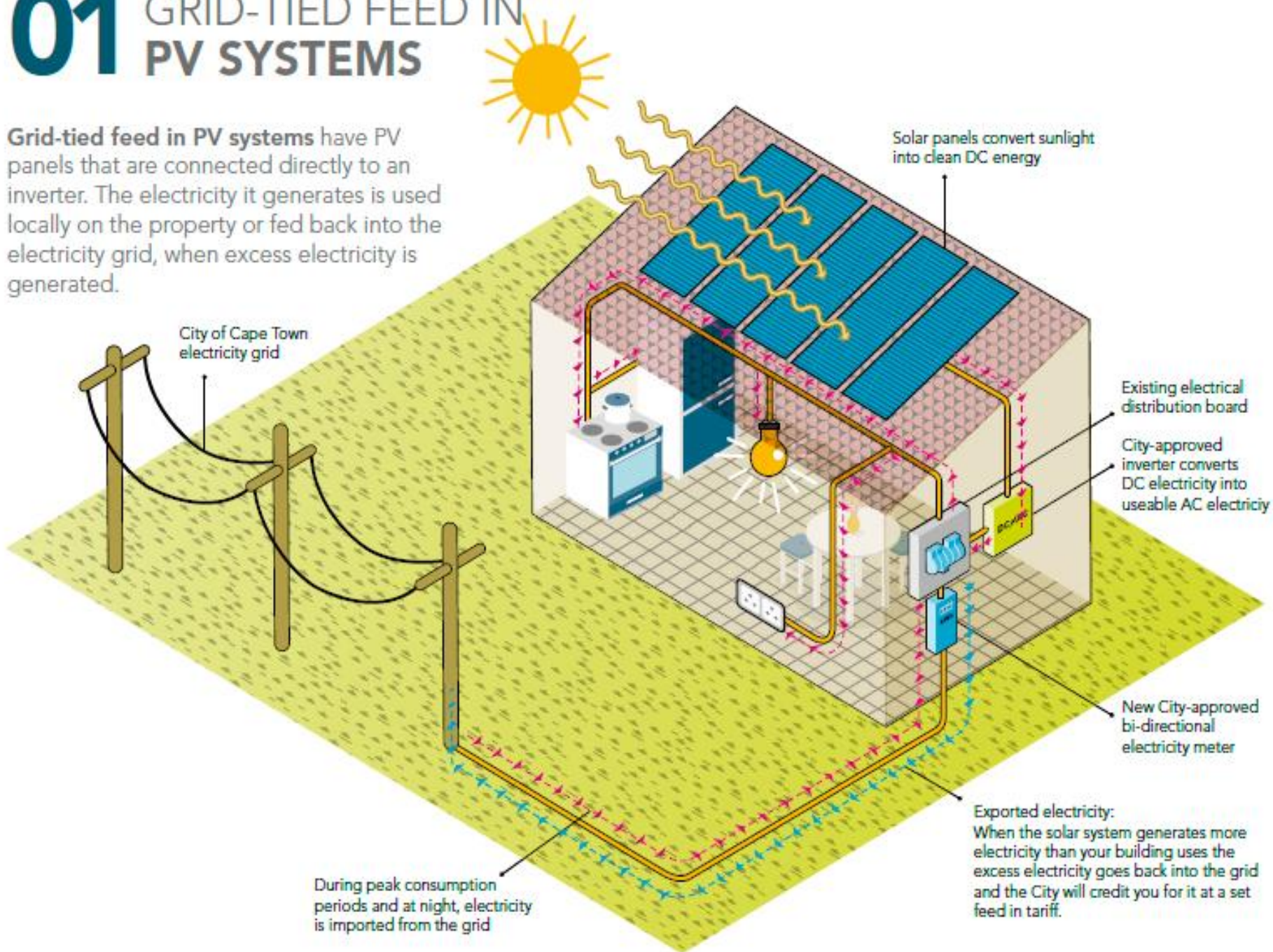


Standards and Specifications for SSEG – Overview



01 GRID-TIED FEED IN PV SYSTEMS

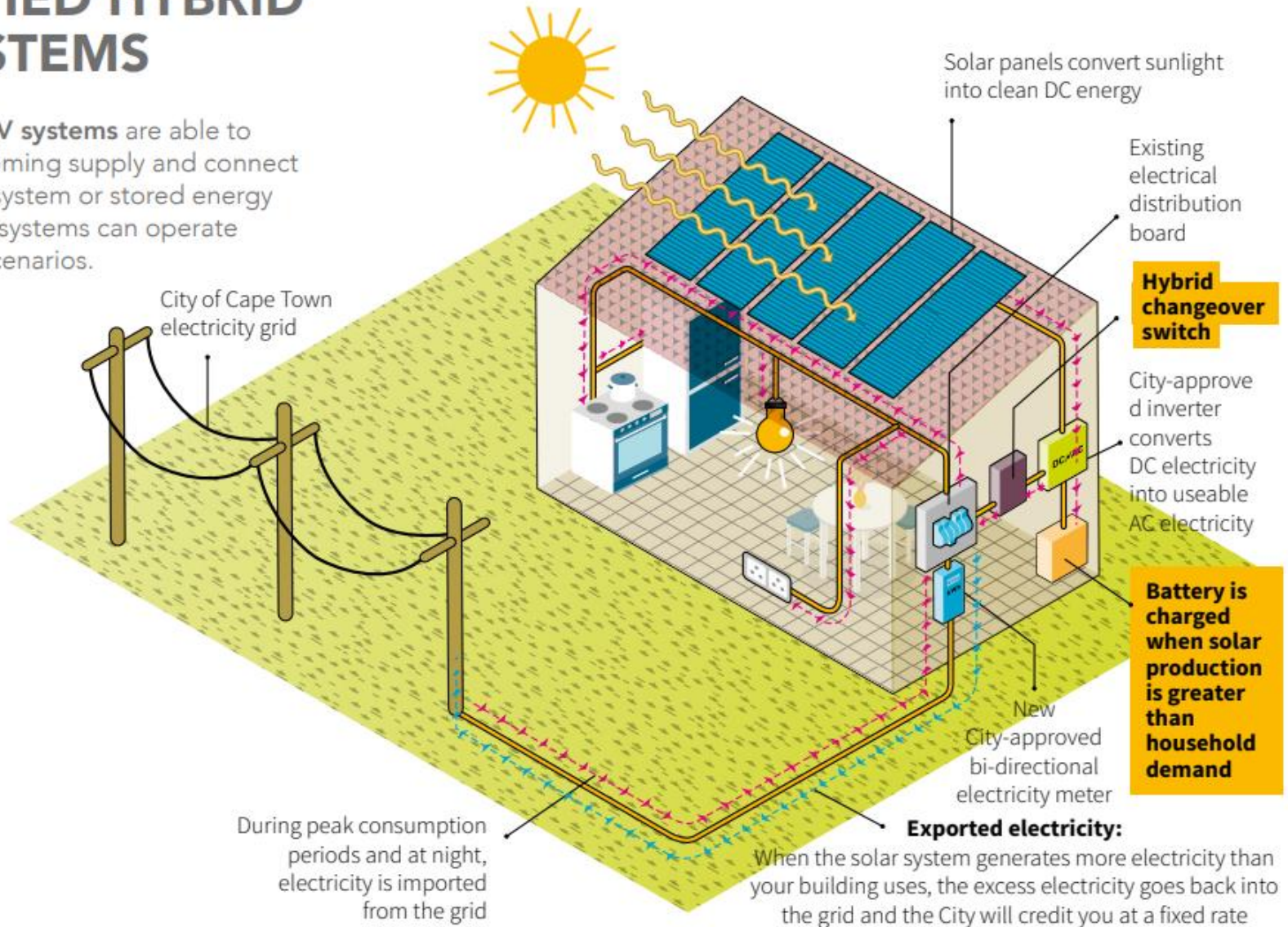
Grid-tied feed in PV systems have PV panels that are connected directly to an inverter. The electricity it generates is used locally on the property or fed back into the electricity grid, when excess electricity is generated.





B. GRID-TIED HYBRID PV SYSTEMS

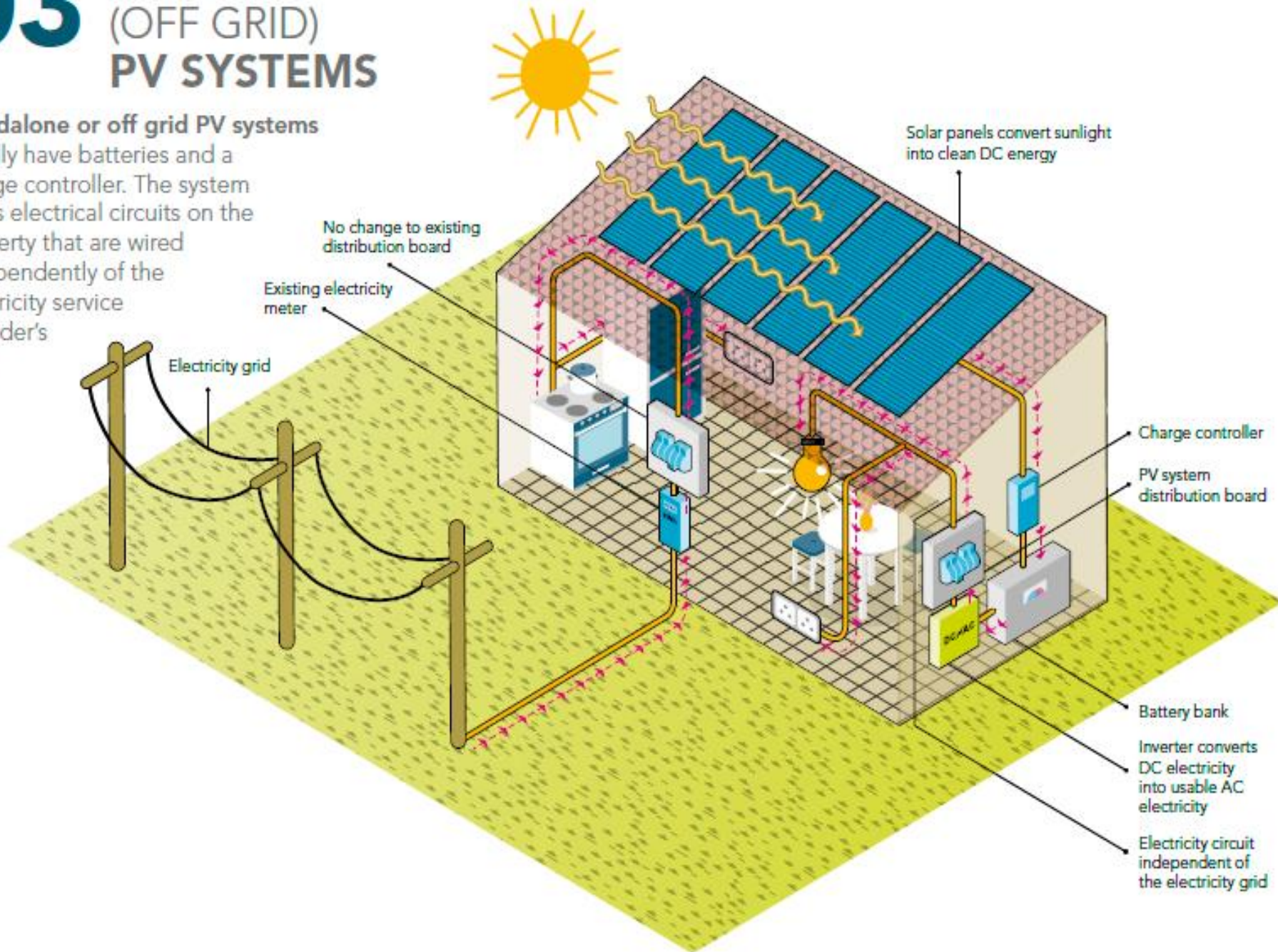
Grid-tied hybrid PV systems are able to disconnect the incoming supply and connect the load to the PV system or stored energy in **batteries**. These systems can operate in load-shedding scenarios.



03 STANDALONE (OFF GRID) PV SYSTEMS

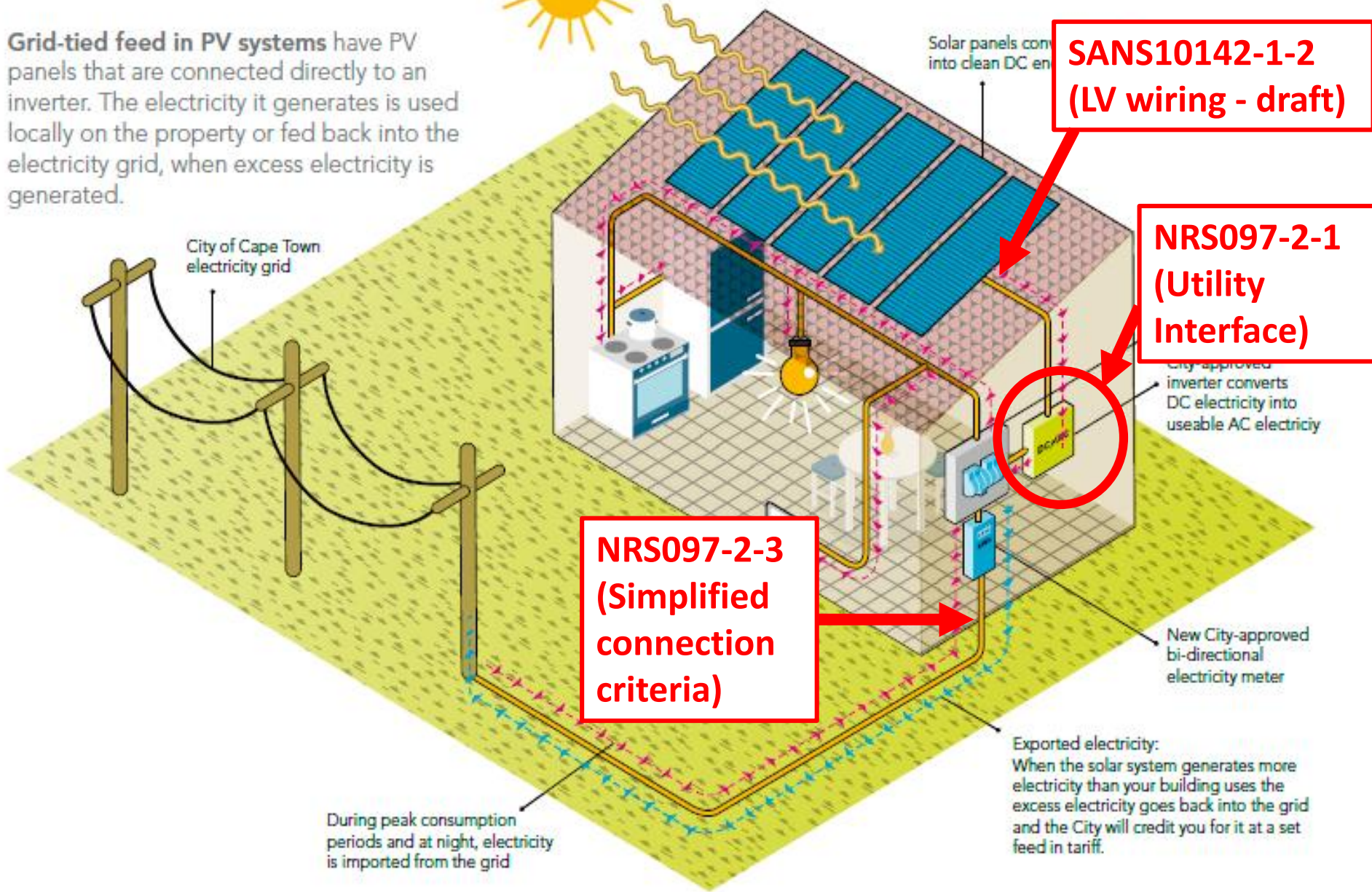
Standalone or off grid PV systems

usually have batteries and a charge controller. The system feeds electrical circuits on the property that are wired independently of the electricity service provider's grid.



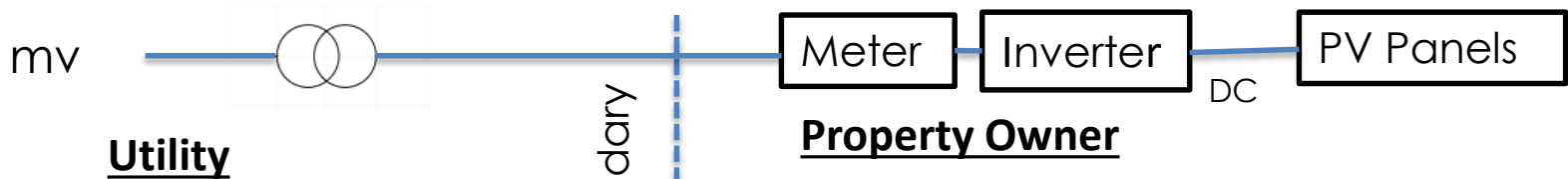
01 GRID-TIED FEED IN PV SYSTEMS

Grid-tied feed in PV systems have PV panels that are connected directly to an inverter. The electricity it generates is used locally on the property or fed back into the electricity grid, when excess electricity is generated.





Applicable Legislation



OHS Act

- Safety of staff
 - Electrical Machinery Regs
 - Electrical Installation Regs

Electricity Regulation Act

- Generation License
- Distribution License
 - Distribution Grid Codes
 - (draft) Small Scale Electricity Generation Regulations

Property Owner

OHS Act

- Safety of Installation
 - Electrical Installation Regs
 - Wiring Code
 - **SANS10142-1-2**
 - CoC

Electricity Regulation Act

- Generation License requirements
- **NERSA Rules for SSEG**
- Utility Electricity By-law
 - **Municipal Requirements for SSEG**
 - **NRS 097-2-1**
 - **NRS 097-2-3**



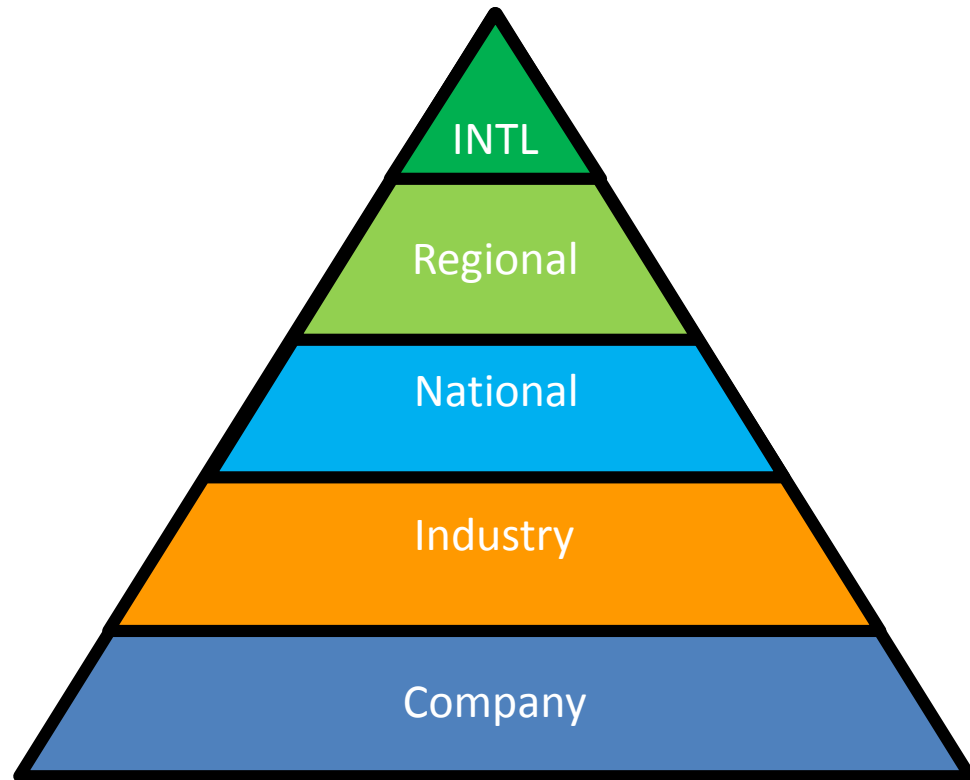
Overview: Technical Standards

- Key South African Documents
 - **NRS 097** (Industry Specifications)
 - **SANS 10142-1-2** (Wiring Standard for SA)
 - **RPP Grid Code** (Required by NERSA)
 - **NRS 052 / SANS 959** (Off Grid PV systems)
 - **NRS 048** (Power Quality)
- International Documents
 - **IEC 62109**: Safety of power converters for use in photovoltaic power systems



Standards and Specifications

- NOTE: No standard means anything until promulgated by a regulatory body
- International
 - IEC / IEEE
- Regional
 - EN / AFSEC
- National
 - SABS
- Industry
 - NRS
- Company
 - Internal





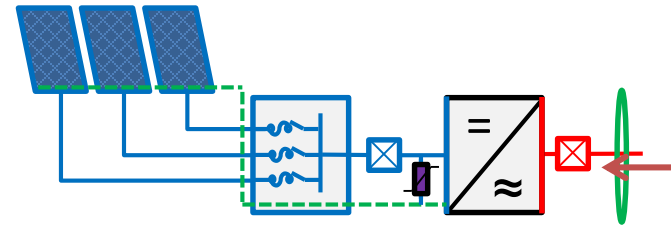
Standards and Specifications

- NOTE: No standard means anything until promulgated by a regulatory body
- NERSA
 - National Energy Regulator of South Africa
- ICASA
 - Independent Communications Authority of South Africa
- NRCS
 - National Regulator for Compulsory Specifications

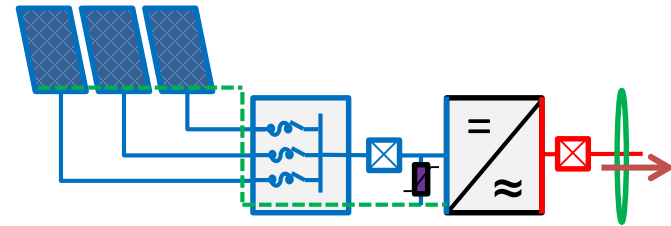


NRS 097-2-1

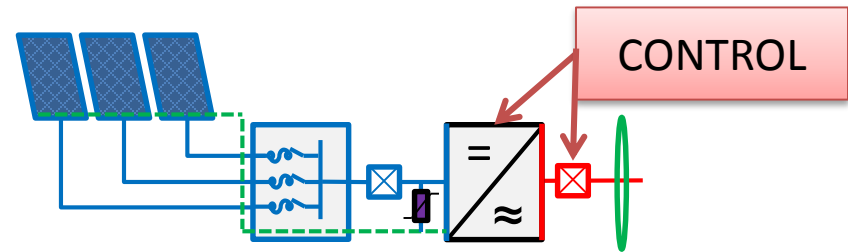
- Summarise as:
 - What to expect?



- What is allowed?



- What to do?





Approved EG list: Example



ELECTRICITY SERVICES

TYPE TESTED INVERTERS/EQUIPMENT IN TERMS OF NRS 097-2-1

2016 12 21

Make	Model	Test House	Certificate date	Valid until	Report number	Certificate of Compliance number	Comments
ABB	PRO-33.0-TL-OUTD-400	Bureau Veritas	2014/10/10	*	13TH0463-NRS 097-2-1	U14-0530	The unit must be provided with an external RCMU type B
ABB	PRO-33.0-TL-OUTD-S-400	Bureau Veritas	2014/10/10	*	13TH0463-NRS 097-2-1	U14-0530	The unit must be provided with an external RCMU type B
ABB	PRO-33.0-TL-OUTD-SX-400	Bureau Veritas	2014/10/10	*	13TH0463-NRS 097-2-1	U14-0530	The unit must be provided with an external RCMU type B
ABB	PVI-13.8-TL-OUTD	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-13.8-TL-OUTD-S	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-13.8-TL-OUTD-FS	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-13.8-TL-OUTD-W	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-12.5-TL-OUTD	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-12.5-TL-OUTD-S	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-12.5-TL-OUTD-FS	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-12.5-TL-OUTD-W	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-11-TL-OUTD	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-11-TL-OUTD-S	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-11-TL-OUTD-FS	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-11-TL-OUTD-W	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-10-TL-OUTD	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-10-TL-OUTD-S	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-10-TL-OUTD-FS	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-8-TL-OUTD	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-8-TL-OUTD-S	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-8-TL-OUTD-FS	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-6-TL-OUTD	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-6-TL-OUTD-S	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	PVI-6-TL-OUTD-FS	TUV Rheinland	2015/02/08	*	28 107 377 001	AK 60099744 0001	
ABB	TRIO-8.5-TL-OUTD-400	TUV Rheinland	2013/11/28	*	28 106 226 001	AK 60090280 0001	
ABB	TRIO-8.5-TL-OUTD-S-400	TUV Rheinland	2013/11/28	*	28 106 226 001	AK 60090280 0001	



NRS 097-2-3 Summary

- Simplified Connection Criteria
- Flowchart
- Basic checks
 - Customer size
 - Thermal loading of feeder
 - Fault level > 210 A
- Total installed capacity as percentage of:
 - MV/LV Transformer size
 - MV Feeder loading
 - Network loading (HV/MV substation)
- If not meet - detailed studies



SANS 10142-1

- Department of Labour
 - Determined by Minister
- Enable by the OHS Act
- Supported by the Electricity Installation Regulations
- SANS 10142-1



Technical Standards and Specifications

Questions?