

แนวทางการจัดการซากแผงโซลาร์เซลล์ ของภาคอุตสาหกรรม

BCPG Public Company Limited
November 2017

Agenda



1

BCPG Introduction

- About BCPG
- BCPG's Solar Portfolio

2

How BCPG will handles PV Modules

- Overview
- COP Requirement
- Before Construction & CoD
- Broken, Damaged Panels
- Decommissioning

About



Our Vision & Mission



Vision

The World 's Greenergy Iconic Creator

The iconic greenergy developer who evolves the world through the greener ways.

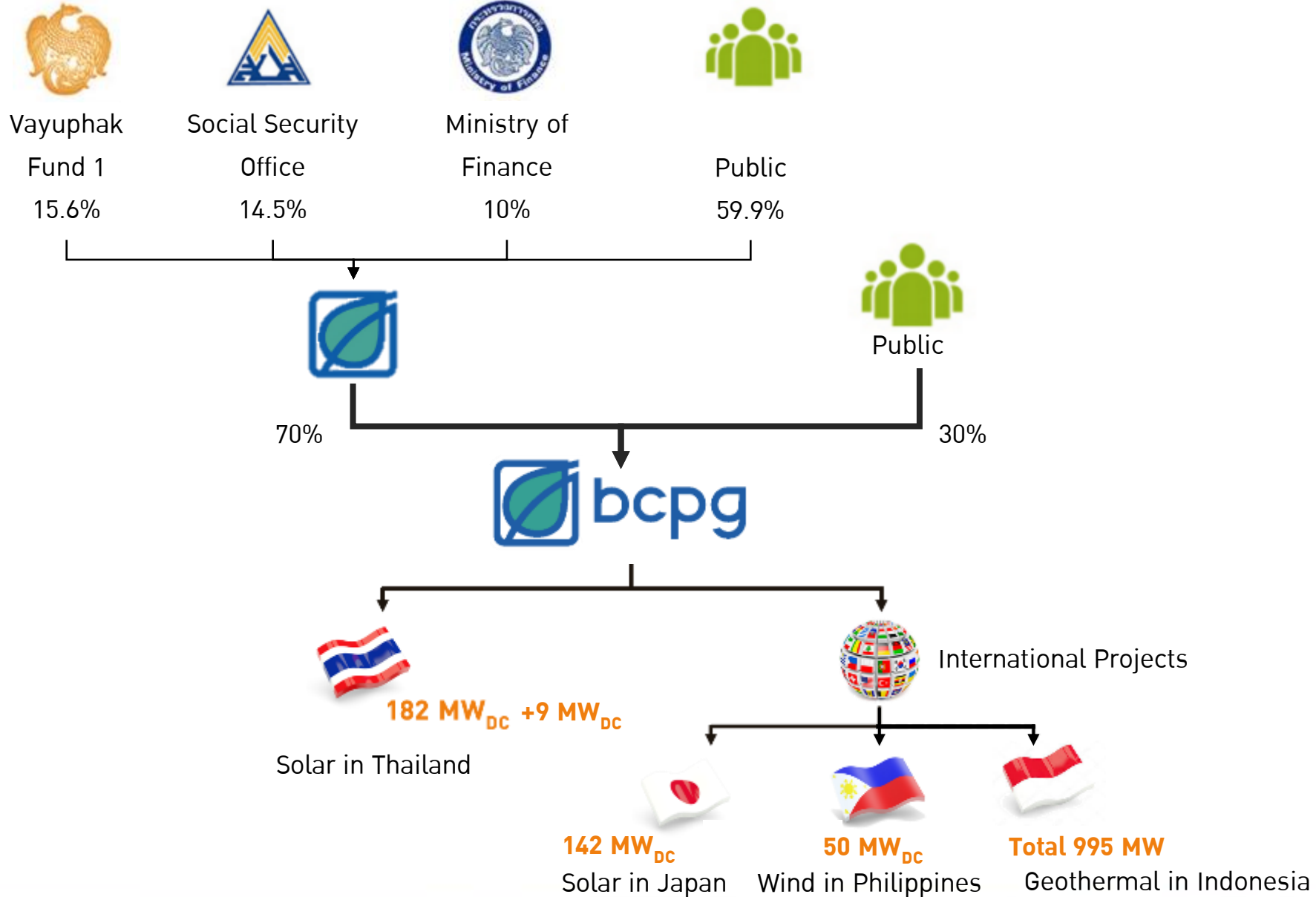
Mission

To invest, develop and operate green power plants globally with state-of-the-art green technology to secure a sustainable and environmentally-friendly business platform

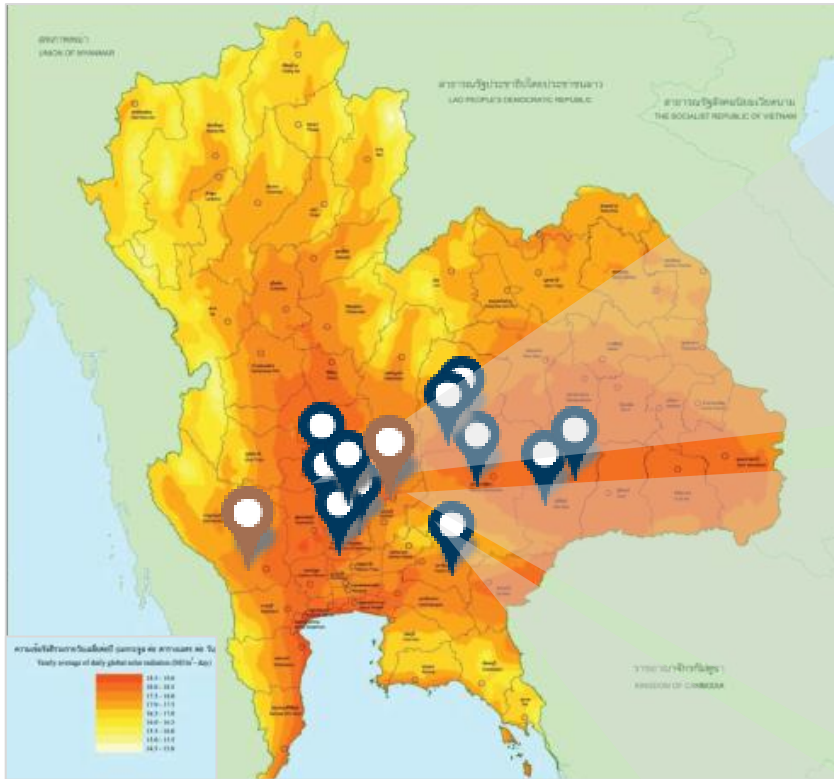
“1,000 MW Target in 2020”





Who are we?

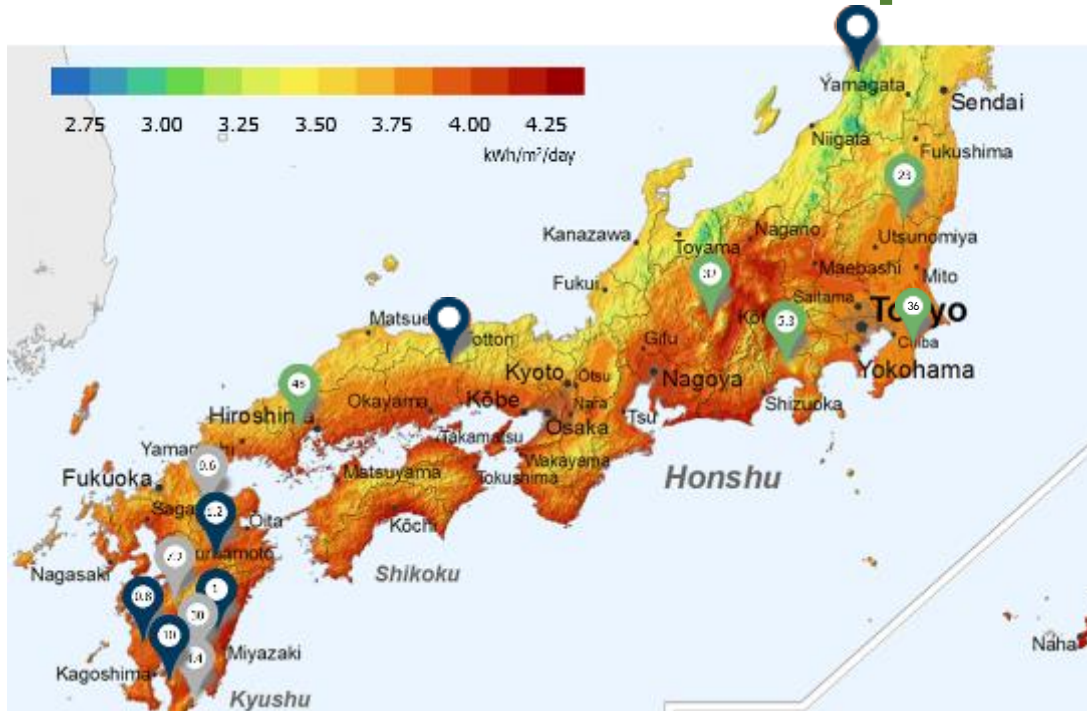


Solar Portfolio in Thailand







Status		Installed Capacity (MW _{DC})
	10 Operating	182
	2 Development	9
Total		191

Solar Portfolio in Japan



High Potential for Growth in Japan and Asia Pacific

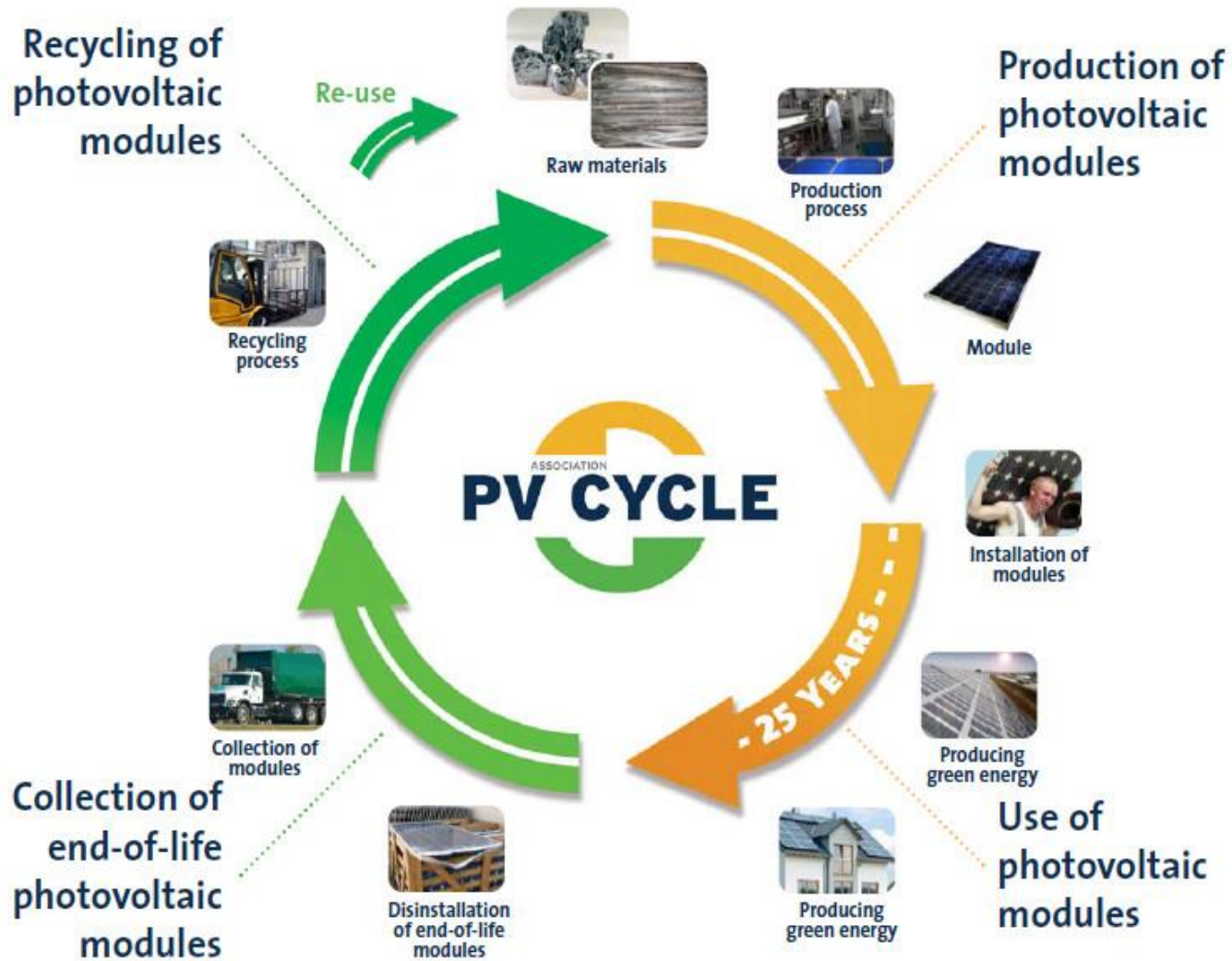
-  **High Feed-in-Tariff Scheme**
-  **Experienced local staffs to support further developments**
-  **Operation**
-  **Business Development**
-  **M&A**
-  **Administration**

Status		Installed Capacity (MW _{DC})
	5 Operating	40
	- Construction	-
	4 Advanced Development	102
	- Development	-
Total		142

How we handle PV Modules?



LIFE CYCLE OF CRYSTALLINE SILICON MODULES



Stages & Status of PV Modules Handling

Purchasing & Installation



- CoP
- Selecting PV Modules Suppliers
- Installation

Operating



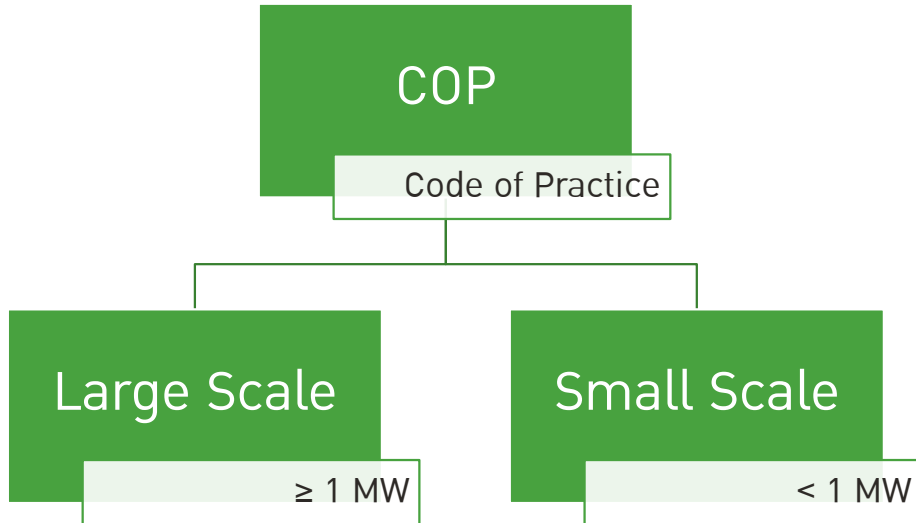
- Damage Panels and Replacement

Decommissioning

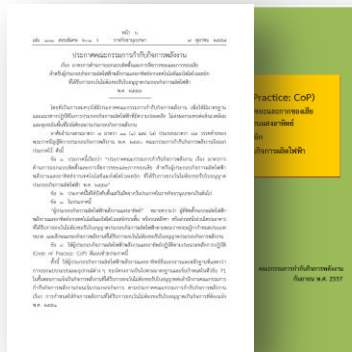
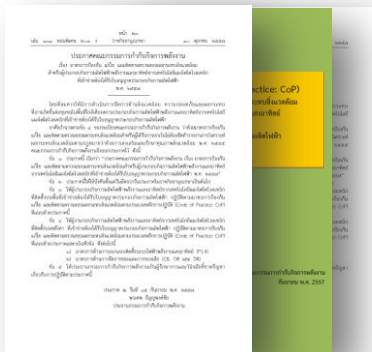


- Recycling of PV Modules

COP Requirement



(required Power Generation License) (not required Power Generation License)



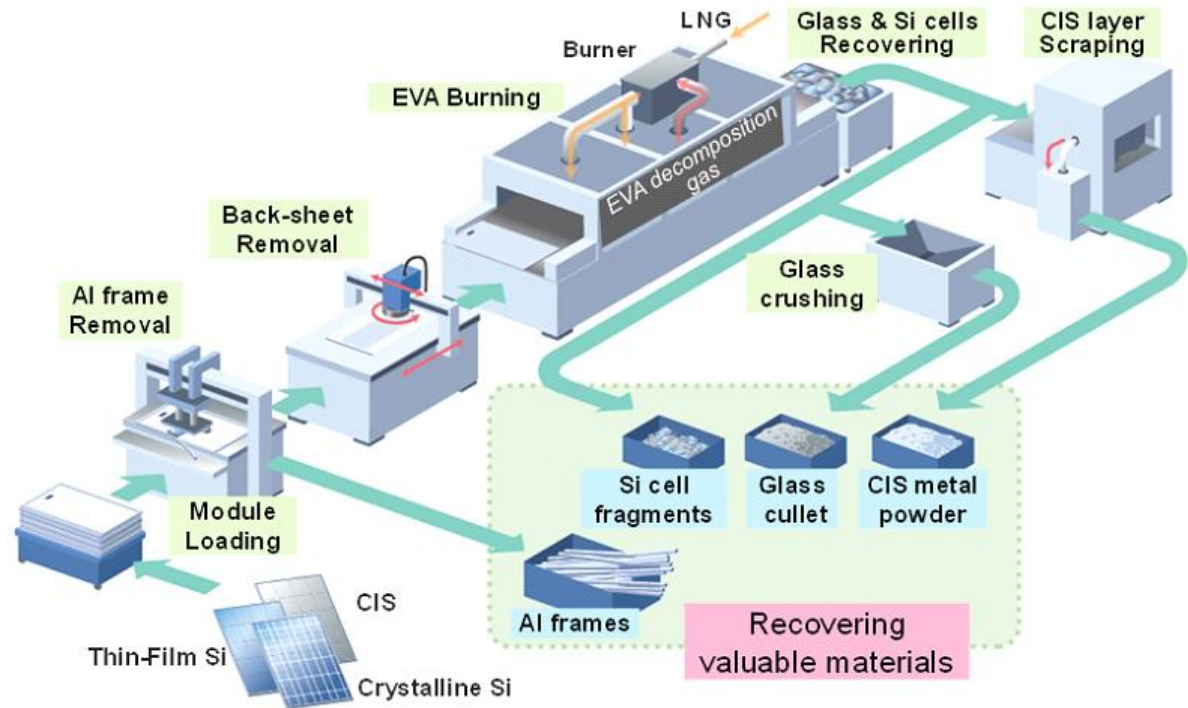
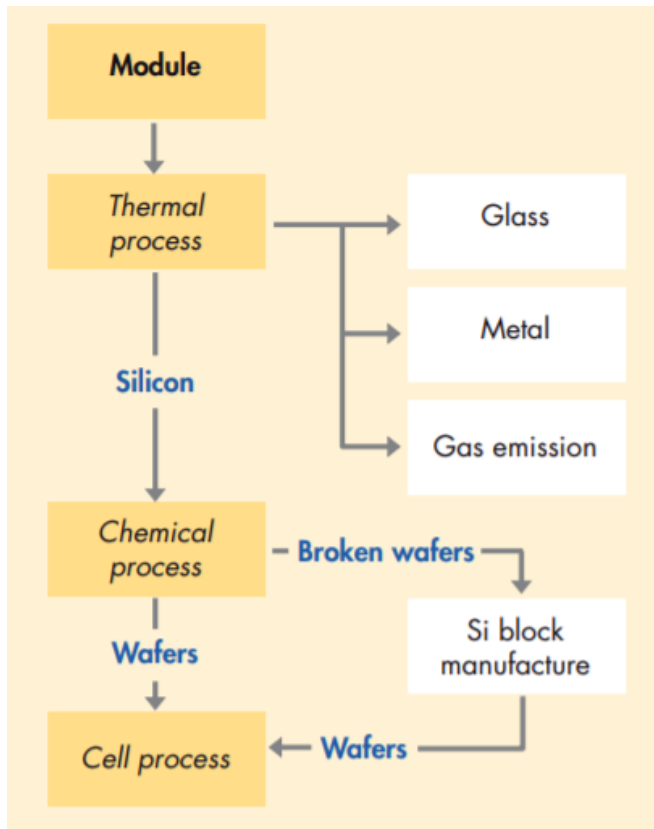
Same Requirement in Both CoP



1st Priority to Mfg./Supplier who Plan to Handle with Recycling Method and Submit Plan

1. Comply with Plan Above
2. Export Case, comply with "HAZARDOUS SUBSTANCE ACT" & International Regulations
3. Domestic Case, Secure Land Fill and comply Regulations.

PV Recycle Process

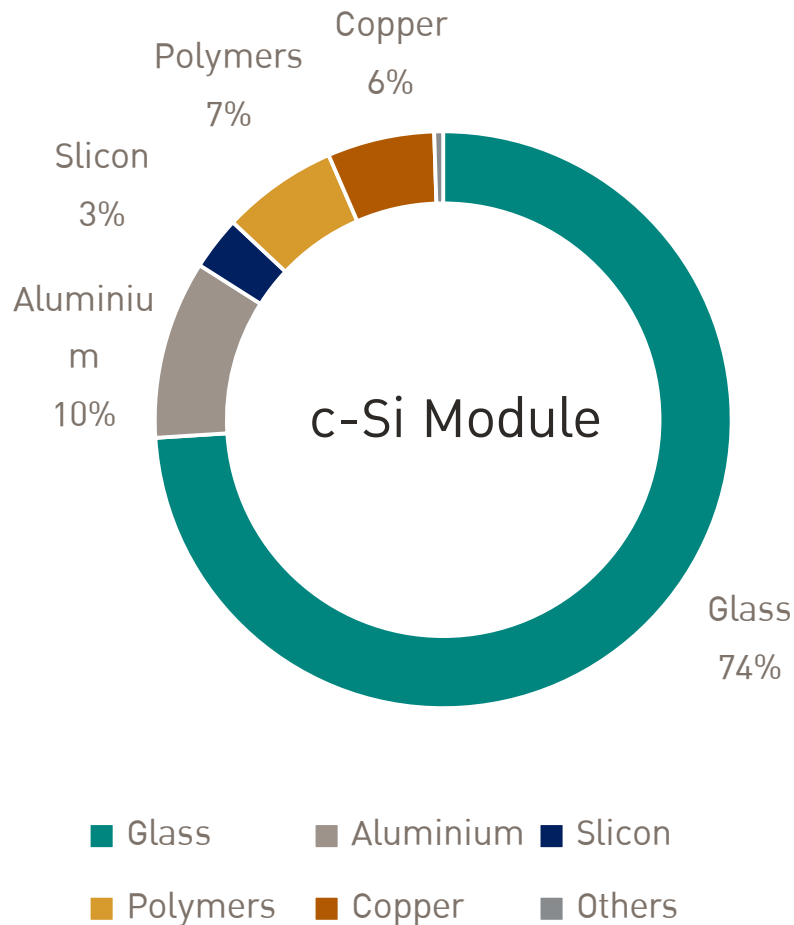


Source: Recycling Photovoltaic Modules, BINE Informationsdienst

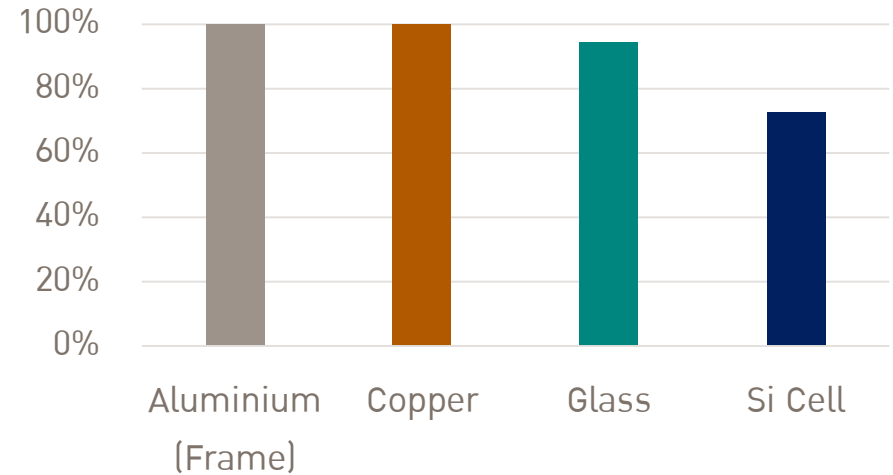
Source: Keiichi Komoto, Workshop on PV Life Cycle Management & Recycling, Amsterdam, the Netherlands, 23 September 2014.

PV Recycle Yields (Crystalline)

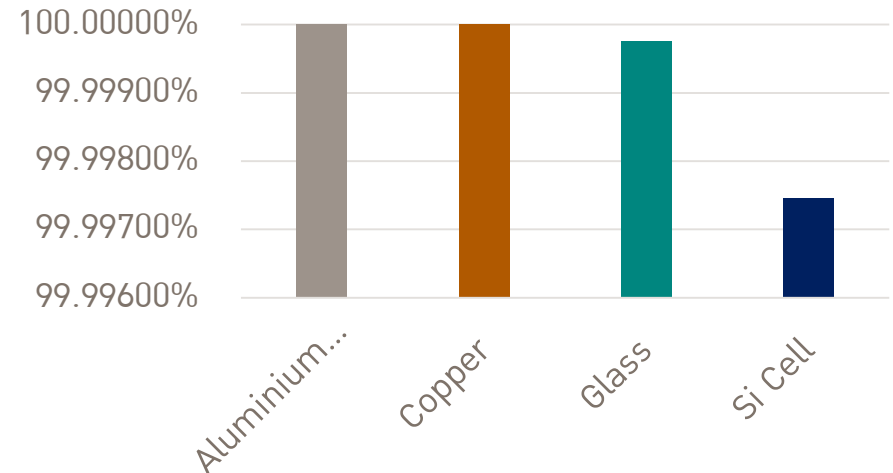
Composition of Recycling Products



Yield (%) – Overall Highest Rate 95%



Purity (%)



Source: Recycling of Solar Modules – Potential and requirements of a future material flow/ PV Cycle study

Today's PV Recycle Environment



A non-profit, member-based organization, PV CYCLE offers collective and tailor-made waste management and legal compliance services for companies and waste holders around the world.

Founded in 2007 by and for the PV industry, PV CYCLE today includes a broad range of waste products in its portfolio.



Thailand

No Specific Company with PV Cycle



Japan

Small Quantities – JPV Network
<http://www.jpvcollection.jp/>

Large Quantities – PV Cycle Directly

Stages & Status of PV Modules Handling



Purchasing & Installation



- CoP
- Selecting PV Modules Suppliers
- Installation

Operating



- Damage Panels and Replacement

Decommissioning



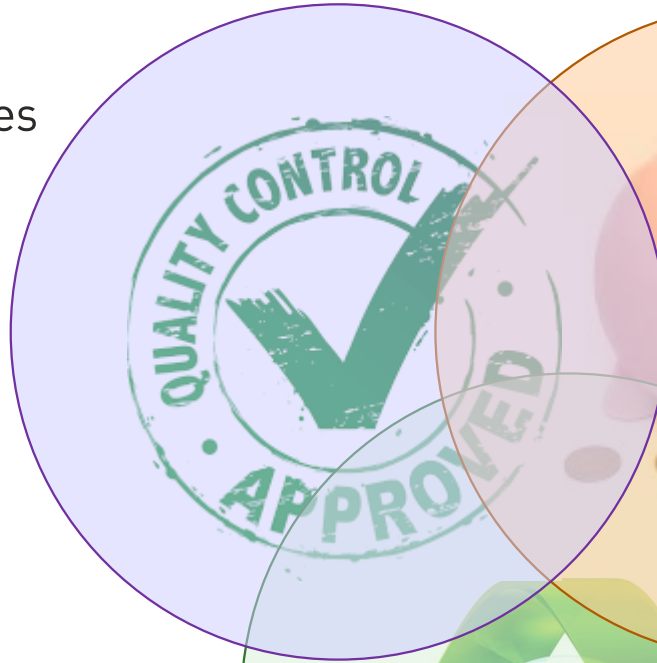
- Recycling of PV Modules

How we select PV Modules or EPC



Quality

Tier 1 PV Modules



Price

Feasible



Using BCP SHEE Policy
+ PV Recycle Plan

During Construction



Types of Damage:

- Broken
- Performance

PV Damage Cases

- During Logistic
 - Insurance: Cargo
- During Installation
 - EPC & Construction Insurance
- Before Hands Over to BCPG
 - EPC & Construction Insurance

Case Not Passed Performance Test



Factory Acceptance Test

- Still at Factory
- Company's witness
- If not qualified, reject before shipping



Random: Lab Test

- 1% - 2% of Sample
- If not qualified, reject and send back to Manufacturers



String Test & Commissioning

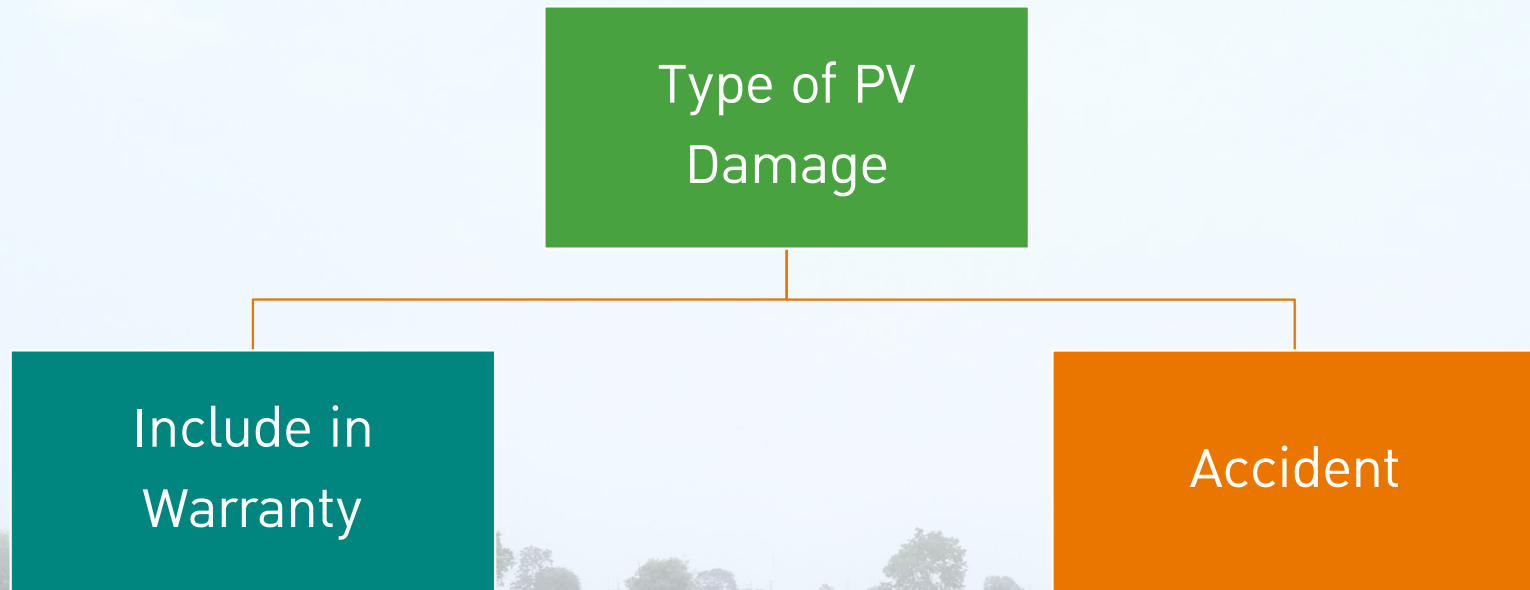
- Visual Inspection
- Performance Test Every String
- Matching Modules
- If not qualified, reject and replace. Handle to ship back to manufacturer or EPC depends on the problem by EPC.

Case Flooded 2011: All Panels is Replaced



- Already Installed, approx. 150,000 panels submerged (45 MW).
- BCPG's construction all risk.
- Insurance company replaced all PV and took all submerged PV.
- Some Panels were sold to secondary market with lower price.





2 Types of Warranty

- 10 Years Product Warranty
- 25 Years Power Output

Handling

- Claim with Suppliers
- Replace and Ship Back by Suppliers

Handling

- Keep Panels in our warehouse until reach our minimum quantity.
- Company chooses to sell or send back to PV Supplier for Recycle

Future Plan after 25 Years of Operation



Continue Operation

- Using existing panels
- Replacing with new panels
 - Sell back to Manufacturers for Recycle
 - Comply with COP

Decommission

- Shipped back to Manufacturers for Recycle.
- Comply with COP



Thank You

BCPG Public Company Limited