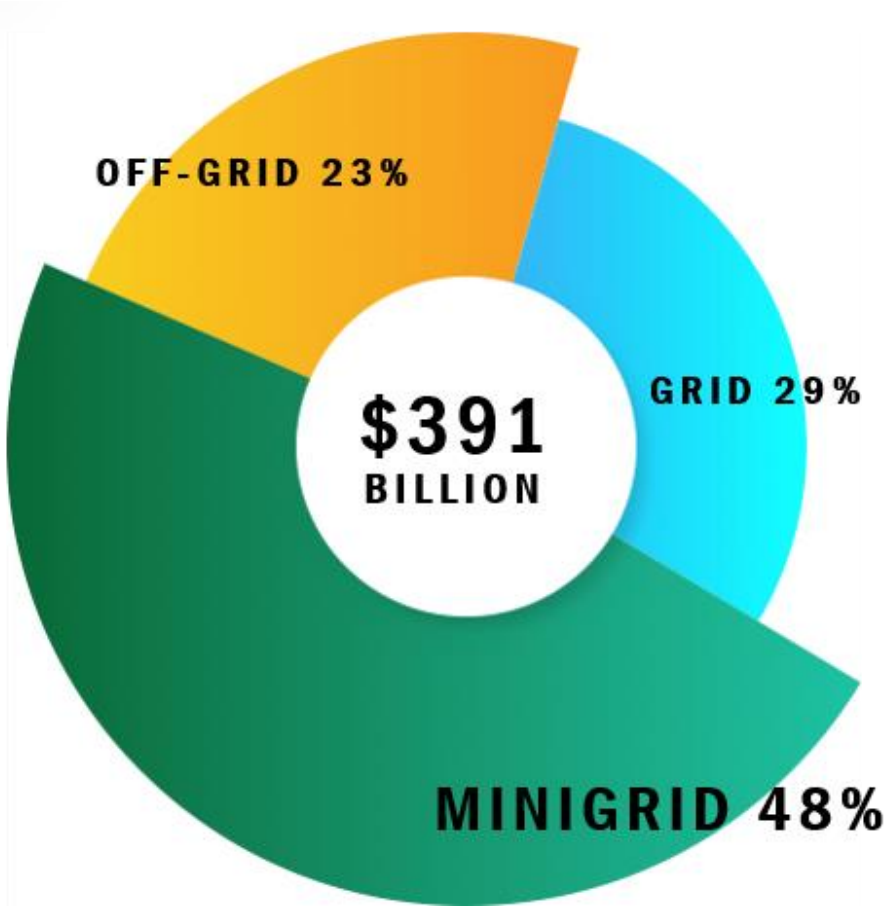
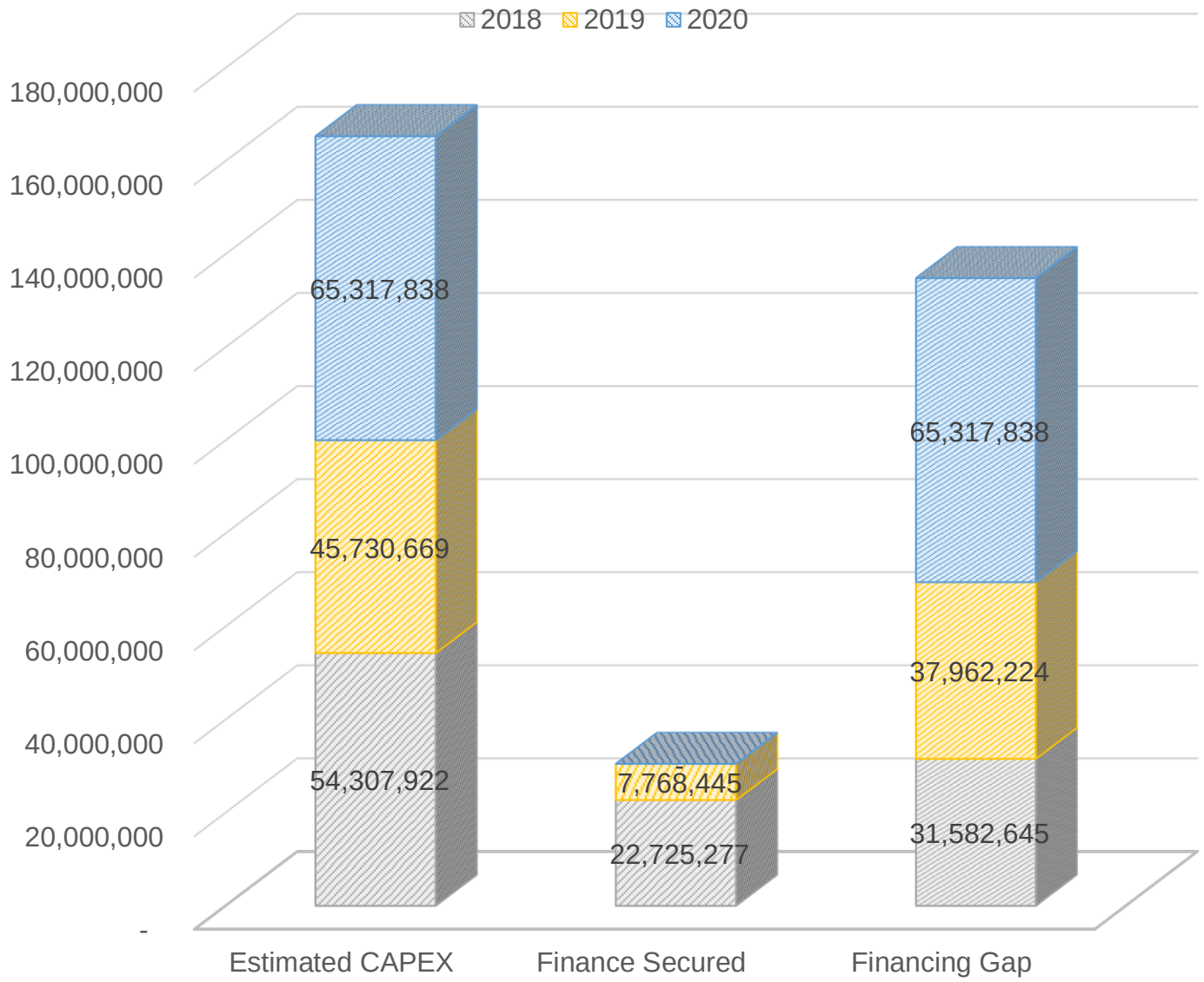


Financing Gap (TZ & Kenya)



Initial AMDA data insights – Kenya pipeline

133

MGs being actively built out 2019-2020

370

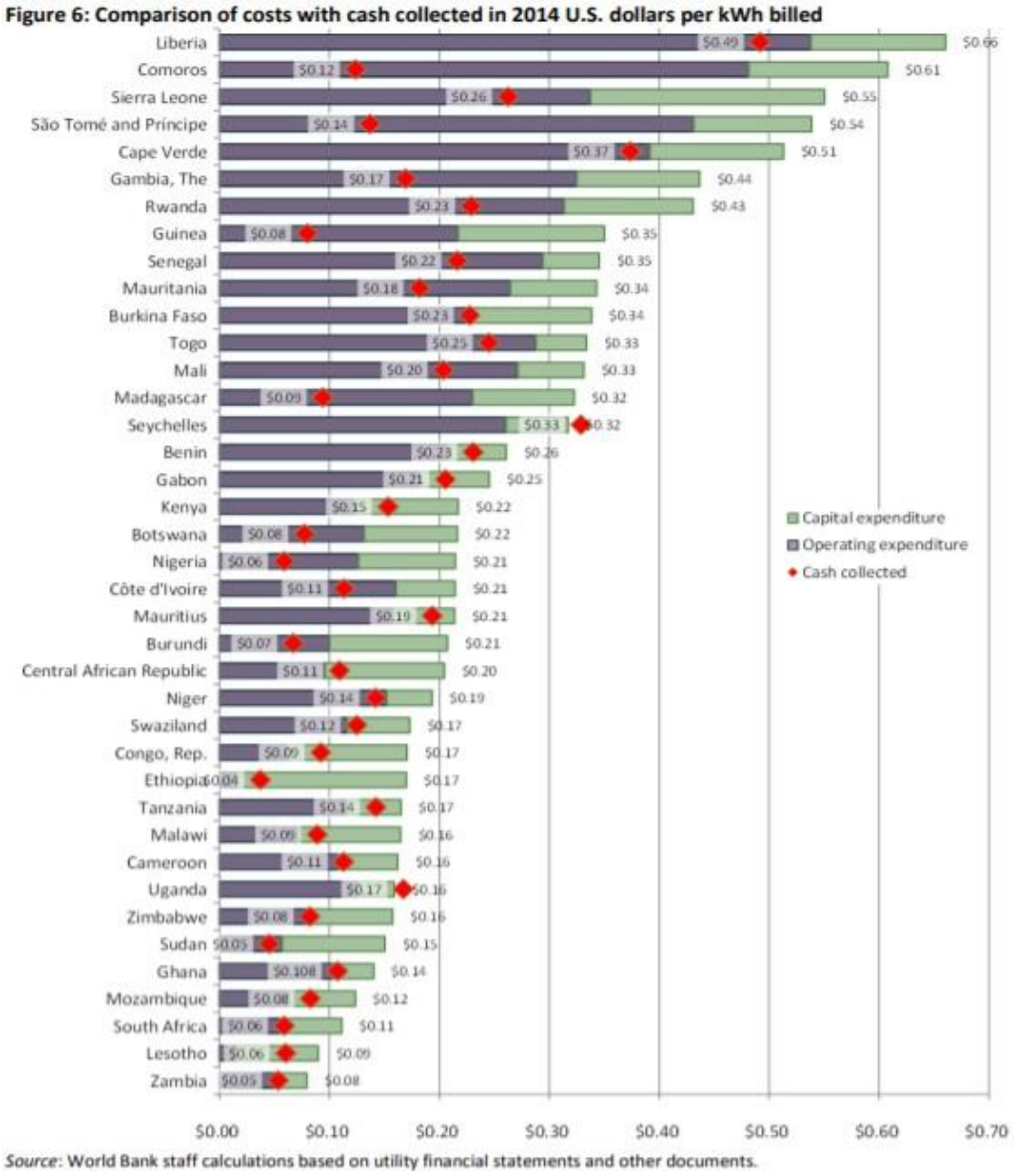
Sites identified as viable with GIS and site visits

54,396

Connections through visible pipeline

2,850

Additional sites identified as likely viable through GIS



Existing Utility Companies

- Only 2 of 39 Utilities in Africa are solvent
- They are massively subsidies and still can't provide quality service
- Riddled with Poor Management and inefficiencies
- Grid extension costs for communities more than 10km from the grid cost between 1500-$26,000 a connection

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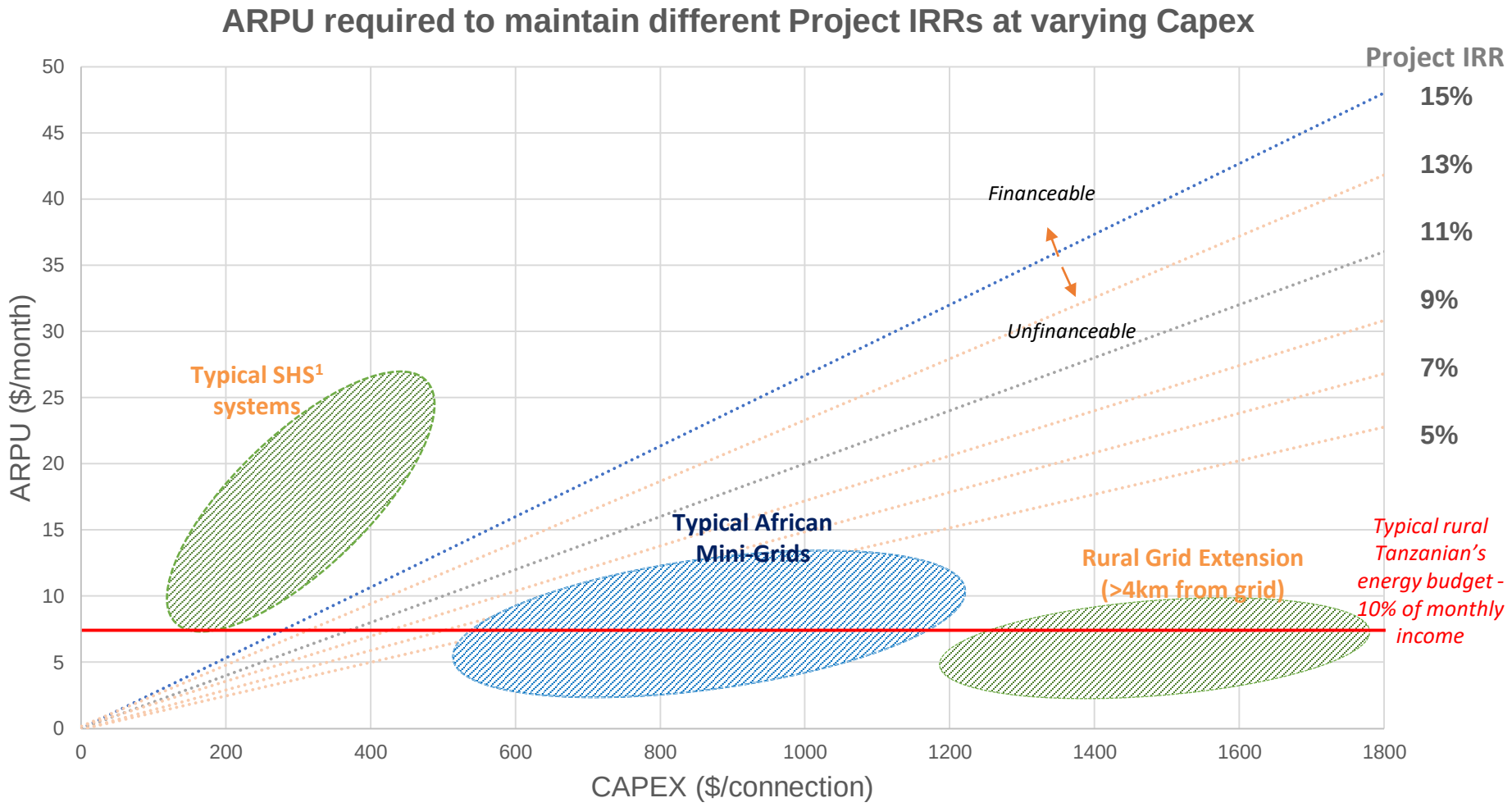


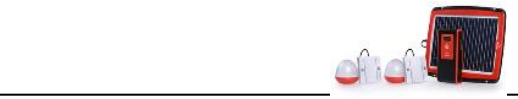
Need for subsidy: Most rural customers cannot afford SHS1, and mini-grids and main grid extensions are unfinanceable without government support

Although commercially viable, SHS1 are too expensive for most rural consumers' energy budget. Main grid rural extensions and mini-grids require subsidy.

Sources: World Bank, McKinsey Power Africa Report , Tanzania Rural Energy Authority, Tanzania Rural Electrification Expansion Program. Note: 1. ESMAP Tier 2 SHS providing General lighting and Phone Charging and Television Chart developers by Cross Boundary

Policy Implications

- Currently there are 2 parallel funding streams for rural electrification that are not speaking to each other
- Governments have no mechanism to compare how their policies impact pricing and spread of deployment
- Benchmarking costs for MG’s is a first step to creating comparative analytics between traditional utilities and new decentralized utility companies

	SHS	Micro-grids	National Utility
			Kenya Power PHCN
Electricity Delivered	DC	AC	AC
Capex / Connection	$100 – 400	$700 – 1,200	$2,000 – 5,000
Installation Time	✓	✓	✗
Reliability	✓	✓	✗
Service Level	✗ Only Low-Power DC Devices	✓ Grid-equivalent power	✓ Grid-equivalent power
Energy Cost	✗ >$4.00 per kWh	✓ $0.20-$2.00 per kWh	✓ $0.15-$0.50 per kWh
Main Grid Integration	✗ Not Possible	✓	N/A
Convergent with Global Future Power System	✗ No clear path to convergence with global system	✓ Micro-grids are building blocks of future grid	✗ Grid of the 20th century, not 21st

Least Cost Option for Electrification

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What MG Developers in Africa Are Being Asked to DO

Deliver better than utility quality Power Infrastructure :

AMDA Members provide 97% service uptime (there is no good way to compare to utilities as they do not provide information on service level for rural consumers)

Build Generation and Distribution system that are compatible with the national utility for less than Utilities:

Average MG cost in East Africa was 938$ per connection in 2018 – KPLC is > 1500 TANESCO is > 2500

Build Infrastructure with limited & unreliable concessional money:

Between 2014 – May 2018 14% of minigrid costs were paid for with concessional funds. 86% was equity

Show Commercial returns in 5-7 years:

While competing with subsidies utility companies and virtually NO access to debt

Fix Rural Economies:

Minigrid developers are also now being tasked and evaluated on the basis of education performance/ Health Performance as well as improved economic outcomes

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AMDA Data for: Policy Makers

	Private sector as Contractor (Senegal)	Private sector as Owner (Nigeria)
Approach	• Public ownership of generation and distribution to retain energy as a publicly provided service. • Government dictates mini-grid location • Government determines price	• Private ownership to maximize speed and efficiency of rural electrification. • Mini-grid firm **(decentralized utility)** bids on concessions • Decentralized utilities negotiate price w/ communities
Role of mini-grid (companies)	• Mini-grids are a tool of the government to reach underserved areas. • Mini-grid companies are government service providers, and do not own the mini-grids.	• Decentralized utilities reduce rural burden for governments so they can focus on improving “big” grid. • Decentralized utilities are private sector owners and operators of grids they build.
Advantages	• Easy access to finance for grids (government backed) • Potentially easier to cross subsidize rural connections	• High incentive to improve demand / rural economies • High incentive for good quality energy service • High incentive for good customer service • High incentive to improve efficiency / reduce costs • High incentive to bring external investment • High incentive to expand and create jobs
Disadvantages	• Little incentive to improve demand / rural economies • Little incentive to improve quality • Little incentive for good customer service • Little options for communities left behind • Little incentive to increase efficiency / reduce subsidy • Little incentive to bring external investment • Little incentive to expand and create jobs	• Difficult for companies to access finance (new sector) without support • Pricing can be political – but mostly happens only when politicians make it political – not a community issue.

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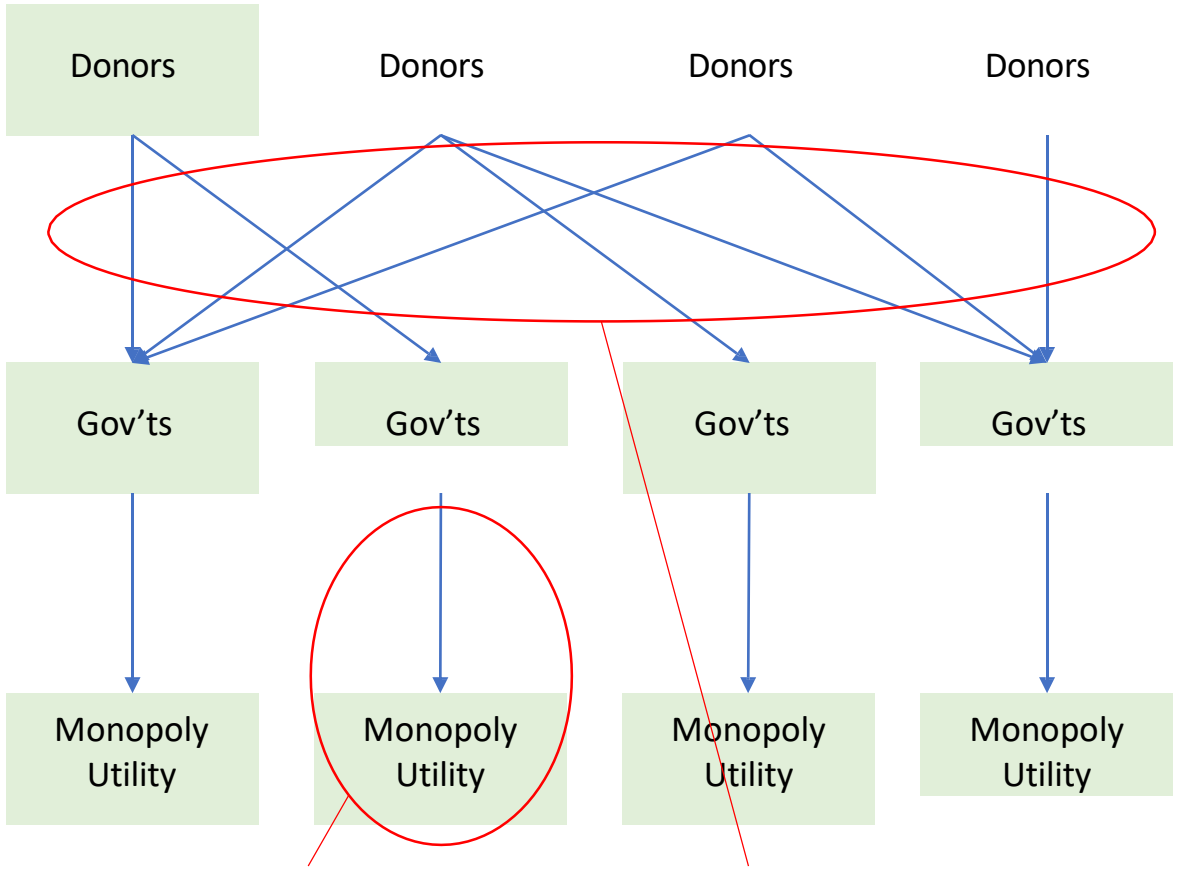
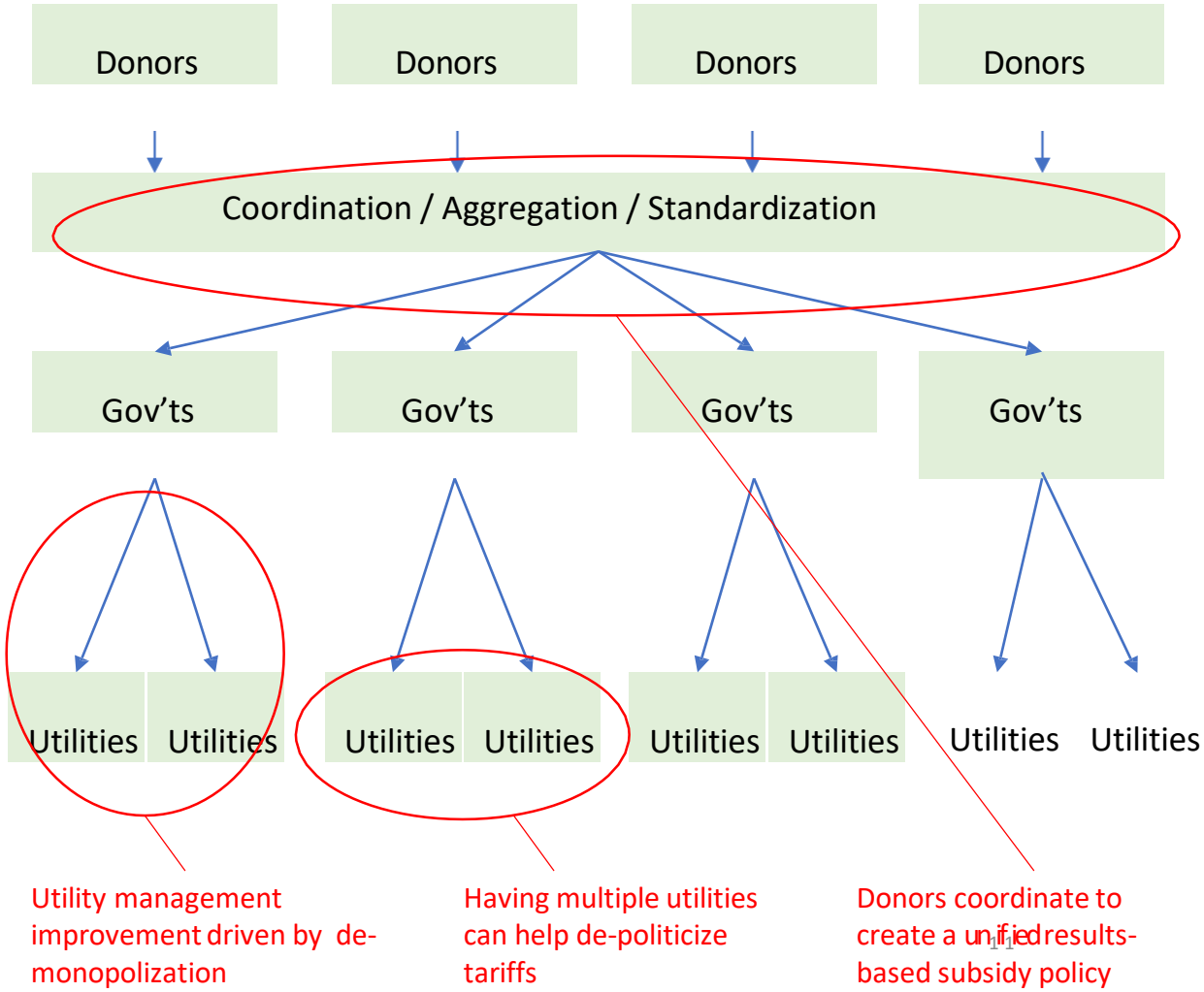
Ecosystem schematic of both Philosophies in action

1. Institution-Driven (now)



2. Market-Driven (goal)



How do we Create a Market-Driven Solution to the problem?

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Basic Policy Reform

- Lightweight mini-grid permitting process
- Tariff liberalization (cost reflective)
- Multi-utility integration framework

Market-Driven Incentives

- SMART RBF (unified among donors)
- Urban/Rural Cross Subsidies

Healthy Utilities

- Management Capacity
- Scale
- Customer Centric (demand stimulation, payments)
- Ability to Utilize: Grid Extensions, Mini-Grids, SHS

Global pan-African RBF concept

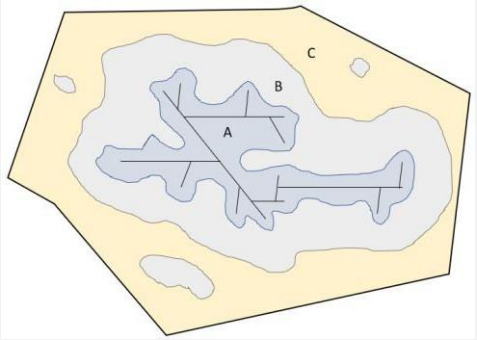
Decisions on electrification are done on a least cost, best service level basis

Project Financiers

Global donors fund the Global RBF Facility with **$50b over 15 years.**

$50B →

Funds **available in all countries** who are willing to enact basic reforms and sector liberalization



Funds available to both **private** and **public** utilities deploying grid extensions, mini-grids, and SHS, according to a simple 3- zone plan agreed upon by Apollo and host government.

$$$ →

	Grid Extensions	Mini Grids	Solar Home Systems
Public	✓	✓	✓
Private	✓	✓	✓

Utilities **deploy assets with private finance, and receive a rebate from the Global RBF** facility after validation that they are built to standard.

$$$ ↓

100m connection, future grid, diversified energy economies

Research Priorities

Topic	Content	AMDA Role
Sector Benchmarking	An analysis of aggregated site-level data from hundreds of AMDA member sites. This will include trends on cost reduction, OPEX reduction, revenue and consumption trends. Analysis of this data will be undertaken to draw lessons for: minigrid developers; national utilities; policymakers & regulators; and financiers.	Data provision Design advisory Co-authoring Dissemination
Grid vs Minigrid Economics	Using AMDA and African national utility data, CAPEX costs and performance of each will be compared to explore how to better build off their respective strengths and address weaknesses. This will include analysis of implicit national utility CAPEX subsidization	Design advisory Data provision Peer review Dissemination
Subsidy Analysis	An analysis of OPEX subsidies and cross-subsidization received by national utilities. The objective is to explore what cost reflective national tariffs would be, but also what minigrid tariffs would be if they received OPEX subsidies similar to national utilities.	Design Advisory Peer Review Dissemination
Growing the Load	Using load data from our developers as well as that of select national utilities, we will take a deep dive into trends in load growth. This will entail working with NGOs and others focused on community empowerment, rural economy development, and microfinance, to establish best practices and further research needs in this space.	Design advisory Co-analysis Dissemination
State of the market	The Minigrids Partnership, co-hosted by the UN Foundation and ARE will be developing a global State of the Market report for the minigrids sector which we will co-steering.	Design advisory Co-analysis Dissemination

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You