ENERGY POVERTY: Options for Nigeria

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Nigeria: Factsheet

Socio-Economic Factsheet	
Population (million) (2019)	206
Population growth (%)	3.25
Share of rural population (%)	49.7
GDP (US$'bill) (2019)	448.1
GDP per capita (US$)	2,229.86
HDI (2018)	157 of 188
Poverty rate (%)	53
Unemployment rate (%)	25.4
Life expectancy at birth (years)	55
Adult Literacy rate (%)	62.7

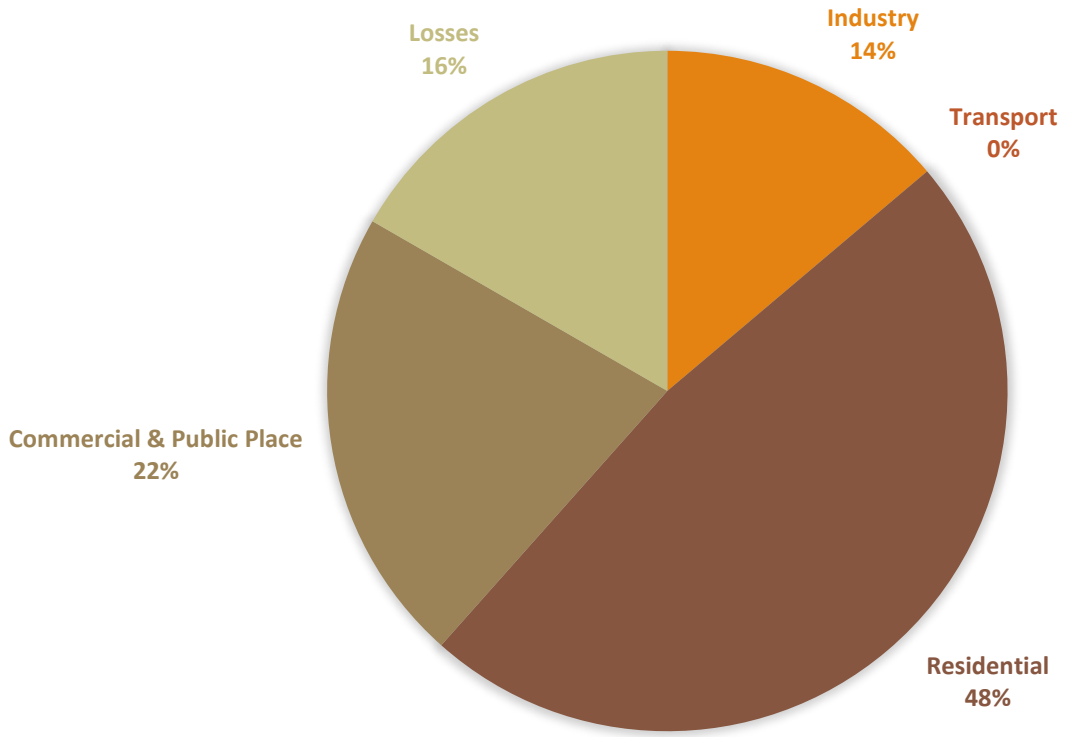
Nigeria Factsheet 2

Electricity Factsheet	Amount
Access to electricity (% of population)	60%
Urban access to electricity	86%
Rural access to electricity	41%
Fossil fuel (share of energy consumption)	18.88
Installed capacity (MW)	12,500
Operational Capacity (MW) Hydro 15% Fossil fuel 85%	4,600
Electricity Consumption per capita (kWh)	150
Captive generation (GW)	14-20
Share of daily gas produced allocated to electricity generation (%)	9

Energy Endowments

	Energy Resources	Estimated Reserves
1	Crude Oil	37 billion barrels
2	Natural Gas	187TCF
3	Large Hydropower	11200MW
4	Small Hydropower	3,500MW
5	Fuelwood	11 million hectares of forest &woodland
6	Solar Radiation	3.5-7.0 kWh/m^2/day
7	Wind	2.4m/s 11m^2 heights

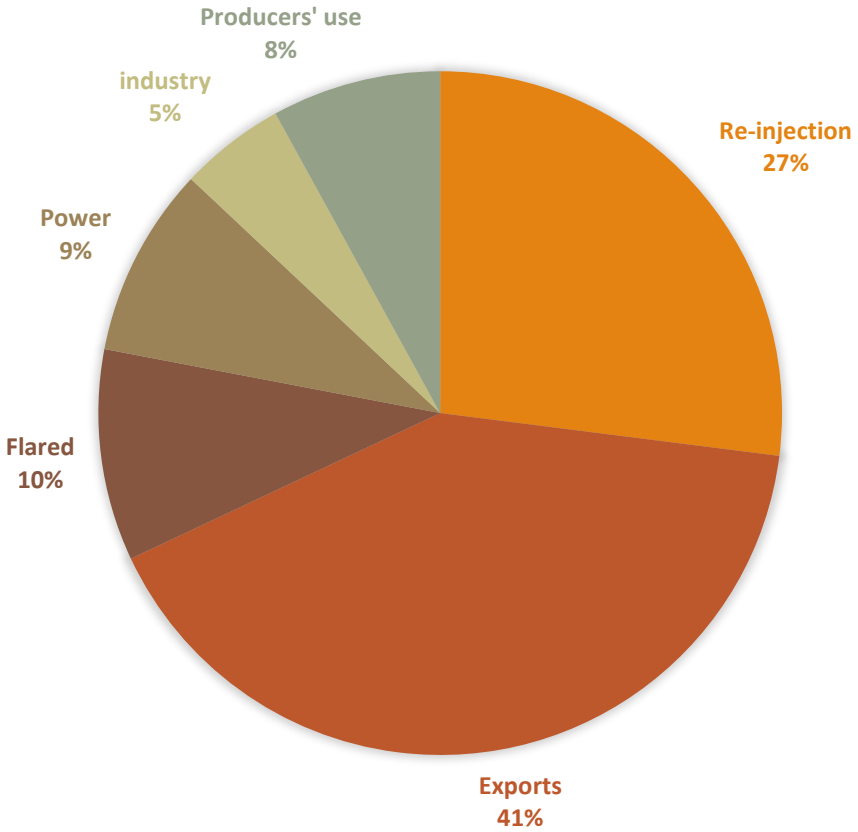
Electricity Consumption in Nigeria (2014)

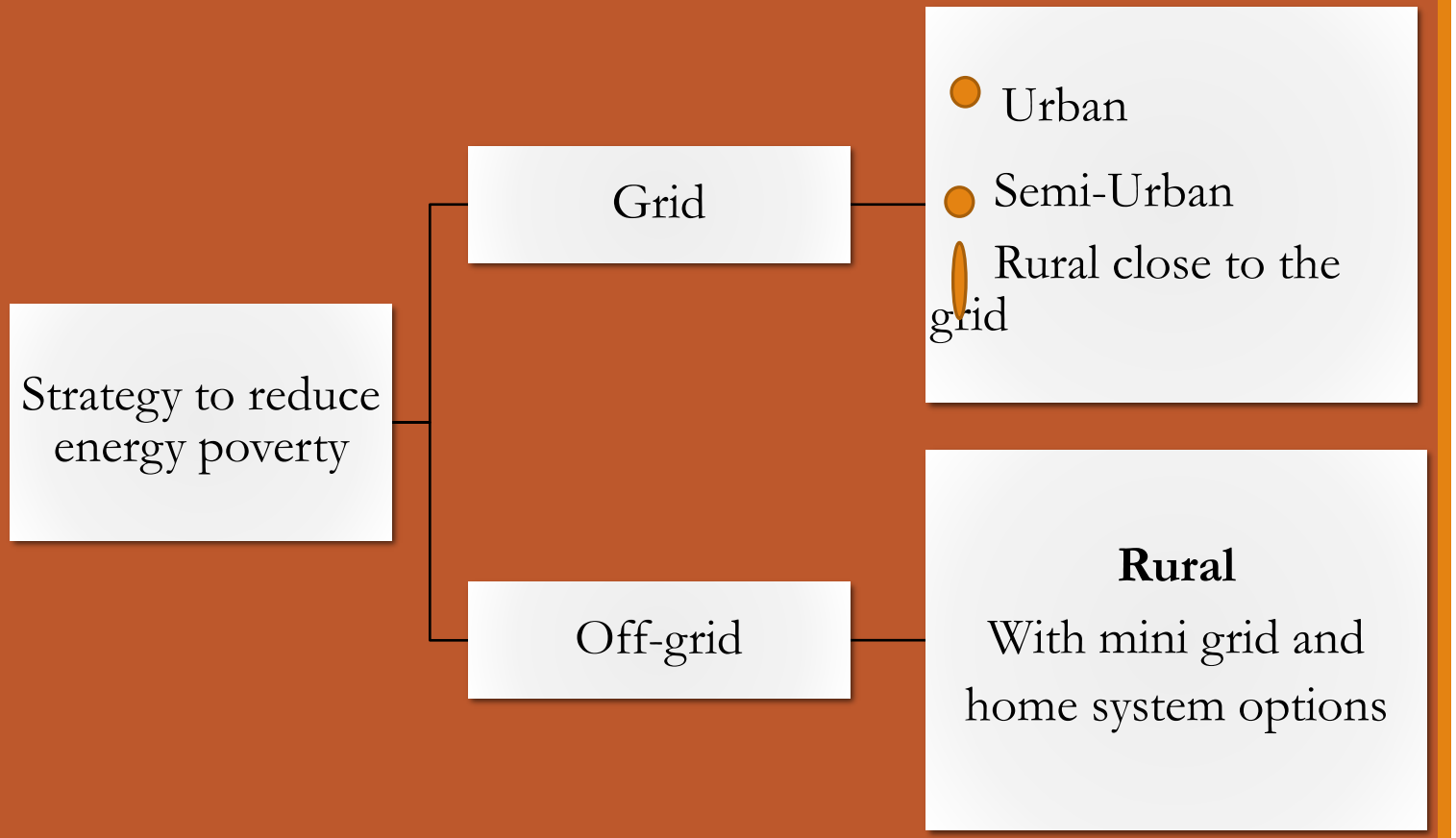


Weekly Average Frequency and Duration of Outages for 2013 and 2014 (Adenikinju, 2015)

Geo Political zone	Weekly Frequency of outages 2013	Weekly Duration of outages 2013	Weekly Frequency of outages 2014	Weekly Duration of outages 2014
North Central	27.53	14.0	28.08	14.5
North West	45.57	23.2	48.7	25.1
South East	42.38	21.6	37.37	19.3
South West	45.94	23.4	43.54	22.5
South South	34.81	17.7	36.06	18.6
Average	39.25	19.98	38.75	20.00

Gas Utilisation in Nigeria apprx 5.2bscf/day production





Key Determinants

- Energy resource endowments
- National Agenda
- Cost effectiveness and affordability
- Funding options
- Regulatory environment

Energy Access is key to energy poverty reduction…

Mini-grid has a number of benefits:

1. Least cost option for extending electricity into areas that outside existing coverage
2. Scalable and energy investments costs per installations much lower

Cost of extending electricity access in Nigeria (Sanusi, 2013)

	Grid	Mini-Grid
Average connection cost per household ($)	899	775
Recurrent costs per household per year ($)	318	316
Levelised cost per $/kWh (2013)	0.30	0.47
Current average tariff rate $/kWh (2020)	0.09	0.32 - 0.39

No free lunch: Funding options

- World Bank estimates $10billion will be needed to fund mini-grids between now and 2030

- Options include:
  - Direct public funding (federal and state governments have ongoing direct funded projects)
  - Indirect public funding (funds that can be competitively bidded for)
    - Performance based grant
    - Minimum subsidy tender
  - Capital subsidy and tax/tariff incentives for private producers (over the world rural energy access always require some forms of government subsidy
    - ($500 per installation has been recommended)
    - Tax exemptions on some clean energy
  - Tax on generator imports (green energy or carbon tax)
  - Private capital (equity, bond markets, crowdfunding, government guarantees)
  - Multilateral agencies/ donors (technical, access to database, grants) World Bank/AfDB $550million
  - Cross subsidy
  - Tariff payments (rural customers willing to pay higher rate as costs of alternatives are higher)

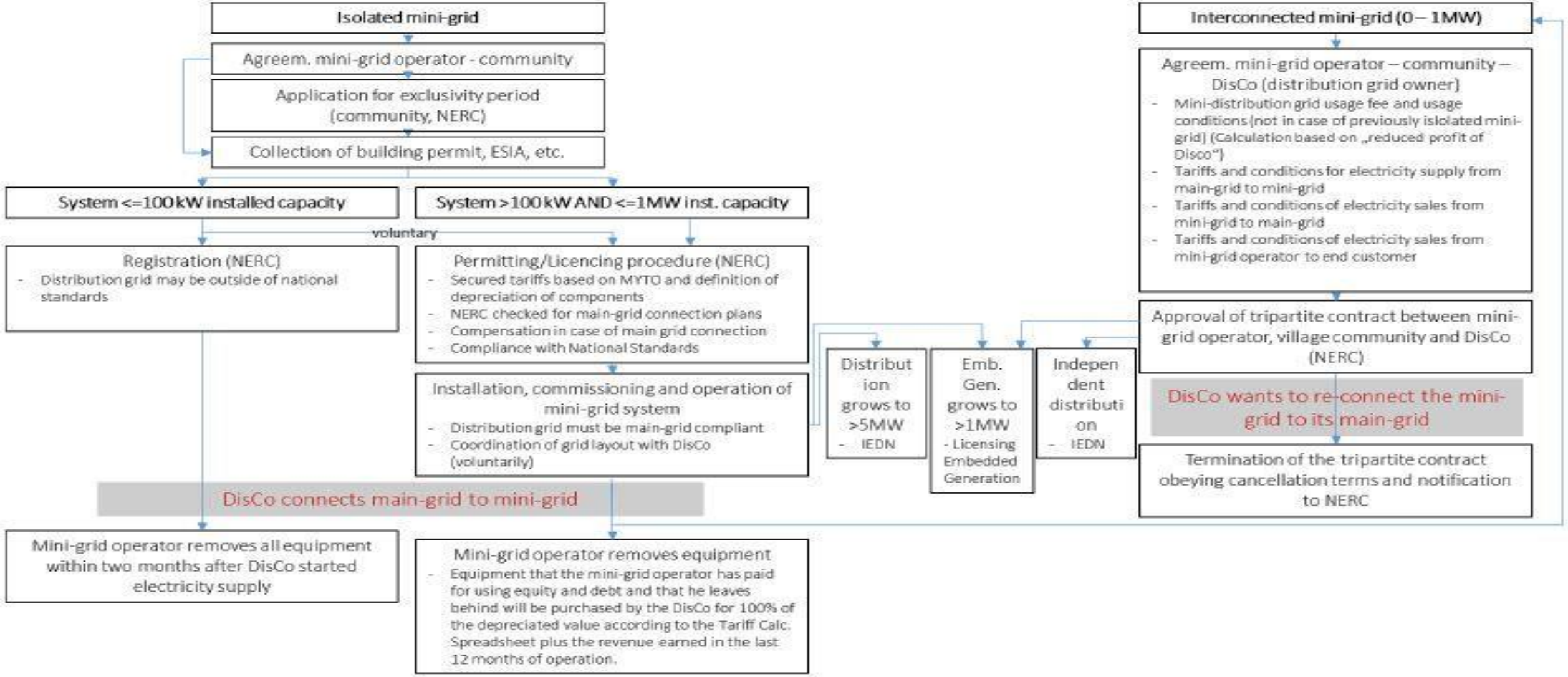
Mini-grid: The Nigerian situation

- Significant growth: 11 projects in 2015 to 59 projects in 2019 (target of 10,000 minigrids 2023)
- Drivers of growth
  - Size of growth opportunities (many viable rural communities)
  - Robust regulatory environment (Mini-grid regulation introduced by NERC in 2017 supported isolated and grid connected mini-grids between 100kW and 1MW in size.
  - Dynamic private companies under some forms of PPP and allowed to set their own tariffs (negotiated with communities and approved by the NERC
  - Regulators:
    - NERC issues and monitors generation, transmission and distribution licences.
    - The NEMSA is charged with inspections and certification of mini-grids.

Some Private Mini-grids

Location (State, town)	Year	Type	People served	kW	Owner/funding sources
Niger, Rokota	2019	Solar PV Hybrid	3000	64	PowerGen
Ogun, Gbamu Gbamu	2018	Solar PV Hybrid	292 households, 142 businesses	85	Rubitec Solar
Kaduna, Dodan Karji	2017	Solar PV	443	16	ACOB Lighting Technologies
FCT, Rije	2017	Biogas	500	20	Waste-2-Watt / Ajima Farm
Niger, Bisanti	2016	Solar PV	1,600	34	GVE
Edo, Obayantor 1	2016	Solar PV	1,180	38	Arnergy
Rivers, Egbeke	2015	Solar PV	720	9	GVE

Regulatory Framework for Mini-grid



Thank you