UNLOCKING THE ROOFTOP PV MARKET IN SOUTH AFRICA

Riversdale case study

SAPVIA Networking Event

CENTRE FOR RENEWABLE AND SUSTAINABLE ENERGY STUDIES

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Fire & Ice Protea Hotel

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

NRF National Research Foundation

Eskom

sasol
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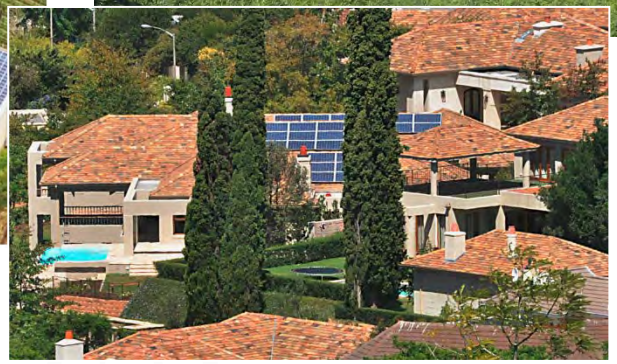
Background to study

- Funded by The GreenCape Initiative
  - Provincial “green economy” implementation agency
- Aim of study:
  - Identify opportunities and hurdles to rooftop PV uptake in mid-sized municipalities in the Western Cape
  - Riversdale selected as case study

Motivation for / against PV

- Two main stakeholders within municipal context
  - Rooftop owner
  - Municipality



Suppose you could save 30% on your electricity bill, but the City of Cape Town said no! And suppose they have been saying no since 2003?

Would you be prepared to save 30% of your bill and pay 1/2 of this (ie save 15% of your bill) to the City and let the City NOT buy some electricity?

The overall saving is still 30% in electricity. 15% is for your account and 15% is for the City for allowing this to happen.

Example: you are paying R3,000 per month in electricity. You can save R900 per month, but the City won't let you do it, because they might lose money (there are other variables at play but the City isn't interested in them).

So you have R900 per month overall savings and you give R450 per month to the City for allowing you to save the other R450. If the City makes 100% profit on electricity sold to you then the profit on R3000 is R1500. If you save 30%, then the City only makes R1,050, but then you pay R450 (of your R900 savings) and the City makes R1,500. The City still makes R1,500 per month from you but you save R450 per month!

Any takers?

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4 people like this.

Wildpoldsried produces 321% more energy than it needs

Wildpoldsried, a small village in Germany produces 321% more energy than it needs, and sells it for $5.7 million.

Motivation – rooftop owner

- Mainly financial
  - Currently not a “no-brainer”

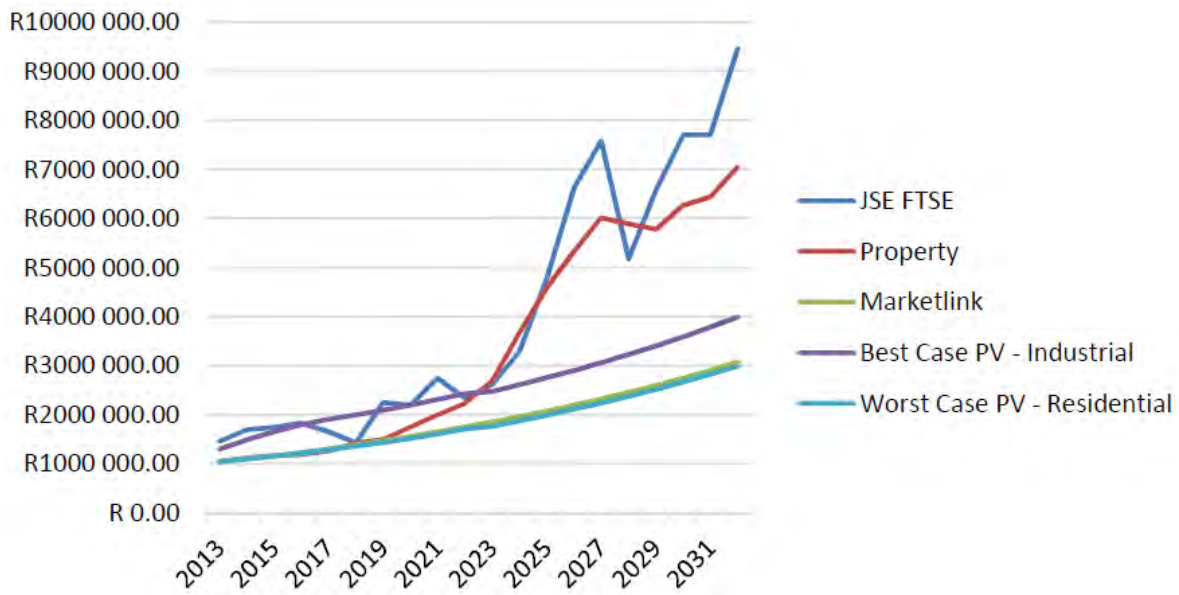
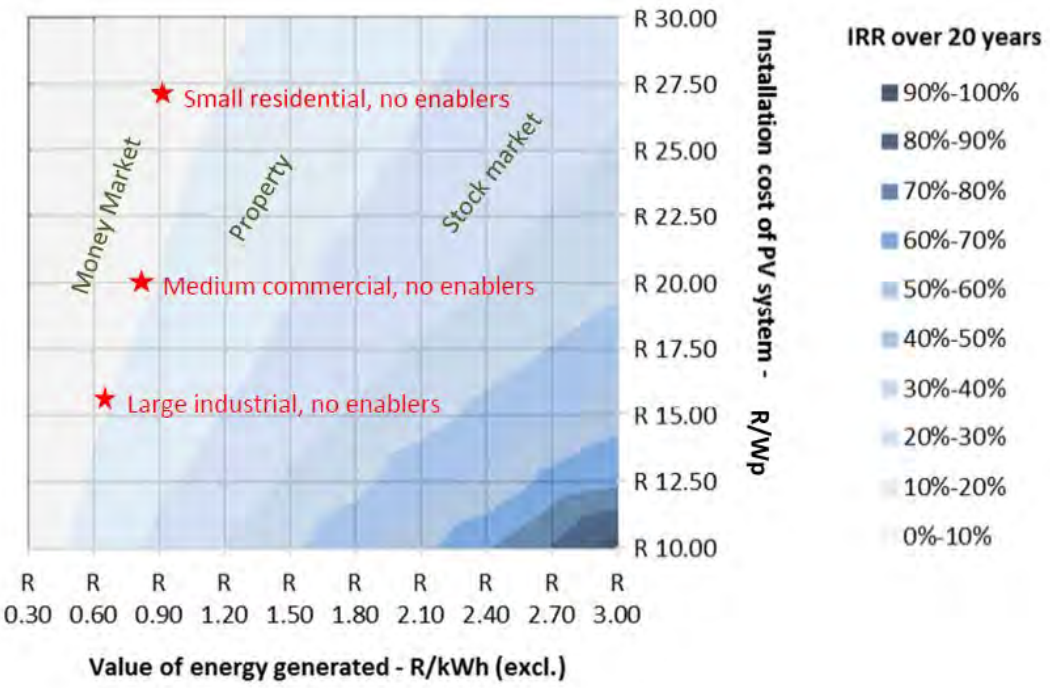


Figure 7-6: Rooftop PV predicted performance over the next 20 years, compared to alternatives

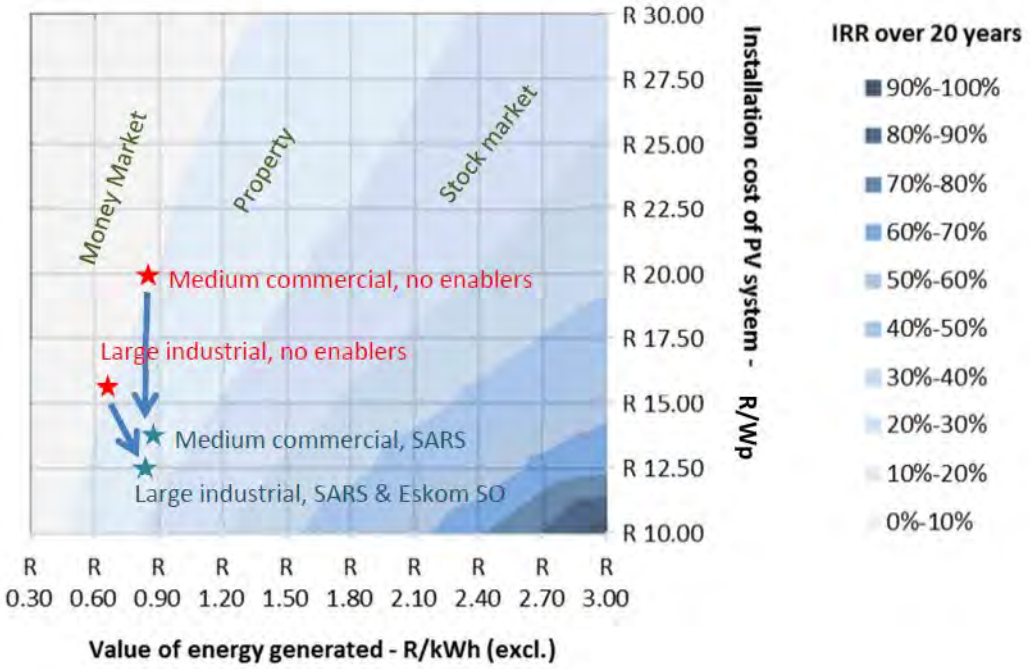
Motivation – rooftop owner

- Mainly financial
  - Currently not a “no-brainer”



Motivation – rooftop owner

- Mainly financial
  - Currently not a “no-brainer”
  - With incentives, more viable for non-residential

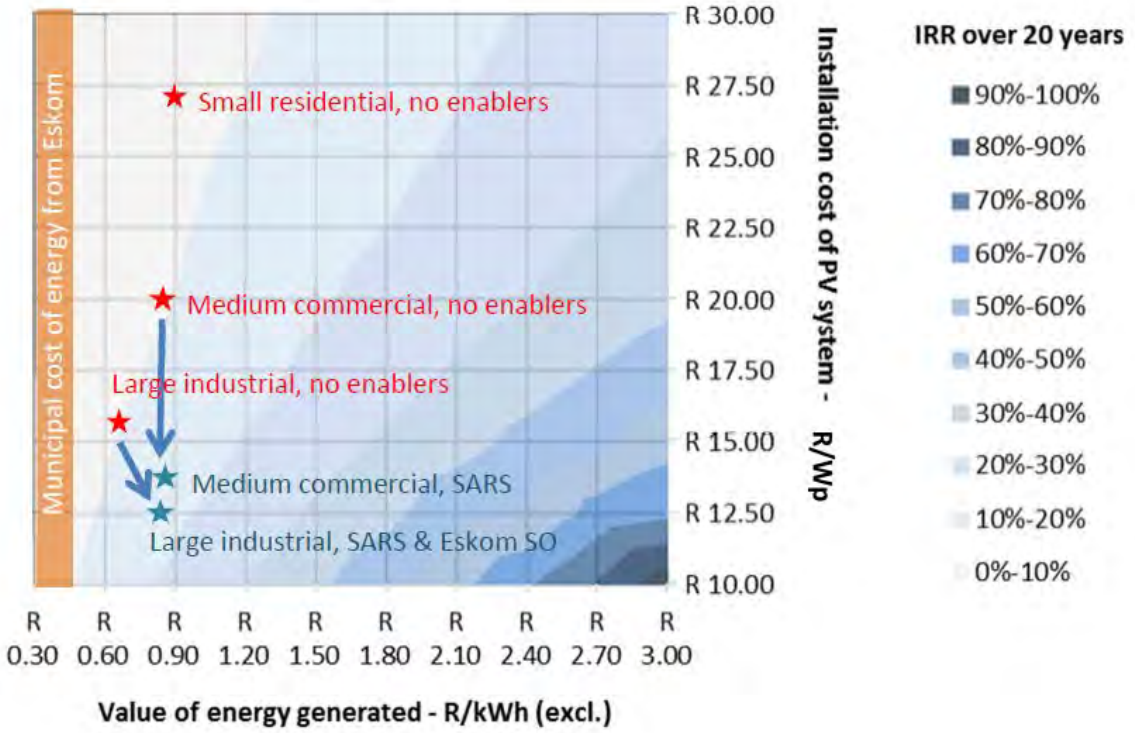


Motivation - municipality

- For:
  - Climate change mitigation
  - Avoidance of “illegal” connections
  - Aligning towards a future with high uptake of rooftop PV
  - Electricity peak allocation restrictions
- Against:
  - Protection of revenue from electricity sales
  - Electricity supply quality and safety
  - Avoiding increased administrative burden

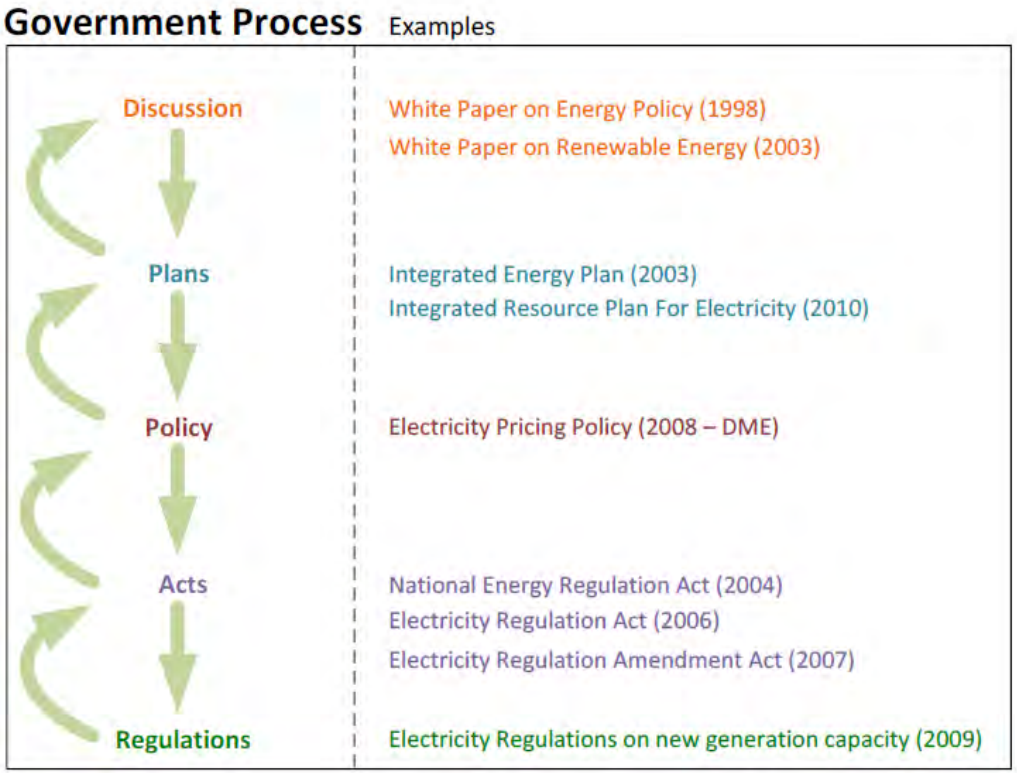
Motivation

- From financial perspective, municipality-rooftop owner win-win impossible



Current situation in South Africa

- Government process promotes renewable energy generation, including rooftop PV

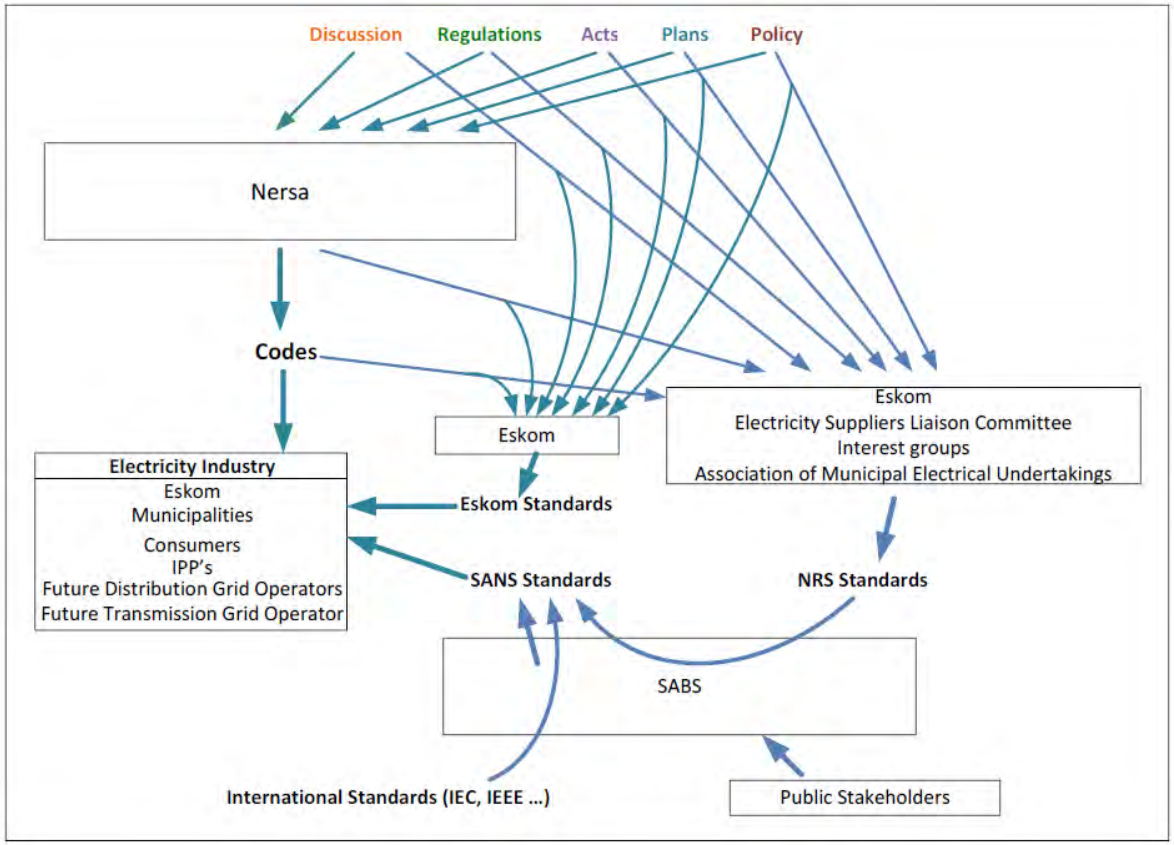


Current situation in South Africa

- Municipal Financial Management Act not a barrier
  - the MFMA's purpose: ensure sound financial management
  - not prevent municipalities from embarking on work which they must do to fulfil their statutory responsibilities
  - nothing in the MFMA which explicitly states that municipalities cannot buy electricity at a rate above the Eskom rate (Mosdell, 2012)
  - municipalities can generate their own electricity
  - decisions should just be justifiable, e.g. to reduce illegal connections, prepare municipality for future with high Eskom prices & new generation technologies

Current situation in South Africa

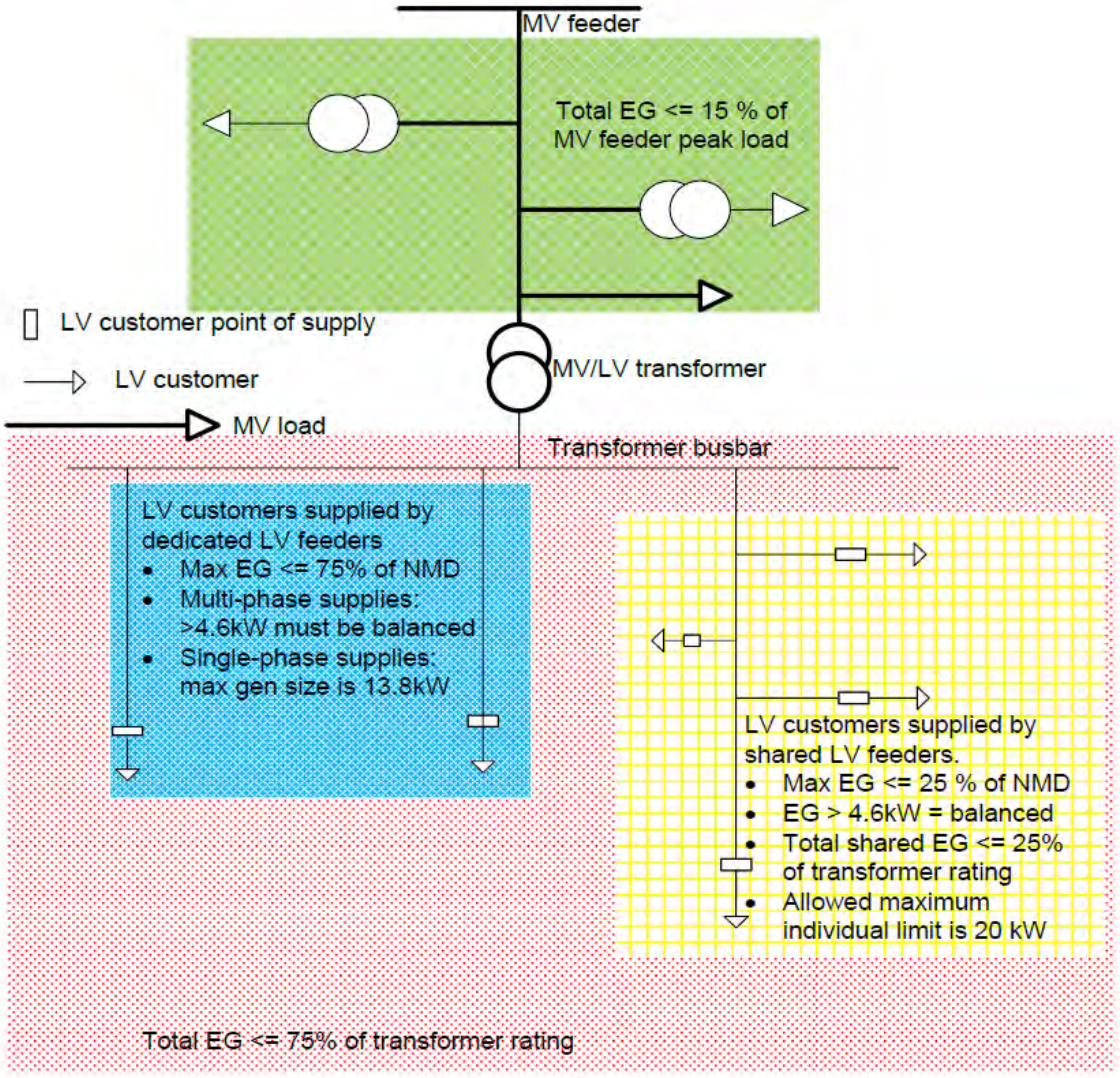
- Codes and standards not complete



Current situation in South Africa

- Codes and standards not complete
- In process of being published:
  - NRS097-2-1 edition 2: Utility interface of embedded generators
  - NRS097-2-3: simplified utility connection criteria for LV connected generators
- Challenge:
  - NRS097-2-2 not in place: Embedded generator requirements
  - Until then: require compliance to NRS097-2-1

Current situation in South Africa



Current situation in South Africa

- Mechanical disk-type meters
  - Suitable for rooftop PV (easy illegal connection)
  - in most cases runs backwards when exporting excess PV energy
- Prepaid meters
  - Not suitable for rooftop PV
  - Trips, or continue to run forward when exporting
  - Need to be replaced with suitable meters

Current situation in South Africa

- Several municipalities already allow PV
  - City of Cape Town
    - no export
    - pilot project with own tariff
  - Ethekwini
    - export allowed at Eskom Megaflex
    - 600kWp own system
  - City of Johannesburg
    - no export
    - Demand Side Management will be compulsory
  - Ekurhuleni
    - no export
    - 200kWp own system

Motivation - municipality

- For:
  - Climate change mitigation
  - Avoidance of “illegal” connections
  - Aligning towards a future with high uptake of rooftop PV
  - Electricity peak allocation restrictions
- Against:
  - Protection of revenue from electricity sales
  - ~~Electricity supply quality and safety~~
  - Avoiding increased administrative burden

Impact of PV on Riversdale

- Rooftop PV will reduce electricity sales
- By how much?
  - Understand Riversdale's current electricity revenue
  - Understand potential uptake of rooftop PV in Riversdale

Riversdale's electricity revenue

Electricity Revenue and Expenses for Riversdale Municipality 2011 / 2012		
Income		R27 590 263
	Electricity sales	R27 142 318
	Service Charge Income	R419 175
	Electrician services and special meter readings	R28 770
Expenses		R26 521 557
	Eskom account	R17 654 582
	Employee related costs	R4 156 874
	Prepaid commission	R191 232
	Depreciation	R944 737
	Repairs and Maintenance	R999 312
	Interest	R814 778
	Other Expenses	R1 582 170
	Provisions	R177 872
	Surplus / (deficit) for the year	R1 068 706 (4,0%)

Riversdale's electricity revenue

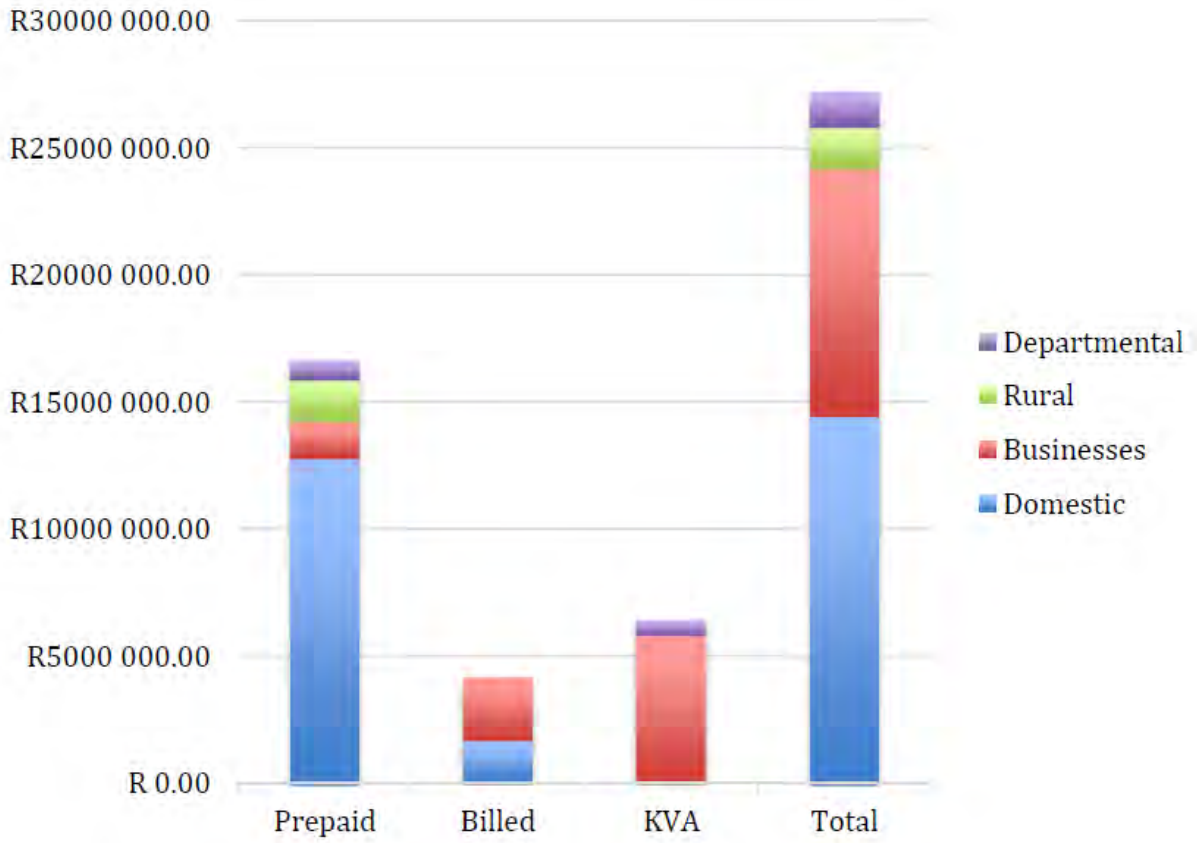
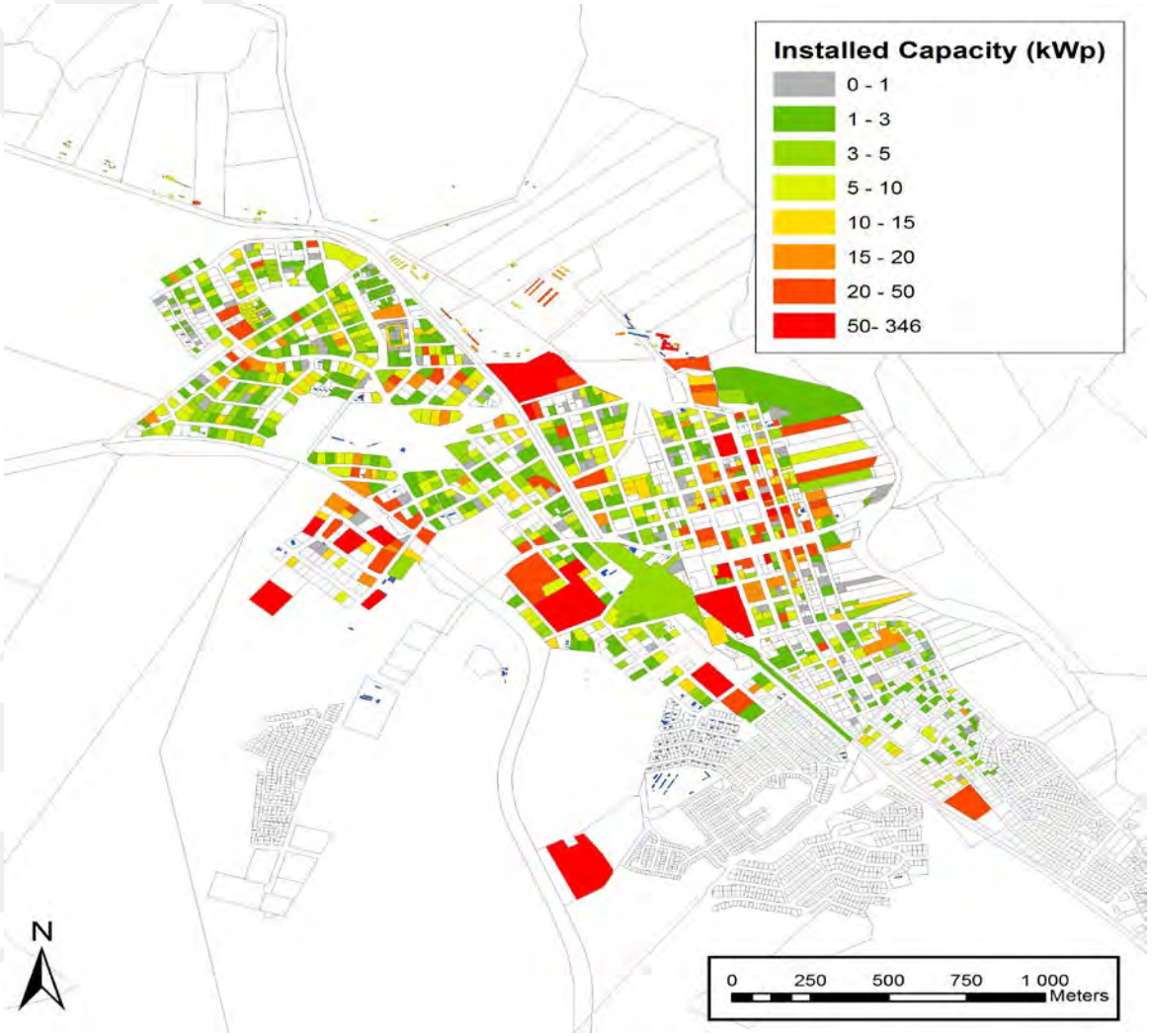


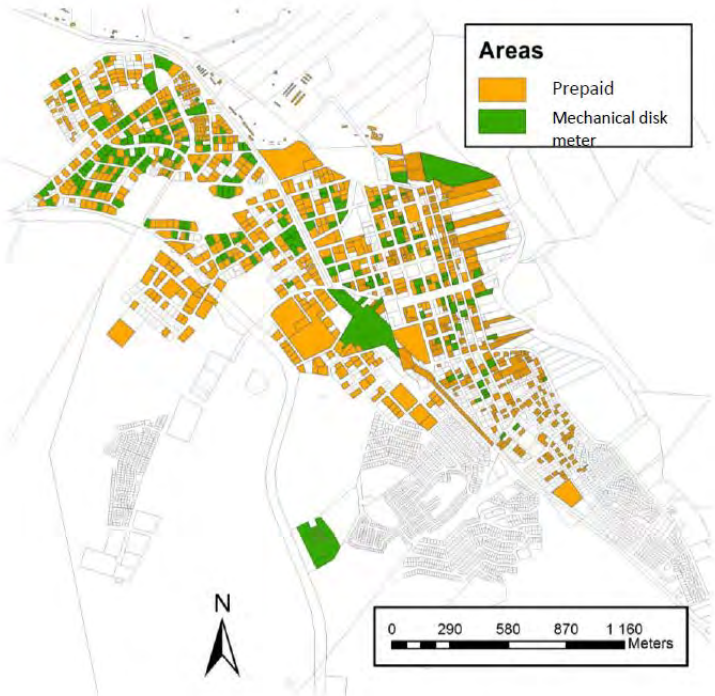
Figure 6-6: Electricity Income Riverdsale - 2011/2012

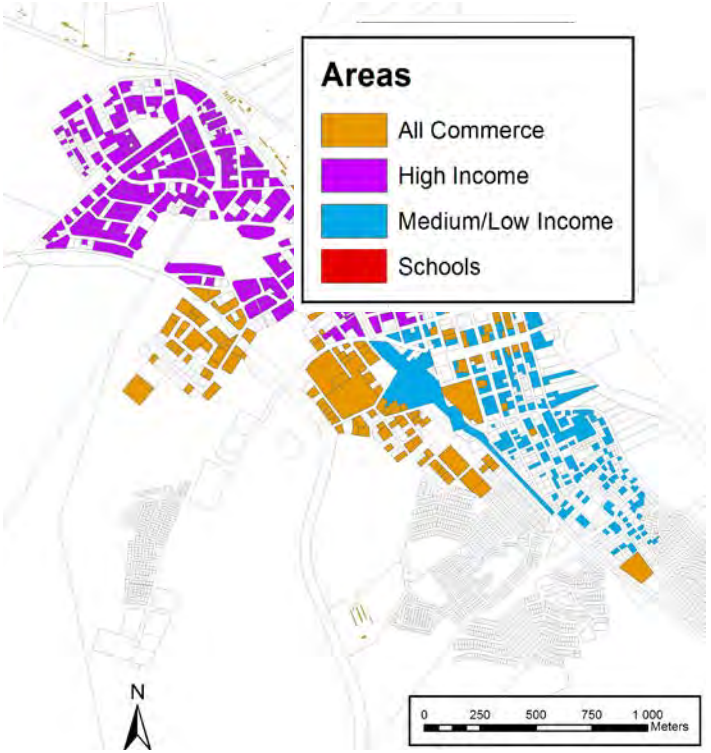
Potential uptake of rooftop PV

Potential uptake of rooftop PV



Potential uptake of rooftop PV





Potential uptake of rooftop PV

Conservative		Erven	PV ins (kWp)	Gen (kWh)
	Residential Single Phase	3	6	8 874
	Residential Three Phase	0	0	0
	Light Commercial	2	20	29 582
	Heavy Industrial	3	120	177 496
Total		8	146	215 954

Table 8-3: Conservative uptake scenario

Generous		Erven	PV ins (kWp)	Gen (kWh)
	Residential Single Phase	15	30	44 374
	Residential Three Phase	1	8	20 412
	Light Commercial	5	50	73 957
	Heavy Industrial	9	360	422 022
Total		30	448	560 765

Table 8-4: Generous uptake scenario

Impact of PV on Riversdale

- Rooftop PV will reduce electricity sales
- By how much?
  - Understand Riversdale's current electricity revenue
  - Understand potential uptake of rooftop PV in Riversdale
- By only a small amount
  - Conservative uptake – 146kWp: 0.2% of electricity sales
  - Generous uptake – 448kWp: 0.66% of electricity sales
  - All rooftops – 9 840kWp: 11% of electricity sales
  - Note: max 1 384kWp allowed for Riverdale (NRS097-2-3)

Unlocking rooftop PV market

1. Finalise technical standards that inform rooftop PV
2. The municipality provides an environment where legal connections are encouraged.
3. Additional incentives are made available that improves the financial viability of rooftop PV.
4. The municipality leads by example.

Why bother as municipality?

- illegal connections problematic: quality of supply, safety, liability
- municipality aligns with national and provincial government policy and decisions.
- builds competency and gains experience with regards to PV systems, and plays a leading and active rather than re-active role in future embedded generation developments.
- empowers the municipality to contribute to the national conversation on related topics.

Proposed next steps

- Identify a rooftop PV champion
- Establish internal rooftop PV working group:
  - Electrical as well as the finance departments
  - Aim: establish an environment where legal connection is encouraged
  - Technical regulations – what is acceptable?
  - Admin systems – what is required?
  - Tariff design (consider externally funded study)
- Join existing regional/national working groups:
  - eg NRS-097 working group

Thank you