SOLAR PHOTOVOLTAIC EMPLOYMENT IN EUROPE

The role of the European PV industry for Europe's jobs and education today and tomorrow

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Project partners

European Photovoltaic Industry Association
www.epia.org

University of Flensburg
www.uni-flensburg.de

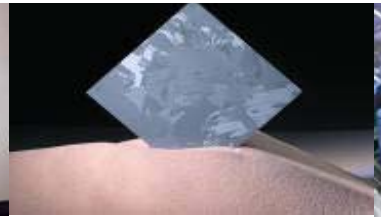
WIP-Renewable Energies
www.wip-munich.de

National Technical University of Athens
www.ntua.gr

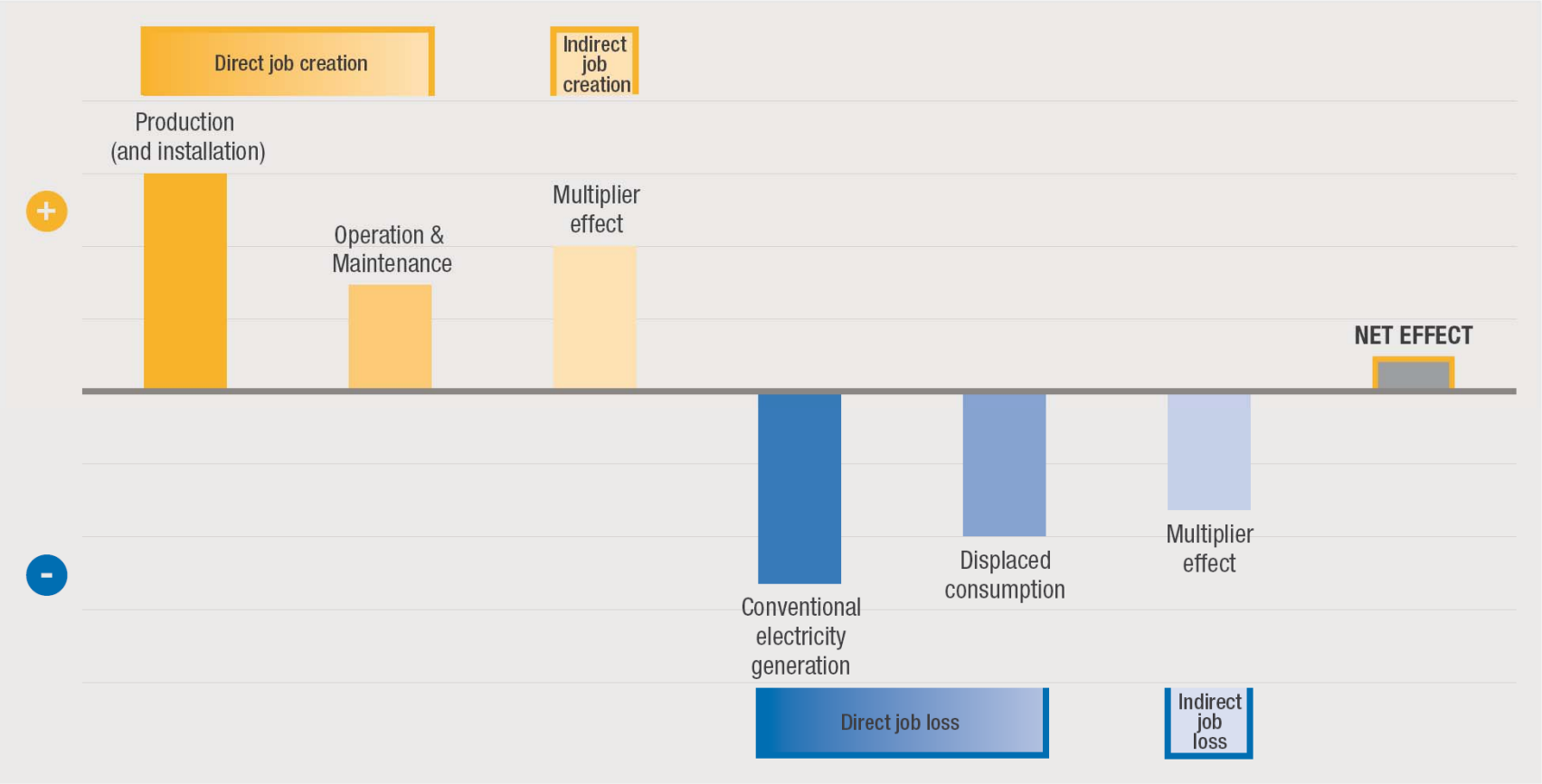
Realised in the frame of the European Project PV-Employment and financed by the 6th European Framework Programme for Research and Technological Development.

European Photovoltaic Industry Association

- **World's largest industry association devoted to photovoltaic's**
- **Since 1985** (in Brussels)
- With **205 EPIA members**, EPIA represents **95% of the European PV industry**
- **Represents the whole value chain**: silicon feedstock, equipment suppliers, cell and module production, balance of system (inverters, cabling), project developers, national associations

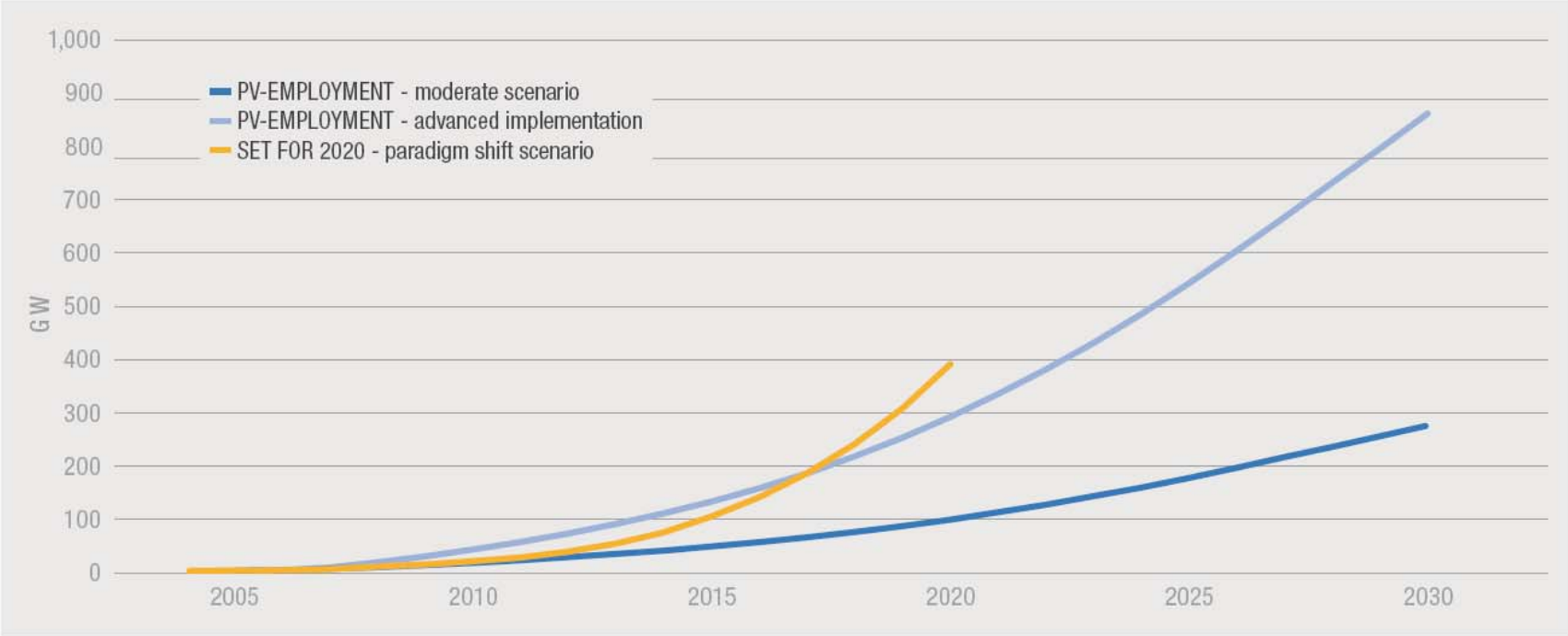




Definition of net employment effect



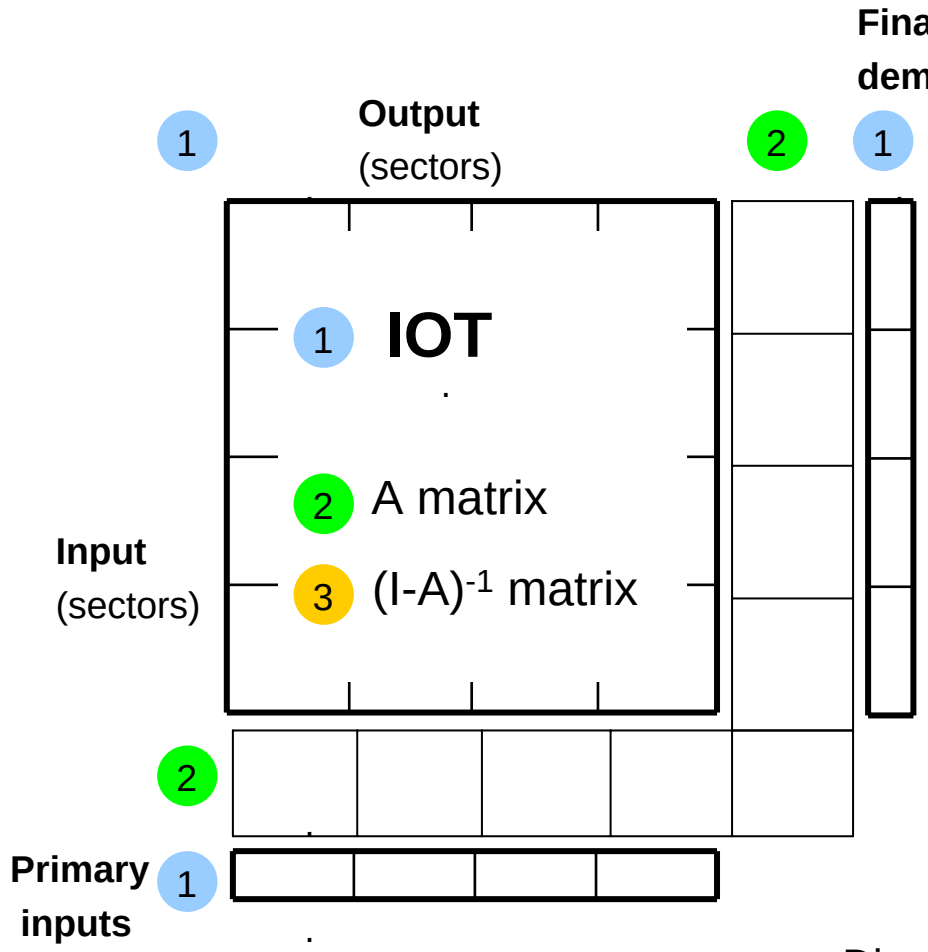
Source: PV-Employment 2009

Cumulative PV power installed (EU27) market scenarios 2005-2030
Comparison between PV-EMPLOYMENT and SET FOR 2020



Source: PV-Employment 2009

Input-output tables (University of Flensburg)



1

- input-output tables (59 x 59)
  primary inputs
  final demand

2

Matrix extension:
additional vectors
Typical PV production functions
= PV input vectors

3

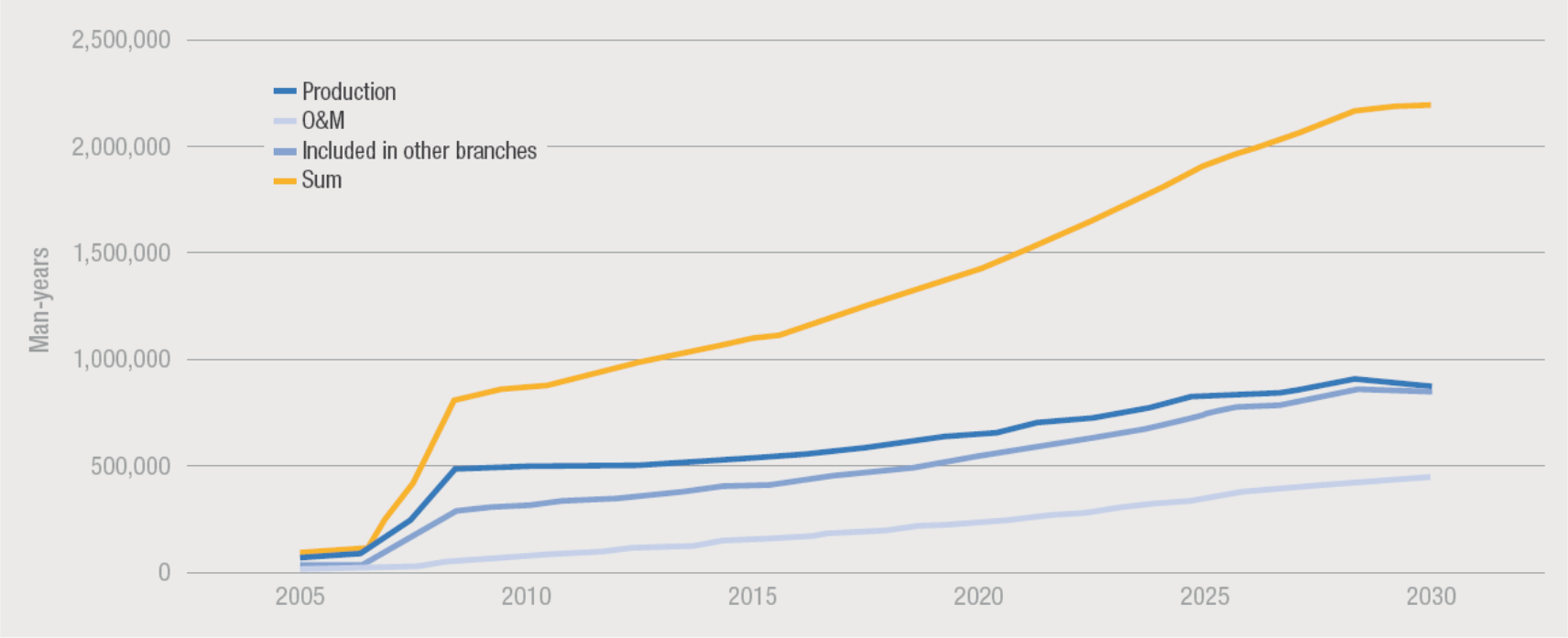
→ A matrix
→ $(I-A)^{-1}$ matrix

Direct input ➔ total induced over all steps

General Equilibrium Model (National Technical University of Athens)

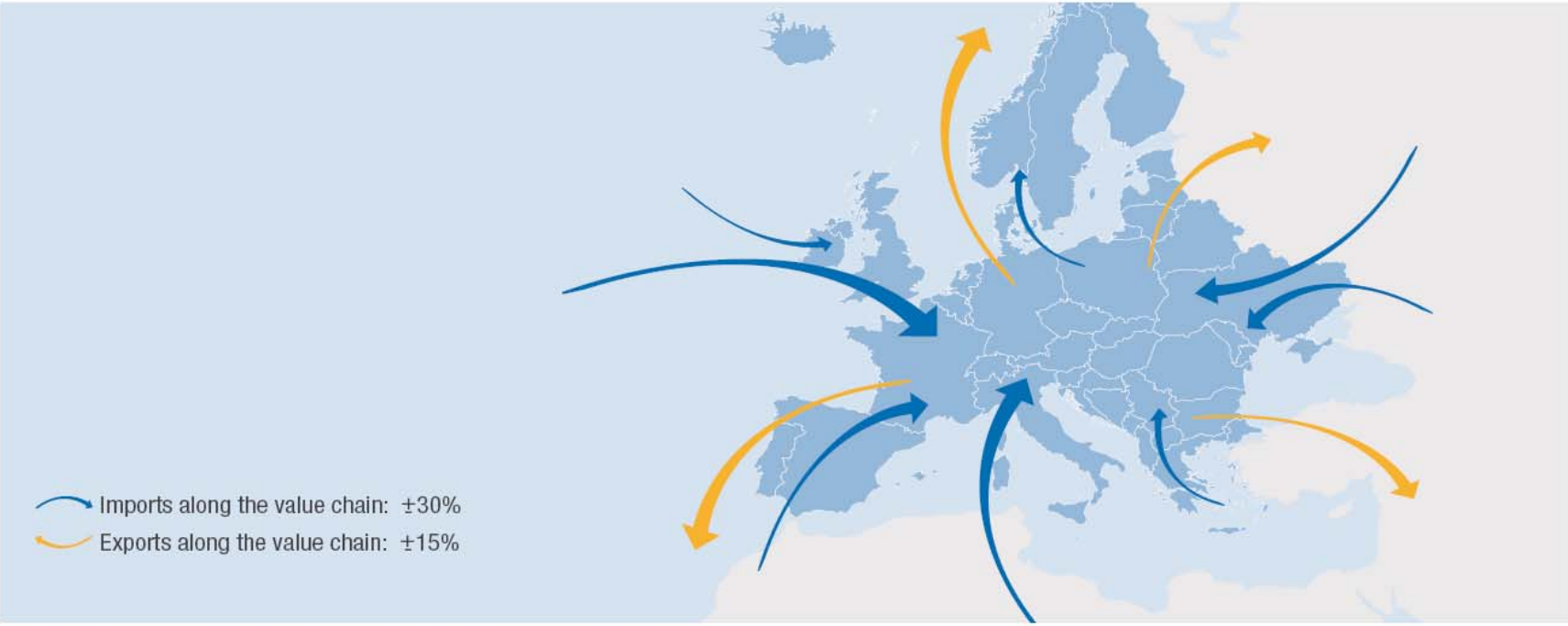
- all EU member states (apart from Malta, Luxembourg and Cyprus)
- 4 economic agents (households, firms, government and foreign)
- 18 production sectors
- Multiple equilibrium (labour, capital and product markets)
- 2000 to 2030 with a five year time step
- *Infinite number of firms that produce a homogeneous product under perfect competition*

Gross employment effects (advanced scenario)



Source: PV-Employment 2009

Import - Export share assumption



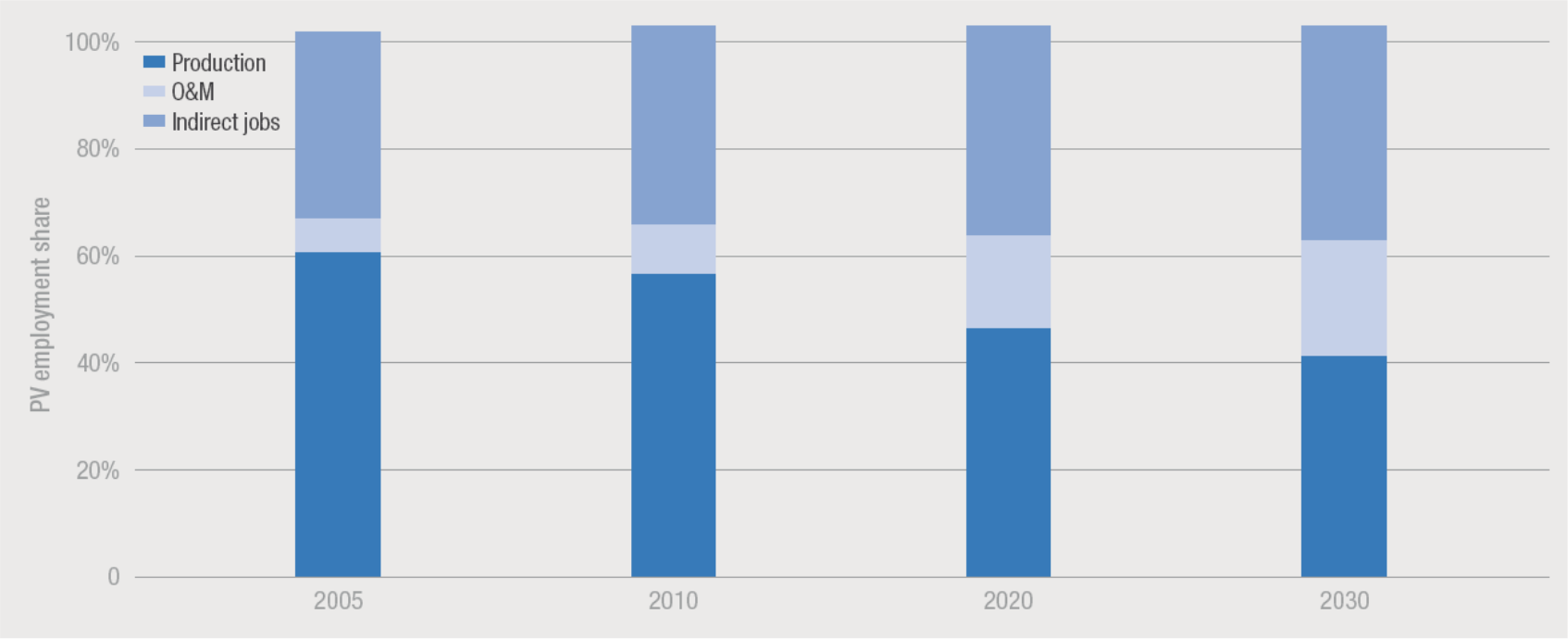
Net employment effect

Assuming a 15% export share along the value chain (advanced scenario), **the net employment effect for the EU27 is positive.**

Year	Annual new installed PV power in EU-27	Net effect assuming 15% exports
2010	12 GW	20,000 man-years
2020	39 GW	49,000 man-years
2030	65 GW	162,000 man-years

PV-Employment, 2009

Evolution of the employment share per stage of the PV value chain (advanced scenario)



Source: PV-Employment 2009

Qualification profiles and education recommendations

- **PV will not only create jobs but the EU PV Industry will call for highly qualified people**
  - Highly skilled academics:
    - academics with university studies specialised in photovoltaics, physics, chemistry, engineering and other technical backgrounds
    - business development, architecture, design, marketing or accounting
  - Skilled labourers:
    - Technicians
    - Electricians
- **There is a need for appropriate programmes from education institutions**
  - Specific courses in photovoltaics, in order to meet the demand of 50,000 new direct jobs created annually between 2006 and 2030
  - Specialised PV masters or post-graduate training in photovoltaic energy.

To be compared with results from other studies (EU scope)

- 2009 – Low Carbon Jobs for Europe – WWF
  - by 2030, around 1,4 million jobs (gross) in PV

- 2009 - Employ-RES (EC project)
  - To reach the 20% RES target by 2020, about 410,000 net additional jobs will be created in the RES sector
  - By 2030, around 400,000 gross jobs from PV industry

- 2009 - Study of the effects on employment of public aid to renewable energy sources - Universidad Rey Juan Carlos (Spain)
  - « *Each green job created destroys 2.2 jobs in the rest of the economy* »
  - 14,500 gross direct jobs in 2008 for Spain (~45,000 jobs according to ASIF)

Conclusions

- **In 2008, over 190,000 people were employed by the European PV industry** (130,000 directly and 60,000 people indirectly)
- By supporting its photovoltaic market and industry, the EU-27 ensures a **gross job creation of about 2.2 million jobs by 2030**
- Compared to the gross employment effects induced, the net employment effects are small
- Assuming a 15% export share along the value chain (advanced scenario), the **net employment effect for the EU27 is positive about 162,000 net jobs by 2030** (20,000 in 2010 and 49,000 in 2020)
- PV Industry will call for **highly qualified people**
- There is a **need for appropriate programmes from education institutions**

- **Acting today is key to ensuring tomorrow's sustainable energy future**

Thank your for your attention !

www.pvemployment.org