



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD



Solar PV at the City's Royal Ascot building. Photo credit: Bruce Sutherland, City of Cape Town.

SAFE AND LEGAL INSTALLATIONS OF ROOFTOP PHOTOVOLTAIC SYSTEMS COMMERCIAL AND RESIDENTIAL - IN CAPE TOWN

If you are considering installing a rooftop photovoltaic (PV) system, but you are not sure how to do it safely and legally, these guidelines will help you to:



Make informed decisions about what type of PV system you are allowed to install.



Select a service provider capable of designing, supplying, installing and commissioning your PV system safely and legally.






Ensure you have addressed all the key requirements before, during and after installation.

Making progress possible. Together.

BACKGROUND

It has come to the attention of the City of Cape Town that certain rooftop PV systems are being poorly installed while others are being connected to the electricity grid illegally.

These incidents are a safety concern for three reasons:

-  The household's safety will be compromised by exposing it to the risk of electrical fires and electric shocks from poor quality installations that do not meet national wiring standards.
-  The safety and the power quality of the electricity grid will be compromised by illegal connections that use the wrong equipment or by adding unplanned generation capacity to a part of the network not designed to carry it.
-  The safety of City of Cape Town electricity staff working on the reticulation network could be compromised by electricity feeding into the grid from the illegally connected PV installations.

While there are compulsory wiring standards for general electrical installations, there is no dedicated national standard for PV installations yet.

Nor is there a nationally approved training and accreditation system specifically for PV installers yet.

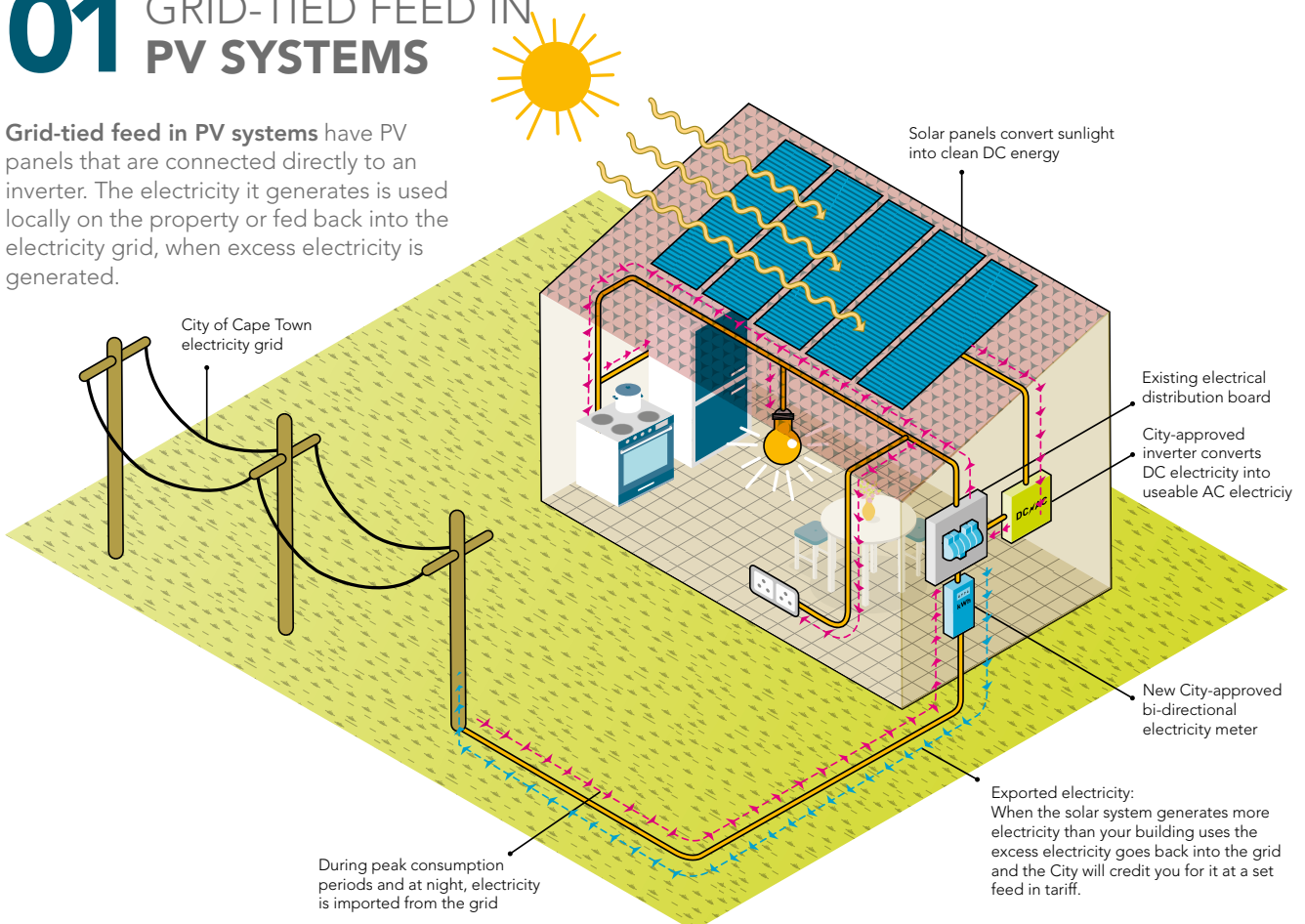
This does not mean that you are not allowed to install a PV system. But without these quality reference points, you need to know how to ensure a safe installation and a good quality product that complies with the law.

DECIDING ON THE SYSTEM YOU WANT

THERE ARE THREE TYPICAL CONFIGURATIONS FOR RESIDENTIAL AND COMMERCIAL PV SYSTEMS:

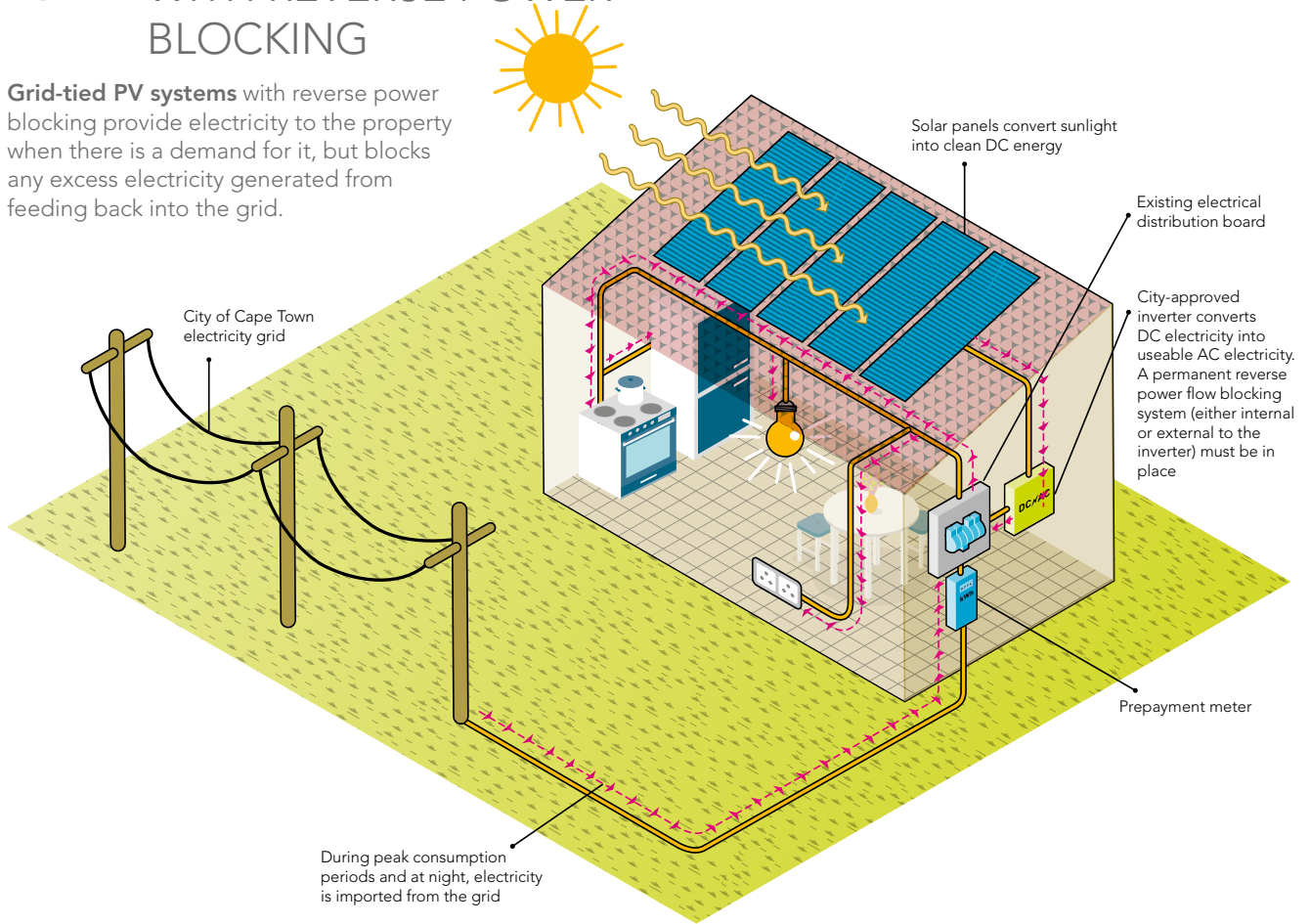
01 GRID-TIED FEED IN PV SYSTEMS

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.



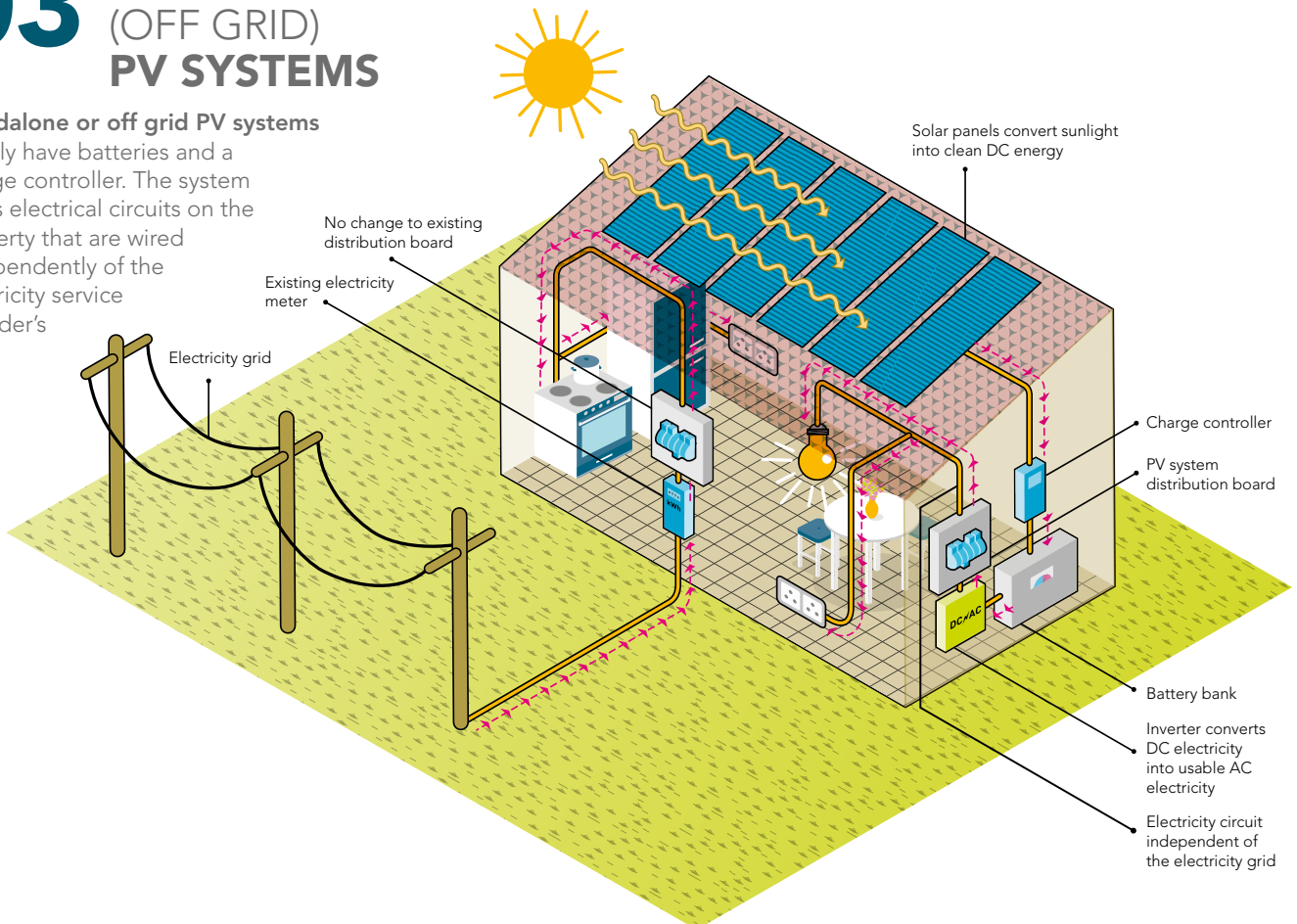
02 GRID-TIED PV SYSTEMS WITH REVERSE POWER BLOCKING

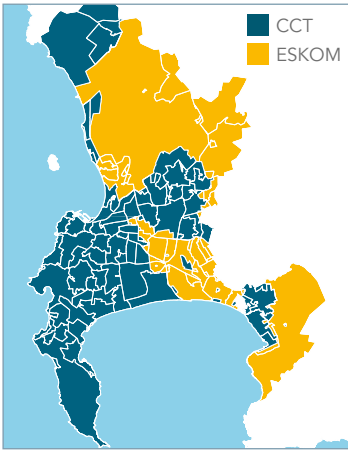
Grid-tied PV systems with reverse power blocking provide electricity to the property when there is a demand for it, but blocks any excess electricity generated from feeding back into the grid.



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.





The City distributes electricity to 75% of Cape Town, while Eskom distributes electricity directly to the remaining 25%.

Make sure you know who distributes electricity to your area.

Standalone PV installations are permitted in both these areas. But at present, only the City allows you to connect your PV system to the grid. If you are in an Eskom area, your system will need to operate independently of the grid.

TYPE OF INSTALLATION	PERMITTED IN CCT AREA?	PERMITTED IN ESKOM AREA?
Grid-tied	Yes	No
Standalone	Yes	Yes

PLEASE READ THE FOLLOWING NOTES

01 If you live in an Eskom distribution area and you install a grid-tied system, you will do so illegally.

02 If you live in a City of Cape Town distribution area, you may install a grid-tied system, but you will require prior written approval from the City of Cape Town's Electricity Services Department. If you connect without notifying the City, you will be doing so illegally. To grid tie and feed in, you will require a specialised meter and you will be placed on a new tariff. To grid tie with reverse power flow blocking, you must have a prepayment meter and will remain on your existing tariff. For details on how to grid tie, consult the City's Small Scale Embedded Generation Requirements at: www.capetown.gov.za/ElecServiceForms, under 'Reference documents'.

03 Standalone (off-grid) PV installations do not require approval from the City or Eskom. However, your distributor may require a Certificate of Compliance (CoC) issued by a registered electrician, verifying that the installation is connected and operated off-grid, as defined.



Grid-tied PV system at Black River Park. Photo credit: Bruce Sutherland, City of Cape Town.



CHECKLISTS FOR SAFE AND LEGAL ROOFTOP PV INSTALLATIONS

01 ENSURING A QUALITY INSTALLATION SERVICE

There are many PV service providers currently operating in Cape Town. This checklist will reduce the risk of a poor or illegal installation.

✓ BUSINESS PERFORMANCE

Verify if the PV service provider has substantial prior experience in PV installations and ask for references with contact details. Establish whether the PV service provider designed, supplied and installed the systems or only carried out one or two of these steps.

The service provider could have subcontracted some tasks and you need to check references for the sub-contractors, as well. References are a good way to determine whether the PV service provider is competent and skilled to design and install your PV system. Also request to see proof of the electrical Certificates of Compliance (CoCs) and/or professional engineer sign offs of previous installations.

✓ STAFF QUALIFICATIONS ARE VERY IMPORTANT

Find out if the PV service provider employs or subcontracts qualified staff to design and install systems. If your installation's maximum supply voltage is less than 1 000 volts (most rooftop systems are), the system's design and installation can be done by a person deemed competent as an electrical contractor by the Department of Labour. Ask for proof of registration (also called a wireman's licence), and check that it is up-to-date.

This registration is critical because it means that:

- the electrician is proficient in the national wiring codes SANS 10142-1:1200, and can install your PV system safely.
- the electrician is permitted to issue a CoC for the installation, which will confirm that the installation has been performed in compliance with the national wiring codes.

If you are planning to install a grid-tied system, the City also requires that your system is signed off by a professional electrical engineer or technologist who is registered with the Engineering Council of South Africa (ECSA). Check that the PV service provider has such a person available.

✓ REGISTRATION WITH THE SOUTH AFRICAN PHOTOVOLTAIC ASSOCIATION (SAPVIA) AND WITH THE ELECTRICAL CONTRACTORS BOARD (ECB)

Find out if your PV service provider is a member of SAPVIA and the ECB. Although SAPVIA and ECB membership is not compulsory, it should be a good indication how committed the service provider is towards keeping abreast of industry best practice and complying with legislative requirements and standards in the PV and broader electrical sectors.

02 BEFORE APPROVING THE DESIGN AND PURCHASING A SYSTEM

Once you are satisfied that your PV service provider has the skills and experience to perform the work, you may go ahead with planning the installation. Here are the key points to follow at this stage:

✓ BEFORE INSTALLING A PV SYSTEM, BECOME MORE ELECTRICITY-EFFICIENT

Before installing a PV system, it makes economic sense to become more electricity-efficient. By doing so, you will reduce the size and cost of the PV system you need. Consider installing an efficient water heater (solar water heater or heat pump), installing efficient lighting and switching to gas for cooking and heating. **For tips go to www.savingelectricity.org.za.**

✓ OBTAIN APPROVAL FROM THE CITY

If you are planning to install a grid-tied system, you need to obtain approval in writing from the City. You will find all the necessary documentation at **www.capetown.gov.za/ElecServiceForms**, under 'Application form and supplemental contract for installation of small scale embedded generation'. Do not go ahead with the installation until you get written approval.

✓ OBTAIN A STRUCTURAL ASSESSMENT

Generally, roofs can withstand the weight and wind load of PV panels. However, it is advisable to obtain a structural assessment of the roof to determine whether it can withstand these loads. Structural engineers can provide this service.

✓ NO NEED TO SUBMIT BUILDING PLANS

There is no need to submit building plans to the City for PV systems - unless the panels protrude more than 600 mm above the highest point of the roof, or they are raised more than 1.5 m above any point on the roof, or if ground mounted, the panels in their installed position project more than 2,1 metres above the natural/finished ground level.

✓ BUY THE CORRECT INVERTER

If you are planning to install a grid-tied system, ensure that you are using an inverter approved by the City. You can find the list of approved inverters at **www.capetown.gov.za/ElecServiceForms** under 'Reference Documents'.

✓ CHECK PV PANEL STANDARDS

At the very least, ensure that the PV panels you will use have a Certificate of Compliance with the IEC standard:

IEC 61215 – Crystalline silicon terrestrial PV modules.

IEC standards are the international version of the SABS, and are a good indication of panel quality. Ask your service provider for proof.

✓ STORE BATTERIES SAFELY

If you are installing batteries, make sure that they are stored in a properly racked, well ventilated, dry room, in accordance with the Occupational Health and Safety (OHS) Act, Act 85 of 1993.

03 DURING INSTALLATION

✓ ENSURE EFFECTIVE CONTROL

Ensure that the electrician who will be signing off the electrical CoC is in control on site and carries out or supervises the work effectively.

✓ DON'T CONNECT TO THE GRID

If grid-tied, the system cannot be connected to the grid before the City grants permission in writing.

✓ CHECK PLACEMENT ON THE ROOF

Ask the PV installer to demonstrate that the placement of the panels on the roof allows adequately for cleaning and also provides access for the fire department.

✓ ENSURE SPECIALISED DC CIRCUIT BREAKERS ARE BEING USED

DC current from your PV panels requires specialised circuit breakers. Ensure that your service provider is using these.

✓ MANAGE HEALTH AND SAFETY ON SITE

Ensure installers work according to national health and safety codes, and hold Working at Height training certificates. If working at heights above 3m, they must use some form of fall arrest system. Personal protection equipment (hard hats etc.) must be used at all times.

04 POST-INSTALLATION

✓ REQUEST AN ORIGINAL ELECTRICAL CERTIFICATE OF COMPLIANCE (CoC)

The Department of Labour-registered installation electrician who performs the installation must supply you with a CoC after s/he has carried out the installation and completed the required tests and checks. Remember that as the property owner, you are responsible for the safety of the electrical installation on your property in terms of the OHS Act. Without a valid electrical CoC, you will find it difficult to prove that you have taken reasonable precautions should anything go wrong. Insurance companies might not pay out for damages; and if someone is injured or dies as a result of the installation, you could be held liable as the property owner.

✓ CHECK FOR ROOF LEAKS

Check the installation work has not caused leaks in your roof.

✓ WARRANTIES AND MANUALS

Obtain all warranties and guarantees on offer, both for the installation as a whole and for its components (solar modules, inverters, structural system). Also, check you have all operations and maintenance manuals.

✓ RECOURSE FOR POOR WORK

If you are not satisfied with the work, request an independent inspection of the installation. In Cape Town, an organisation that carries out this work is the Electrical Approved Inspection Authority Southern Africa (EAIASA). Before it can carry out an inspection, you must have the original CoC and you will need to pay an inspection fee.



Solar PV panels on Bayside Mall. Photo credit: Bruce Sutherland, City of Cape Town.

Produced by Electricity Services Department and Environmental Resource Management Department of the City of Cape Town.

March 2016.

Please note that this document may be updated from time to time, so visit these websites to check for the most recent version: www.capetown.gov.za and/or www.SavingElectricity.org.za.