



A FUTURE STATE OF A JUST MUNICIPAL ENERGY PROVISION

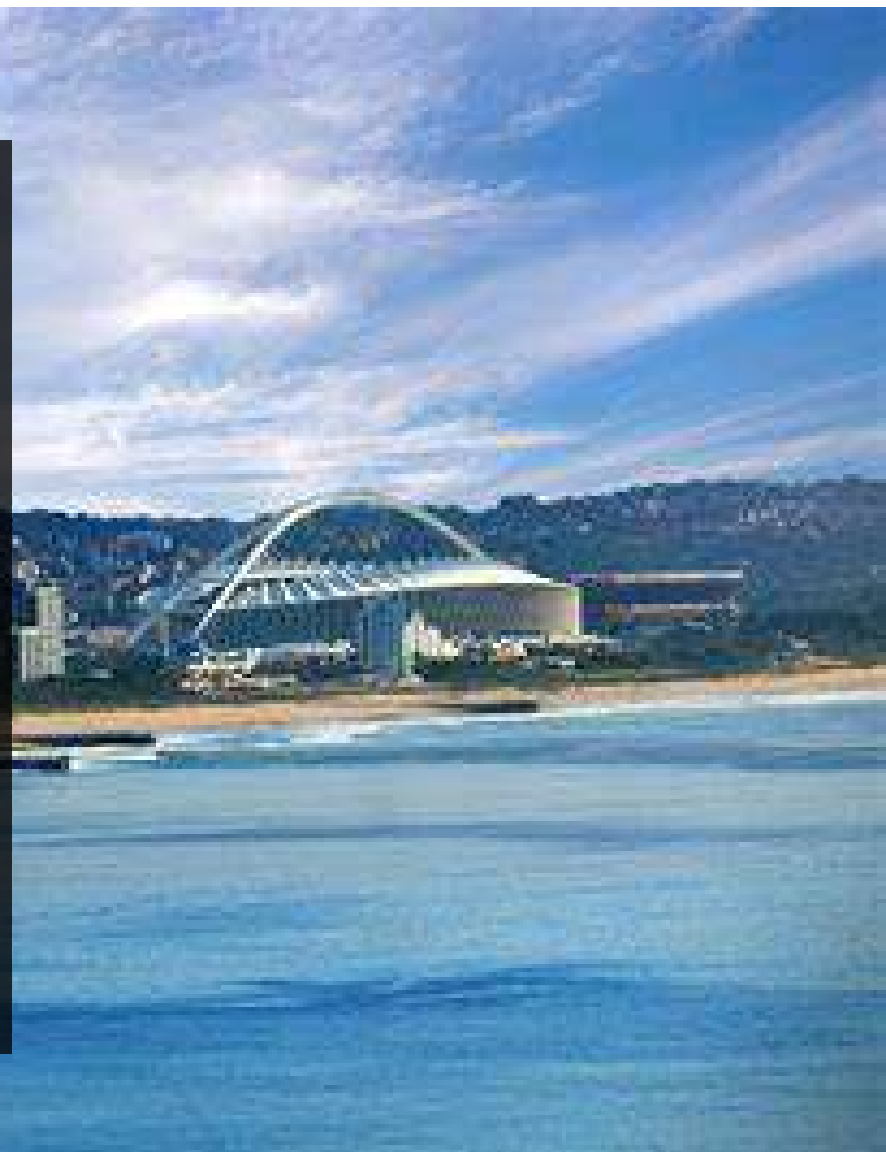
for low income
communities?

KEY ENERGY ACCESS ISSUES

Metropolitan municipalities are home to the highest portion of indigent households in the country:

***18% (627 000) in eThekweni,
13% (474 035) in Tshwane,
6% (213 424) in Cape Town and
5% (178 599) in Johannesburg***

(Stats SA, 2017).





47%

of South Africa's
households are considered
to be energy poor



55.5%

is the number of South
Africans living in poverty
by 2015



R1600 - R3500

threshold income of
indigent households
in SA



poor households largely rely on **unsafe, unhealthy and expensive** fuels such as **candles, paraffin, biomass or coal**

- Access to reliable and affordable of electricity still a challenge
- Poor households spend at least 20% or more of their income on energy costs compared with the 2-3% for wealthier households
- Widespread electricity disconnections in poor areas, due to the non-payment of electricity accounts



THE SOUTH AFRICAN GRID OLD, CURRENT AND THE FUTURE



SUSTAINABLE
ENERGY
AFRICA

The **OLD** electricity grid

GENERATION

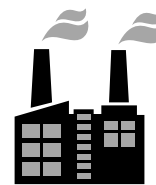
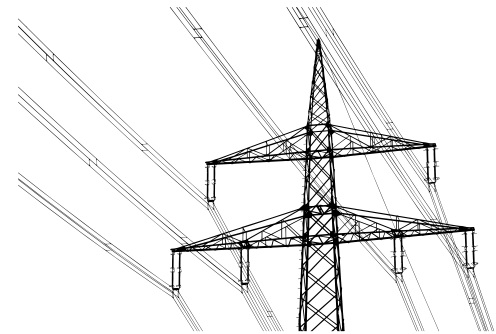
TRANSMISSION

DISTRIBUTION

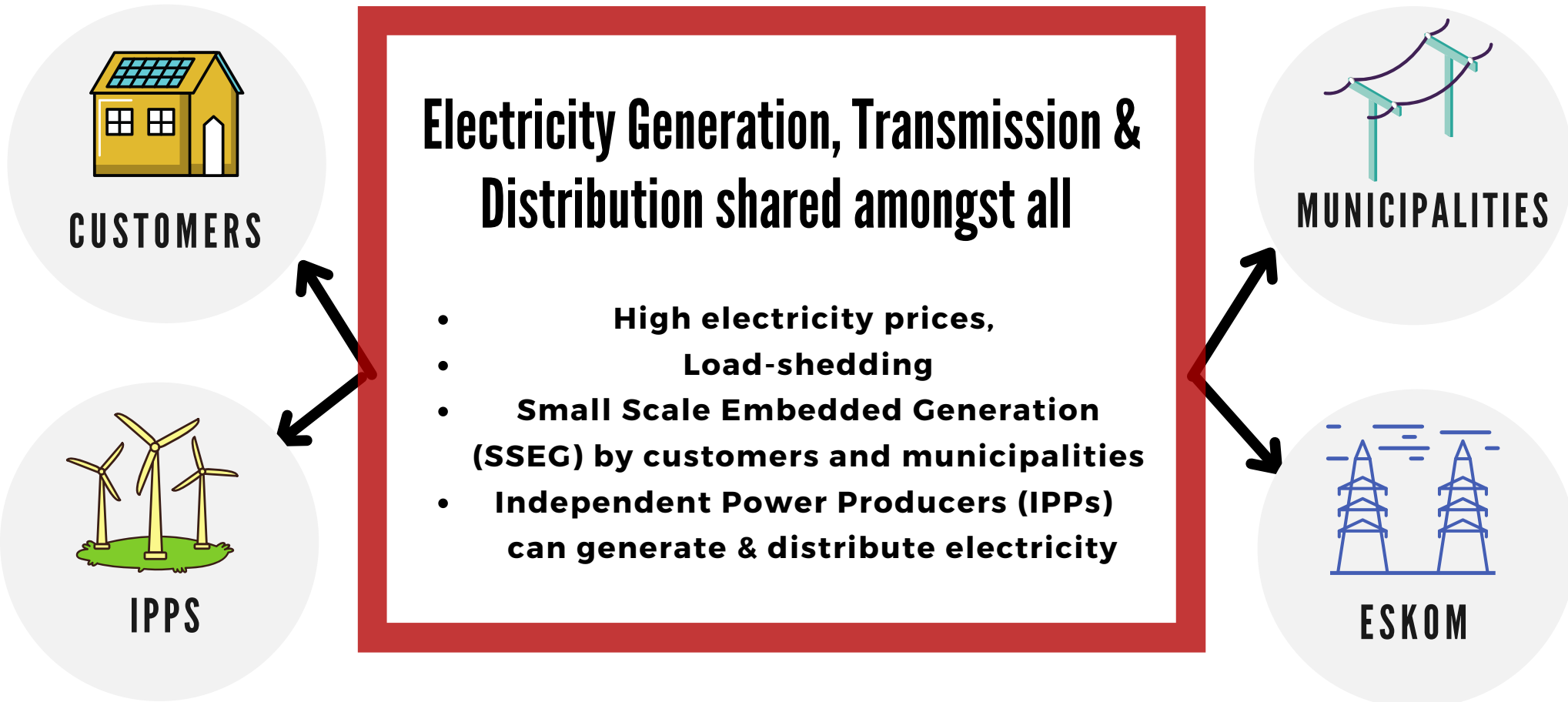
ESKOM MONOPOLY

- **ESKOM Monopoly characterised by centralized power**
- **Based On SUPPLY & DEMAND of bulk electricity by municipalities**
- **Coal based electricity generation**

Municipality buys from ESKOM and sells to all customers



The **CURRENT** electricity grid



A **JUST** electricity grid



HOUSEHOLDS

- Low income households receive Free Basic Energy support
- Cross subsidised by industry and the business sector



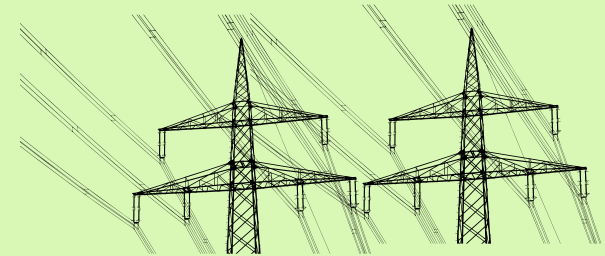
BUSINESSES



INDUSTRIES

*"The **electricity** grid is the fabric that connects all households, businesses and industries and enables cross subsidies from the rich to the poor. "*

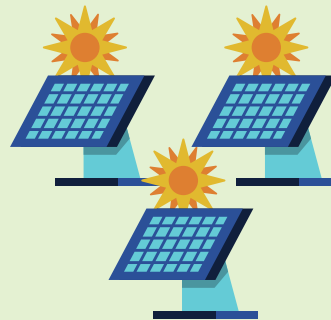
MUNICIPAL ELECTRICITY GRID



Supplies all customer levels and groups with electricity, also enables own energy generation from solar (SSEG). It is also vehicle to achieve a **Just Energy Transition**

Independent Power Producer (IPP) can also sell energy directly to industries (THROUGH **WHEELING**)

SOLAR FARM



Independent Power Producer (IPP) **sells** clean energy to the municipality

WIND FARM

Generate clean sustainable energy from the sun or the wind.

SCALABLE RENEWABLE ENERGY SOLUTIONS FOR COMMUNITIES

a just way forward???



SUSTAINABLE
ENERGY
AFRICA

COMMUNITY-LED ENERGY OWNERSHIP

Can be designed in a range of system options

Solar home systems, grid-tied, solar PV systems or mini-grids.

Should be tailor made according to specific needs and affordability

Costs to develop depend on the type of system to be installed

COMMUNITY ENERGY SYSTEMS

1

SOLAR HOME SYSTEMS



- Off-grid system
- **Energy services:** Basic energy services (lighting, Wi-Fi) while awaiting grid connection.
- **Value:** Allows households to use electric devices in the absence of the grid.
- **Size:** 100 – 500 watts size
- **Cost to install** - around R40 000 per kW and above
- **Cost per household** - about R5 000 – R20 000. More expensive overall compared to the grid
- **Finance:** Homeowners typically rent the systems from the developer for a daily or monthly fee.

COMMUNITY ENERGY SYSTEMS

2

ROOFTOP SOLAR



- Onsite grid-tied system
- **Energy Services:** Grid provides full modern energy services including cooking.
- **Value:** Solar reduces the electricity bill since solar energy is consumed during the day.
- **Size:** 1 – 5 kilowatts size
- **Cost to install** - around R20 000 per kW and above
- **Pay-back:** takes about 13 years to recover the capital cost
- **Finance:** by a bank with monthly repayments or financed by a developer with a power purchase agreement.

COMMUNITY ENERGY SYSTEMS

3



SOLAR FARM (IPP)

- Off-site grid-tied system
- **Energy services:** Grid provides full modern energy services including cooking.
- **Value:** Solar reduces the electricity bill since solar energy is consumed during the day.
- **Size:** 50 kilowatts and upwards
- Cost to install - around R12 000 per kW and above
- **Cost:** R30 000 – R60 000 or R0,70 – R0,90/kWh
- **Pay-back:** takes about 5 years to recover the capital cost
- **Finance:** Facilitated by a developer who will arrange a power purchase agreement to cover the bank's monthly load repayments.

BENEFITS FOR COMMUNITIES

SOLAR HOME
SYSTEMS

ROOFTOP
SOLAR

WHEELING

air quality improvements when replacing paraffin stoves,
heaters & lights

employment opportunity for a few community members.

clean energy use by reducing consumption of coal generated
grid electricity

skills development opportunities to maintain and operate
such systems

possibly **lower electricity costs** for the households in the
community

CHALLENGES FOR COMMUNITY-LED ENERGY OWNERSHIP

individual household systems limit community participation
systems not very well suited for block of flats - difficult to track energy consumption per flat/unit

Need for a Feed-in Tariff to allow households to sell excess power to the municipality

Need a wheeling tariff to allow IPP's to use municipal network to sell energy directly to businesses or household communities

Need a proper governance and legal structure (cooperative/ NGO)
Community Members need technical skills to manage and operate the system

Systems need to be "registered" onto the municipal network

FEASIBILITY FOR COMMUNITY-LED ENERGY OWNERSHIP

Only Possible at Large Scale: due to economies of scale the financial feasibility of large solar farms far outweigh that of rooftop solar PV

Feed- In Tariff not enough : compensation rates, or “export credits”, are insufficient to create a business case for low-income solar PV
- households still need to consume enough power to have their monthly bill credited for these export credits

Rooftop PV requires high consumption : rooftop solar PV generally only makes sense for customers who have a substantial daytime energy demand, which most households do not have.

FEASIBILITY FOR COMMUNITY-LED ENERGY OWNERSHIP

Batteries are still expensive: used to store the energy for consumption in the evening

Capital to install : high initial installation costs for household PV
low business case , therefore low Bank finance options

off- grid systems : off-grid system not feasible for small scale consumption - best only at large IPP scale
not feasible without battery storage
best used as an interim measure

Need Wheeling : households consumption must be high
Best for large systems that can sell energy
to municipality/ households
need wheeling to be in place to sell power directly to households

A JUST MUNICIPAL ENERGY SYSTEM

to make energy access
more inclusive

CRITICAL ROLE OF THE MUNICIPALITY

Municipalities are mandated to develop and support low income communities

Play a critical role in bringing IPPs into the grid :
legal structure, legal support

Have the resources needed to bring energy to communities:
own the grid, have distribution resources

Can absorb the technical and financial risks:
operations and maintenance



MUNICIPALITY AS IPP



WHEELING



**SMALL SCALE EMBEDDED
GENERATION (SSEG)**

**A JUST
MUNICIPAL
ENERGY SYSTEM**

has 4 pillars



CROSS SUBSIDY

MUNICIPALITY AS IPP

1

Municipality installs Rooftop
PV on household roofs ,

2

municipality installs solar on
its own buildings or land

3

municipality generates its own
energy, reduces bulk electricity
costs and sells cheaper
electricity to its customers



SMALL SCALE EMBEDDED GENERATION (SSEG)

1

Municipality develops a SSEG policy,
SSEG tariff and Feed-in tariff to
support individual home/business
installers ,

2

Households that can afford to install
solar are able to do so, to reduce
their electricity bill

3

Households that can afford can
pull resources /capital to finance a
centrally located community
owned SSEG system



WHEELING

1

Municipality develops a wheeling policy

2

Municipality develops a wheeling tariff to support Independent Power Producers (IPPs)

3

IPPs sell power directly to households or businesses at a reduced tariff/ cost



CROSS SUBSIDY

1

Municipality uses Free Basic Electricity (FBE) to subsidise low income households

2

FBE is used to reduce low income tariffs (through cost of supply studies)

3

Municipality designs tariffs that cross-subsidise energy costs for low income households (high income/business charged more and poor homes charged less)





GROUP EXERCISE

What is the role of community in a renewable energy future?

What would be the best way to gain access to renewable energy?

How would a community energy system be managed (governance structure)?



THANK YOU