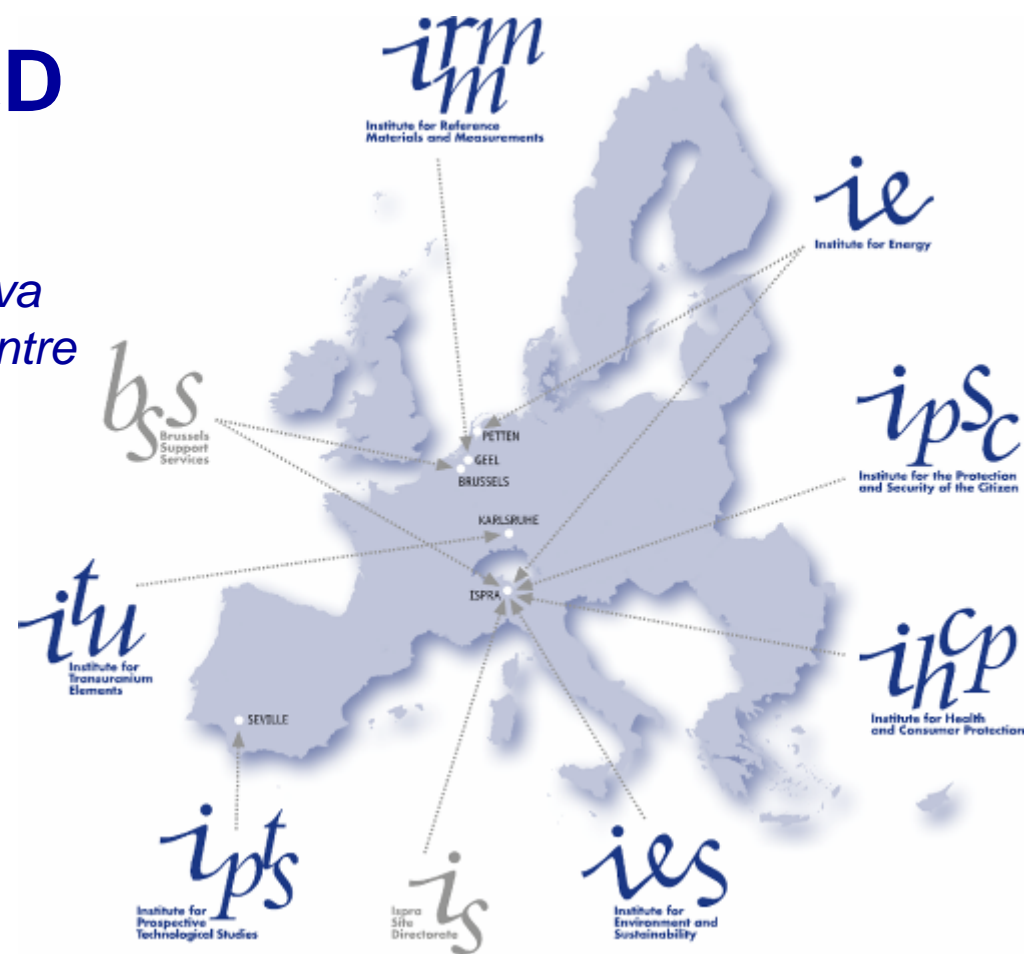
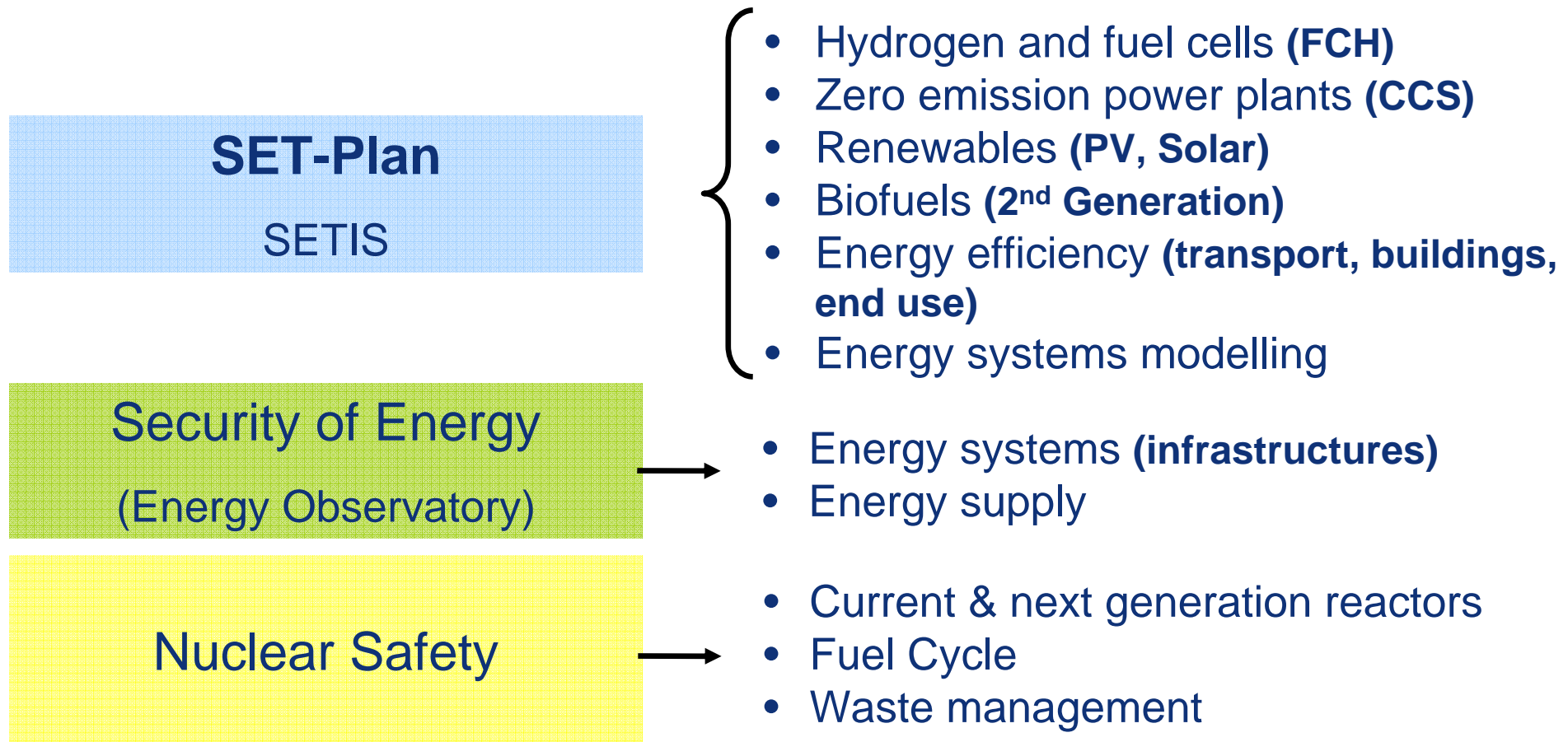


Renewable Energy R&D

*Dr. N.G.Taylor & Dr. M. Nikolaeva-Dimitrova
European Commission Joint Research Centre
Institute for Energy*



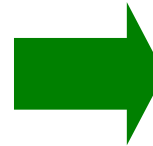
Focus of JRC Research in the Energy Landscape



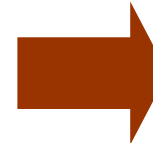
SET = Strategic Energy Technology Plan

SETIS = Strategic Energy Technology Information System

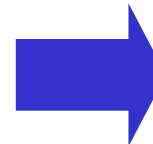
- Electricity End-Use Efficiency
- Renewable Energy
 - *Progress of Renewables*
 - *Biofuels*
Well-to-Tank Study
Resources & Environmental Impact
 - *Photovoltaic Solar Energy*
Research
Resources and Costs
Performance
Lifetime



REEF
Reference System for
Renewables and Energy
Efficiency



BioF
Bio-Fuels Quality &
Performance



Solarec
Solar Electricity

Electricity End-Use Efficiency

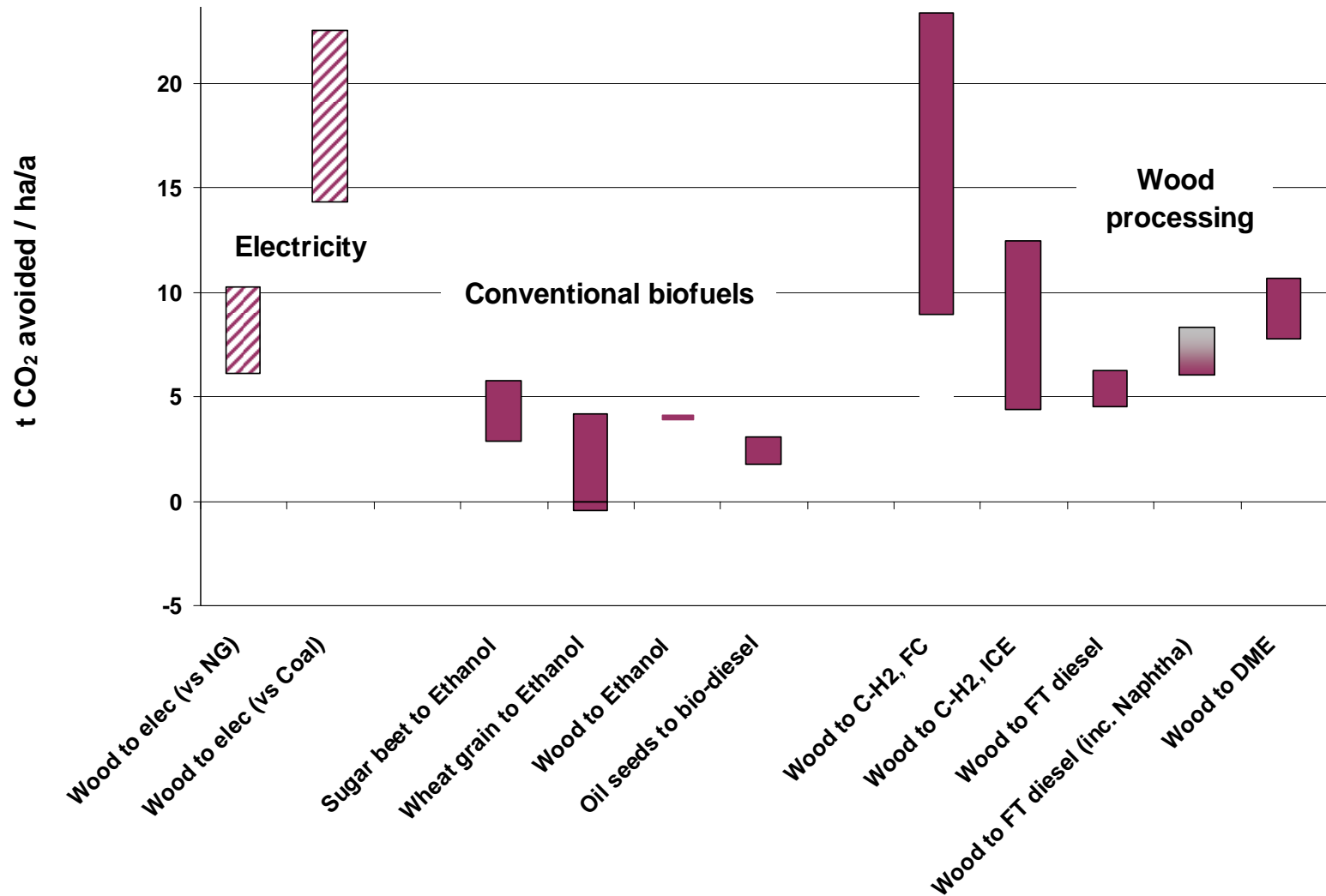
Use	Technologies Today		Lost	Dated	Europ. Cons.	Technologies Today and Tomorrow	Cross fertilisation
Illumination	Incandescent Lamp		96%	~1879	65 TWh	CFL and LED	Optoelectronics
Stand-By Loads	Iron Transformer + Rectifier		80%	~1882	50 TWh	HF Switchers	Semiconductors
Car Drive Train	Combustion Engine		75%	~1862	280 Mtoe	Brushless DC Motors LiPolymers H2 Fuel Cells	Advanced Materials, Polymer Electrochemistry Electronics
Electricity Generation	Steam Turbine		60%	~1885	218 Mtoe	Wind Photovoltaics	Aerodynamics Quantum Physics Semiconductors Thin Film Displays

Example for Policy Design (2007): Scenarios for Phasing-Out Conventional Lighting for Domestic Use.

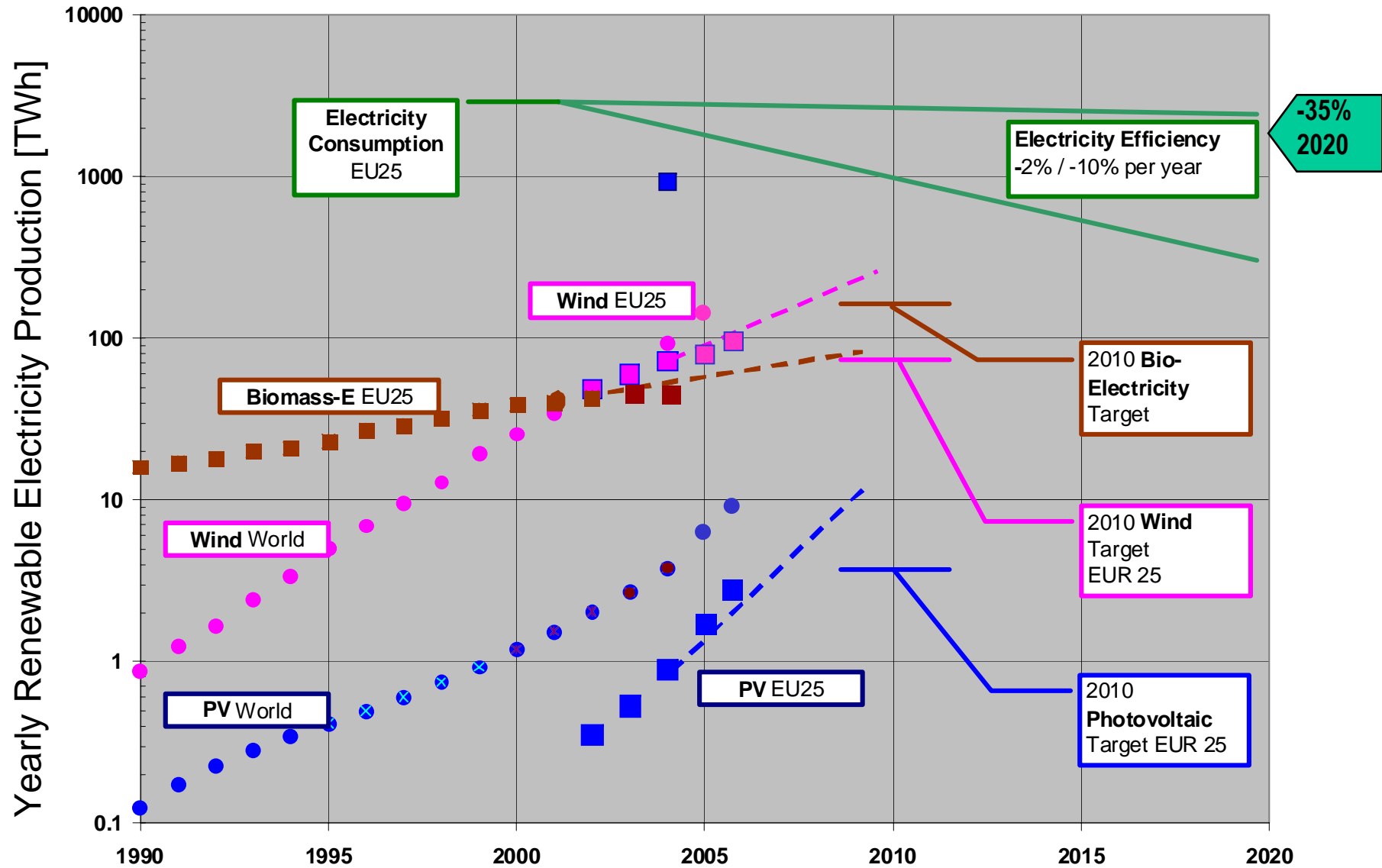
N.B. EU-27 Consumption for Lighting: 97 TWh (3%)

	Scenario 1 (1 more CFL/hhsld)		Scenario 2 (25% of the lighting points with CFLs)		Scenario 3 (total replacement with CFLs)	
	additional CFL's [millions]	savings [TWh]	additional CFL's [millions]	savings [TWh]	additional CFL's [millions]	savings [TWh]
EU-15	156	9,6	442	13	3300	33
NMS10	25	2,1	83	3.9	400	37
EU-25	180	12	524	17	3700	40
EU-27	192	12,8	546	18,8	3800	44,3

- CO₂ savings per hectare are better for advanced biofuels than ethanol or biodiesel
- Using biomass for electricity or heat offers greater savings.



Reference case: 2010 internal combustion engine with conventional fuel





Open rack
and
Dual axis solar
tracker

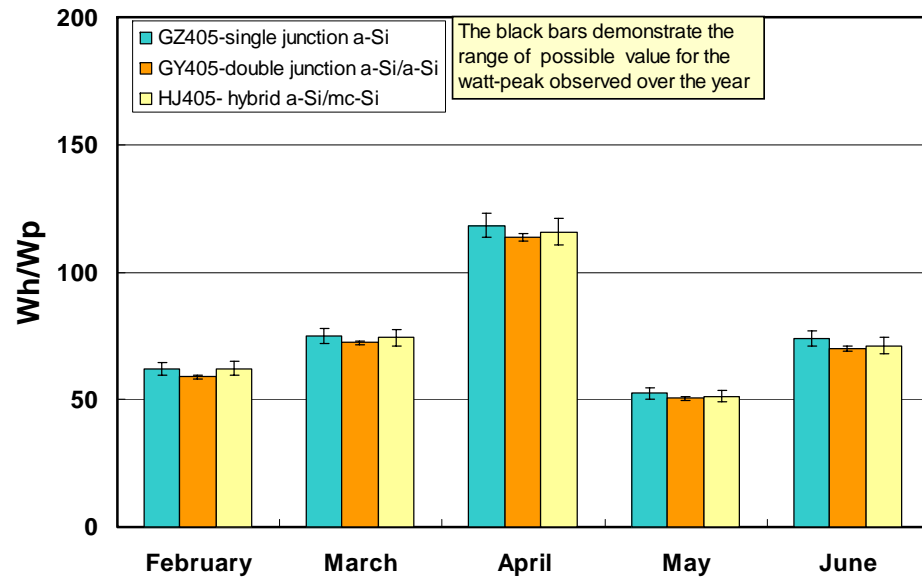
Outdoor
calibration
box

Traceability of primary SI standards
Measurements in lab and **real**
operating conditions



Building
integration
system

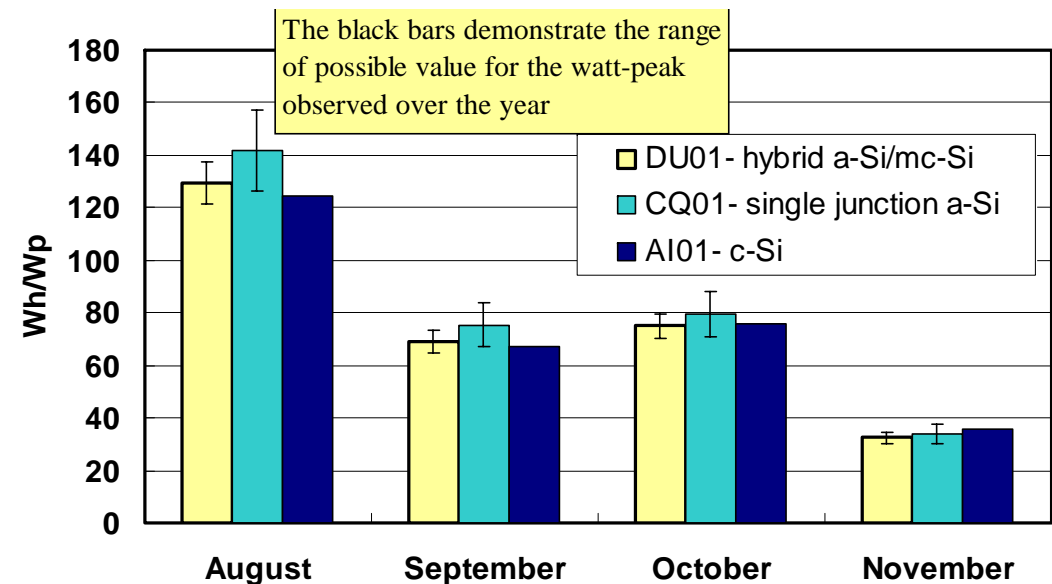
Energy rating



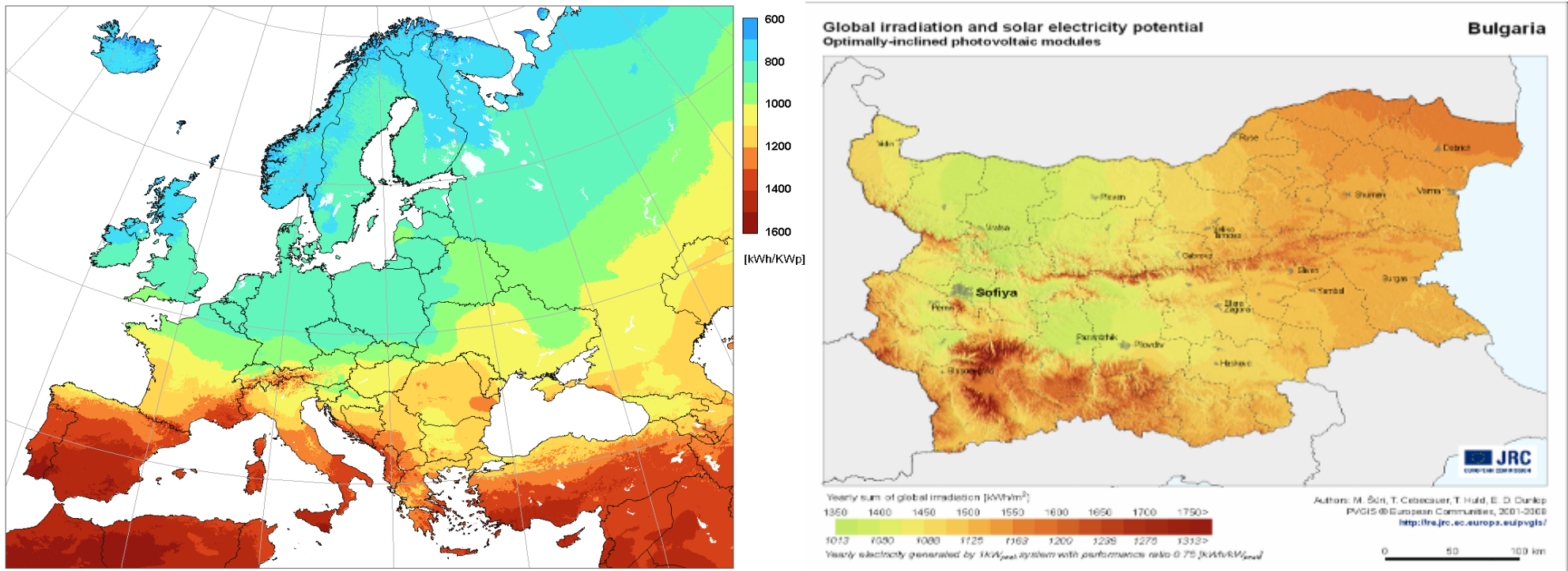
- Enables to choose between different products and solutions.

Why is the energy rating of a photovoltaic module important?

- It helps the installer to guarantee a certain output power or Wh.
- The guaranteed output power or Wh can be verified by the end-user.



Photovoltaic Geographical Information System (PVGIS)



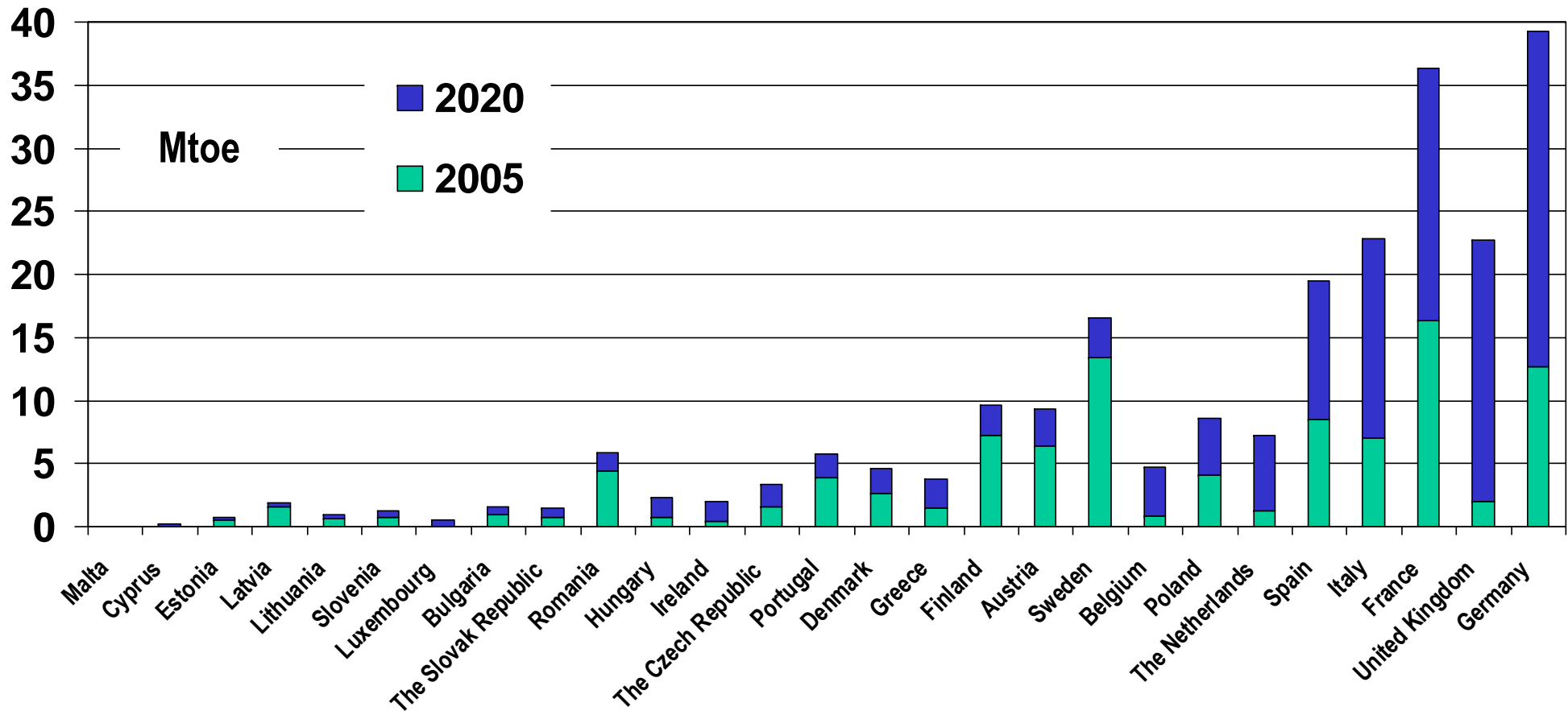
PV electricity generated from south-oriented optimally-inclined modules
[kWh per kilowatt-peak]

- **R&D for renewables and energy efficiency will be in demand for the foreseeable future**
- **Wide reaching, cross-cutting issues:**
 - fuels, materials, electricity grid, environmental impacts, rapid industry development, developing world and poverty, human “footprint”, sustainability
- **JRC’s reference role within the EC also relies on effective collaborations with centres of excellence in energy in the Member States.**

Thank You !



- Proposed Directive on Renewable Energies
- Target 20% by 2020



EU-27 energy flow trends - 2005 Supply, transformation, consumption (TJ)

