



CLEAN POWER
EAST AFRICA 

Renewable Energy at the local level

Lessons from South Africa's embedded generation market

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Who is GreenCape¹

- Sector development agency
- Mandate: green economic activities
- Western Cape province and City of Cape Town
- Established in 2010, initial focus on RE sector

What space do we operate in?

ENERGY

RENEWABLE ENERGY

ENERGY EFFICIENCY

RESOURCES

WATER

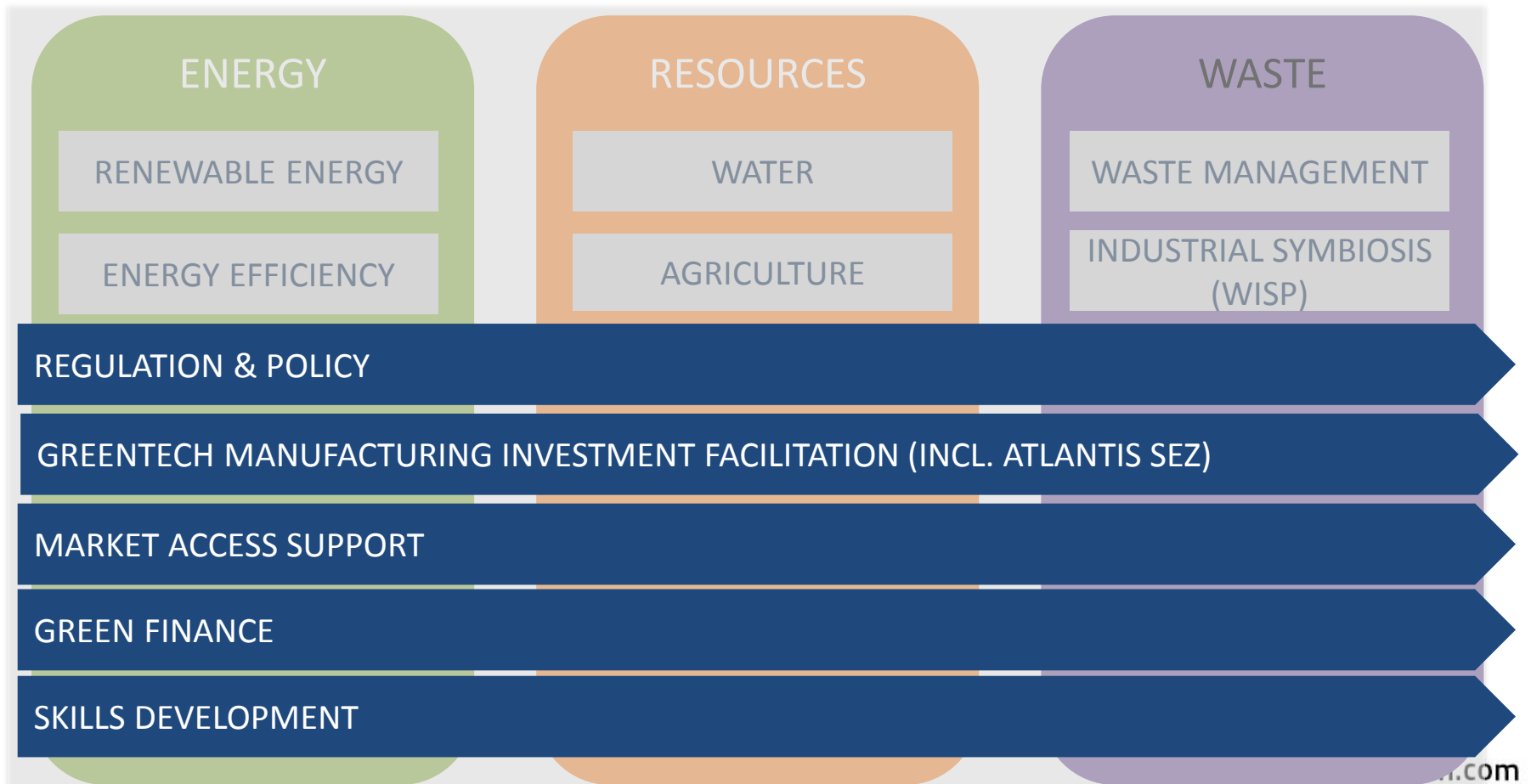
AGRICULTURE

WASTE

WASTE MANAGEMENT

INDUSTRIAL SYMBIOSIS
(WISP)

Cross-cutting activities



Overview of South African energy market

- Over 42 GW of generation capacity
- 95% supplied by state utility, Eskom
- Centralised system | historically cheap electricity prices
- Generation capacity dominated by coal fired power stations, but includes nuclear and OCGTs (currently run on diesel)
- Renewables <5% of generation capacity currently

Overview of South African energy market

- Over demand/ under capacity 2007/2008 → first load shedding incidents
- Government set in motion REIPPPP:
 - First bidding window in late 2011
 - Over 6 300 MW of renewables procured to date
 - Over 1 500 MW of renewable generation capacity to date
- Growth in the renewable energy sector at large

South Africa's renewable energy market

Conventional electricity generation

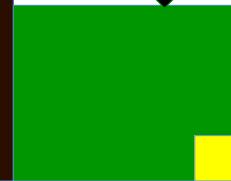
Renewable energy



Utility
scale



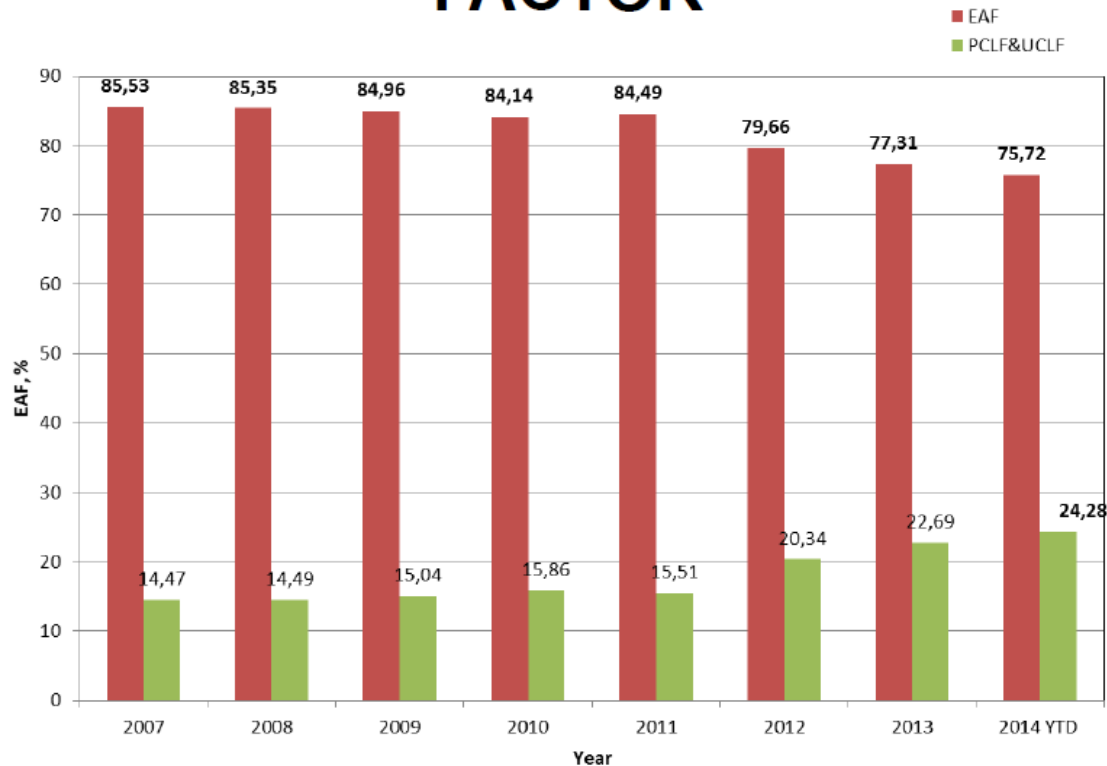
Embedded
generation



Context for embedded generation

Declining national utility availability

ESKOM GENERATION ENERGY AVAILABILITY FACTOR

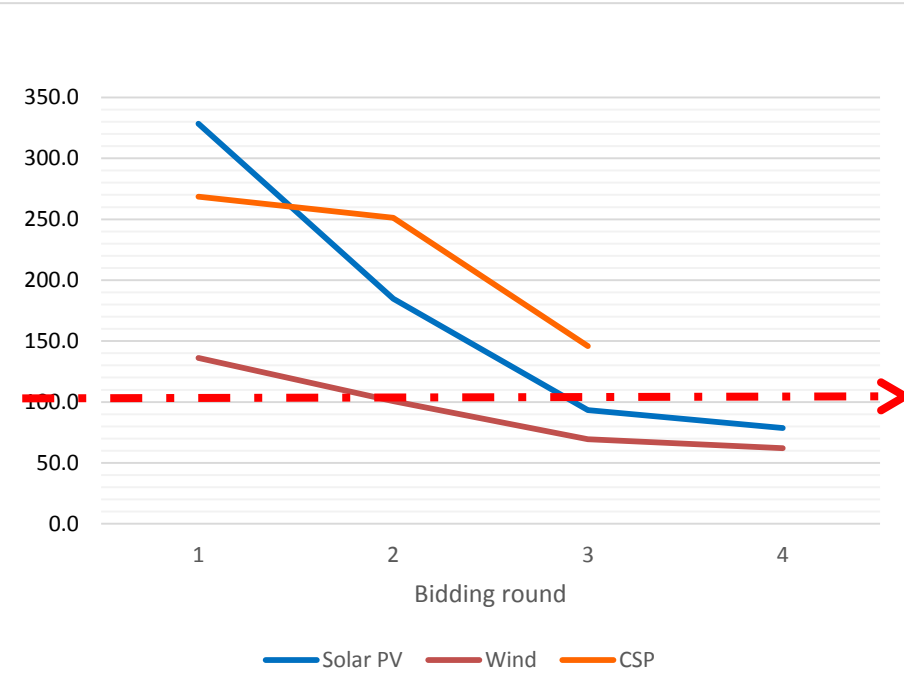
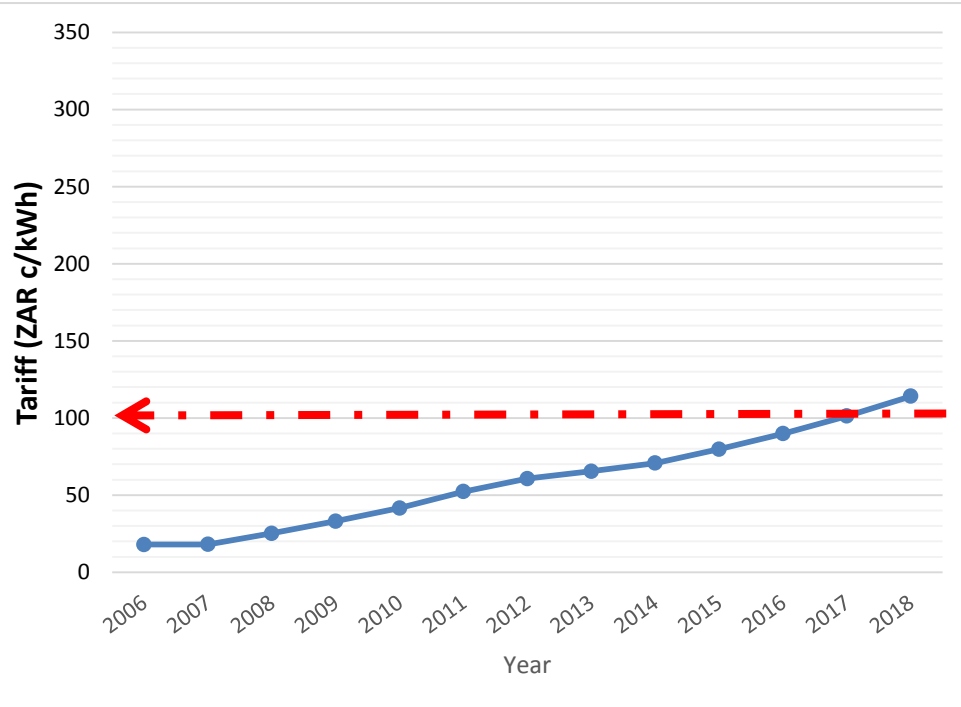


Context for embedded generation

Increases in Eskom's electricity tariffs



Improving business case for renewables



Recent developments

Private sector developments

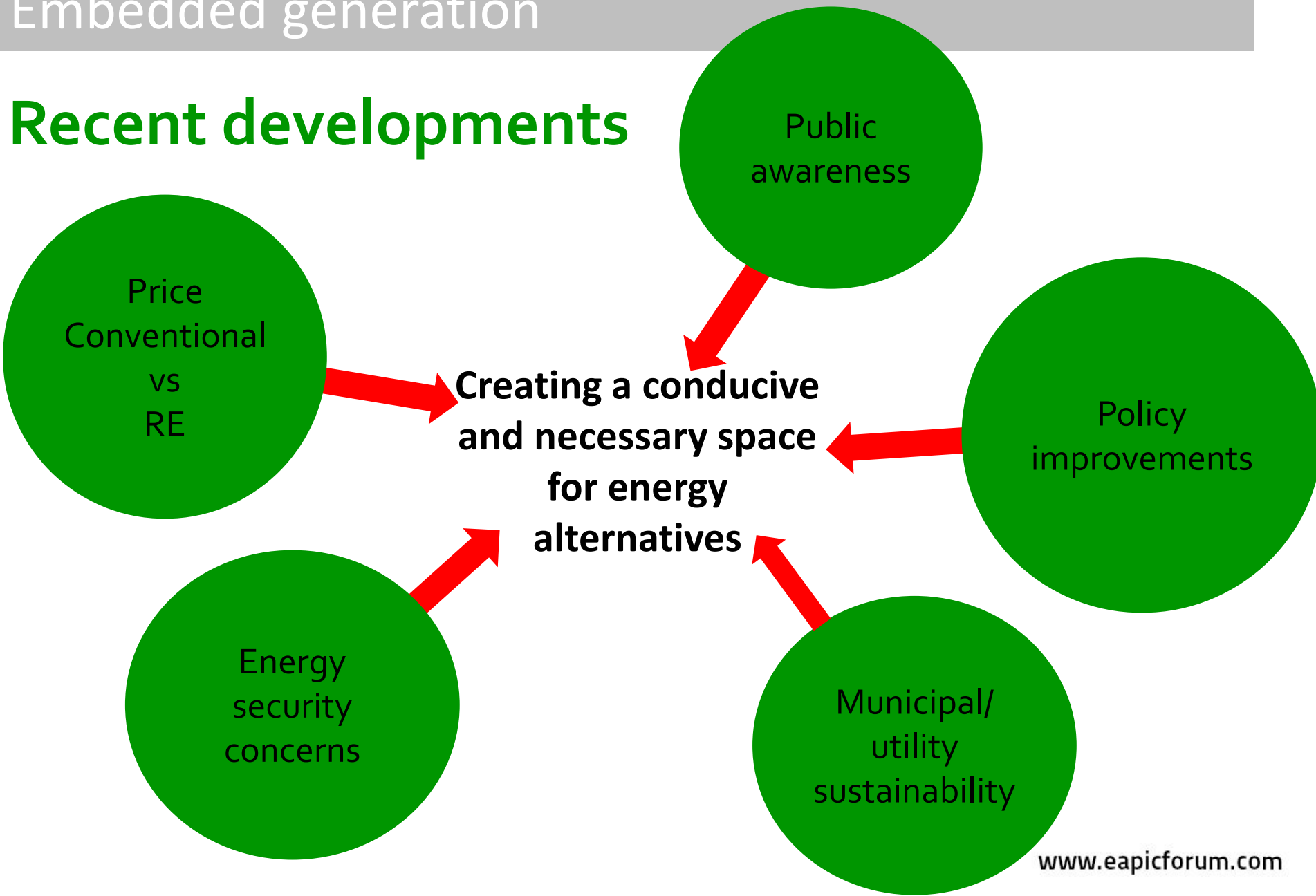
- Need for energy security
- Increasing public awareness
- Increasing installations (larger installations)
- Increasing variety of consumers

Public sector developments

- Energy security concerns
- National regulator guidelines
- Municipal reaction
- Investigations around PPA models for municipalities

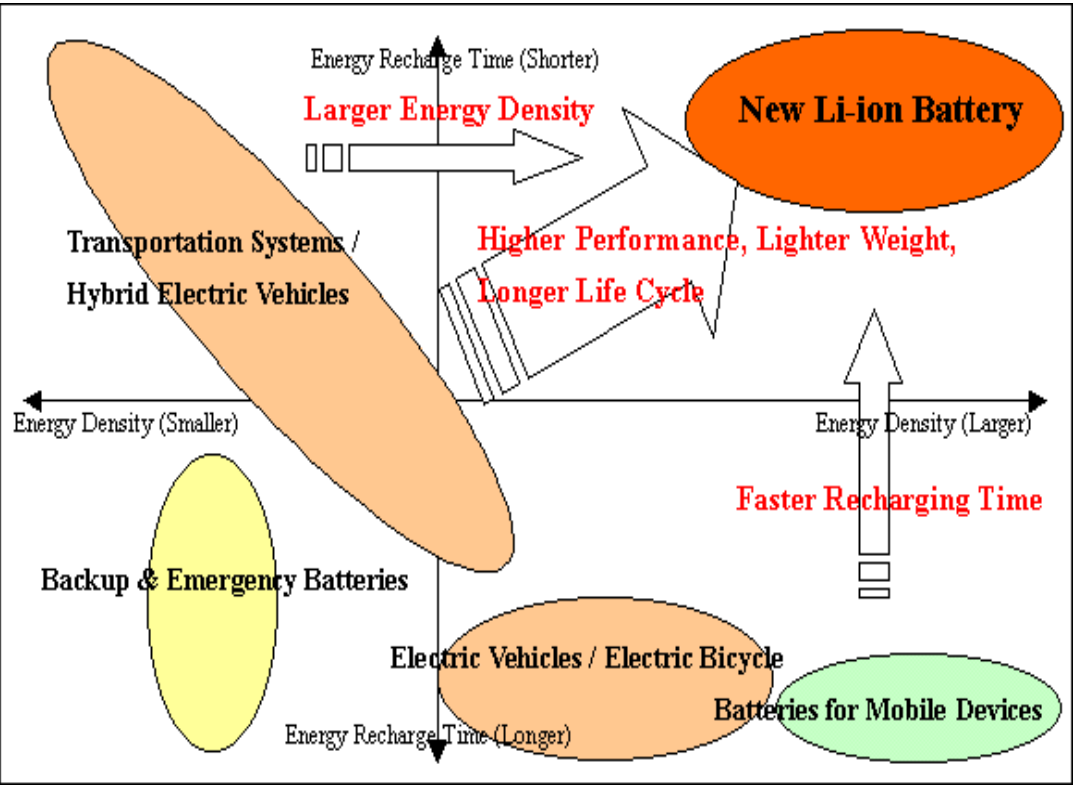
- Rapidly decreasing renewable energy technology costs
 - Advent of increasingly attractive storage technology

Recent developments



Embedded generation

Recent developments



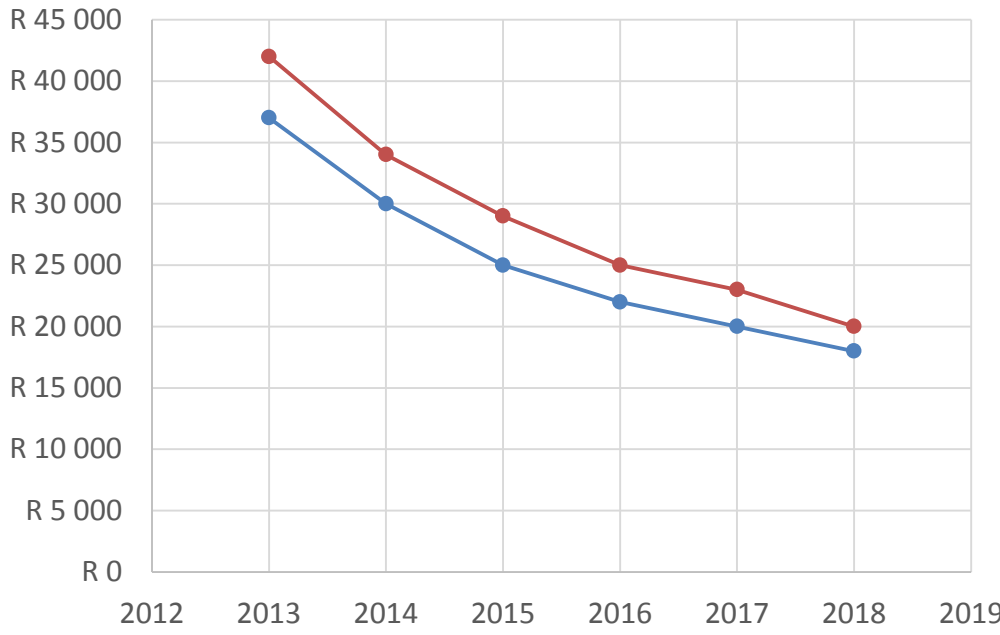
http://media.treehugger.com/assets/images/2015/05/tesla-powerwall-batteries-sold-out.jpg.662x0_q70_crop-scale.jpg

Source: http://www.toshiba.co.jp/about/press/2005_03/imgdat/img2908.gif

Embedded generation

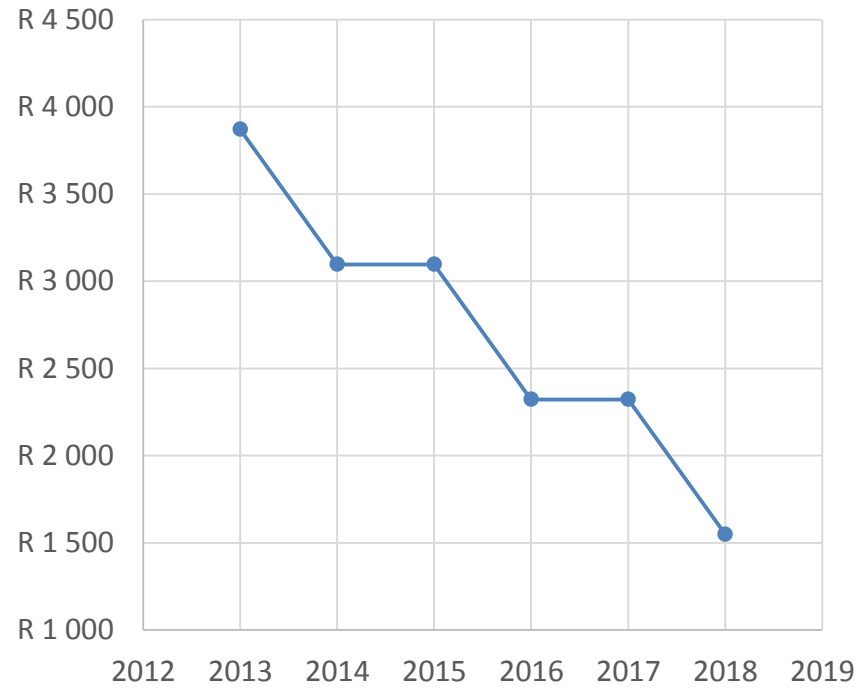
Recent developments

PV with & without storage (R/kW) : 1 – 10kW system



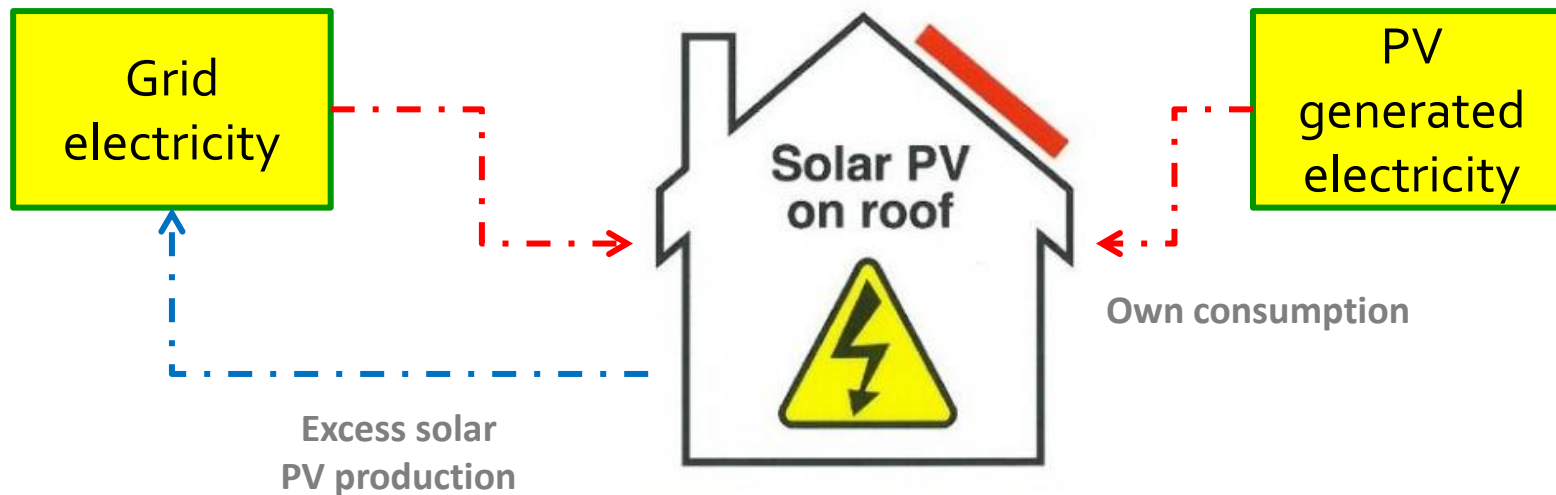
- Rooftop Solar PV system without battery storage (R/kW)
- Rooftop Solar PV system with battery storage (R/kW)

R/kWh storage – 3.1kWh storage system



Source: Private installer (GreenCape member)

Small scale embedded generation tariffs



- Service charge
- Consumptive tariff
- Feed-in tariff
- Technical regulations and standards
- Equipment specification
- Sign-off requirements
- Sizing limits

Small scale embedded generation tariffs

City of Cape Town SSEG tariff (example)

Small-scale embedded generator

A small-scale embedded generator for the purposes of these guidelines is an embedded generator with a generation capacity of less than 1000 kVA (1MVA).

SSEG Residential Tariffs 2015/16*					
	Units	Tariff VAT	excl	Tariff VAT	incl
Service charge	R/day		11.43		13.03
Energy charge – consumption 0 – 600 kWh	c/kWh		95.76		109.17
Energy charge – consumption 600.1 + kWh	c/kWh		187.63		213.19
Energy charge – generation**	c/kWh		56.99		N/A

Small scale embedded generation tariffs

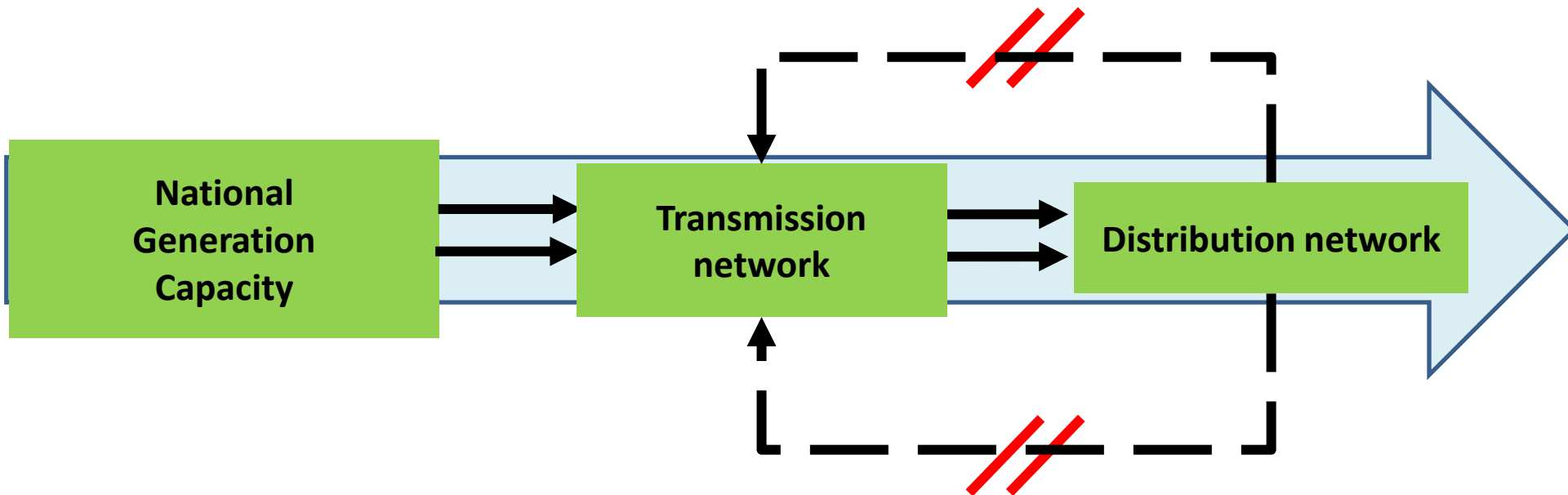
City of Cape Town SSEG tariffs (example)... cont'd

- Commercial and industrial users tariff – slight change

City of Cape Town SSEG conditions (example)

- The user must be a ***net-consumer*** over a year
- Embedded generation capacity must be <1 MVA
- Tariffs revised every 12 month cycle by municipality

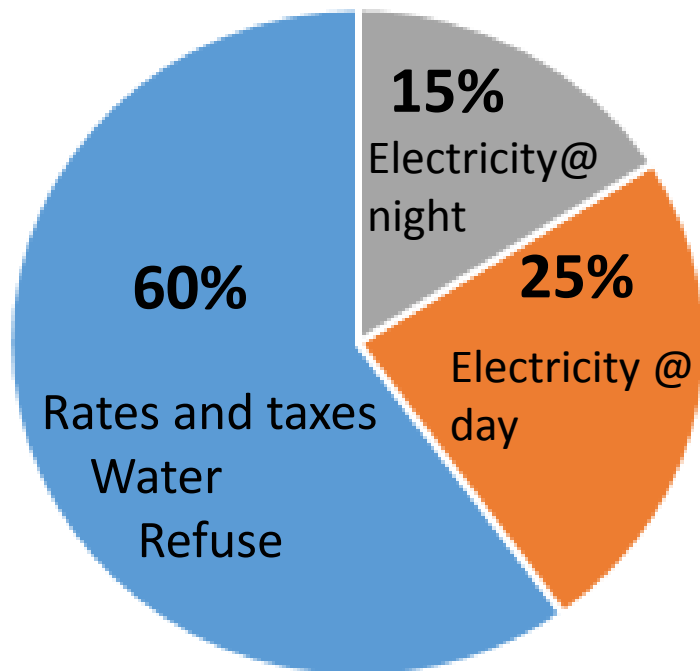
South Africa's traditional electricity system



- Safety concerns from Eskom
- Safety concerns from municipality
- Guidance on accepted technologies, test procedures and connection guidelines needed

Municipal reliance on electricity sales

Total Municipal Surplus



- PV will reduce daytime electricity sales.
- These sales represent 25% of total municipal surplus.
- Surplus is used to cross subsidise essential services.
- Cost of providing an electrical connection to customer (network charges) does not change, despite losses.

What can be learnt

Government:

- EG is inevitable → lay out rules and regulations | Set targets
- Enable EG to solve for whole system → integrated generation system (technical)
- Enable EG to solve for whole system → economic integration (tariffs and prices) | Utility credibility
- National utility(ies) and municipalities can participate → seek business opportunities
- What role will traditional utilities play in future?

What can be learnt

Private sector:

- Customize energy offerings for customer
- Consider principle of energy conservation before generation
- Offer a solution that complements a national need
- Take advantage of current decline in RE technology prices vs conventional generation

Kea leboha | Siya bongga | Thank you



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