Initiative for an European Ecolabel for PV panels

Dr. Françoise BURGUN
National Institute of Solar Energy, France
Francoise.burgun@cea.fr

INITIATIVE FOR AN EUROPEAN ECOLABEL FOR PV PANELS

Proposal for EU Ecolabel for solar Photovoltaic Panel

How to support Industry and secure investors and consumers

CONTENT

1. Why an European Ecolabel for PV Panel
2. Learning from the Preliminary study
3. Possible draft Criteria
4. Ecodesign working plan & other initiatives
5. Status of the initiative & Future prospects

Why an ecolabel for PV panel ?
Market key issues, challenges and objectives

- **CONTEXT**
  - Worldwide, PV is a main contributor in term of RE production and GHG reduction
  - Environmental impacts of PV systems **can vary significantly** according to :
    - ⇒ *module technology, energy mix used of the manufacturing country, system yield and the lifetime*
- **ISSUES**
  - Lack reliable information on environmental performance, and durability of product-specific,
  - Need for methodologies and criteria to qualify and guarantee the better products
- **CHALLENGES**
  - Compliance with environmental regulations (REACH, CLP, RoHS, WEEE)
  - Methodologies for assessing Performance / Reliability / Lifetime
  - Life cycle analysis : in link with EU PV PEF Product Environmental Footprint
- **OBJECTIVES :**
  - Reliability and environmental quality of PV panels
  - Comprehensive information for consumers and investors
  - Market Trust
  - **Solar industry's green credibility**

PV is a mass market: could / should be exemplar in terms of ecological footprint

ECOLABEL DEFINITION & PURPOSE

- *Framework*
- Consortium
- *Scope*
- ***Prerequisites***

- *"The EU Ecolabel helps you identify products and services that have a reduced environmental impact throughout their life cycle, from the extraction of raw material through to production, use and disposal. Recognised throughout Europe, EU Ecolabel is a voluntary label promoting environmental excellence which can be trusted."*

Fraunhofer ISE · INES Institut National de l'Energie Solaire · certisolis · ENEA

- Panel +
- Junction Box + Cables

1. Demonstration of stakeholders' interest
2. Compliance with EU Ecolabel Regulation: Articles 6(6)/(7) on SVHC: REACH & RoHS
3. Fulfillment of consumers' needs

ECOLABEL PREREQUISITE : STAKEHOLDERS' INTEREST

- **PV Manufacturers** and **Solar Power Europe** support the launch of the PV Ecolabel initiative

  ➔ **letters of interest**

- Public Authorities in the EU want to be able to ascertain that their support for PV is in conformity with all their environmental objectives.
- Investors and consumers want to know if their investment is durable and environmentally optimal /responsible.
- **In France** : Support from **ADEME,** involved in **the carbon footprint methodology** implemented in the **French PV tenders**

- **Meeting with the BEUC Bureau of consumers**

ECOLABEL FUNDAMENTAL PRINCIPLES

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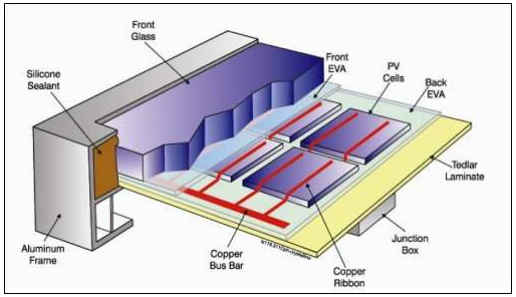
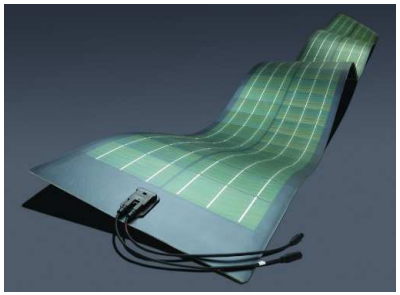
- **Voluntary approach**
- **Certification by a competent body**
- **Pass or fail validation process**
- **Eligibility : 15-20% of a product family**
- **technology neutrality**
  - Typical Crystalline Si panel and thin film module





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PRELIMINARY STUDY : GUIDED BY THE JRC

- Objective :

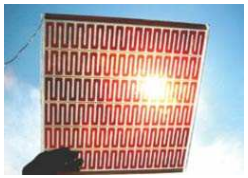
- to assess if it is possible to produce solar photovoltaic panels :
  - **without SVHC referred to in Article 57 of REACH and CLP**
  - **without SVHC referred to in RoHS (1&2)**

- **NB : PV panels are currently excluded from RoHS compliance**

- Data & Methodology

- **Bill of materials** from Smartgreenscan, expert, Mrs. Mariska De Wild-Scholten
- Foreground of the two institutes **Fraunhofer ISE and CEA-INES**, interview of manufacturers and suppliers & thorough quantified analysis.
  - Ref : JRC –IPTS of 24th February 2014, "***Findings of the EU Ecolabel Chemicals Horizontal Task Force Proposed approach to hazardous substance criteria development***"
  - ***PS : The scoping study has been achieved before the ENEA joined the consortium.***

Technology neutral scope : all solar technologies may apply

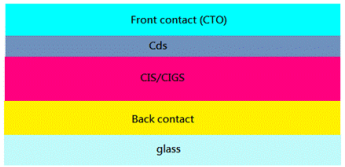
- Crystalline silicon = wafer-based PV modules:
  - mono-crystalline,  multi-crystalline cells 
- Thin film technologies
  - Micromorphous silicon (a-Si)
  - CIGS & CIS (copper indium gallium selenide)
  - CdTe (cadmium telluride)
- Organic PV (OPV) 
- Dye sensitised solar cells (DSSC) 

SVHC in REACH : CdS & some Phthalates

- **Cadmium Sulphide is in REACH**

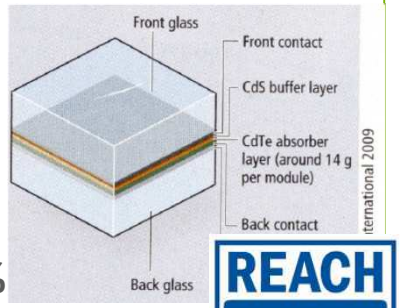
- **CdS in CIGS solar cells**
  - copper indium gallium selenide active layer
  - buffer layer of **CdS**

  ➡ **under the threshold of 0,1%**

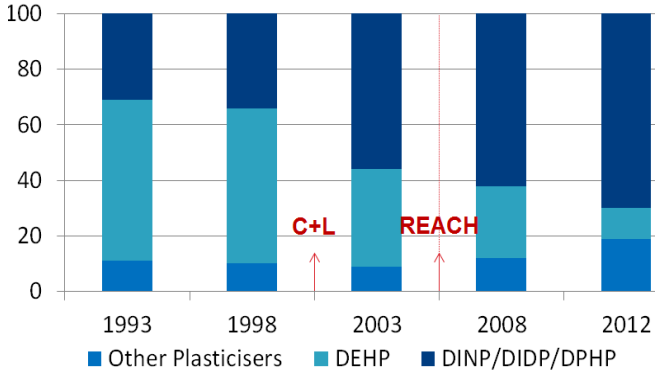


- **CdS in CdTe solar cells**
  - Cadmium Telluride active layer
  - buffer layer of **CdS**

  ➡ **under the threshold of 0,1%**



- **Some phthalates are in REACH**
- **Often used plasticisers in cables are phthalates** ("DINP", "DIB", "DEHP", "DBP", "BBP")
  - DEHP, DPP, BBP and DBP => REACH
  - Trend : Replacement of DEHP by DINP increase of DIDP and new alternatives

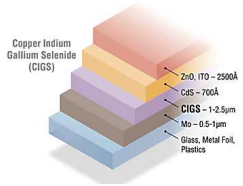


- **An ECOLABEL initiative may help to create awareness & visibility on the actual amount and use of REACH compliant plasticisers**

A general REACH compliance is possible

SVHC in RoHS : Cadmium & some Flame retardants (PBDE)

- **Cadmium in thin film CIGS solar cells**
  - copper indium gallium selenide active layer
  - buffer layer of **CdS**

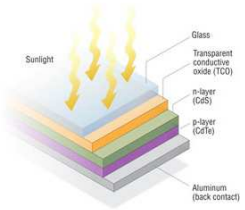


0,0004 wt.% Cd **< 0,01% ROHS limit**

⇒ **cadmium free CIGS commercially available (*Solar Frontier, Stion…*)**

- **Cadmium in thin film CdTe solar cells**
  - Cadmium Telluride active layer
  - buffer layer of **CdS**

0.05 wt.% Cd > 0,01% ROHS limit



⇒ Recycling programs with an estimated cadmium recovery of about 95%.

- **Some of the Flame retardants (FR) used e.g. in back sheets and junction boxes are restricted:**
  - halogen-containing additives (e.g. polybrominated biphenyl ethers), restricted under ROHS

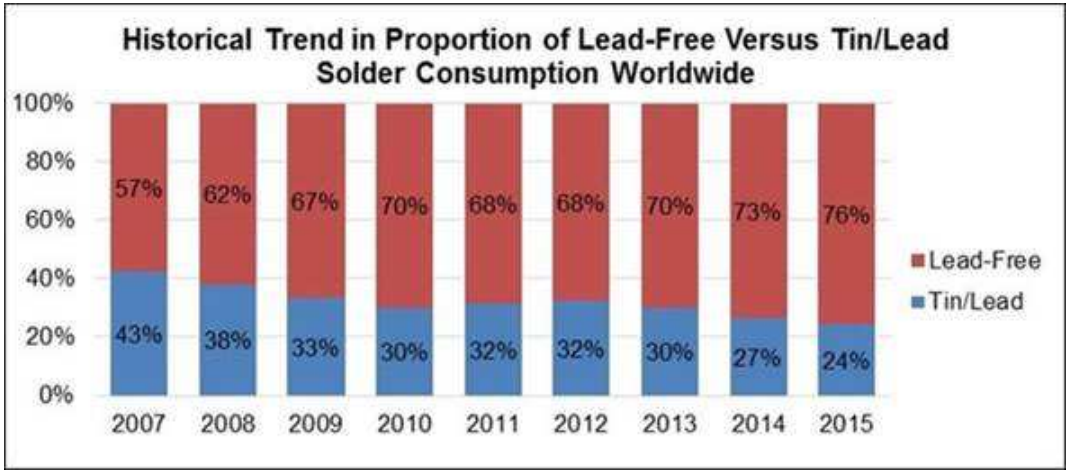
⇒ **Alternatives : halogen-free additives or inorganic additives**

⇒ **An ECOLABEL initiative may help to create awareness and visibility on the actual use of ROHS compliant flame retardant**

SVHC in RoHS: Lead (Pb) status & roadmaps

- **Lead is used in Ag based cell metallization and in solder joints interconnecting cells (c-Si)**
  - According to module design: **Total amount of lead 0.05 < wt% Pb < 0.25 over the 0,1 wt. % limit**
  - Cost competitive Lead-free technical solutions are available with proven industrial feasibility
  - Already applied by major module manufacturers
    - SUNPOWER and PHOTOWATT use leadfree solder , PANASONIC uses conductive adhesives
    - But not the majority…

- **Meanwhile the PV technology roadmap for leadfree solder is far lacking behind the overall electronics industry transition towards lead-free solder.**



➢ **An Ecolabel initiative may help to bridge the gap**

RoHS compliance is possible

CONCLUSIONS OF THE ECOLABEL PRELIMINARY STUDY

- **An EU Ecolabel for PV modules is not only feasible but needed by a variety of stakeholders (authorities, investors, consumers, Industry…)**

- **A growing share of PV modules marketed today in Europe appears already compliant with REACH and RoHS directives (art. 6,(6)/(7) of the Ecolabel) or could become so at competitive cost.** ***e.g. leadfree soldering, halogen-free flame retardants, replacement of hazardous phthalates in plasticizers.***

- A PV EU Ecolabel would contribute to accelerate Eco compliance and reward the first movers
- Along with other instruments, a PV EU Ecolabel would powerfully contribute to reaching EU objectives on Environment protection and Climate-Energy.

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Consultation of industry on possible CRITERIA for an Ecolabel

- **Overview of the result from the consultation of 5 PV module manufacturers**
  - Challenge : to define discriminent enough criteria to meet the eligibility goal of EU Ecolabel
- **Results from a poll : criteria selected with a mark > 3**
  - ➢ **13 selected out of 20 proposed criteria**

Mandatory prerequisites	Mark 0 to 5
ISO 9001 & 14044 certification	5
No-SVHCs /RoHS &REACH	4,25
End of life	4

Most important criteria :

- **Prerequisite : REACH and RoHS**
- **Carbon foot print**
- **Waste Management &security during production**
- **Labour conditions**
- **Recycling**

Ecolabel and SVHCs : beyond REACH and RoHS

- **SVHCs**
  - **Fluor in backsheet => see example**
    - A few back sheet manufacturers are now proposing Fluorinated-free
      - DSM, ISOVOLTAIC
  - **Antimony in glass**

- **Material selection and Conservatism / cost of change**
  - Lead metalisation paste or solderings thought better
  - Fluorinated backsheet considered improving water protection
  - Animony glass supposed to have high transparency

- **Use of SVHCS & life cycle**
- **=>** No harm during « use phase » ⇔ Lamination
- **=> issues : Manufacturing and recycling phases**

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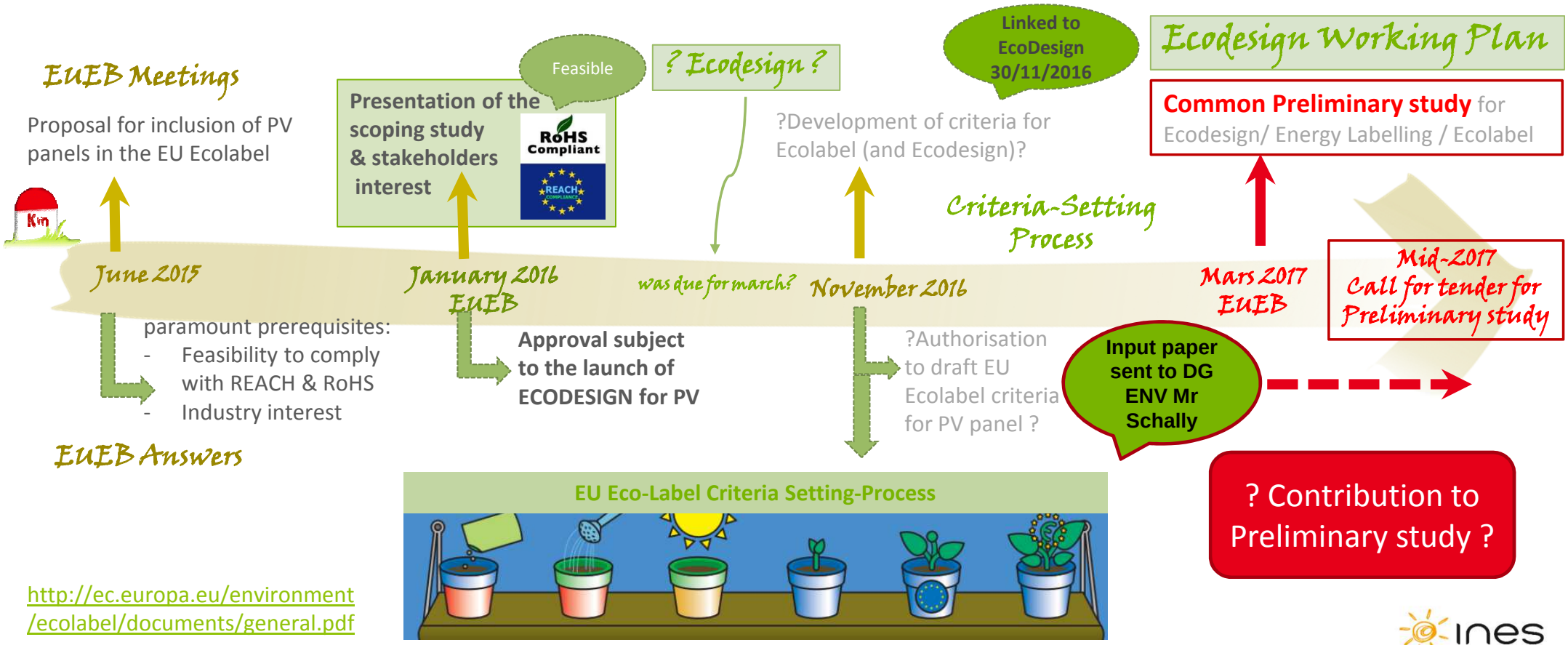
Ecolabel initiative current status …

- ECOLABEL and ECODESIGN working plan :



http://ec.europa.eu/environment/ecolabel/documents/general.pdf

ECOLABEL AND BANKABILITY

- **ECOLABEL criteria :**

➢ **Aiming at establishing verifiable, enforceable requirements on energy and resource efficiency within a circular economy approach**

  - Yield, reliability, long service life, recyclability

➢ **Avoiding red tape : "manageable, affordable" criteria**

- **BANKABILITY often associated to LCOE**
- **LCOE can drive some environmental issues : Yield, Material efficiency…**

➢ **But not all of them with regards to ecodesign considerations**

  - **Substances of concerns, scarce materials, easiness of dismantling for recylcing or reuse**

■ What about BANKABILITY and GREEN VALUE ➔ GREEN INVESTORS

➢ Societal challenges as business driver

ECODESIGN/ENERGY LABEL/EU ECOLABEL…

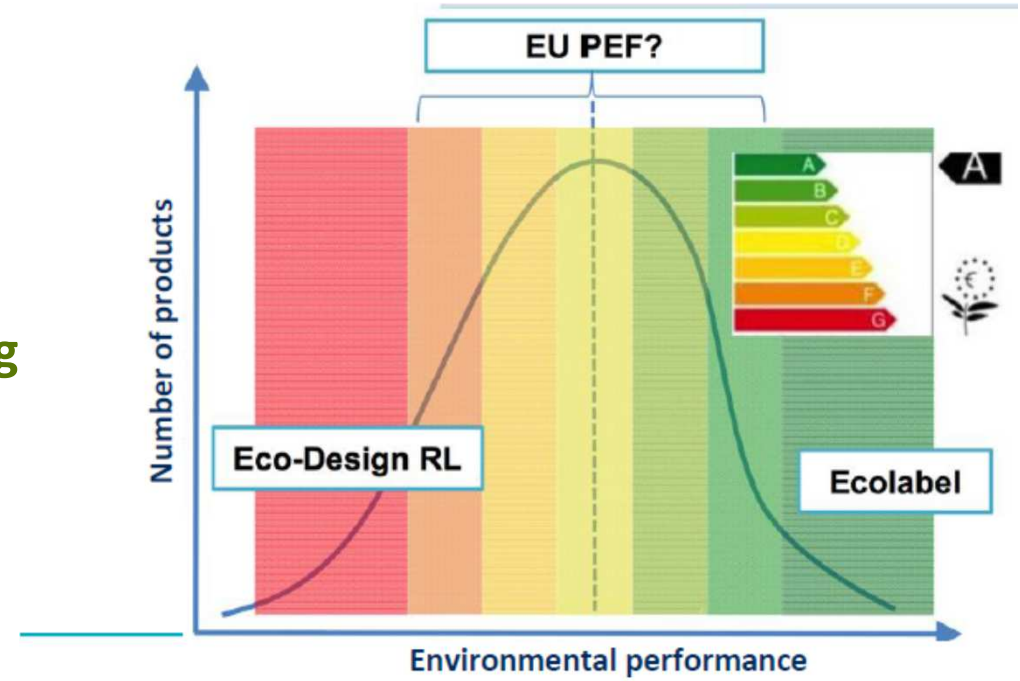
- *European Commission : ecodesign requirements for solar panels and inverters aiminig at energy savings and increase ressource efficiency.*

- **Similar environmental labelling initiatives:**
  - **in the US**: NSF 457 sustainability leader standard.
  - **in CHINA**: Demand from the Chinese gov. to WWF China

➢ **This demonstrate the interest of an Eco labeling instrument for this fast growing PV market and for green investments.**

➢ **Awareness must grow** that **material selections made today,** lock-in the environmental impacts
=> **will only be noticed in 20 to 30 years time**

Towards a market of green(er) products



THANKS FOR YOUR ATTENTION

JNES

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CONTACT PERSON:

CEA-INES : Dr Françoise Burgun
+33 (0)6 86 20 02 90
francoise.burgun@cea.fr *www-liten.Cea.fr*