



Lothian and Borders Fire and Rescue Service

preventing • protecting • responding

OPERATIONAL SAFETY BULLETIN 2010 No.06

THE INFORMATION CONTAINED IN THIS OPERATIONAL SAFETY BULLETIN IS CONSIDERED AS VERY IMPORTANT IN ADDING TO THE SAFETY OF ALL OPERATIONAL PERSONNEL.

WATCH/CREW MANAGERS MUST ENSURE THAT ALL PERSONNEL ARE MADE AWARE OF ITS CONTENT AS SOON AS POSSIBLE.

HAZARDS ASSOCIATED WITH PHOTOVOLTAIC (PV) SOLAR PANELS

Due to the relatively small number of PV units in this country, this information is largely pre-emptive. However, as their numbers increase, so too will the likelihood of there being an incident which will require an awareness of the hazards and risks.

Incident information is provided courtesy of fire services from Tasmania & Germany; and information on general PV principles by kind permission of the Energy Savings Trust.

Electrical hazards

The fire services mentioned above have highlighted a potential electrical hazard from energy produced by PV units. Even when isolated at the inverter or fuse box, the system may remain 'live' between the panels and the isolation point. This presents a potential DC electrical shock hazard for firefighters at structural incidents- not just throughout daylight hours- but even possibly in minimal light levels during the night. (E.g. bright moonlight or from scene lighting)

Falling panels

In addition to electrical hazards, there are also dangers from solar panels falling from the roof; either because they become detached from their fixings, or because the roof members have failed below them and they collapse into the building.

Danger of flying glass

Not only is there a danger of being struck by a falling panel, but once it hits the ground it may cause the glass within it to shatter and be expelled outward with force.

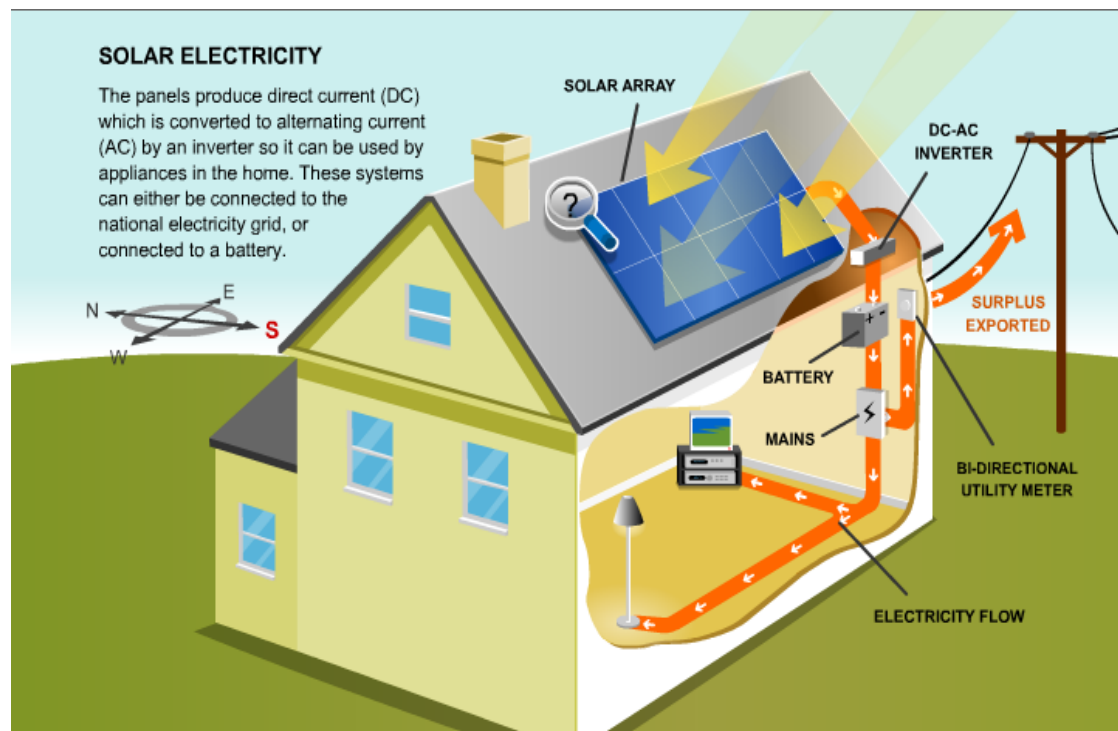
General information

PV cells are panels that can be attached to a roof or wall. Each cell is made from one or two layers of semiconducting material, usually silicon. When light shines on the cell, it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced. However, PV cells do not need direct sunlight to work - they can still generate some electricity even on a cloudy day.

Cells come in a variety of shapes and colours, from grey "solar tiles" that look like roof tiles to panels and transparent cells that can be used on conservatories.

The output of a PV cell is measured in kilowatt peak (KWp), which is the amount of energy the cell generates in full sunlight. A typical domestic system with several cells formed into an array may generate 2KWp.

The system converts solar radiation into direct current (DC) at the solar panel and feeds it into an inverter where it in turn is converted to alternating current (AC) and fed into the fuse box to power the household. Excess supply is either fed back down the electrical supply line and into the grid, or into battery back-up banks. In all cases, the potential for electrical shock is present for firefighters



Incident Commanders should consider the following guidelines when dealing with incidents where PV arrays are involved –

- Ensure that the mains power has been isolated, and that solar isolation switch is off. This may be located either on the main fuse board or near the inverter. **The solar panels and the wiring to the inverter/fuse board will still remain live.**
- Identify the location of the inverter and the solar panel cabling and warn all personnel.
- Monitor fire spread, and warn branch operators if the control equipment or cabling becomes involved, or closer to the fire.
- Ensure personnel are not working directly under the PV arrays; set up cordons.
- As with any electricity generating equipment, do not approach or make contact with any parts that are not considered ‘dead & earthed’, and arrange for the attendance of the electricity authority for advice and guidance.

Operational guidance is limited but will be updated over time as further developments in the industry take place.

This bulletin should be read in conjunction with Framework Operational Procedure:

5.1 Incidents involving electricity.

3.1 Fighting fires in buildings

Action –Watch/Crew Managers are to read out this Safety Bulletin to all personnel in their charge. A record of this action is to be kept in each individual’s training record. A copy of this Bulletin should also be placed on the station Health & Safety notice board.