



**By 2030 eThekweni will be Africa's  
most caring and liveable city**



# **Durban Solar City Framework**

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# Objectives of the Durban Solar City Framework

- Preparing eThekweni for a solar future
- Promote the uptake of solar technologies on residential and commercial properties in the city
- Remove barriers for PV solar installations
- Promote information sharing among municipalities in encouraging solar installations



# Components of the Framework

- Make Solar PV Financial Models accessible for domestic and commercial properties
- Simplifying Development Applications and Approvals
- Improving grid policies and processes
- Educating and empowering potential prosumers
- Leading by example with installations on municipal properties



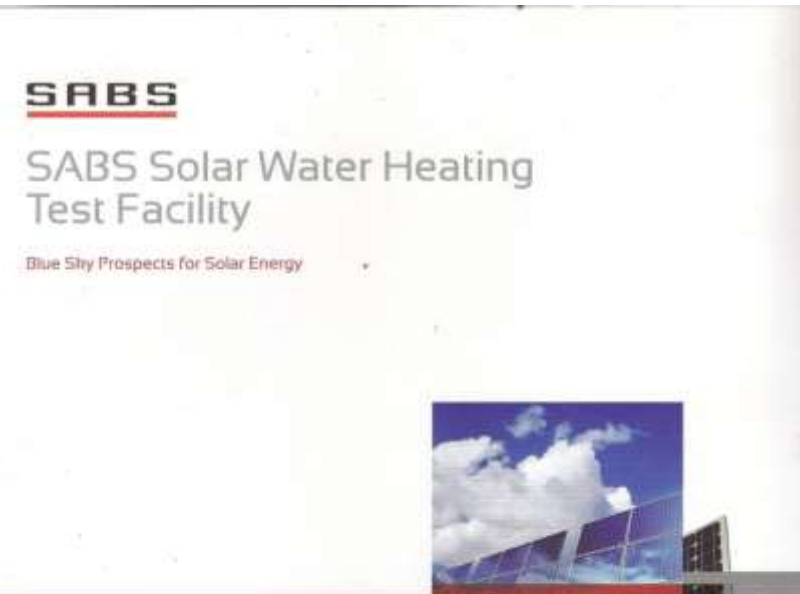
# Simplification of Development Applications for RE

## Recommendations

- Inclusion of PV and SWH installations in Minor Building Works list (implemented)
- Make provision for RE installations in Town Planning Scheme
  - Minor Building Works are ancillary units and exempt from town planning applications



# Educating the Public



## TECHNOLOGIES

for renewable energy and energy efficiency

HOW DO THEY WORK?







▶ Map Data

▼ Solar Calculator

## Solar PV

### Calculations.

Draw PV Area

Clear PV Area

Usable Area

System Size

System Cost

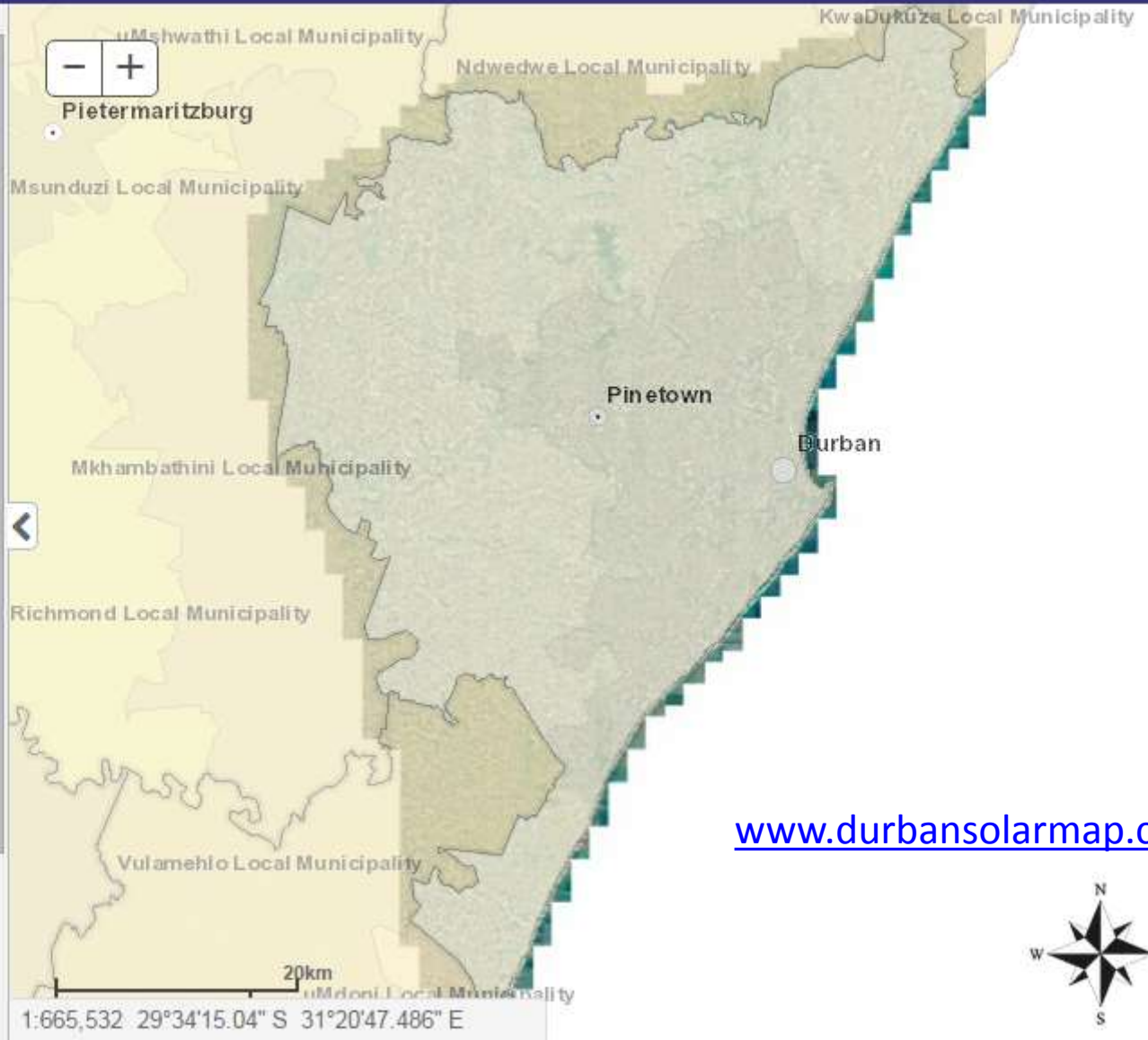
Annual Energy  
Generated

Tariff Charge

Annual Savings  
Amount

More Details ...

▶ Google Street View



[www.durbansolarmap.co.za](http://www.durbansolarmap.co.za)





# Detailed Financial Model

## FINANCIAL MODEL ROOFTOP PV

Output		
Total capacity	10	kWp
Annual insolation	1 890	kWh/m <sup>2</sup>
Performance ratio	83.0%	
Annual degradation	0.30%	
Yearly production (first year)	15 687	kWh
Percent self use	95%	

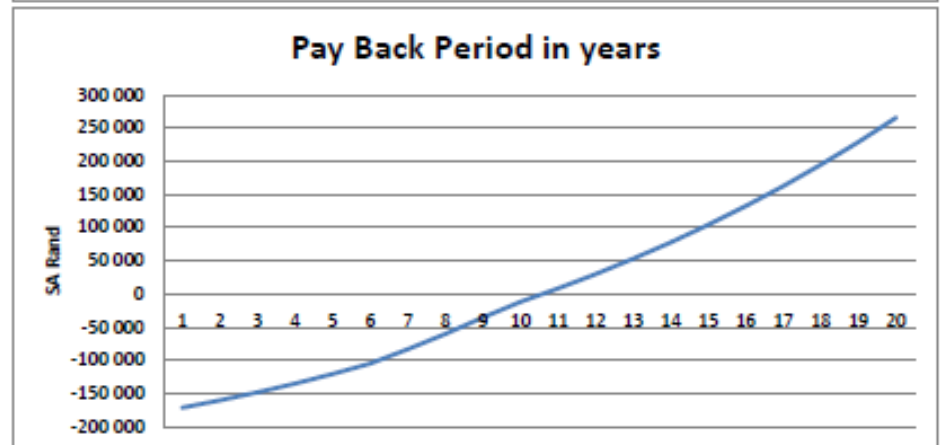
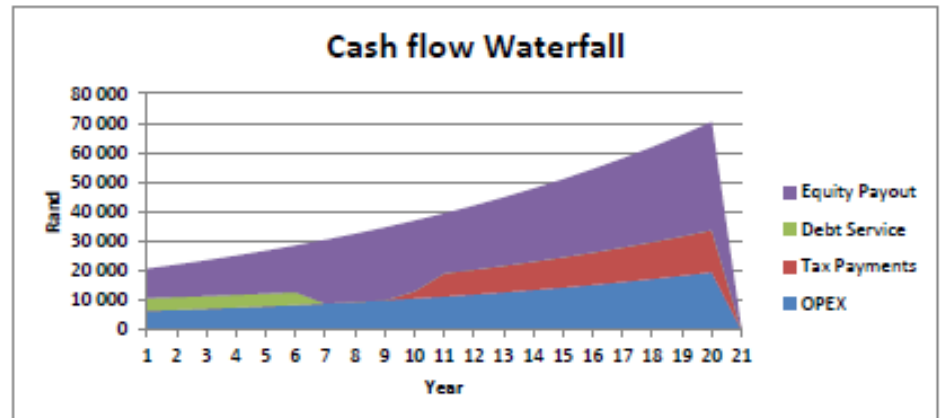
Income and rates		
Customer tariff (avoided electricity)	1.35	R/kWh
Feed in Tariff	0.65	R/kWh
Carbon credit	0	R/kWh
Tax Rate	28%	
Inflation adjustment	7%	per annum

Investment & installation		
Turnkey EPC	18 000	R/kWp
Grid connection	0	R
Project development	1 000	R
Other initial cost	0	R
Decommission	0	R/kWp

Expenses		
Upkeep (first year)	400	R/kWp/annum
Allowance for component change (first year)	1 000	R/annum
Rooftop lease	0	R/annum
Insurance premium	0.8%	of initial invest

Finance structure		
Total investment	181 000	R
Senior Debt Leverage (% bank finance)	10%	
Total debt	18 100	R
Cost of Debt Funding	11%	
Maturity	6	years
Equity	90%	
Total equity	162 900	R

Ratios		
Project Return Post Financing and Tax	10.5%	
ROI (Return on Investment)	10	years



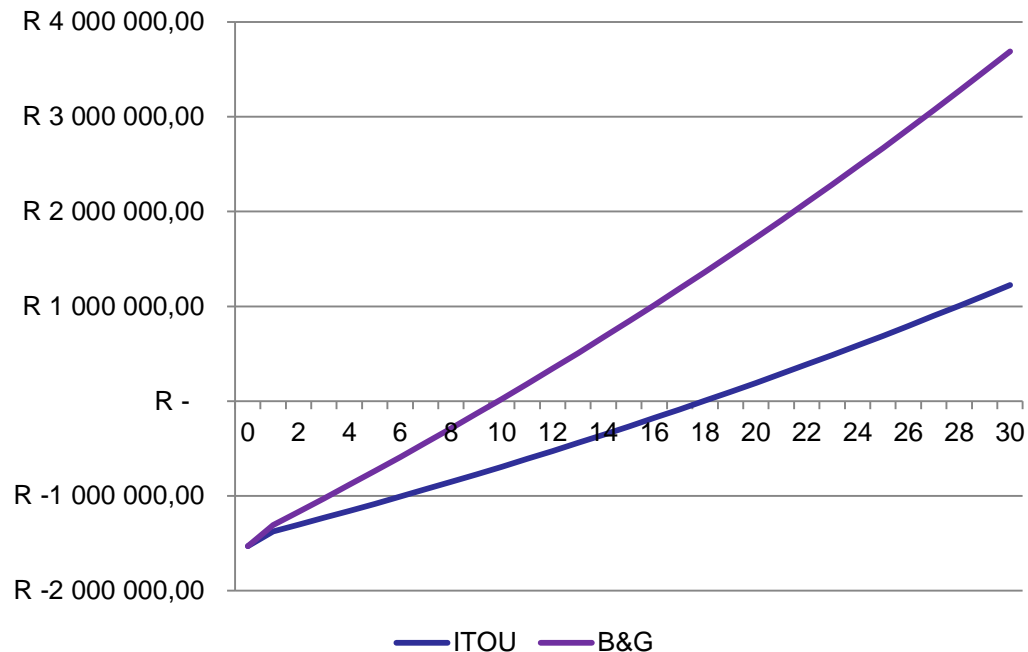


# Municipality Leading by Example Electricity Control Building

Parameter	Silicon
Solar resource	1 869 kWh/sqm/a
Specific yield	1 470 kWh/kW
Installed capacity	90 kWp
Payback Period	
ITOU	18 years
B&G	10 years
Installation Cost	R 1.5 m



**Net Present Value**







# PV roof-top potential in eThekweni Municipality

eThekweni Rooftop PV					
Rooftop	Roof Type	Estimated Area in km <sup>2</sup>	Estimated Area in m <sup>2</sup>	Maximum installed capacity MWp	Annual output MWh
Residential	Flat roof	8.35	8 350 000	1 193.05	854 295.48
	North facing	3.49	3 490 000	498.65	490 116.73
	North east/west facing	13.98	13 980 000	1 997.47	1 144 244.39
	Not usable	24.3	-	-	-
<b>Total</b>		<b>50.12</b>	<b>-</b>	<b>3 689.17</b>	<b>2 488 656.60</b>
Commercial	Flat roof	1.68	1 680 000	240.04	171 882.20
	North facing	1.12	1 120 000	160.03	157 286.75
	North east/west facing	0.36	360 000	51.44	29 465.52
	Not usable	3.58	-	-	-
<b>Total</b>		<b>6.74</b>	<b>-</b>	<b>451.50</b>	<b>358 634.47</b>
Institutional	Flat roof	0.51	510 000	72.87	52 178.53
	North facing	0.57	570 000	81.44	80 047.72
	North east/west facing	0.07	70 000	10.00	5 729.41
	Not usable	1.66	1 660 000	237.18	-
<b>Total</b>		<b>2.81</b>	<b>-</b>	<b>401.49</b>	<b>137 955.65</b>
Industrial	Flat roof	0.14	140 000	20.00	14 323.52
	North facing	4.89	4 890 000	698.68	686 725.16
	North east/west facing	3.15	3 150 000	450.07	257 823.31
	Not usable	12.21	-	-	-
<b>Total</b>		<b>20.39</b>	<b>-</b>	<b>1 168.76</b>	<b>958 871.99</b>
<b>Grand Total</b>		<b>-</b>	<b>-</b>	<b>5 710.92</b>	<b>3 944 118.71</b>

Solar Insolation		
Month	Annual Insolation kWh/m <sup>2</sup> - Flat & North East/West	Annual Insolation kWh/m <sup>2</sup> - North
January	2007.5	1554.9
February	1908.95	1606
March	1726.45	1660.75
April	1467.3	1682.65
May	1204.5	1627.9
June	1062.15	1562.2
July	1131.5	1606
August	1368.75	1697.25
September	1573.15	1606
October	1627.9	1430.8
November	1770.25	1412.55
December	1974.65	1500.15
Mean	1568.59	1578.93
Performance ratio	83%	83%
Spacing loss adjustment	55%	75%
Adjust for east/west roofs	80%	
Average Solar Panel		
kW/m <sup>2</sup>	Length (m)	Width (m)
0.142880217	1.626	0.99



# Thank You

eThekweni Municipality  
**ENERGY OFFICE**

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