PV INDUSTRY'S VIEWS ON STORAGE

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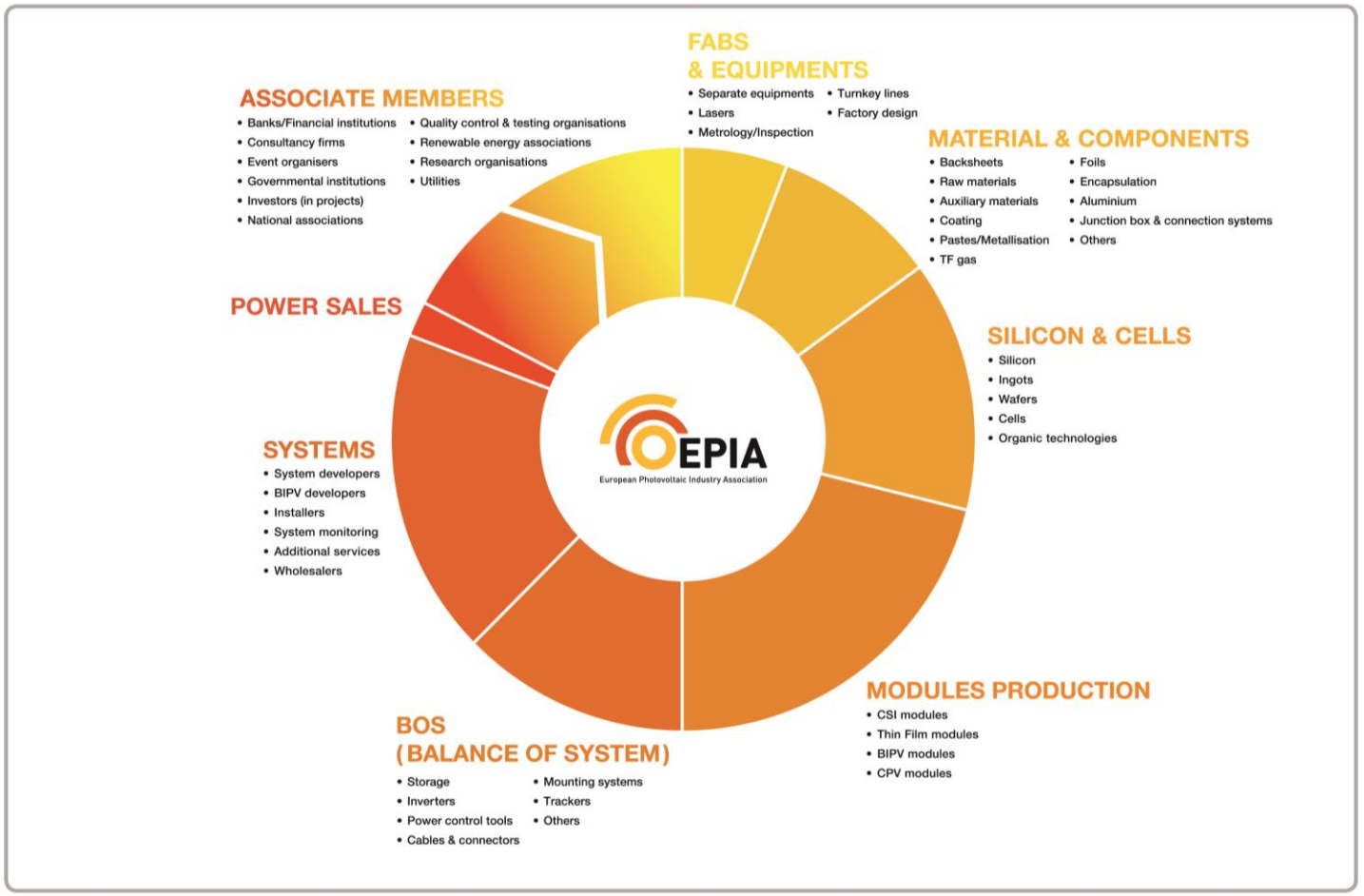
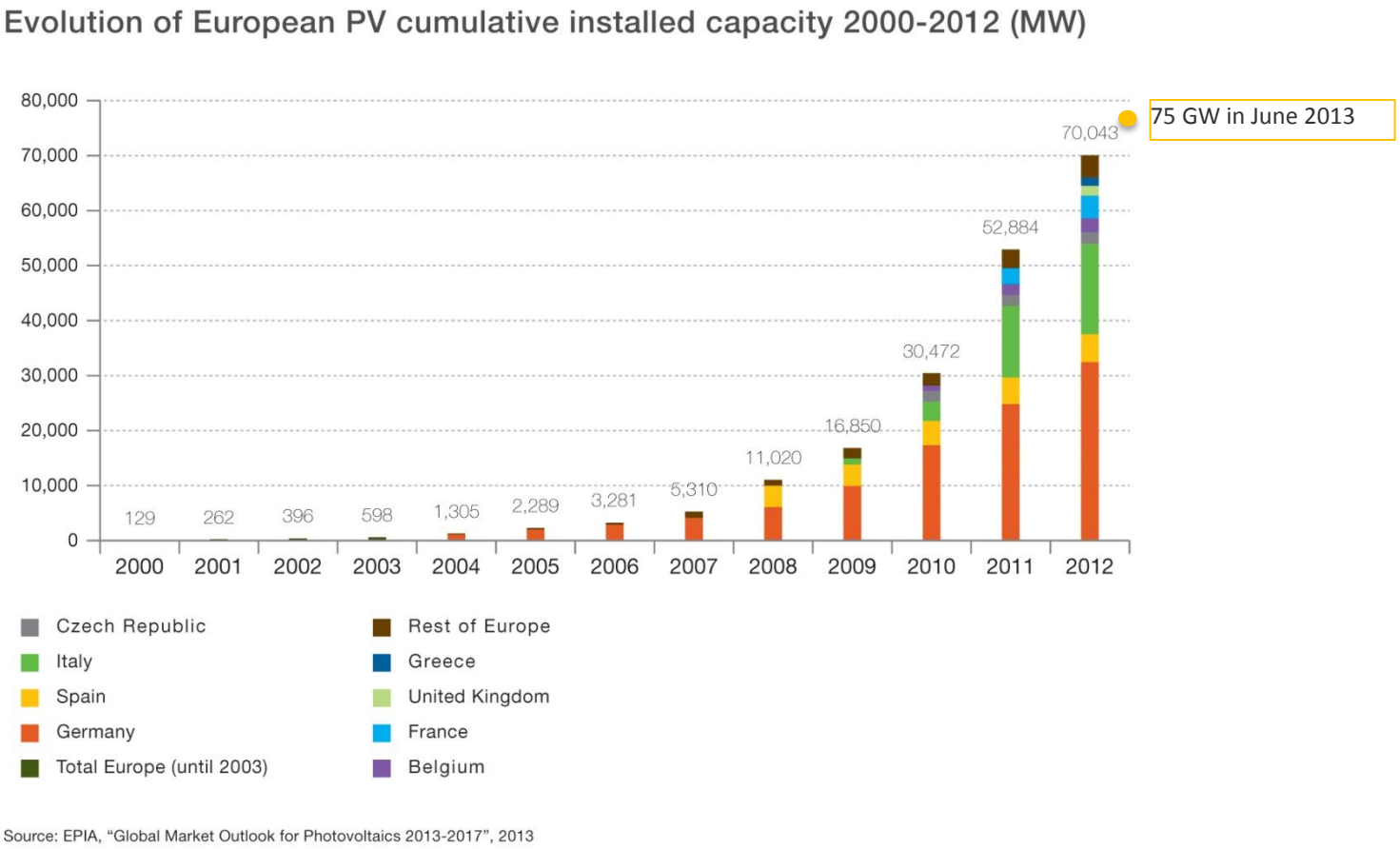
Who is EPIA?

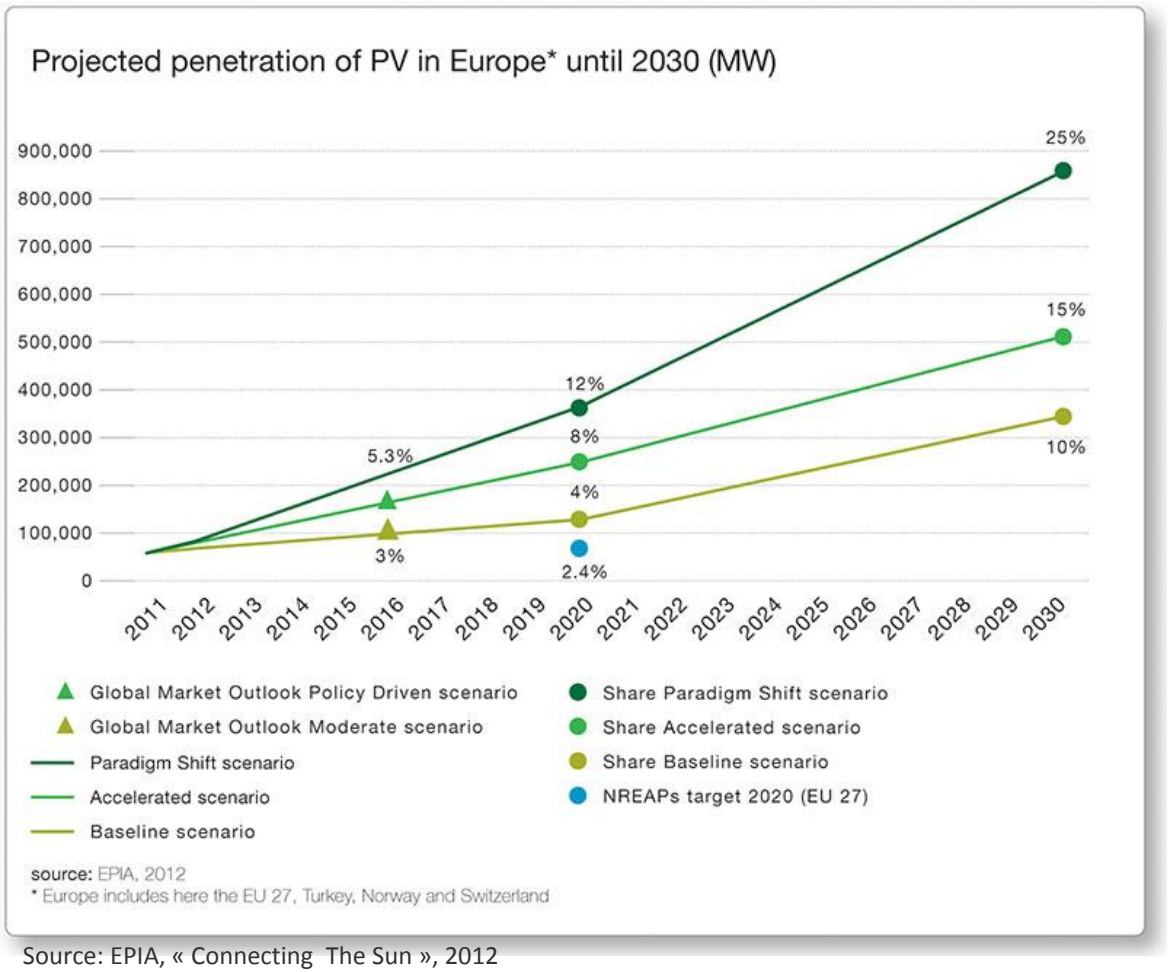

FABS
& EQUIPMENTS
• Separate equipments
• Lasers
• Metrology/Inspection
• Turnkey lines
• Factory design
ASSOCIATE MEMBERS
• Banks/Financial institutions
• Consultancy firms
• Event organisers
• Governmental institutions
• Investors (in projects)
• National associations
• Quality control & testing organisations
• Renewable energy associations
• Research organisations
• Utilities
MATERIAL & COMPONENTS
• Backsheets
• Raw materials
• Auxiliary materials
• Coating
• Pastes/Metallisation
• TF gas
• Foils
• Encapsulation
• Aluminium
• Junction box & connection systems
• Others
POWER SALES
SILICON & CELLS
• Silicon
• Ingots
• Wafers
• Cells
• Organic technologies
EPIA
European Photovoltaic Industry Association
SYSTEMS
• System developers
• BIPV developers
• Installers
• System monitoring
• Additional services
• Wholesalers
MODULES PRODUCTION
• CSI modules
• Thin Film modules
• BIPV modules
• CPV modules
BOS
(BALANCE OF SYSTEM)
• Storage
• Inverters
• Power control tools
• Cables & connectors
• Mounting systems
• Trackers
• Others

EU PV market: where do we stand now?



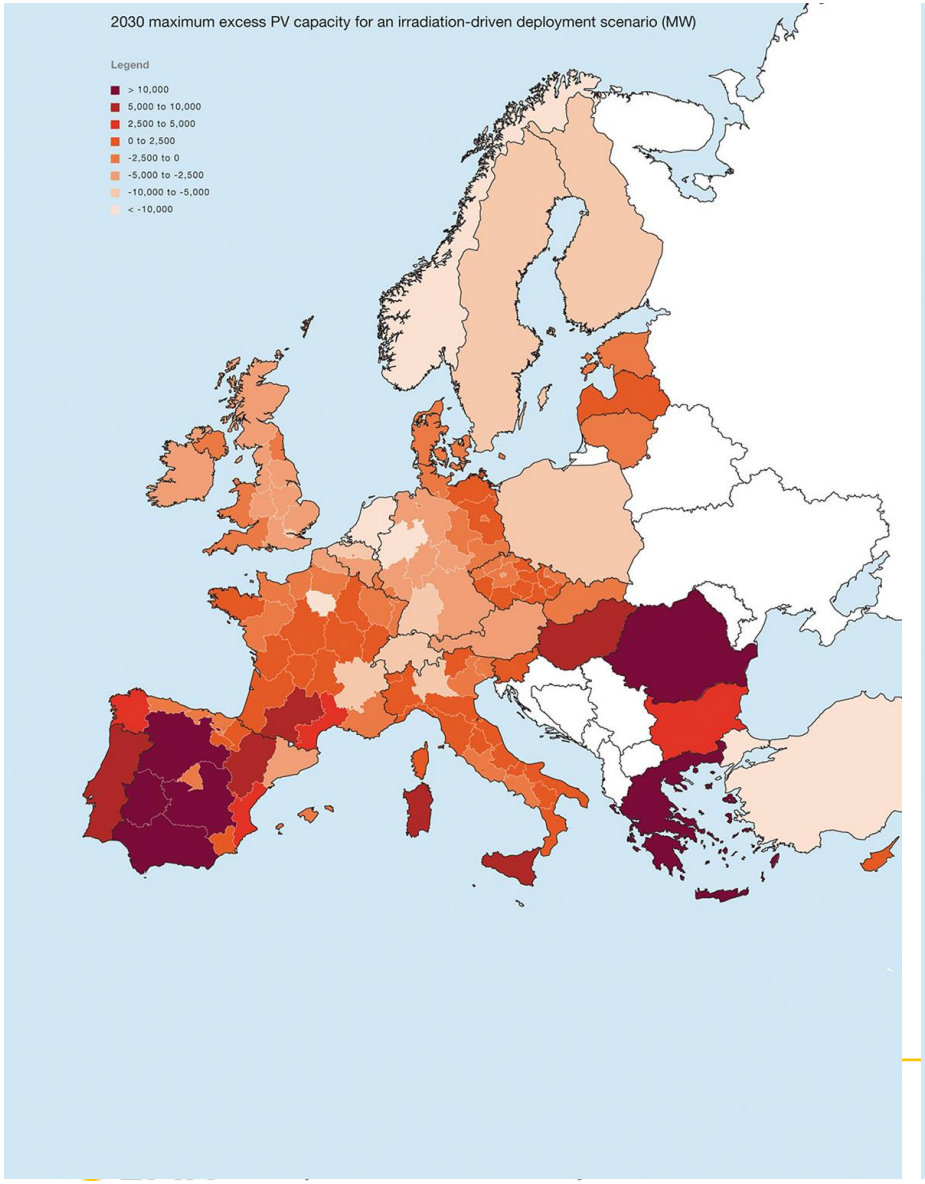
Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

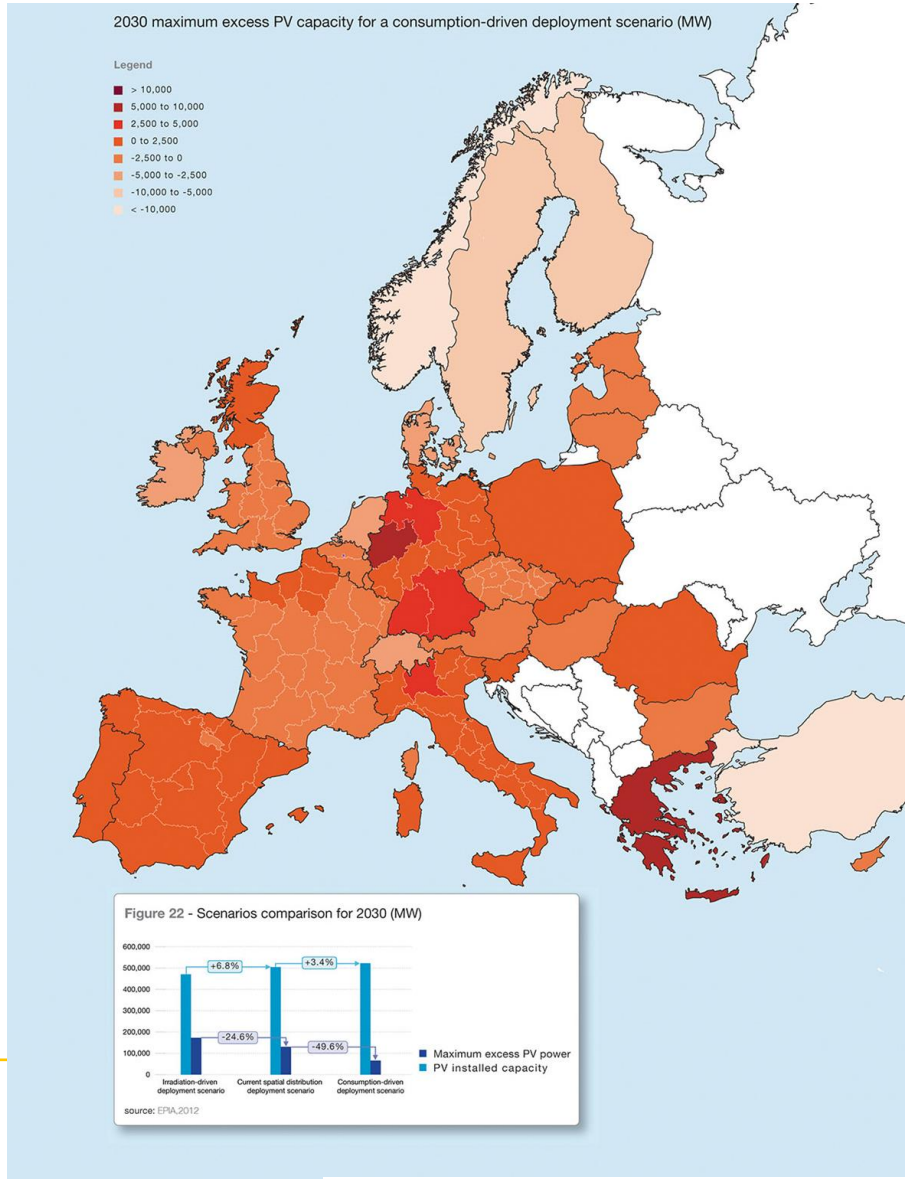
EPIA scenarios for 2020 and 2030



Source: EPIA, « Connecting The Sun », 2012

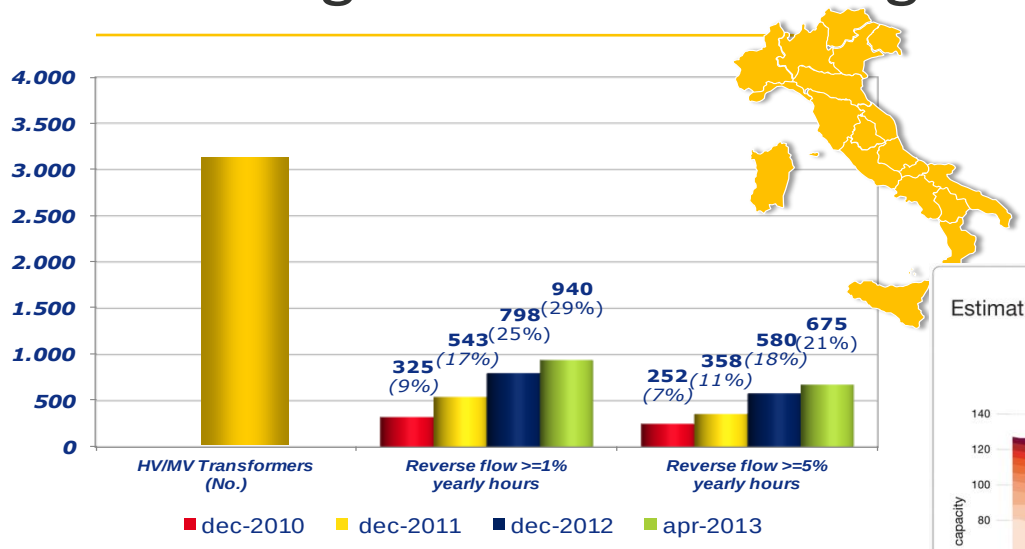
How will future PV capacity be distributed?





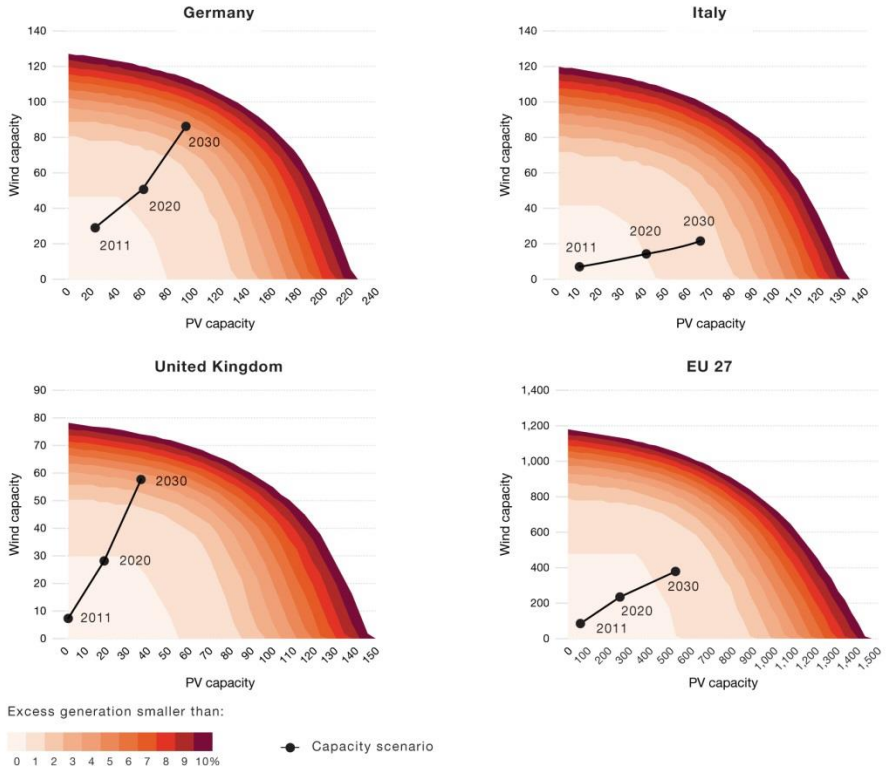
Source: EPIA, « Connecting The Sun », 2012

Challenges at distribution grid and system levels:



(Above) Source: ENEL Distribuzione, PV GRID project

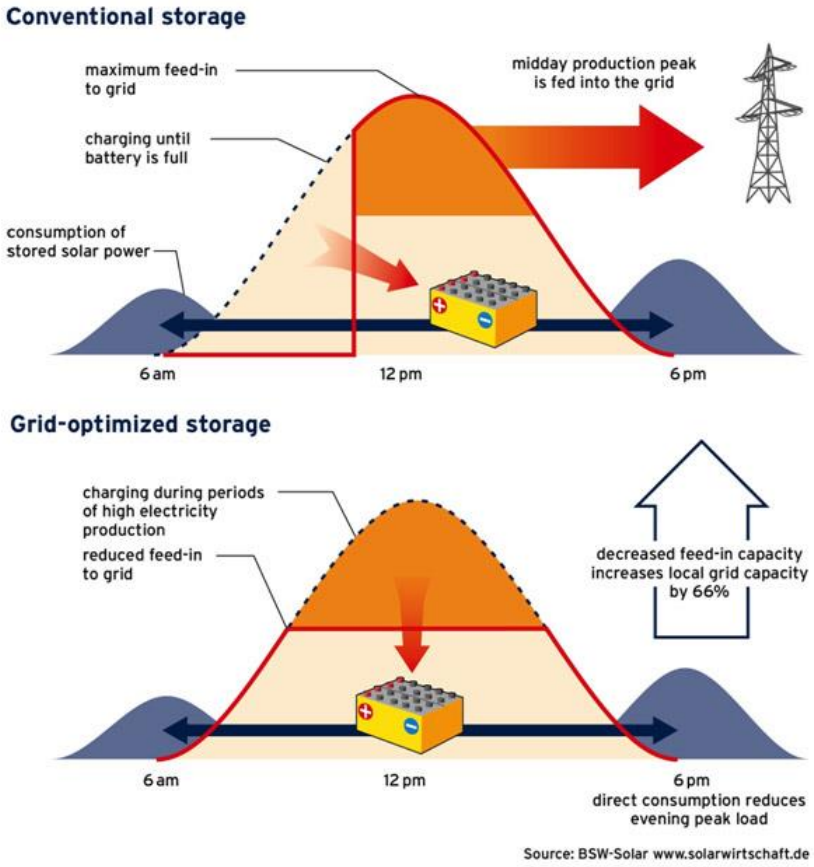
Estimation of the percentage of excess generation based on PV and wind capacity scenario (GW)



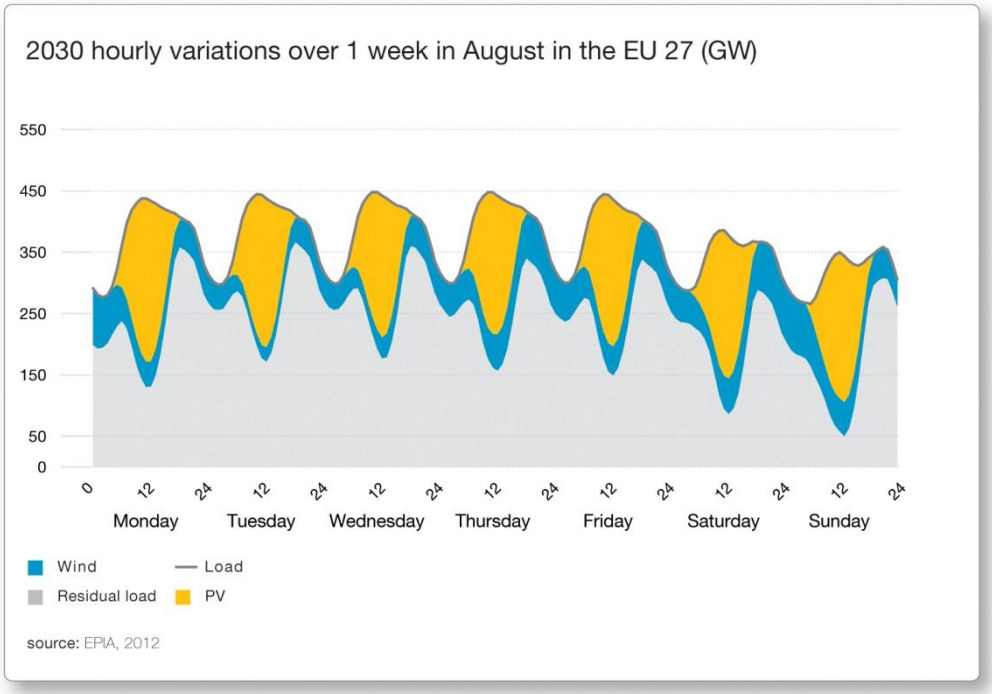
(On the right) Source: EPIA, "Connecting The Sun", 2012

Will storage play an important role?

→ Support D grids



→ Increase system flexibility



Source: EPIA, "Connecting the Sun", 2012

Storage supporting increased PV shares

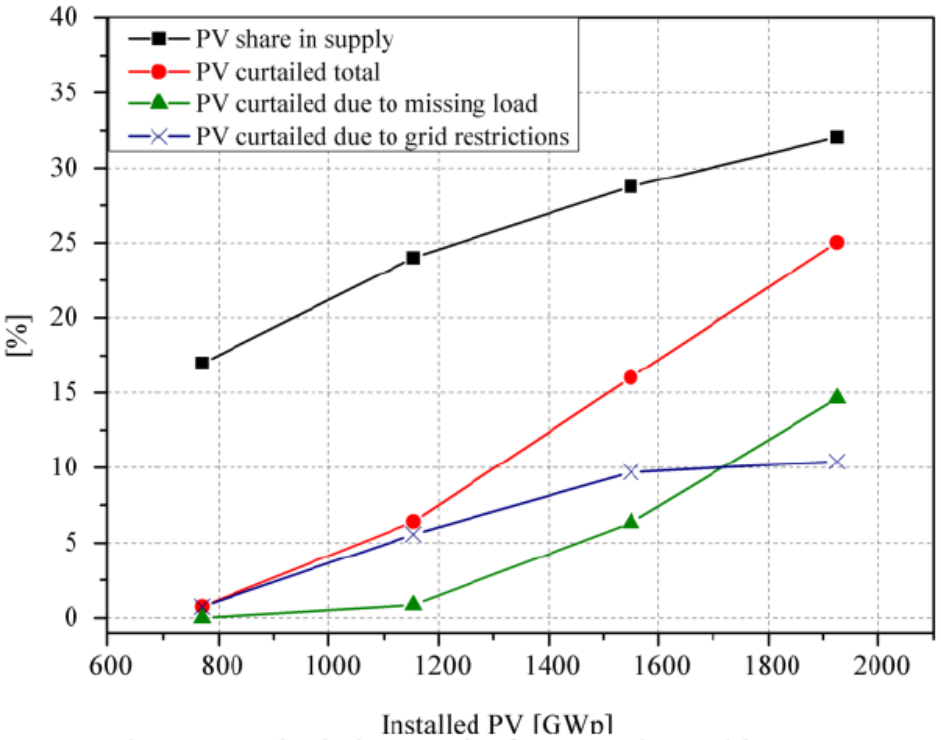


Figure 3: Calculation results for scenario 1 with no storage

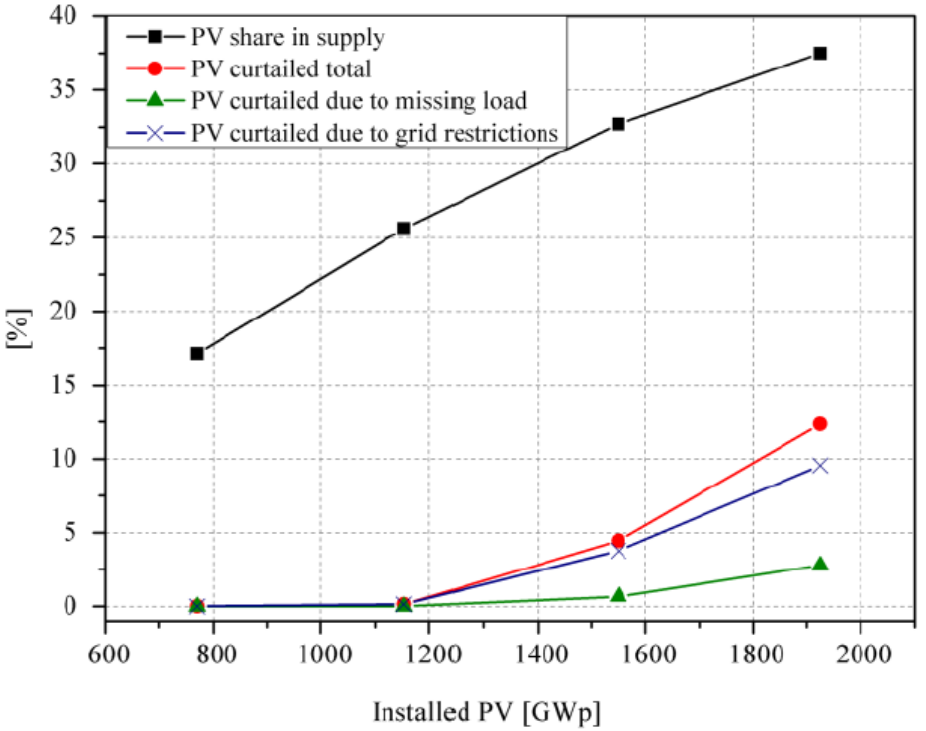


Figure 5: Calculation results for scenario 3 with 1540 GWh of storage

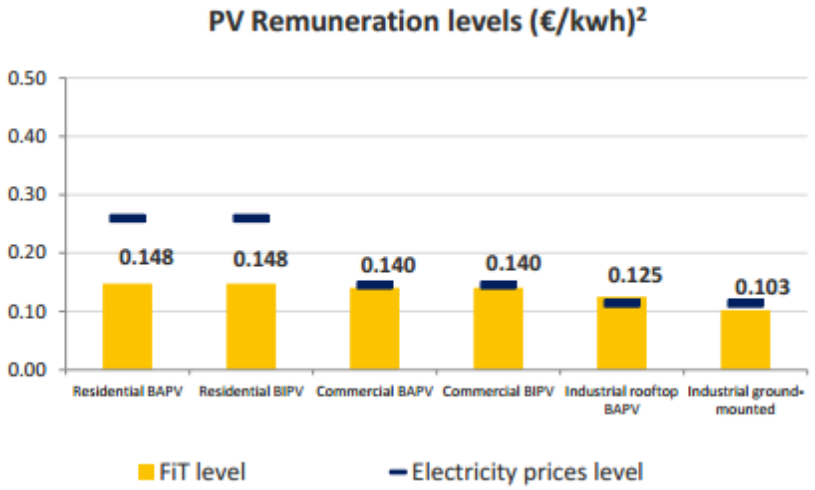
Source: CHEREVATSKIY, Stanislav, TROESTER, Eckerhard, EnergyNautics GmbH, 2013

What drivers for storage deployment?

(-) Technical challenge of market and/or local signals to generation/demand/storage connected to distribution grids

(+) PV FiT level in some countries lower than retail electricity price

(+) PV meeting part of the midday peak but storage could contribute to meeting the evening peak



Source: EPIA internal analysis for Germany, August 2013

If system adequacy assessments prove the need for capacity remuneration mechanisms, then in EPIA's view storage and demand should also be eligible, mechanisms should be time-bound, should aim at minimizing CO2 emissions and should be based on competitive awarding procedures.

THANK YOU FOR YOUR ATTENTION

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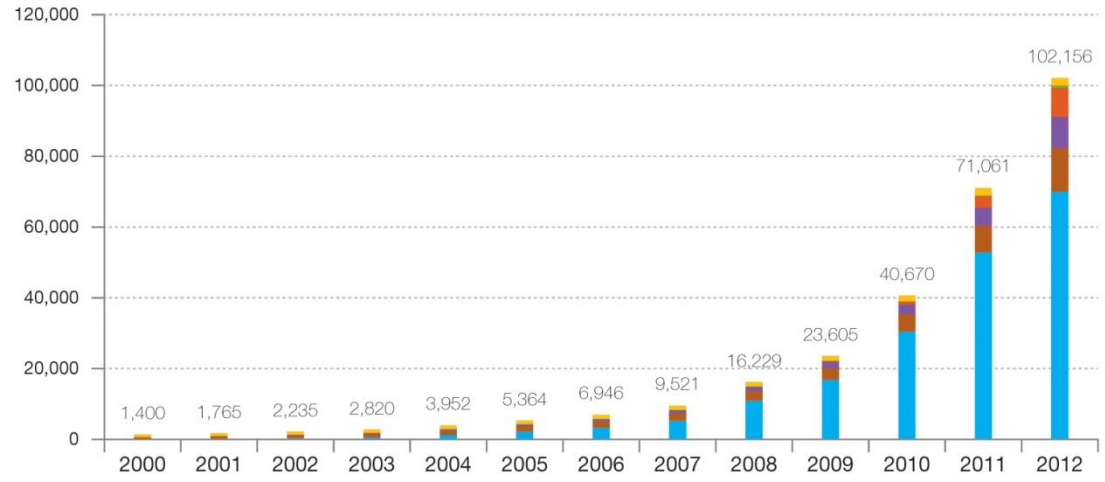
Global PV capacity has reached 100 GW

Evolution of global PV cumulative installed capacity 2000-2012 (MW)



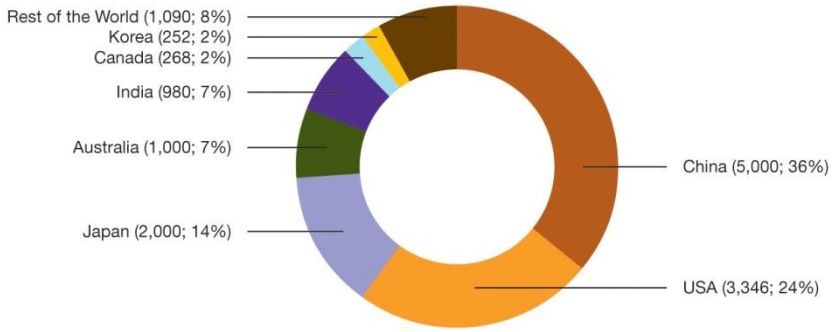
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ROW	751	807	887	964	993	1,003	1,108	1,150	1,226	1,306	1,590	2,098	2,098
MEA	n/a	n/a	n/a	n/a	1	1	1	2	3	25	71	192	601
China	19	24	42	52	62	70	80	100	140	300	800	3,300	8,300
Americas	146	178	225	290	394	501	650	863	1,209	1,752	2,780	4,959	8,717
APAC	355	495	686	916	1,198	1,500	1,825	2,096	2,631	3,373	4,956	7,628	12,397
Europe	129	262	396	598	1,305	2,289	3,281	5,310	11,020	16,850	30,472	52,884	70,043
Total	1,400	1,765	2,235	2,820	3,952	5,364	6,946	9,521	16,229	23,605	40,670	71,061	102,156

ROW: Rest of the World. MEA: Middle East and Africa. APAC: Asia Pacific.

Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

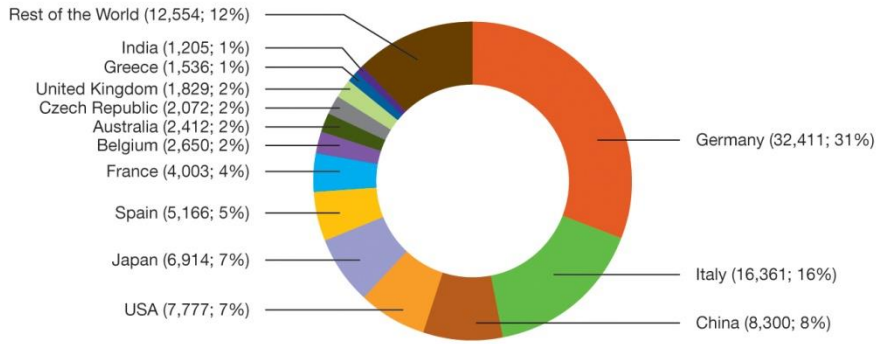
Global PV market in 2012

PV market share outside Europe in 2012 (MW; %)



Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

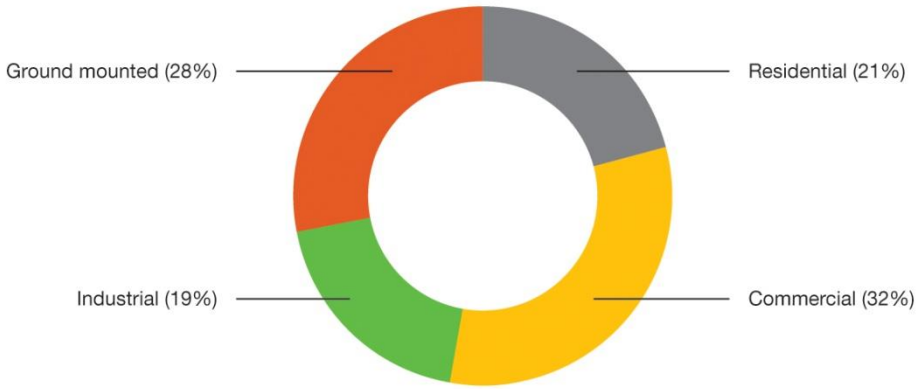
Global PV cumulative installed capacity share in 2012 (MW; %)



Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

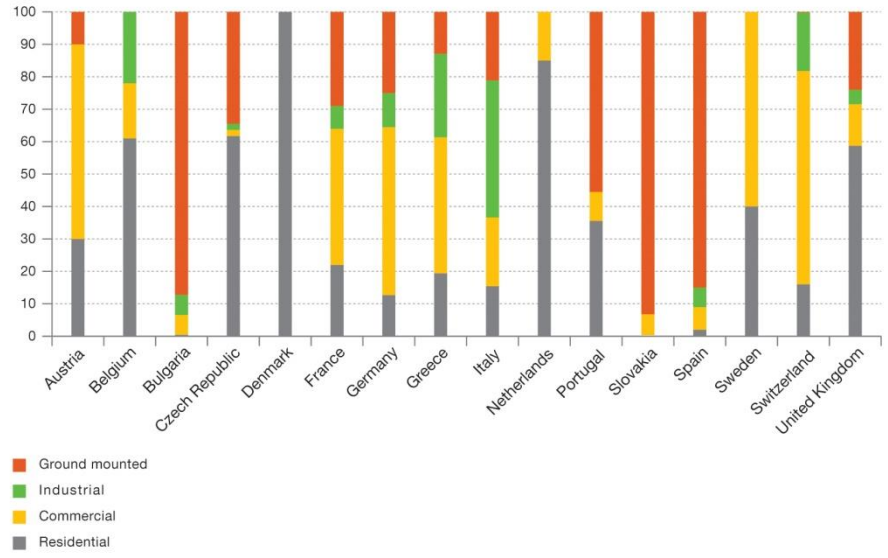
Increasing importance of « self-consumption segments »

European PV market segmentation in 2012 (%)



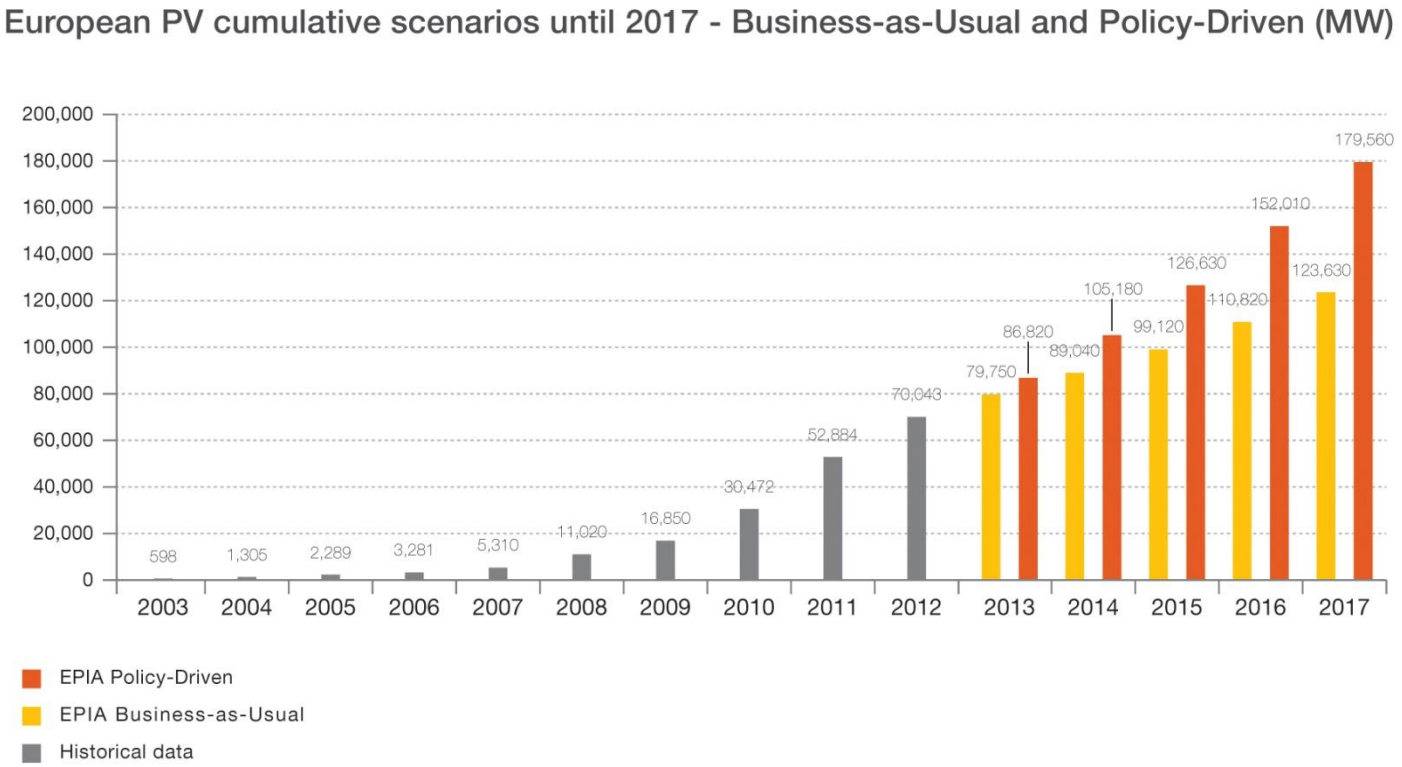
Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

European PV cumulative capacity segmentation by country in 2012 (%)



Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

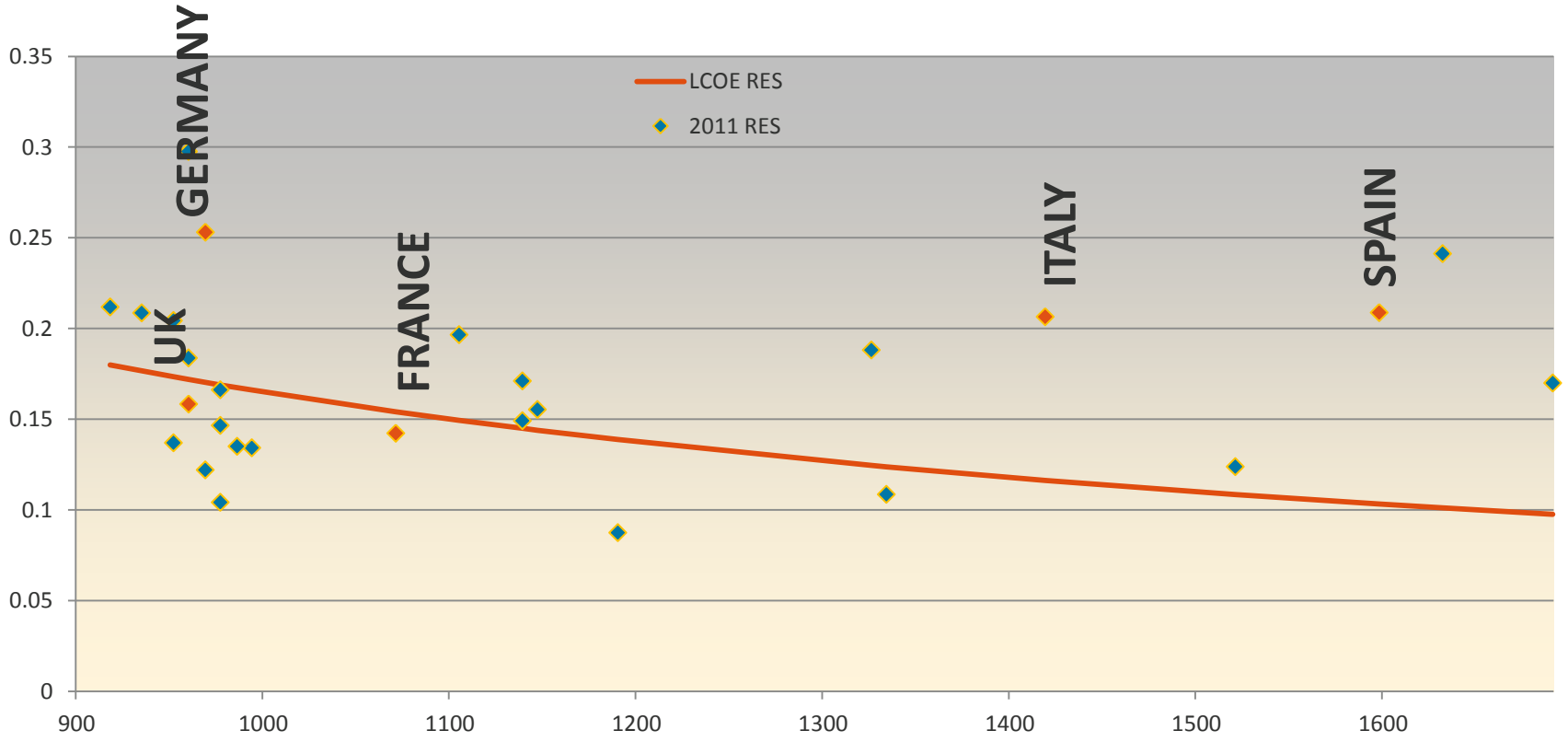
Forecasted European PV capacity until 2017



Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

Comparison PV – retail prices

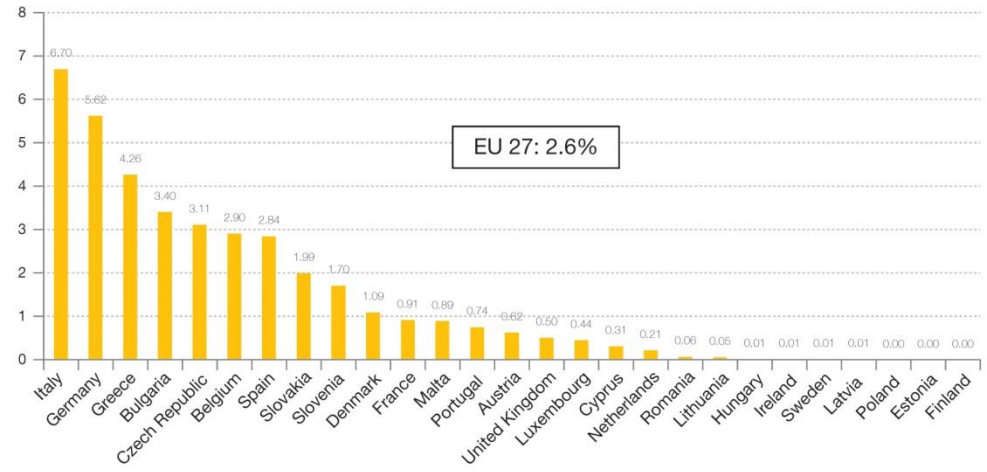
→ LCOE - Residential at 1,8 EUR/Wp – 4,4% WACC – Comparison with electricity retail prices (grid costs and taxes are compensated)



Source: PV PARITY Project , 2013

PV penetration is increasing – instantaneous power penetration is already important

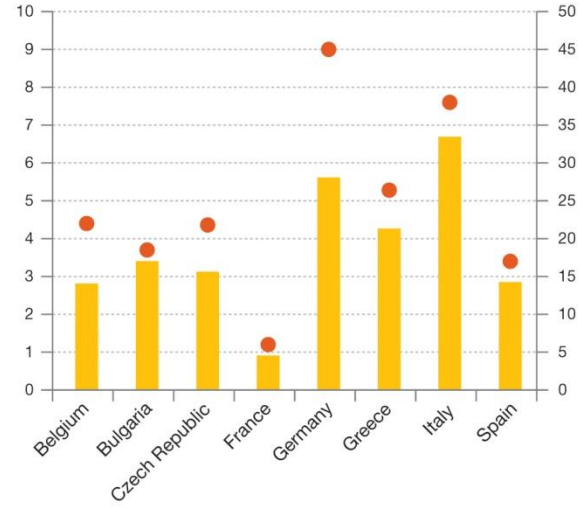
PV contribution to the electricity demand in the EU 27 in 2012* (%)



* Based on 2012 cumulative installed capacity.

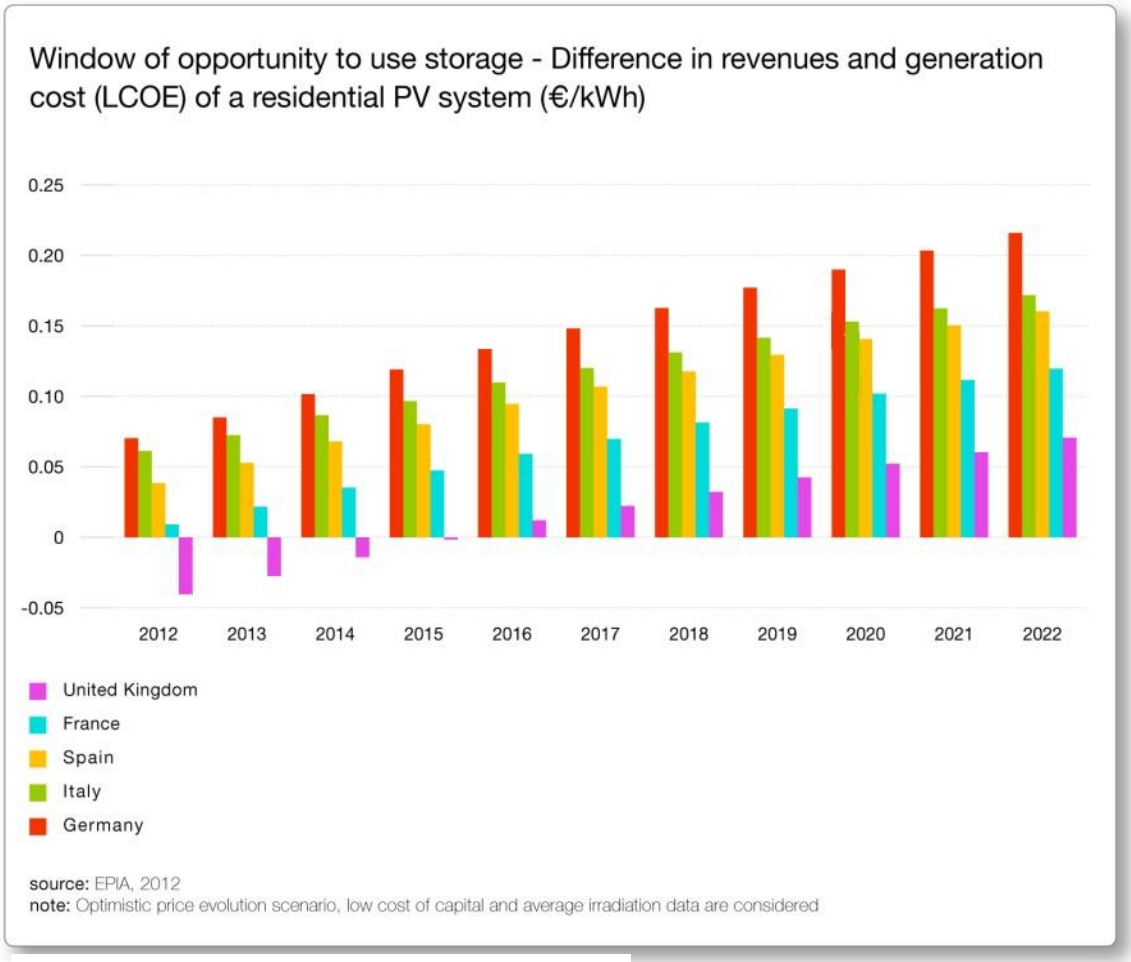
Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

Annual average and maximum instantaneous PV contribution to electricity consumption in 2012 (%)



Source: EPIA, "Global Market Outlook for Photovoltaics 2013-2017", 2013

PV creating window of opportunity in storage investments



Source: EPIA, « Connecting The Sun », 2012