



High Level Energy Conference

Renewable Energy and Infrastructure Development
in Southeastern Europe and the HELIOS Project



DG Joint Research Centre Institute for Energy and Transport (IET)

Giovanni De Santi



Ispra, Italy

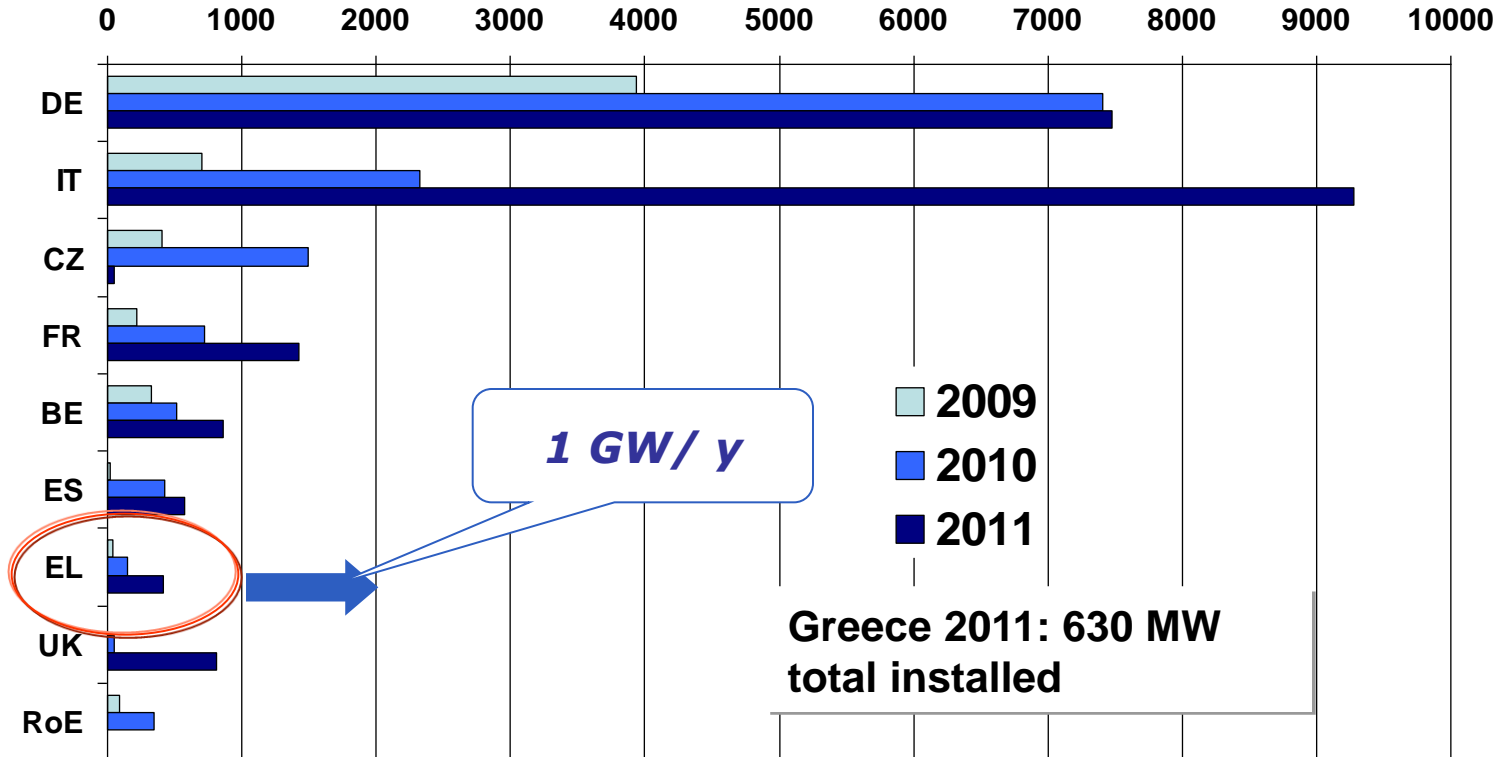
Petten, The Netherlands

The mission of the Joint Research Centre – Institute for Energy and Transport (IET) is to provide support to Community policies and technology innovation related both to:

ENERGY - to ensure sustainable, safe, secure and efficient energy production, distribution and use and

TRANSPORT - to foster sustainable and efficient mobility in Europe.

Progress of PV 2009/10/11 in Europe MW installed per year (2011: 18.3 GW)



Source: 11th EurObserver'ER Report, Paris, 2012
Hellenic Association of PV Companies (EL)
GSE (IT)
AG Energie Statistiken (DE)

Helios as a project of European interest

- *Can help Europe meet GHG reductions and RES penetration at a lower cost*
- *Will contribute to the development of European electricity market with south-north electricity corridors*
- *Be a forerunner for other ambitious European scale projects. which could further extend (e.g. MedGrid, Desertec...).*
- *Contributing to EU Innovation (research, deployment, innovation, growth, employment)*
- *Potential Candidate for "Connecting Europe Facility" (CEF)*

Challenges ahead

Statistical Exchange:

Can Partner Countries be found?

How much can the Greek distribution grid take? 0.5 ... 1.5 ... 5 GW?

What and how much investment would be needed?

Benefits:

Better CO₂ performance of Greece (11 tCO₂/cap, EU 7.5 tCO₂/cap)

Contribute to achieving EU Memberstate targets at affordable costs

Export:

How much can be delivered through existing HV lines?

Is there an economic benefit of a new dedicated line?

Who will be the transiting and importing countries?

Benefits:

Supply Security for the EU Memberstates

Energy Income for Greece from Exports

JRC Contribution to HELIOS (1)

Solar Resources and Performance

high resolution, local weather, shadowing, hourly data

Technical/Economical Evaluation of PV Systems and Sites

hourly radiation, hourly demand, PV technology options, storage and grid connection

Integration of PV Plants into existing Distribution Network

High Voltage grid, Island connection

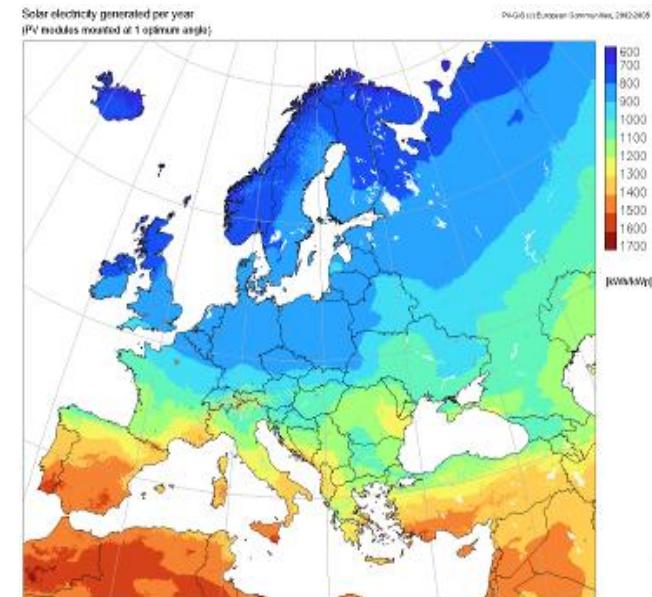
Options for large scale export to EU countries

Adriatic Sea, Mainland Italy. Bulgaria-Hungary

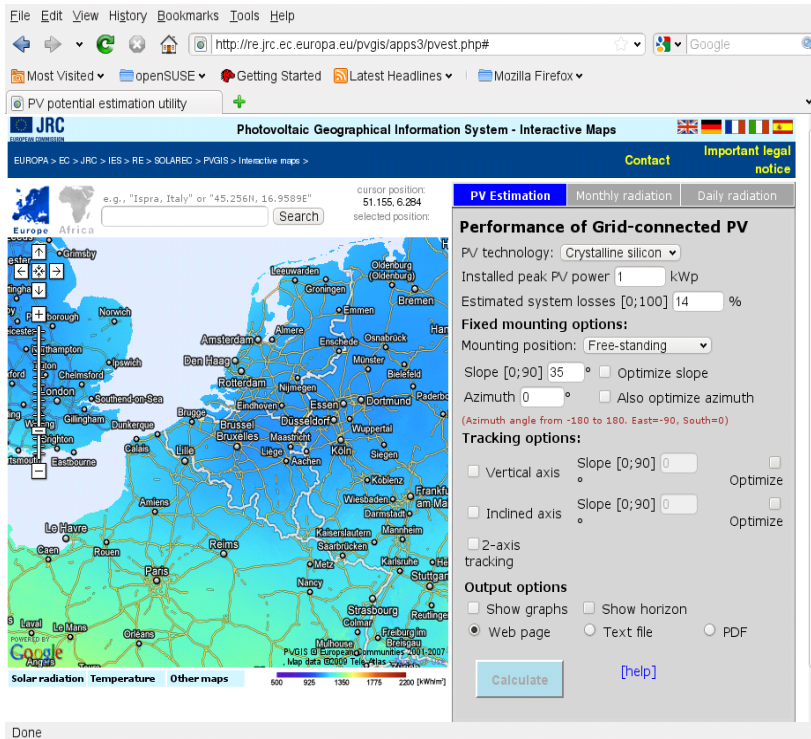
HELIOS as a forerunner of future, larger
“Mediterranean Solar Network”

Renewable energies – Solar PVGIS on-line tool

Solar radiation database which combines atmospheric modelling with satellite and ground based measurements.



Web-interface lets users calculate the energy output of photovoltaic (PV) systems at specific locations.



File Edit View History Bookmarks Tools Help

http://re.jrc.ec.europa.eu/pvgis/apps3/pvest.php#

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PV potential estimation utility

JRC
Photovoltaic Geographical Information System - Interactive Maps

EUROPA > EC > JRC > IES > RE > SOLAREC > PVGIS > Interactive maps >

Contact Important legal notice

cursor position: 51.155, 6.284
selected position:

e.g., "Ispra, Italy" or "45.256N, 16.9599E" Search

Performance of Grid-connected PV

PV technology: Crystalline silicon

Installed peak PV power 1 kWp

Estimated system losses [0;100] 14 %

Fixed mounting options:

Mounting position: Free-standing

Slope [0;90] 35° Optimize slope

Azimuth 0° Also optimize azimuth
(Azimuth angle from -180 to 180. East=-90, South=0)

Tracking options:

Vertical axis Slope [0;90] 0° Optimize

Inclined axis Slope [0;90] 0° Optimize

2-axis tracking

Output options

Show graphs Show horizon

Web page Text file PDF

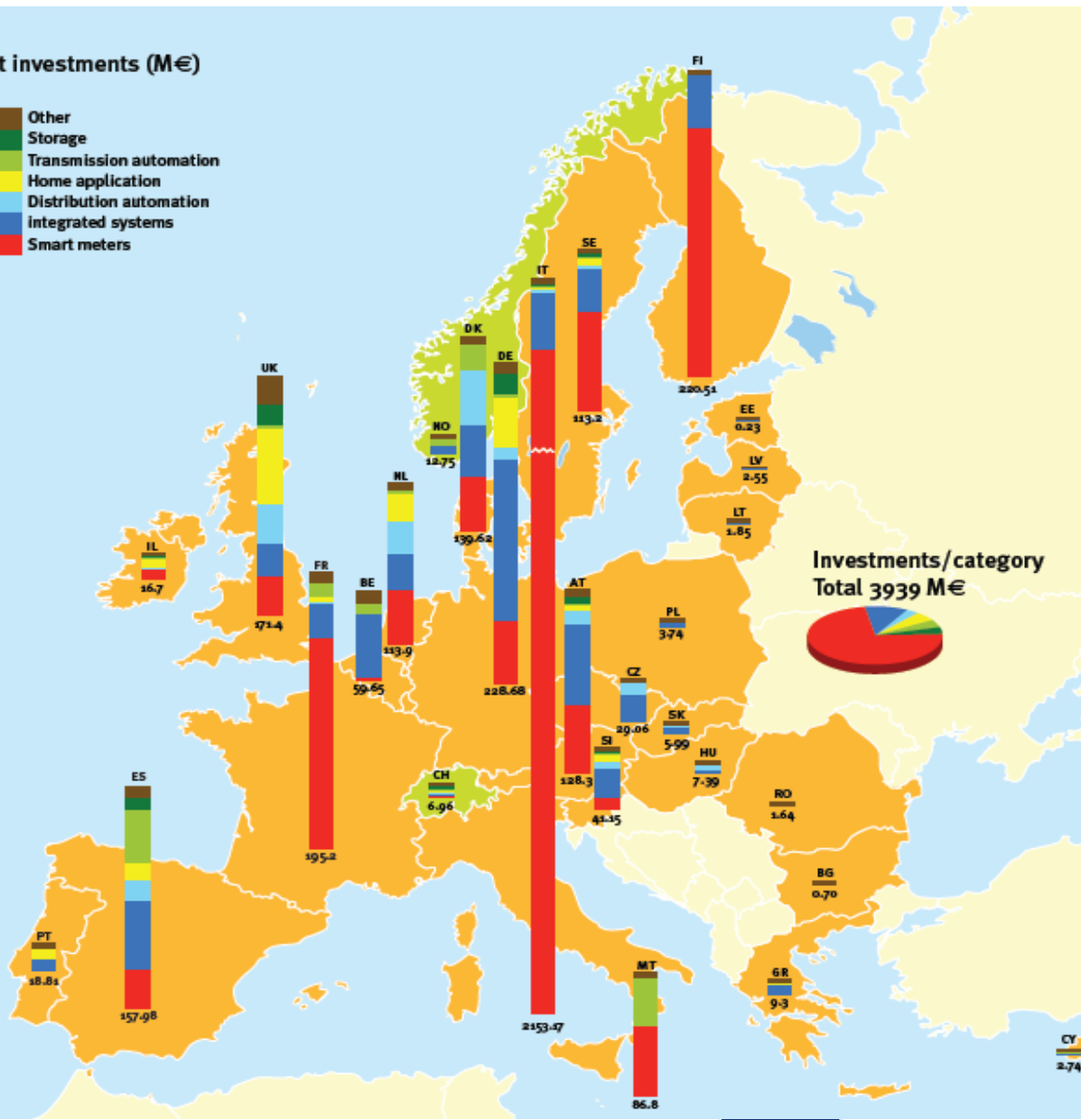
Calculate [help]

Solar radiation Temperature Other maps 600 925 1350 1775 2200 [kWh/m²]

Done

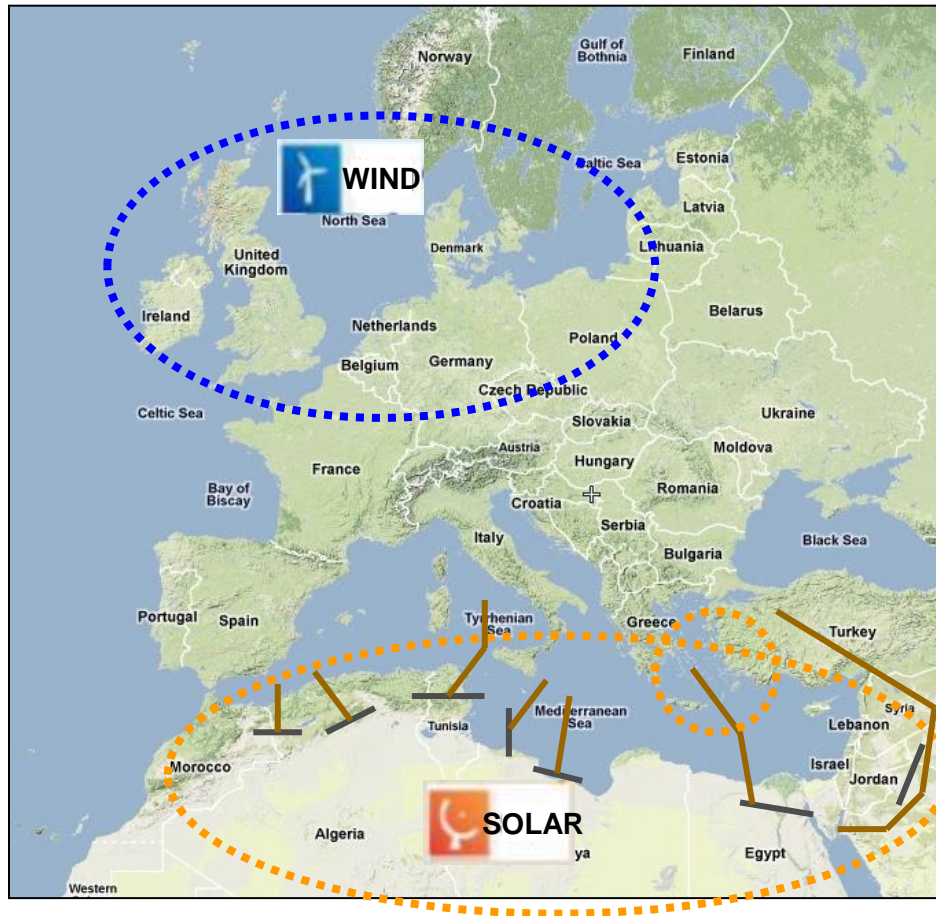
Smart Grid projects analysis and mapping

- Uneven distribution of investments across Europe. Most of investments in EU-15 Countries only
- Over 5 Bio € of investments, but still at the beginning of the Smart Grid transition



Projects can span over more than country and can include more than one category. The picture does not include the Smart Meter Roll-out in Sweden, spanning approx. 150 projects and amounting to approx.1500 M€, as a detailed description of the projects was not received.

Renewables & Super Grids



JRC contribution:

*Communication on smart
grids (202/2011)*

Standards (Mandate 490)

*European Industrial
Initiative on Electricity
Grids (SETIS)*

*Smart Grids Task Force
(DG ENER)*

Industry:

- **MEDGRID**
- **Eurelectric**
- **ENTSOE**

JRC Contribution to HELIOS (2)

The cooperation on power system analysis consists of tasks such as:

- *Required storage capacity, flexible generation capacity and demand in Greece and Europe for supporting the variable output of solar parks*
- *Alternatives for exporting solar capacity*
- *Greek high voltage system's availability to integrate Helios' parks*
- *Determination of the current transfer capacity for solar energy exports from Greece to central Europe*
- *Determination of the future transfer capacity with new lines*
- *Expansion of the Helios project with 10 GW of wind parks in Aegean area*

Closing remarks

This ambitious European scale project will help us reach the EU 2020 targets..

HELIOS can be a forerunner of future, larger "Mediterranean Solar Network"

As the European Commission scientific body, the JRC can contribute to the technical validation and coordination of this project



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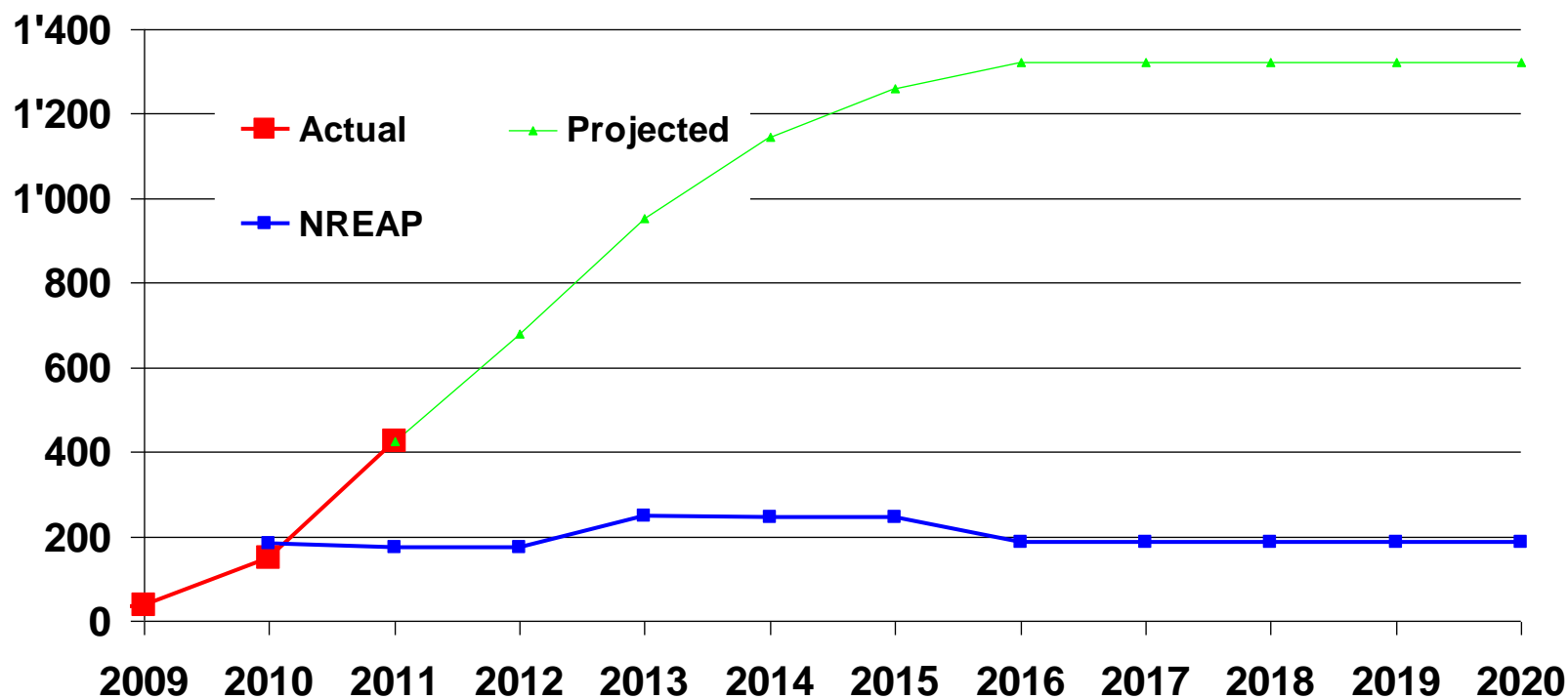


Thank you

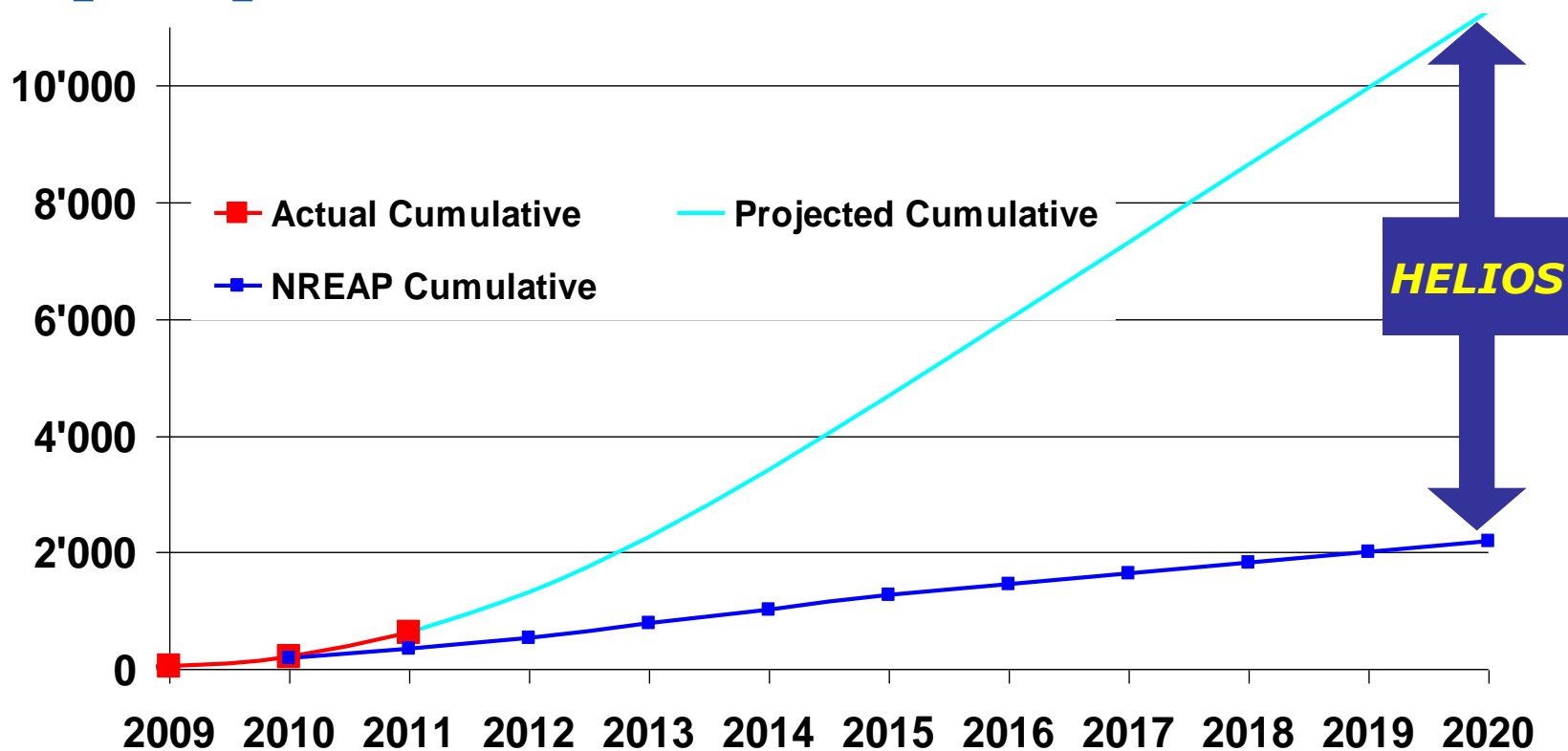


JRC

Installed PV Capacity per Year Ramp Up for HELIOS [MW]



Total Installed PV Capacity at end of Year [MW]



PV Job Creation and Turnover

Installing 1.5 GW/year would create in Greece
30000 jobs
3000 Mio € yearly turnover

<i>2010 Data</i>	<i>Jobs</i>	<i>Turnover Mio€</i>	<i>2010 Installed MW</i>	<i>Jobs/MW</i>	<i>Turnover Mio€/MW</i>
<i>DE,FR,IT, ES, BE</i>	237000	37000	11000	21	3.4
Manufacturing	79000	17000			
Installation	158000	20000			
Greece	4250	500	150	28	3.3