

THE UNBUNDLING OF THE ELECTRICITY UTILITY AND THE RISE OF ENERGY ENTREPRENEUR

BRENT HARE

Information:

29.1 %

70 %

78.2 %

60 %

**2 Billion by
2030?**

Information:

The working age population (15 - 64 years) in Q3:2019 was 38,6 million

38,6 million 

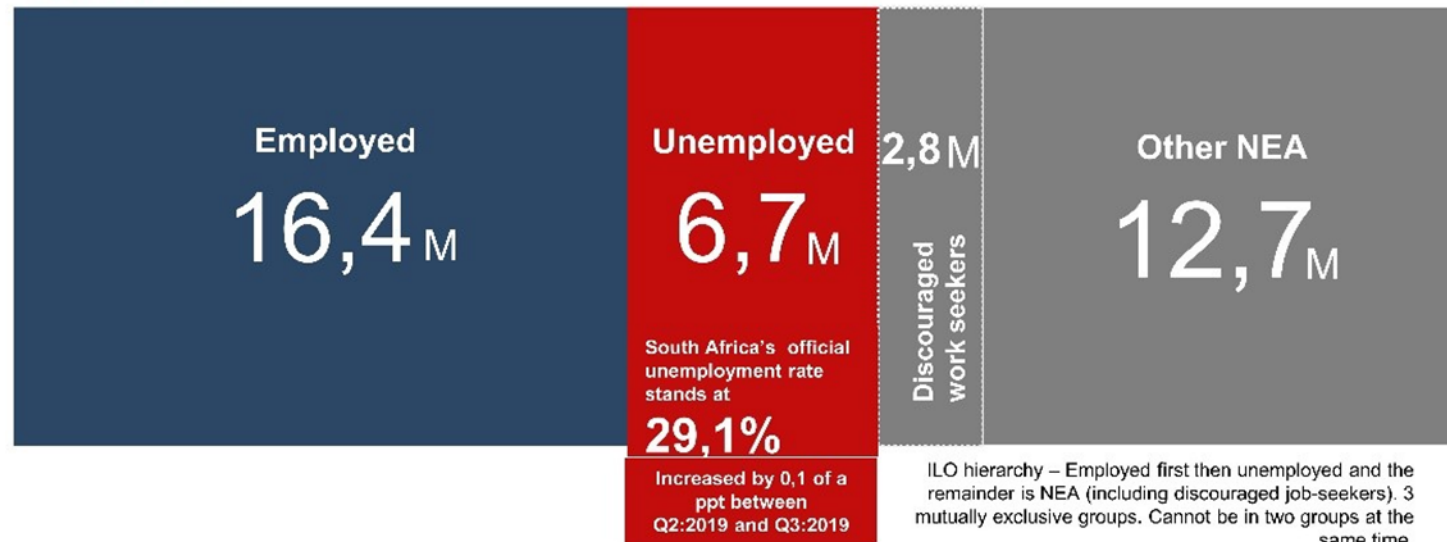
People of working age in South Africa (15 – 64 year olds)

Labour force

23,1 million

Not Economically Active

15,5 million



stats sa

Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA



Build: Gathering Material

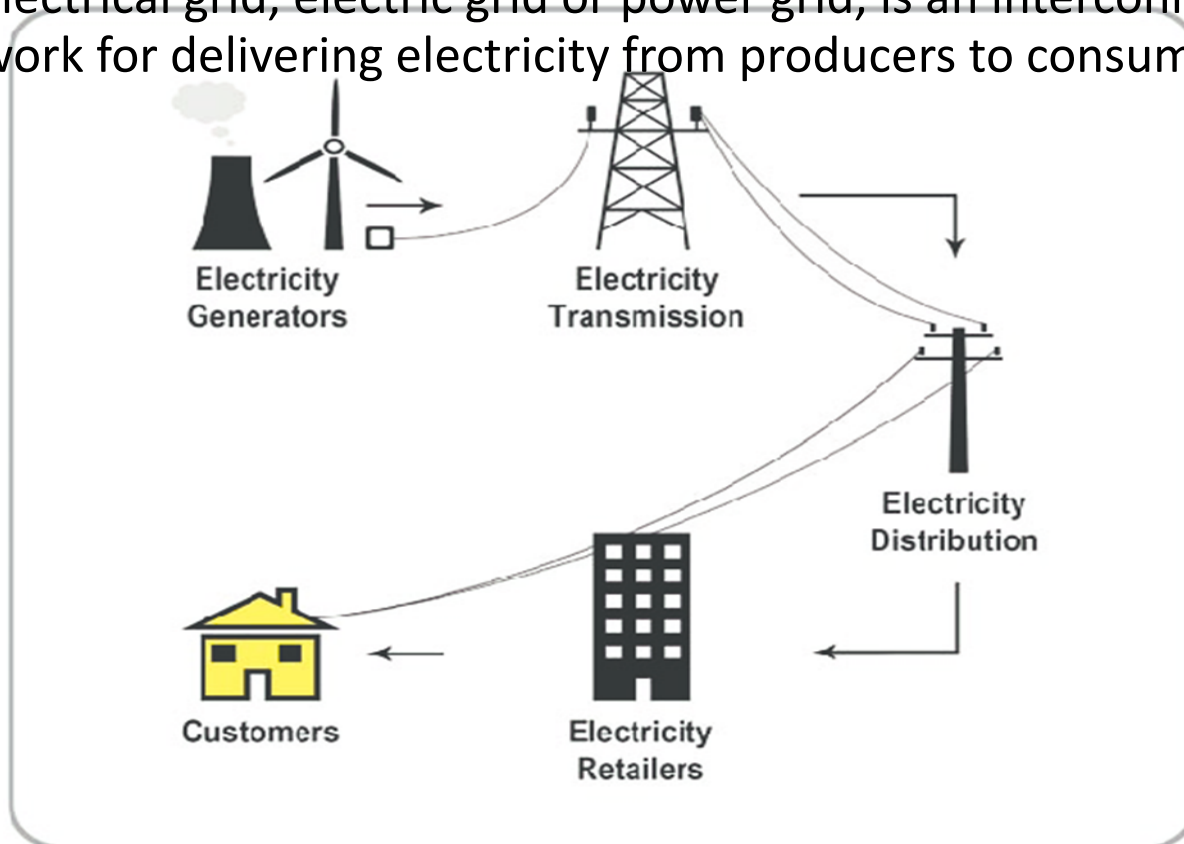
▶ EMPOWER:

- ▶ To give (someone) the authority or power to do something.
- ▶ Make (someone) stronger and more confident, especially in controlling their life and claiming their rights.

Build: Gathering Material

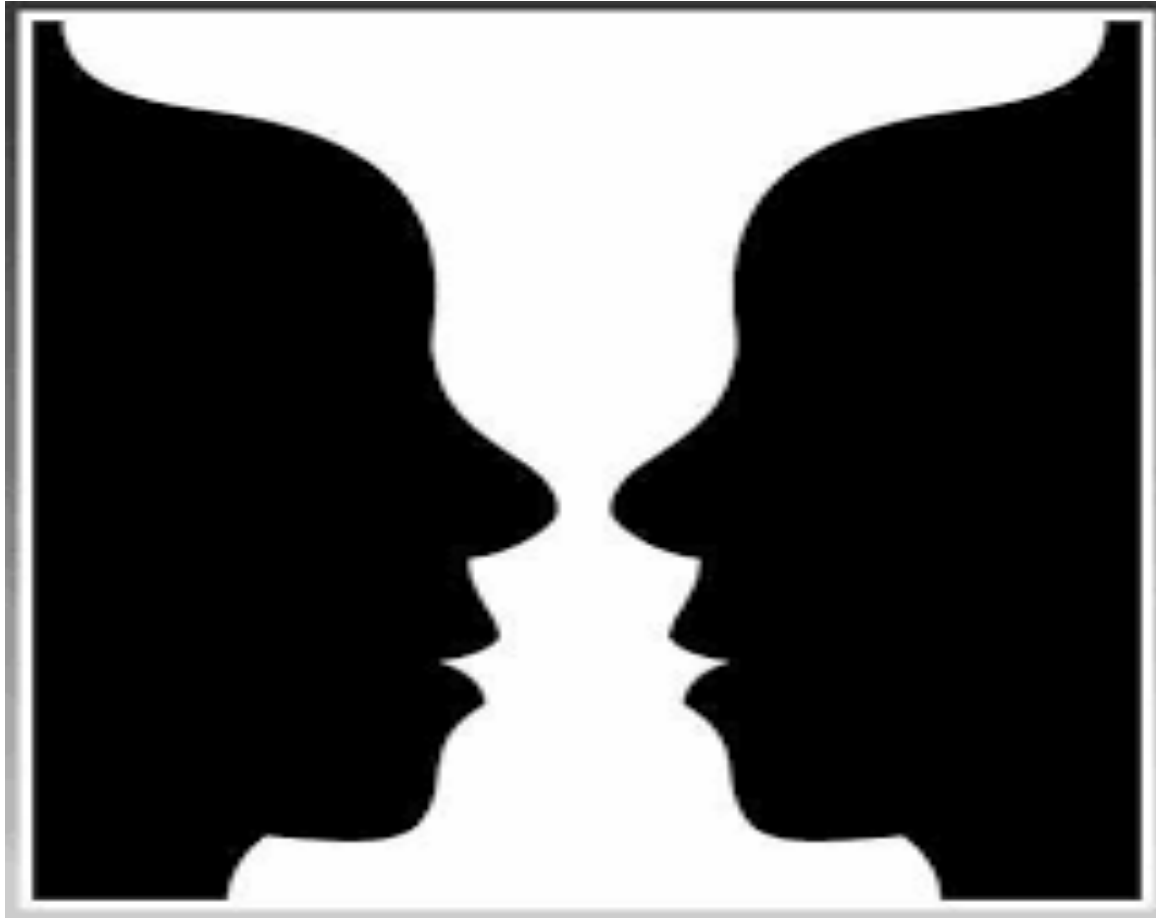
► What is the Definition of an Electricity Grid?

- The electrical grid is the electrical power system network comprised of the generating plant, the transmission lines, the substation, transformers, the distribution lines and the consumer.
- An electrical grid, electric grid or power grid, is an interconnected network for delivering electricity from producers to consumers.



Build: Gathering Material

- ▶ Entrepreneurship means something different for everybody...



- ▶ Entrepreneurship is imperative for Economic Development, Employment Creation, Social Welfare and Innovation

Build: Gathering Material

► What is the Definition of a Prosumer?



Build: Gathering Material

- What is the Definition of a Prosumer?

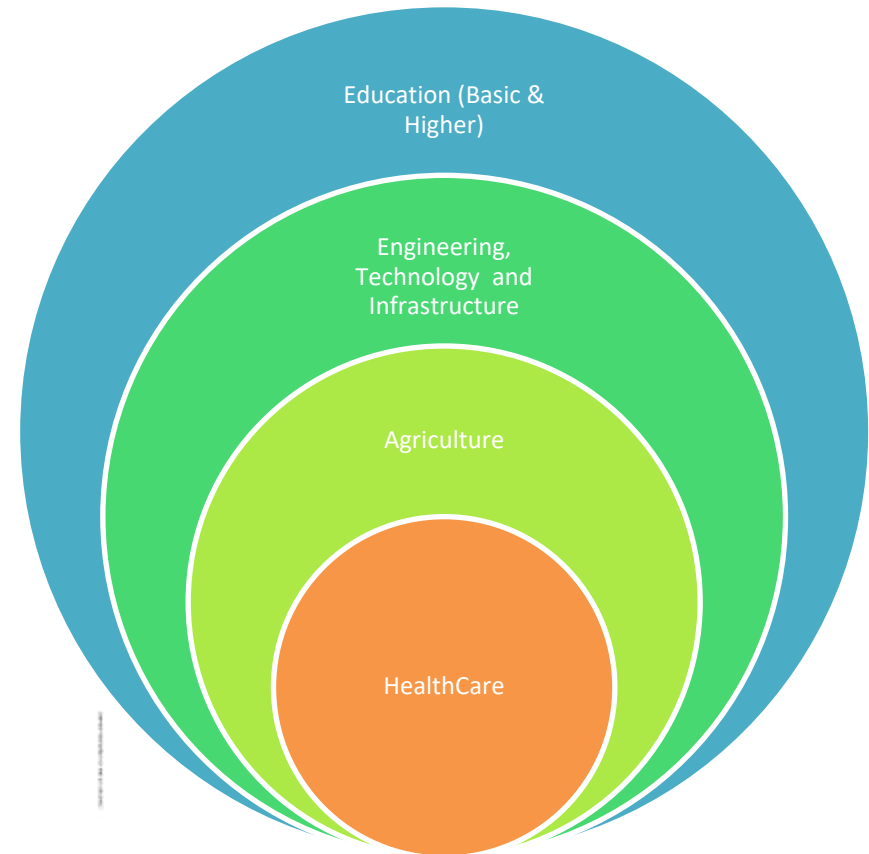


#BRING
CHANGE
HOME

Residential
Green Building
Toolkit

Build: Gathering Material

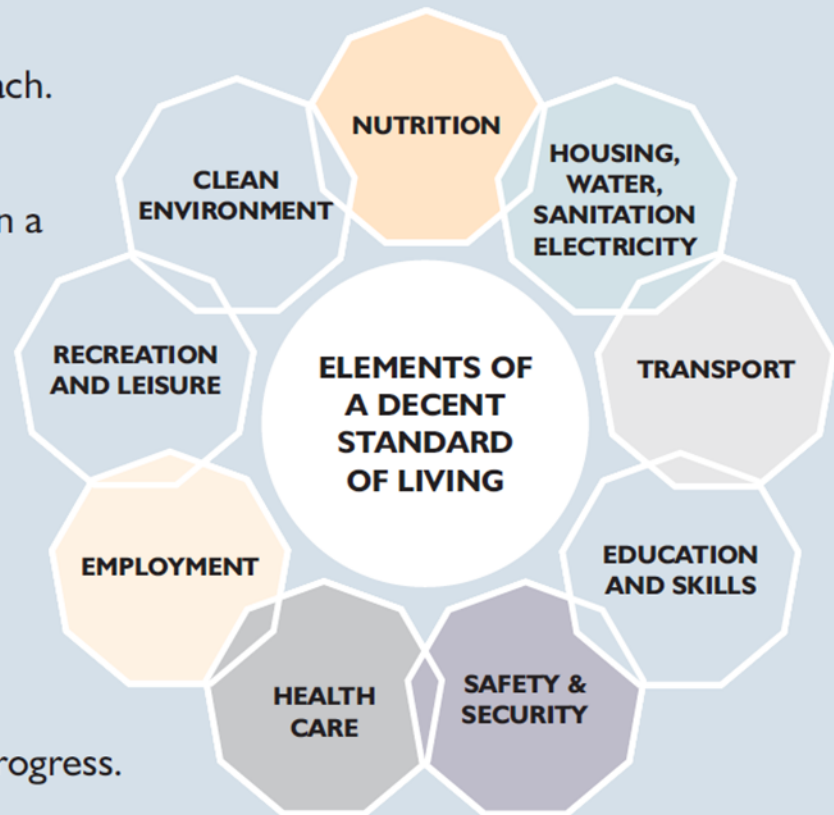
► What is the Definition of a Prosumer?



Build: Gathering Material

The following picture illustrates the approach.

This approach to defining living standards in a holistic way is consistent with the capabilities approach advanced by the Commission. The approach focuses on the key capabilities that individuals need to live the life that they desire. Of these capabilities, education and skills, and the opportunity to work are the elements where South Africa most needs to make progress.



Source: NDP 2019

Power UP:

- ▶ The Integrated approach
- ▶ The Rise of the Energy Entrepreneur



Source: Photodune.net



Source: Simplilearn.com

Power Up:

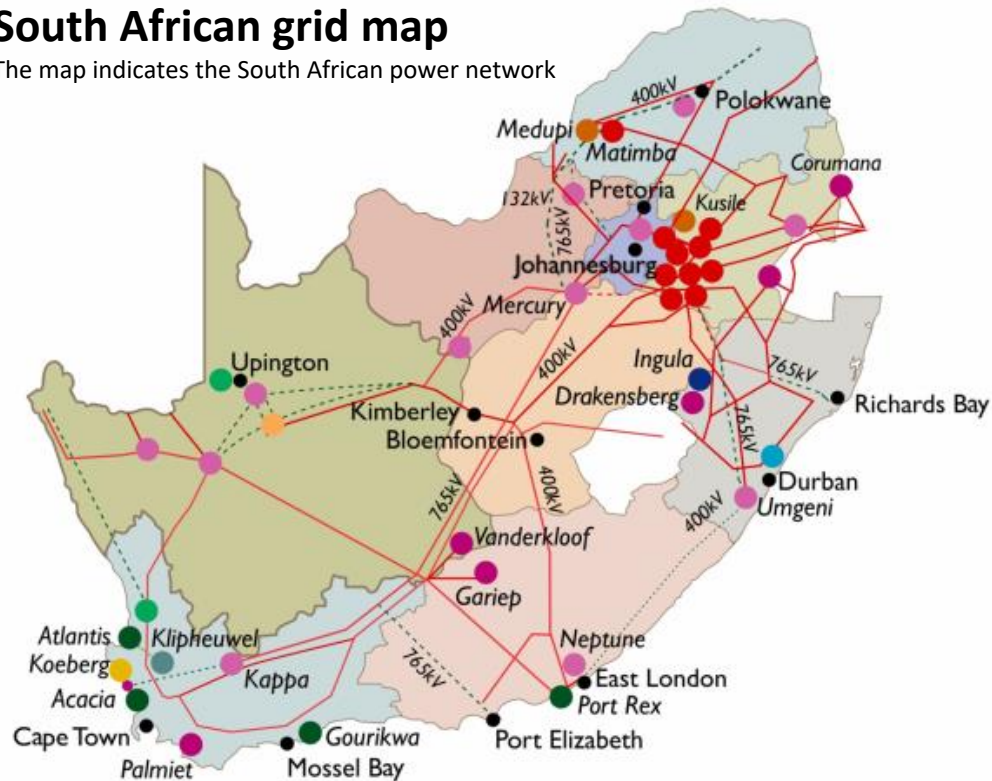
The Solution has been there for years...



Power UP:

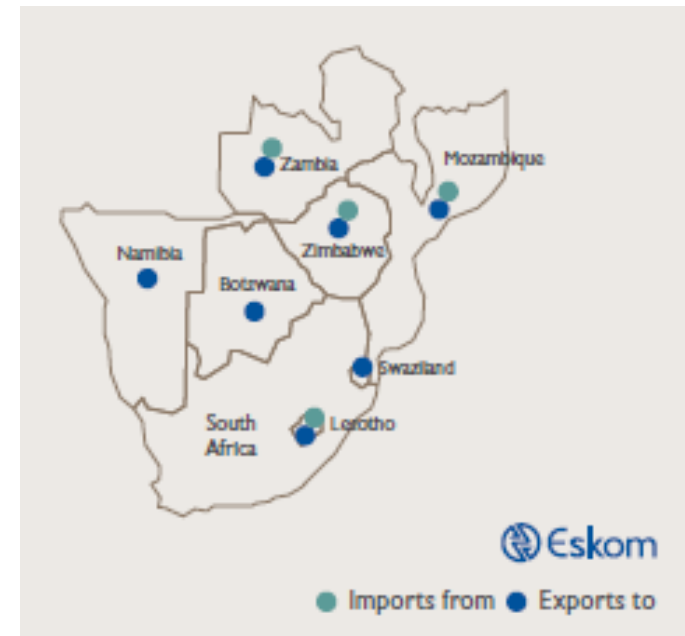
South African grid map

The map indicates the South African power network



Key

- Existing grid system
- - - Not yet complete
- - - Possible future grid system
- Future hydroelectric power station
- Future thermal power station
- Hydroelectric power station
- Interconnection substation
- Town
- Future renewables
- Renewables
- Thermal power station
- Future interconnection substation
- Nuclear power station
- Future gas station
- Gas power station
- Future substation

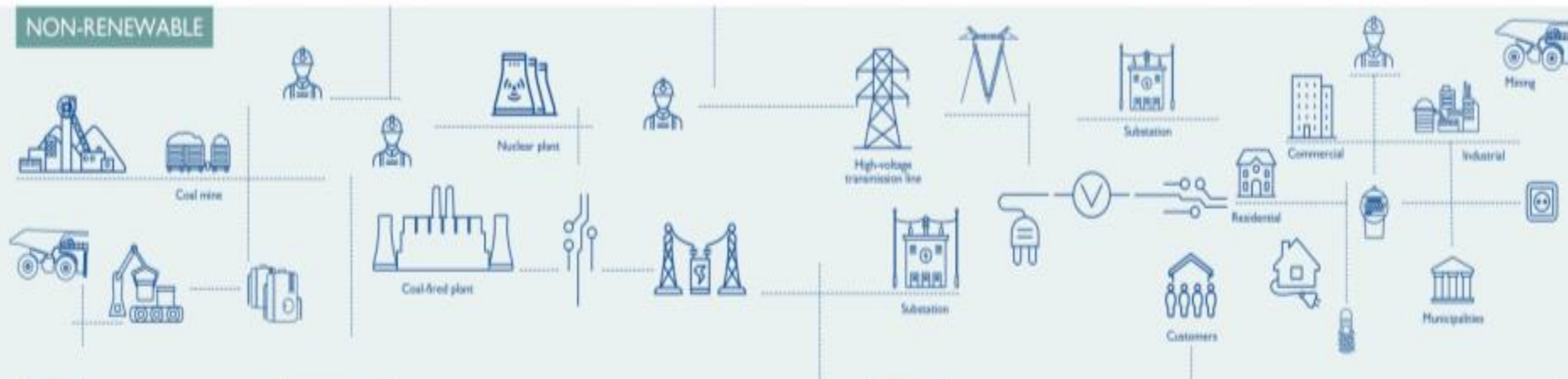


Power UP:

- ▶ The Integrated approach, Interconnected, Collaborate
- ▶ Rise of the Energy Entrepreneur



NON-RENEWABLE



INPUTS

- Capital expenditure **R48 billion**
- 115.49Mt** coal burnt
- 276 335Mℓ** raw water used
- 45 561MW** installed capacity at 30 stations
- 48 628** Group employees
- 235 406GWh** Total energy demand

PERFORMANCE

- 28 days** Normalised coal stock
- Energy availability (EAF) **78%**
- Planned maintenance (PCMF) **10.35%**
- Unplanned maintenance (UCMF) **10.18%**
- IPP purchases **9 584GWh**
- 0.23** Group LTIR
- 2.09** System minutes lost <1
- System interruption frequency (SAIFI) **18.7 events**
- System interruption duration (SAIDI) **38.8 hours**
- 9.15%** Total energy losses

OUTPUTS

- Electricity revenue **R175 billion**
- 31.65Mt** Ash produced
- 205.5Mt** CO₂ emissions
- 57.13kt** Particulate emissions
- 215 905GWh** Electricity sent out by Eskom

212 190GWh Total sales

- | | |
|---------------------------|-------------------------|
| 41% Municipalities | 5.8% Residential |
| 22.6% Industrial | 5% Commercial |
| 14.2% Mining | 2.7% Agriculture |
| 7.2% International | 1.5% Rail |
- Municipal arrears debt R13.6 billion**

OUTCOMES FOR ESKOM

- EBITDA **R45.4 billion**
- EBITDA margin **25.91%**
- Average electricity price **85.06c/kWh**
- Free funds from operations after interest paid **R9.1 billion**
- External funding raised **R57.5 billion**
- Debt/equity ratio **2.52**
- Cash and cash equivalents **R15.8 billion**
- IPP cost savings **R20.73 billion**
- Maintenance expense **R14 billion**
- Depreciation expense **R23.1 billion**
- 2 units at Medupi and 1 at Kusile **commissioned**
- 722.3km** Transmission lines installed

OUTCOMES FOR OTHERS

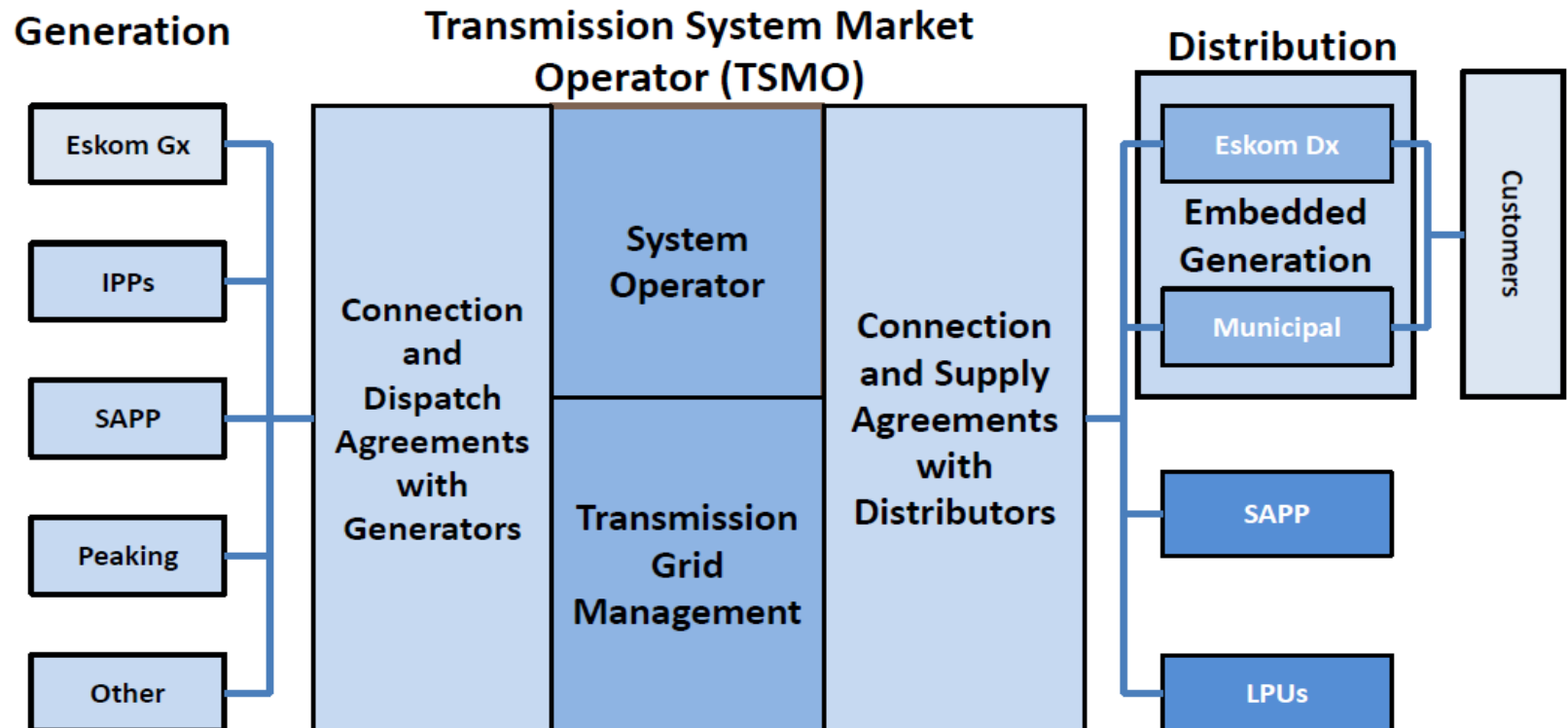
- Cash interest cover **1.22**
- Debt service cover **0.87**
- Relative particulate emissions **0.27kg/MWhSO**
- Specific water consumption **1.30ℓ/kWhSO**
- Employee benefit costs **R29.5 billion**
- 4 176** Total learner pipeline
- 15** Employee and contractor fatalities
- Racial equity in senior management **68.31%**
- Gender equity in senior management **38.20%**
- 1 441** Group employees with disabilities
- Eskom KeyCare index **105.9**
- Electrification **215 519** households connected
- CSJ committed spend **R192 million**
- 80.25%** B-BBEE compliant spend



For a discussion of the performance of the abovementioned KPIs against target, refer to "Financial review" and "Operating performance"

Change:

Reformed Electricity Supply Industry



SAPP - South African Power Pool

LPU - Large Power User

IPPs – Independent Power Producers

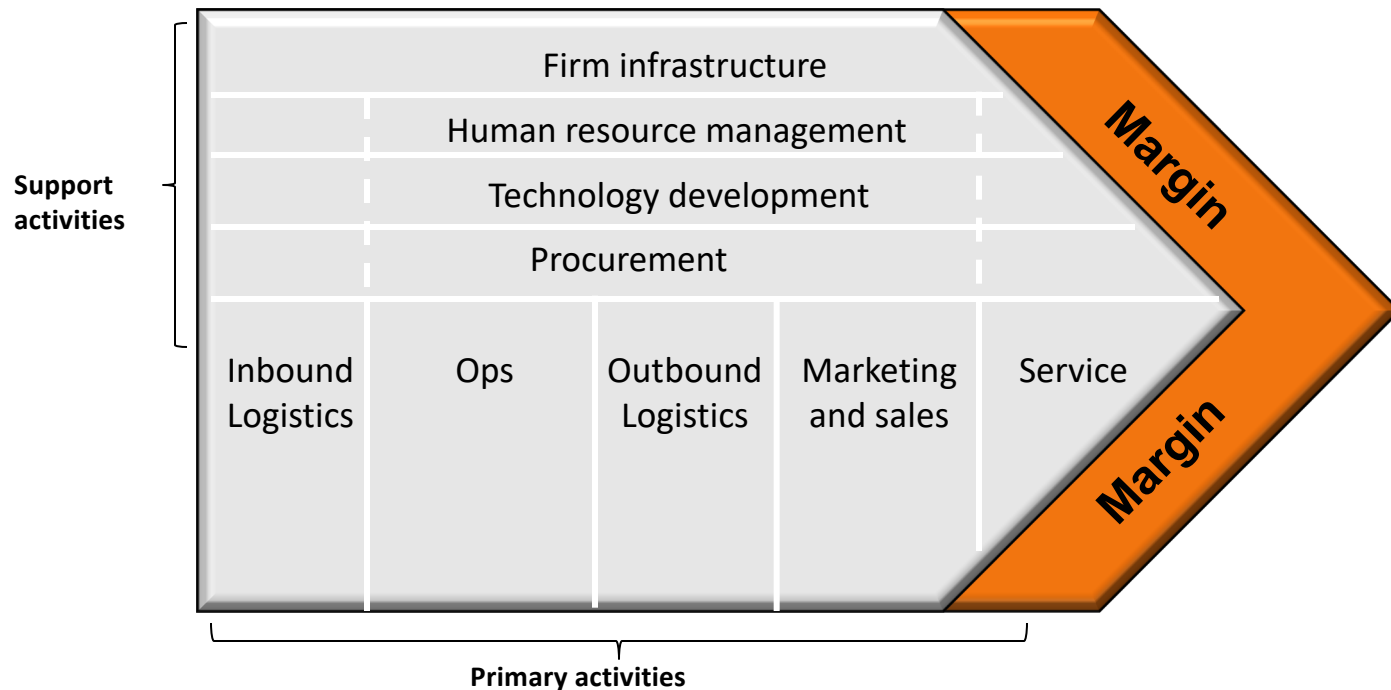
Embedded Generation – household / business own generation such as rooftop solar

Gx – Eskom Generation entity

Dx – Eskom Distribution entity

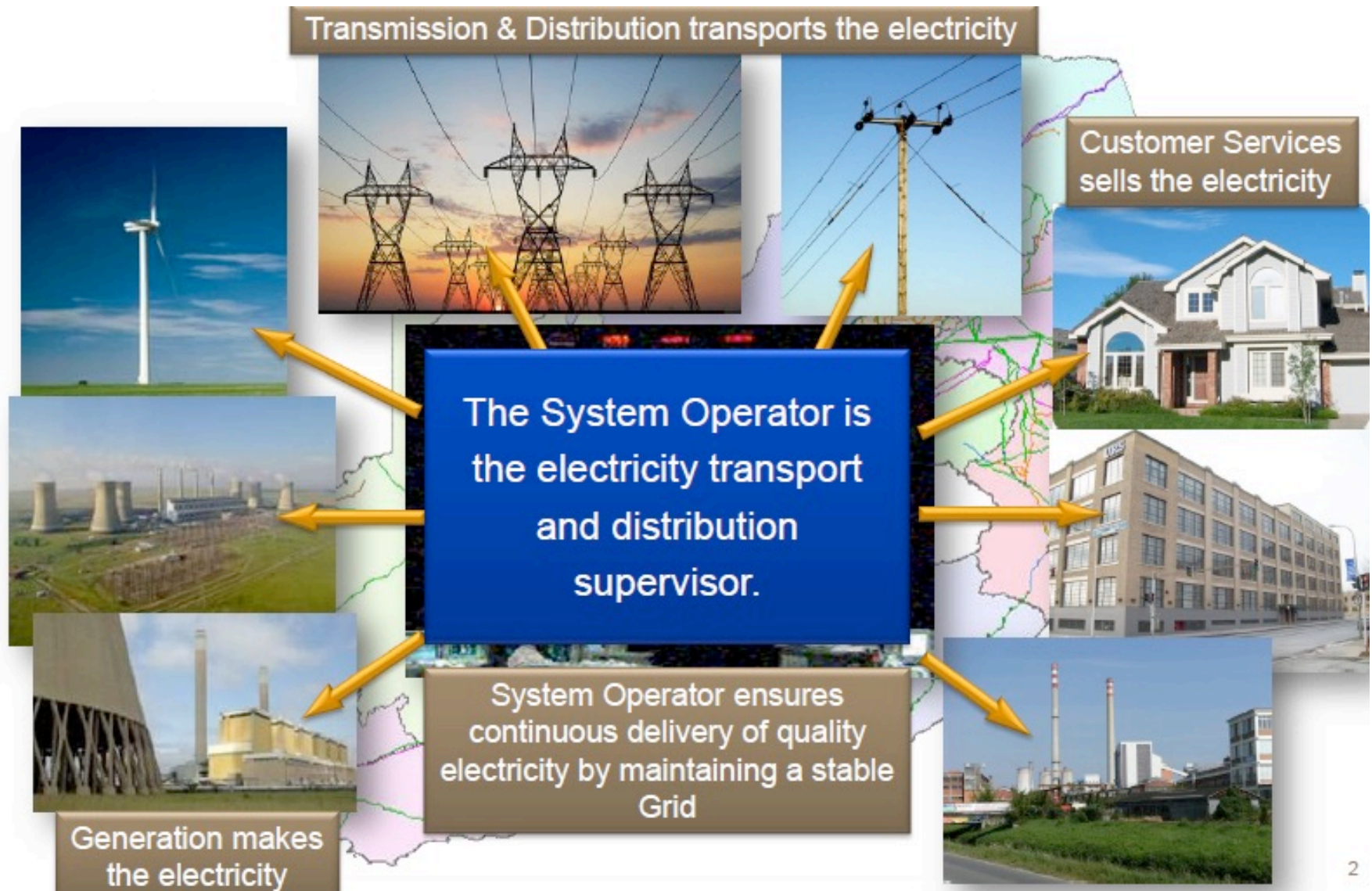
Change:

The Porter's Value Chain model

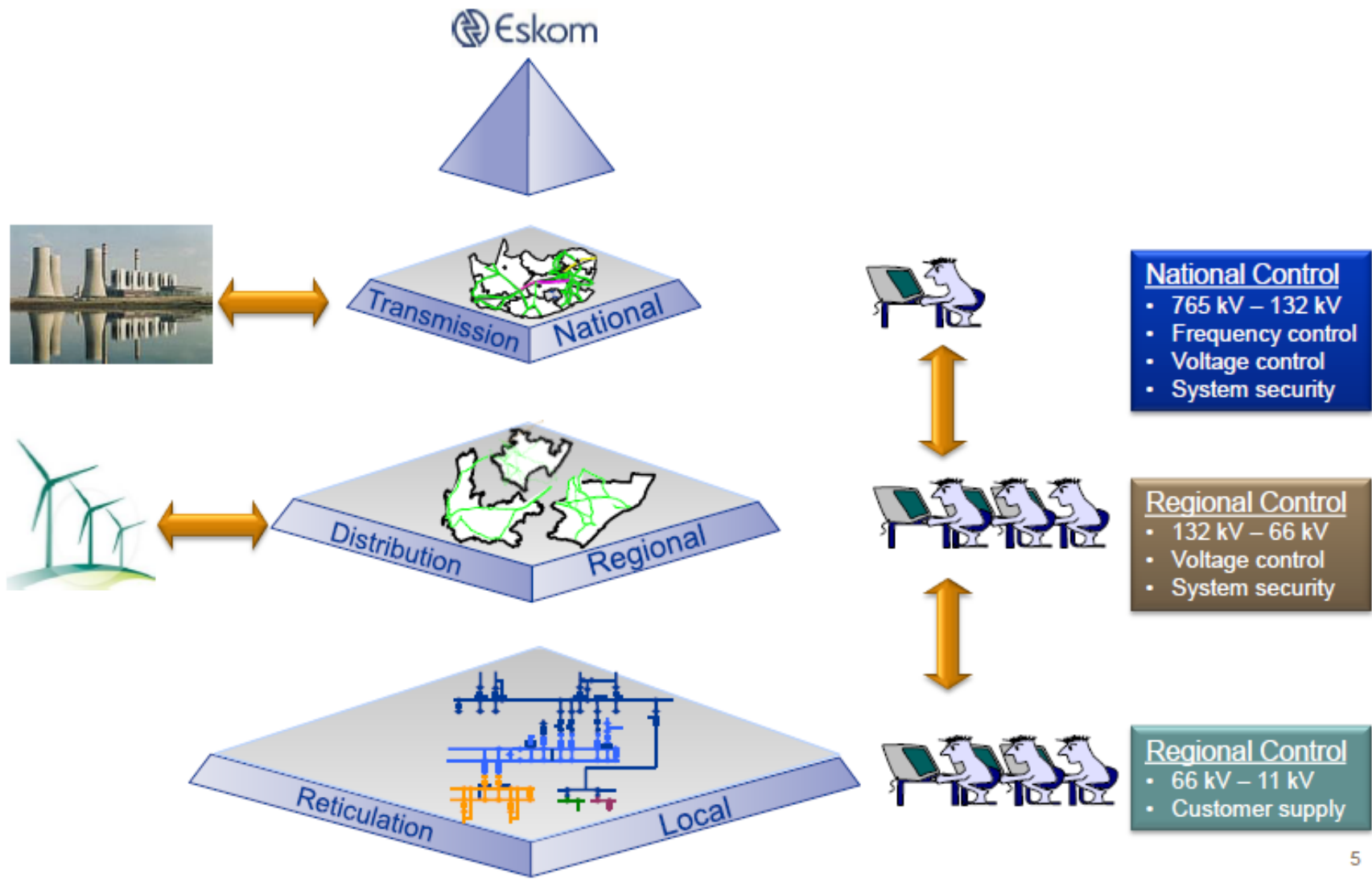


Source: Adapted from Prof. Jonkers Presentation **FAST FOOD FRANCHISING : BUSINESS MODEL AND VALUE CHAIN APPLICATION**

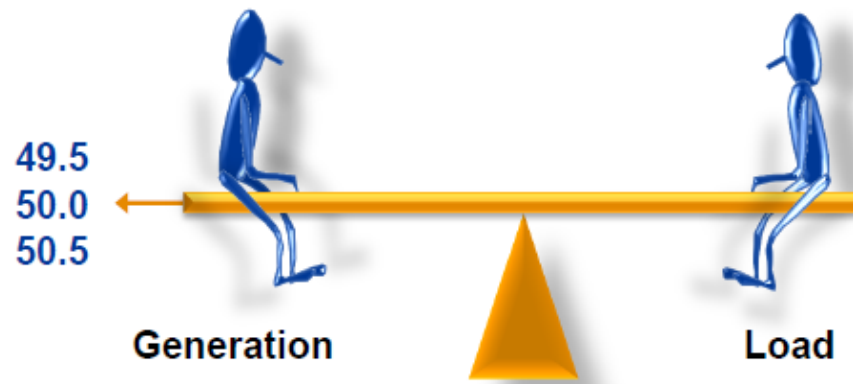
Change:



Change:

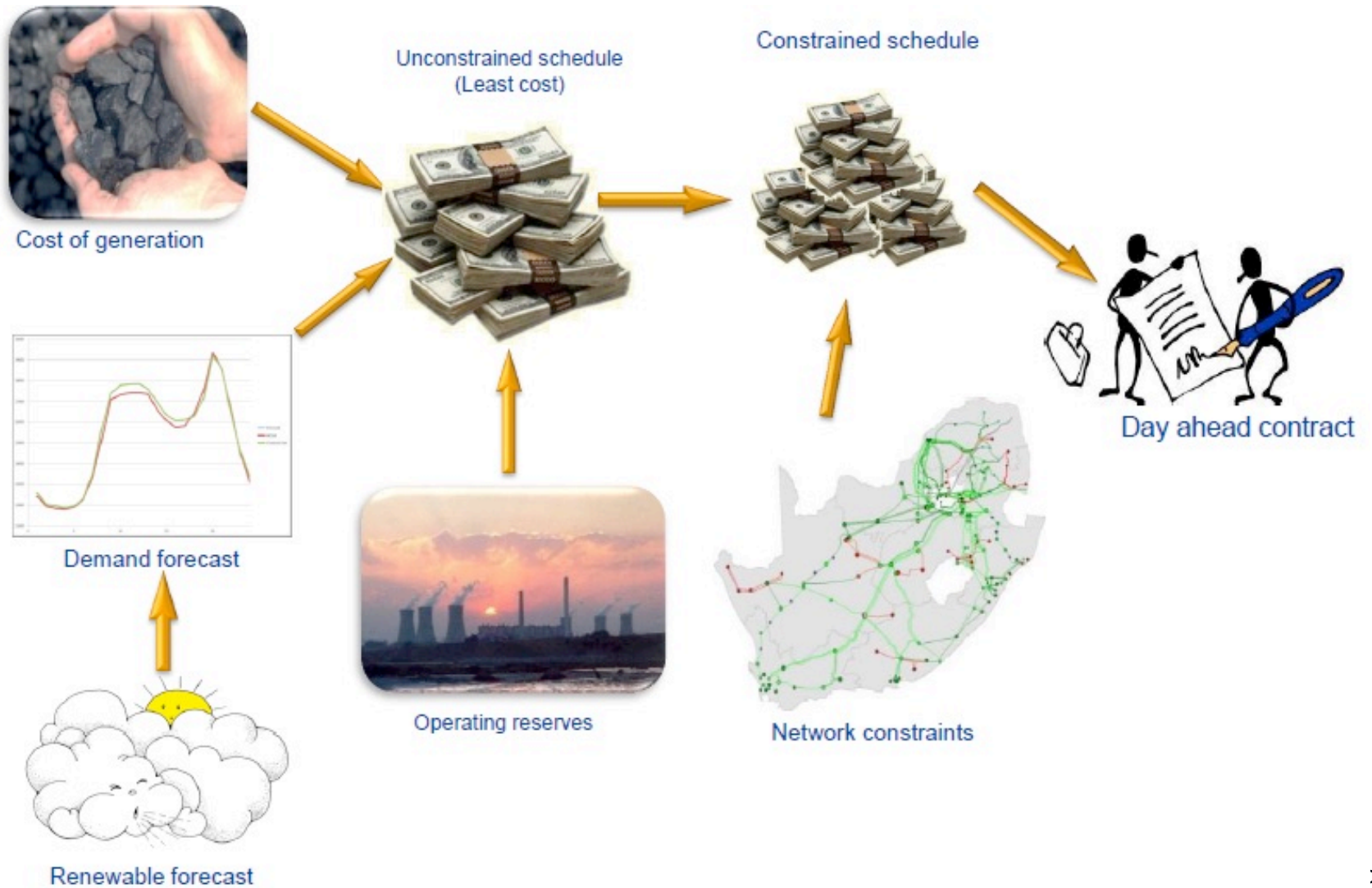


Change:



Generation output is changed every 4 seconds to match customer demand. When there is insufficient generation available, customer demand is reduced to ensure system stability is maintained.

Change:

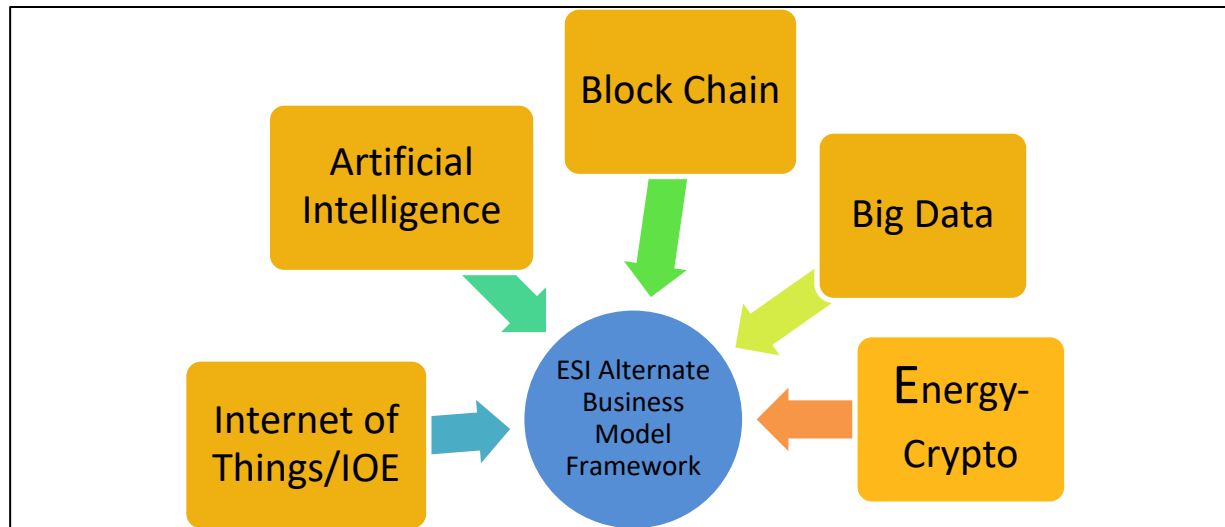




Global Megatrend: As @ Now....Driver for Change is Technology and its disruptive capabilities

Build; Power Up; Automate; Connect; Empower; Change

- ▶ Dynamic optimization
- ▶ through active exchange of information between the distribution operation domain and other power system operation domain
- ▶ utilizing the power system operator approach.



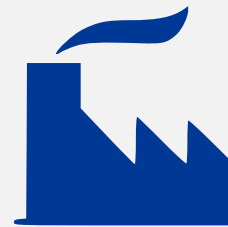
Build; Power Up; Automate; Connect; Empower; Change

Electric Supply Area

IRP Chnages

Generation

- Multiple generation businesses owned by different or similar companies, private or state owned
- Long term Power purchase agreements (PPAs) with ISMO
- Nuclear ideally owned by the state



Thermal
GenCo 1

Thermal
GenCo 2

Thermal
GenCo 2

Medupi and
Kusile

Renewable
IPPs

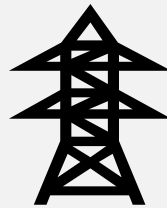
Nuclear
GenCos

Power

ZAR

Transmission/ISMO

- Removal of system operator from Eskom
- State owned or privately owned
- Transmission in Eskom, state owned or privately owned
- PPA signed by the operator



TransCo

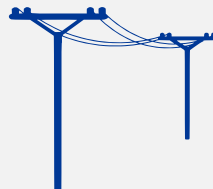
ISMO

Power

ZAR

Distribution

- Split into multiple companies, including Eskom, Metros and Private companies
- Each business will have PPAs with the ISMO
- Procure electricity from ISMO and supply to customers
- Distribution System Operators (DSO's) an option



DisCo 1

DisCo 2

DisCo 3

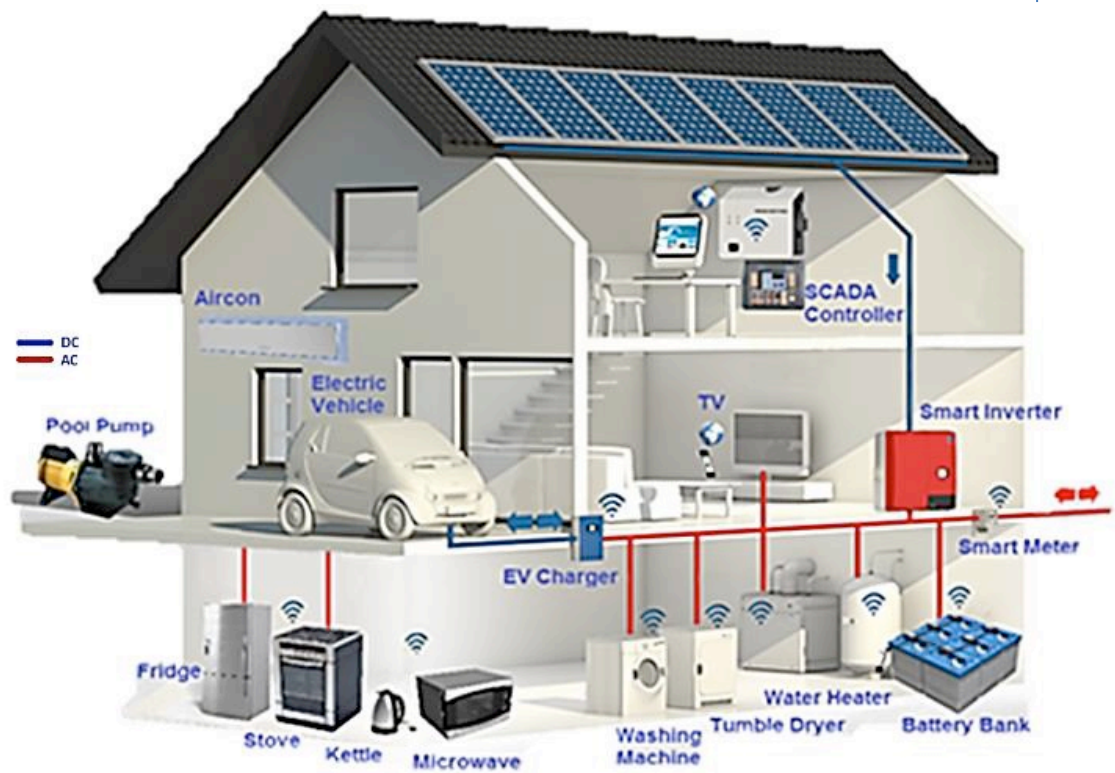
DisCo 4

DSO

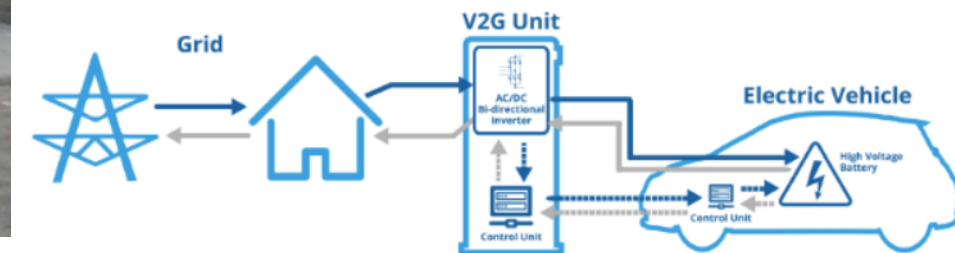
DSO

DSO

- Distribution**
- Split into multiple companies, including Eskom, Metros and Private companies
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 - Procure electricity from ISMO and supply to customers
 - Distribution System Operators (DSO's) an option



Build; Power Up; Automate; Connect; Empower; Change



Build; Power Up; Automate; Connect; Empower; Change

- ▶ What is the Definition of Energy Entrepreneur?
 - ▶ Someone with the authority or power to do something;
 - ▶ in an interconnected integrated collaborative way
 - ▶ Through the benefit of foresight!!!



Source: <https://mashable.com/2015/06/15/1916-suffragette-scooter/> lady Florence Norman

EMPOWERED:

- ▶ Are you That Somebody; Ready to take the authority and power to LEAD and do something Simple but Impactful; in an interconnected integrated collaborative way, With the benefit of foresight



Source: Solopracticeuniversity.com



“Education is the most powerful weapon which you
can use to change the world”

Nelson Mandela (1918 – 2013)



www.leadersfortomorrow.co.za

Considerations to enable the Rise of the Energy Entrepreneur



Alignment on **key policy issues** and **collaborate with existing businesses and new businesses**



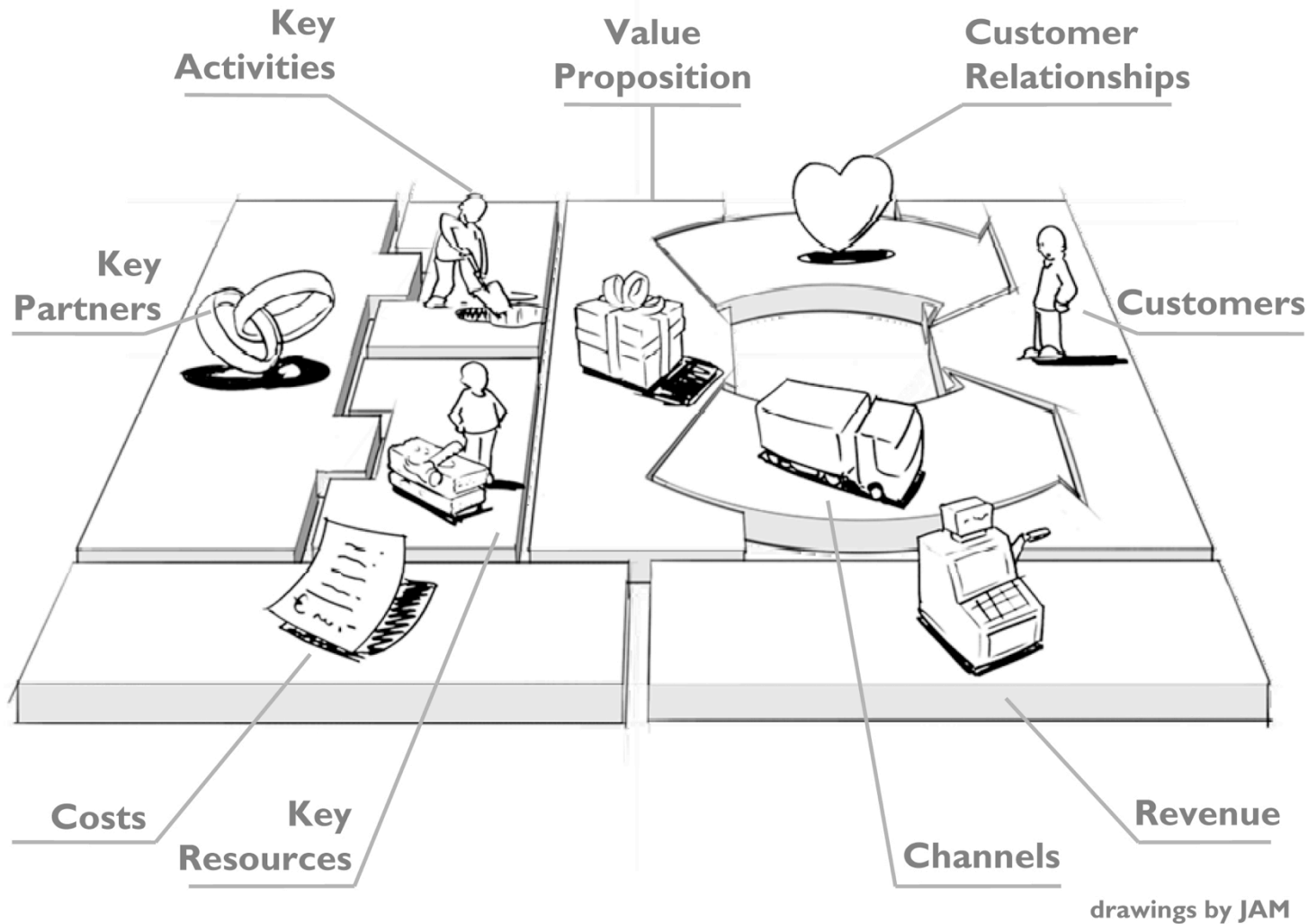
Adopt new business model to align to technological, environmental, social and regulatory changes



Understand the **skills and capabilities** required



Tap into **new growth markets and products- Join the Energy Life Cycle**



Business Model Generation, By A. Osterwalder & Y. Pigneur