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O&M PROCEDURES WASTE MANAGEMENT AND MODULE RECYCLING	

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1 INTRODUCTION

Waste produced during the operational phase of the PV plant is mainly expected to be:

- maintenance material
- damaged components
- domestic waste from packaging or from the maintenance personnel or from the security staff if applicable (food leftovers, packaging (bricks, cans), paper and cardboard).
- rests of vegetation

Waste shall be properly separated, stored and disposed of/send for treatment in order to decrease the visual impact and to avoid unfulfilment of applicable regulations and minimize potential fire hazard and landowner complaints.

Recycling of damaged PV modules is particularly important, therefore shall be properly performed and shall comply with all applicable legal requirements.

2 PROCEDURE

2.1 Previous works

Before storing and /or disposing of any kind of produced waste (including damaged PV modules), verify that it complies with all the applicable regulations about storage and waste management

If necessary, an authorized waste manager shall be contacted. It shall be verified that it has all the required permits to develop its labor.

If any exceptional replacement operations of big components shall take place (e.g. replacement of centralized inverters or transformers) waste disposal of the damaged components shall be previously agreed with the manufacturer whenever possible.

2.2 Waste management

Following the Directive 2008/98/EC of 19 November 2008 on waste, the following waste hierarchy shall apply as a priority order in waste prevention and management:

1. prevention

2. preparing for re-use
3. recycling
4. other recovery, e.g. energy recovery
5. disposal.

Wherever possible and practical, waste materials generated on site shall be recycled.

Recyclable waste, including damaged components like fuses and electronic devices, wires, scrap metal, glass, paper and plastic, etc. must be separated, stored and recycled.

Waste material produced during the operational phase of the PV plant shall be properly separated, stored, removed and transported off site to a registered waste disposal/treatment facility.

The Operator shall keep the site in a neat and tidy condition at all times, including neat and safe stacking and storage of materials and equipment, and management of waste materials at appropriate intervals.

Temporary storage of waste shall take place within the site, within designated areas.

No waste materials may be dumped or temporarily stored in any restored or protected area. All waste shall be removed from site immediately on completion of planned maintenance activities. No burning of waste shall be permitted on site.

2.2.1 Module recycling

Treatment of PV modules at the end of its useful life, as with any other waste, should be performed in accordance with applicable legislation. Proper PV modules waste treatment shall be ensured by through its collection, recycling and recovery.

According to the European legislation, the responsibility of the PV modules producers is officially regulated by the DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on Waste Electrical and Electronic Equipment (WEEE).

This WEEE Directive requires producers of PV modules to ensure the collection and recycling of waste products at the end of its life in any country of the European Union.

Recycling of damaged PV modules shall be previously agreed with the manufacturer and this agreement shall prevail over any general procedure.

Only in case of no agreement with the manufacturer, a contractor licensed to handle and recycle PV modules shall be contracted.

As a general rule, damaged PV modules shall be stored within the facility, in the same warehouse as the spare PV modules (it shall be recommended to have a stock of around 0.5% of the total module number installed in the PV plant). Once the stock has to be replaced and new PV modules are to be supplied on site, old damaged PV modules shall be taken by the manufacturer (or authorized supplier) to an appropriate waste recycling facility.

The amount of PV modules generated shall be recorded and quarterly reported in the corporative tool SIS.

2.2.2 Domestic waste

Very little domestic waste is expected to be produced during operational phase. This waste shall be produced by the maintenance personnel or by the security staff, if any.

Waste produced under this classification is mainly expected to be plastic, cardboard, paper, etc.

Sealable and clearly marked waste bins shall be provided for the correct separation and storage of domestic waste.

Dispose of all generated domestic refuse shall be developed, as maximum, on a weekly basis at the nearest municipal waste disposal facility. The amount of the different kinds of domestic waste generated (food leftovers, cans, bottles, bricks…) shall be recorded and quarterly reported in the corporative tool SIS.

2.2.3 Hazardous waste

All applicable regulation regarding hazardous waste shall be observed.

Although it is not expected to produce hazardous waste such as oil, paints, solvents, etc, in the event they are generated, they shall be segregated separately from general waste and collected and properly treated by a licensed waste handler of hazardous wastes.

Documentation regarding waste removal shall be kept on file for any hazardous waste for at least the time specified in the applicable legislation.

The amount of hazardous waste generated shall be recorded and quarterly reported in the corporative tool SIS.

3 H&S PRECAUTIONS

Waste management activities might create potential risk for harmful contact with damaged components (cut, abrasion if hazardous materials, etc.) and exposure to lethal voltage.

Appropriate risk assessment shall be performed prior to developing such operations and control measures are to be taken in accordance with risk assessment and with respect to hierarchy of control measures.

Appropriate Personal Protective Equipment (PPE) and safe work instructions shall be considered as control measures in cleaning, storing or disposing of operation. Attention! Electrical insulating PPE is highly sensitive to cuts and punctures which highly damage the protection capacity of such PPE. Identify such situations throughout risk assessment process and address them by proper control measures.