OVERVIEW OF MUNICIPAL ROOFTOP PV INSTALLATION

Local Government Energy Support NETWORK MEETING
30 – 31 October 2014

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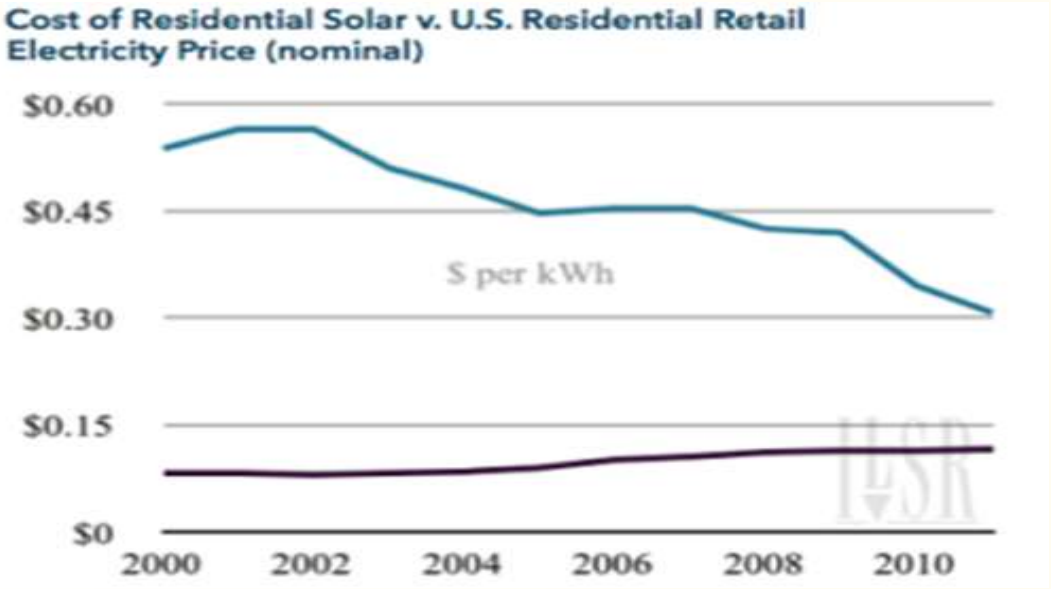
Background

- Rising electricity prices and fast reducing solar PV panels makes PV generation to be a cost competitive option.



- Cities are increasingly recognising solar PV to promote RE and reduce carbon emissions
- Solar PV embedded generation – a new area for municipalities

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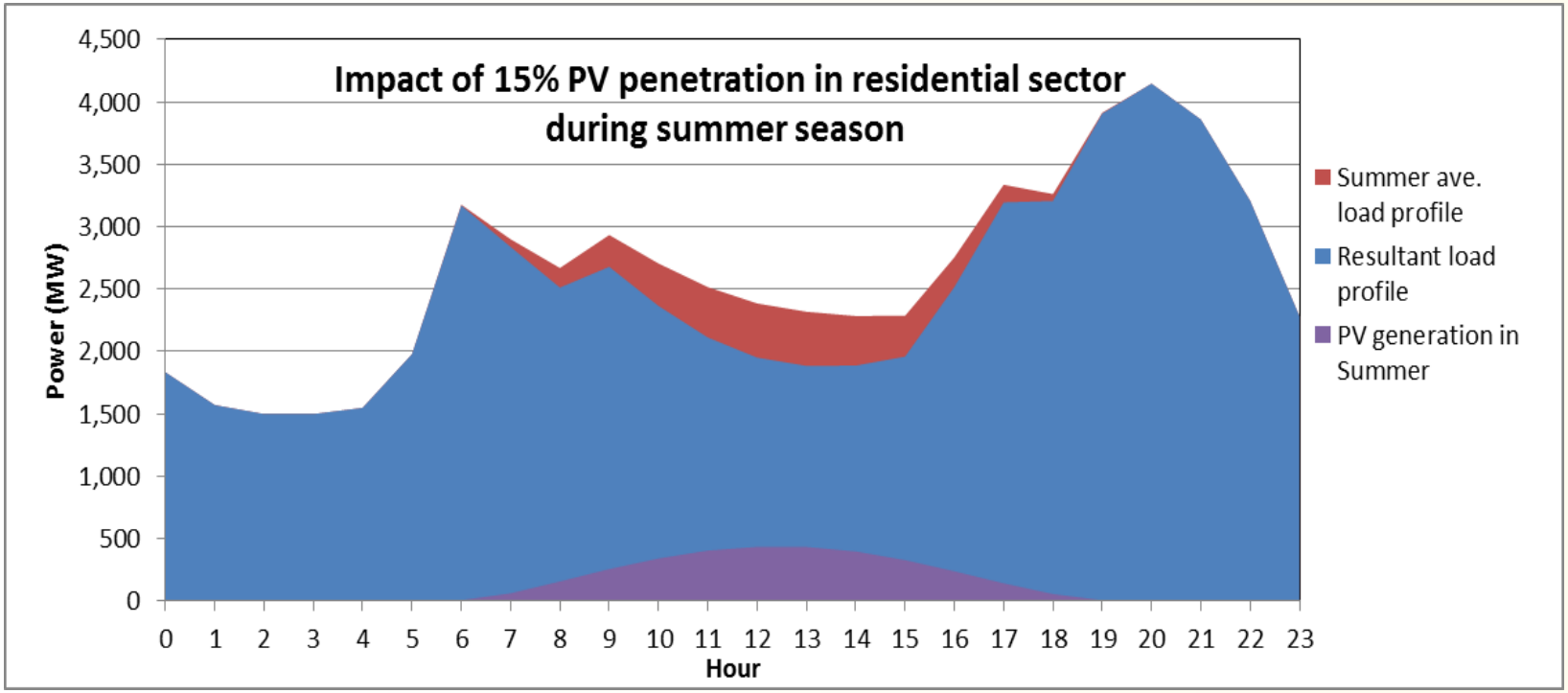
National Impact Analysis

- An assessment of the national impact of the solar PV programme on reducing electricity demands and CO_2 emission can be made
- Assessment was undertaken for each sector



- This can result to the average of 10% drop in the overall electricity demand of the residential sector between 06h00 and 18h00

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National Impact Analysis

Residential sector

- The amount of potential energy saved from solar PV embedded generation over a period of a day is 3 247 MWh
- This amounts to an equivalent CO_2 savings of 87 tonnes

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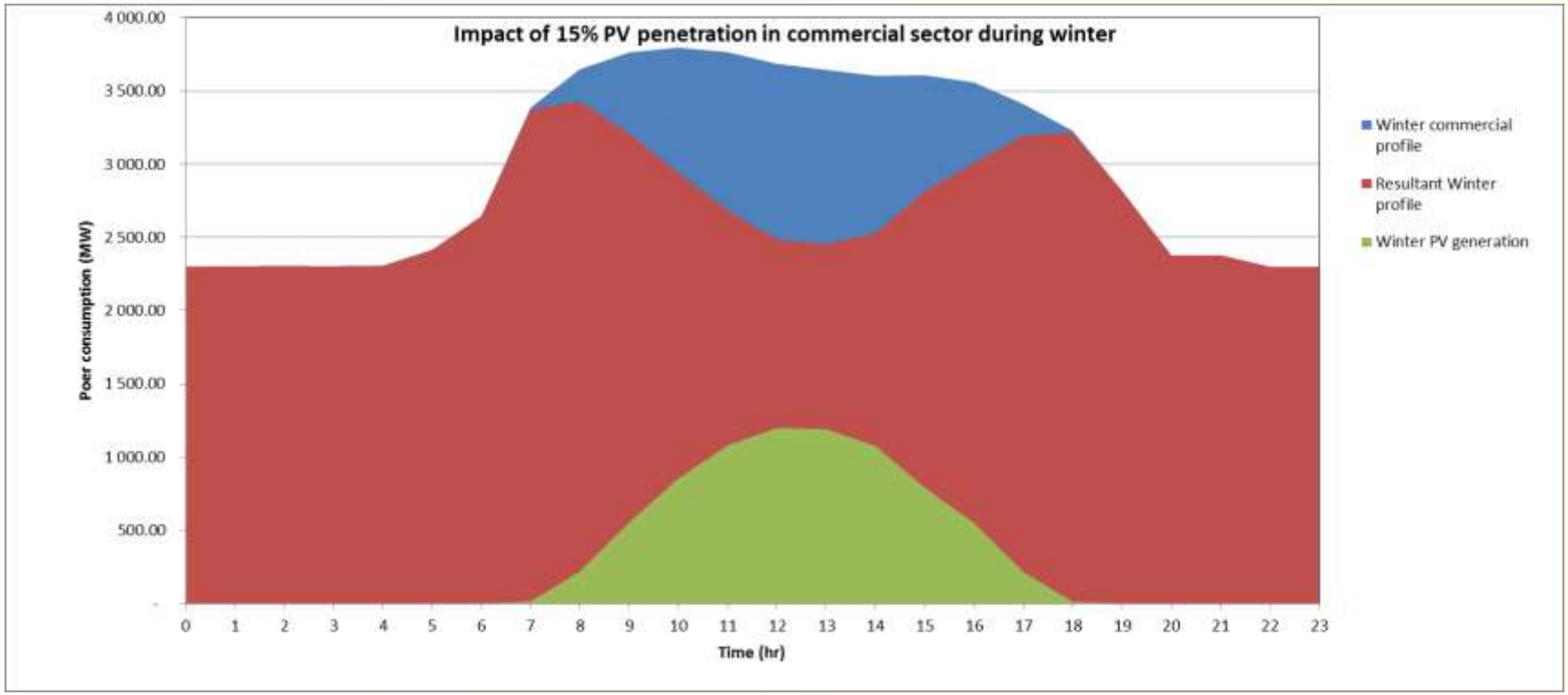
National Impact Analysis

Commercial sector

- Potential electricity demand drop in commercial sector



- This can result to the average of 25% drop in the overall electricity demand of the commercial sector between 06h00 and 18h00

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National Impact Analysis

- **Commercial sector**

- The amount of potential energy can be saved over this period is 9 090 MWh
- This gives CO_2 equivalent savings of 242 tonnes

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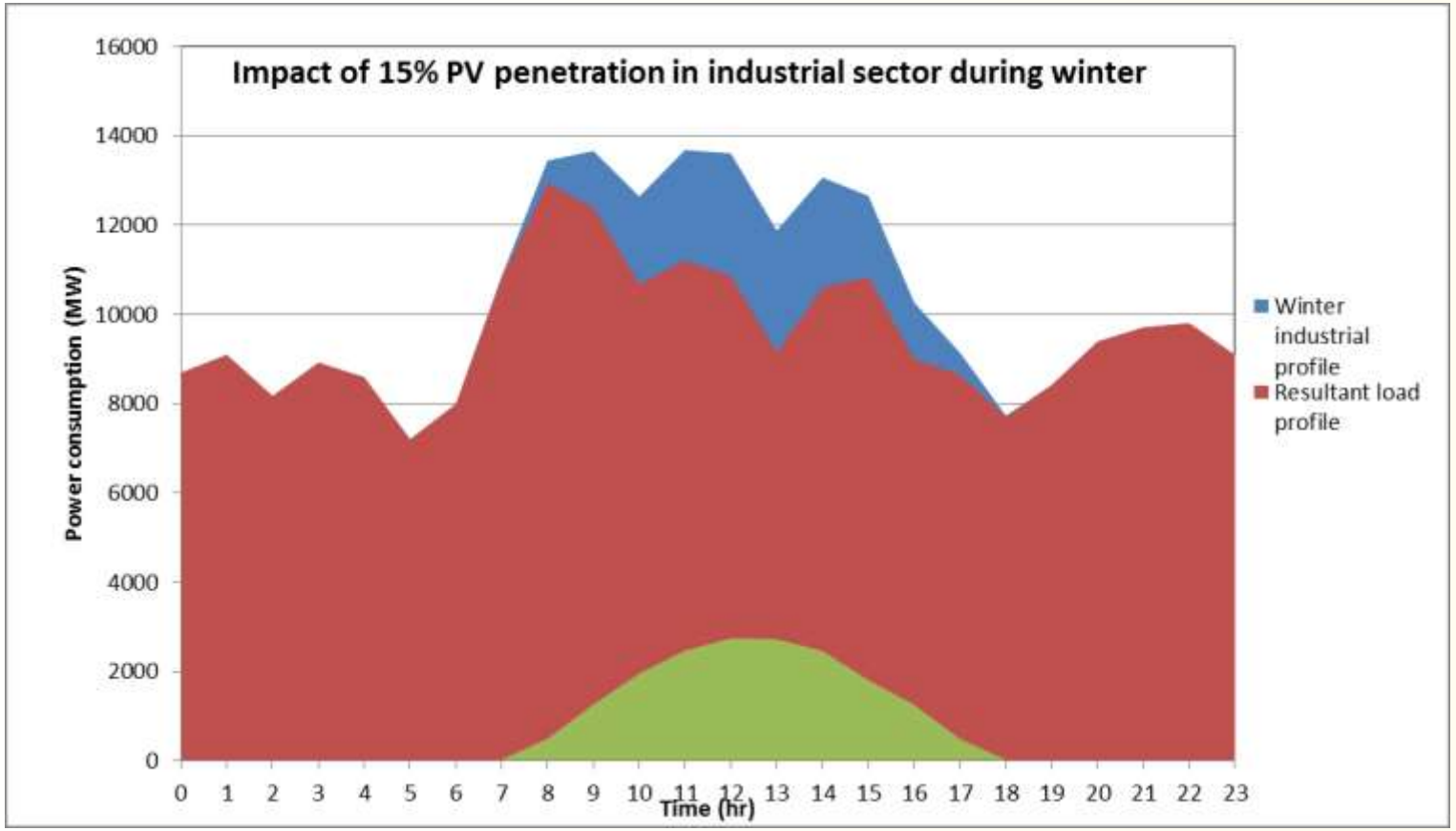
National Impact Analysis

- Potential demand drop in the industrial sector



- This can result to the average of 13% drop in the overall electricity demand of the industrial sector between 06h00 and 18h00

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National Impact Analysis

- **Industrial sector**

- The amount of potential energy can be saved over this period is 17 698MWh.

- This gives CO_2 equivalent savings of 472 tonnes

BHC funded Project on rooftop embedded solar PV generation

- Initiation of a rooftop solar PV programme in South Africa's metros:
  - City of Cape Town
  - EThekwini Municipality
  - Ekurhuleni Municipality Central City zones

- This was undertaken through:
  - feasibility analyses (financial and technical)
  - system installation
  - and capacity building through knowledge and lessons shared among other South African cities

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Technical Feasibility

How it was undertaken:

Mapping of the rooftop of central city buildings using Tatuks GIS (available for free GIS tool)

- Select a standard block within the CBD
- Measure the area of the roof space within the selected block
- Measure the size of the areas which are not compatible with PV

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PV embedded generation potential in central cities

Name of City	CBD size (m^2)	Usable space	PV potential (MWh/day)	PV capacity (MW)
Cape Town	1 982 027	17%	278	46
Durban	3 265 515	39%	536	80
Joburg	4 320 343	10%	388	65
Pretoria	3 511 514	19%	629	104
Germiston	314 438	22%	65	11
Bloemfontein	998 532	28%	300	50
PE	975 202	30%	225	37
East london	950 246	29%	177	29

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Examples of PV generation potential in industrial zones

- Epping industrial zone in City of Cape Town

Average usable space	90%
Total usable roof area (m^2)	5 005 396
PV potential generation (MWh/day)	303
Potential PV capacity (MWp)	51

Evaluation of potential impact of PV installation in central City of Cape Town

- The potential impact on PV generation on the central City of Cape Town

Annual CBD energy consumption (MWh)	1 972 222
Daily PV gen. potential (MWh)	278
Annual PV gen. potential (MWh)	101 470
Potential impact by PV installation	5%

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Financial feasibility

- **PV cost benefit analysis tool**
  - This tool has been developed by Sustainable Energy Africa (SEA), with funding from the Renewable Energy and Energy Efficiency Partnership (REEEP)
  - Tool developed for municipalities in South Africa and is available at no cost
  - It calculates the payback period (PBP) for PV installed at different times into the future for each sector
  - The results can be used to assist with developing uptake projections for PV in each sector
  - It takes into consideration all costs for PV generation, electricity tariffs, taxes and subsidies into the future, and the PBP using various repayment options.
  - It is available at www.cityenergy.org.za

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Results of the tool

- Presents 3 time lines of installation, i.e. Now, in 5 or 10 years, the Pay Back Periods will be as follows:
- Favourable Payback periods (PBPs) are highlighted (in white). These are those that are less than 3 years, or have a monthly loss that is less R100.

	Install now			
Financing arrangement		**0%**	**18% over 5yrs**	**8.5% over 10yrs**
Resid	**PBP (year)**	8	11	10
	Max annual loss	R 49 045	R 12 313	R 3 275
	Monthly loss	R 4 087	R 1 026	R 273
Comm	**PBP (year)**	6	8	2
	Max annual loss	R 42 055	R 8 452	R 184
	Monthly loss	R 3 505	R 704	R 15
Industrial	**PBP (year)**	8	11	10
	Max annual loss	R 35 210	R 8 844	R 2 357
	Monthly loss	R 2 934	R 737	R 196

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Results of the tool

- **If installed in 5 years time**

	Install in 5 years			
Financing arrangement		**0%**	**18% over 5yrs**	**8.5% over 10yrs**
Resid	**PBP (year)**	6	9	4
	Max annual loss	R 52 565	R 11 827	R 1 804
	Monthly loss in 2013 ZAR	R 3 509	R 790	R 120
Comm	**PBP (year)**	4	6	1
	Max annual loss	R 42 082	R 4 814	-R 4 355
	Monthly loss in 2013 ZAR	R 2 809	R 321	-R 291
Industrial	**PBP (year)**	6	8	2
	Max annual loss	R 36 846	R 7 605	R 410
	Monthly loss in 2013 ZAR	R 2 460	R 508	R 27

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Results of the tool

- **If installed in 10 years time**

	Install in 10 years			
Financing arrangement		**0%**	**18% over 5yrs**	**8.5% over 10 yrs**
Resid	**PBP (year)**	5	7	1
	Max annual loss	R 57 400	R 11 035	-R 373
	Monthly loss in 2013 ZAR	R 2 904	R 558	-R 19
Comm	**PBP (year)**	3	2	1
	Max annual loss	R 43 686	R 1 271	-R 9 165
	Monthly loss in 2013 ZAR	R 2 210	R 64	-R 464
Industrial	**PBP (year)**	5	7	1
	Max annual loss	R 39 901	R 6 621	-R 1 567
	Monthly loss in 2013 ZAR	R 2 019	R 335	-R 79

BHC funded project support given to Cities

- **Support given to CCT**

  - Implement a 10kWp PV system in one of the city buildings. Cape Town has completed the 10kW solar PV installation at Gallows Hills, a municipal-owned building. SEA provided guidance in the specifications as well as compliance issues.

  - Provided support with the preparation of tender documentation, evaluation and appointment of a contractor for an additional 80kWp system in one of their buildings. SEA also supported CCT with choosing appropriate building and evaluated its PV generation potential.

  - Developed guidelines for embedded generation applications. SEA has developed guidelines to allow PV generators to connect to the municipal grid.

- **Support given to eThekwini**

  - Assess 17 City buildings for PV generation potential.
  - Prepare tender documentation for a consultant who will manage the installation of 500kWp of PV on City rooftops.
  - EThekwini has committed R1 million in the next financial year to appoint a consultant to draw up the plans and manage the implementation of R10 million worth of PV in 5 buildings in the City.
  - The BHC project has assisted in determining which 5 buildings would be optimal for such project.
  - Prepare tender documentation for the procurement and installation of PV.

- **Support given to EMM**

  - Assessed 6 City buildings for PV generation potential. The BHC project assisted Ekurhuleni in deciding which buildings to select by commissioning a study by a PV expert.
  - They were planning to install 2 X 150kWp system, SEA recommended suitable buildings for this
  - SEA assisted Ekurhuleni to prepare tender documentation for the installation of 2 x 150kWp systems on City buildings.

Thank You

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