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Setting the scene
-
why this conference?

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on behalf of the Steering Committee

EU PVTP Conference
RIBA, London, UK, 8 July 2015

PV in a period of transition

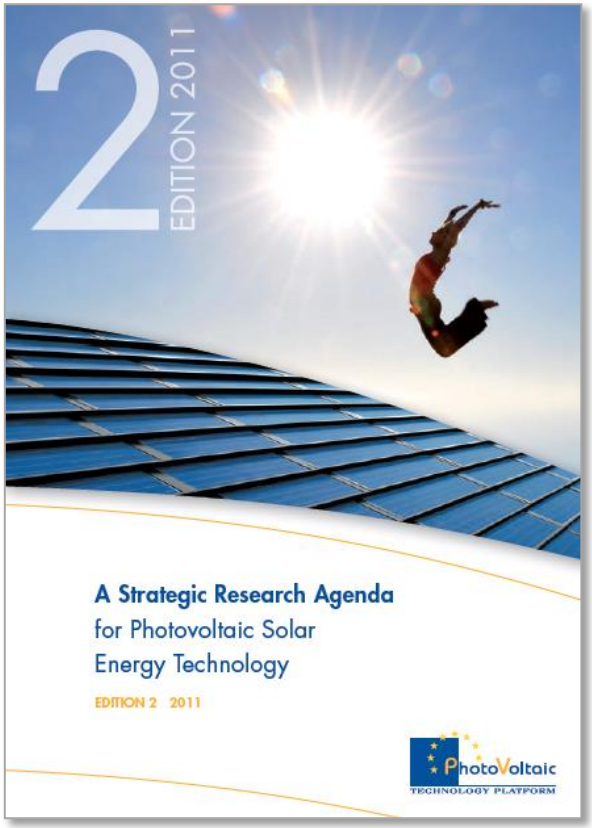
FROM:

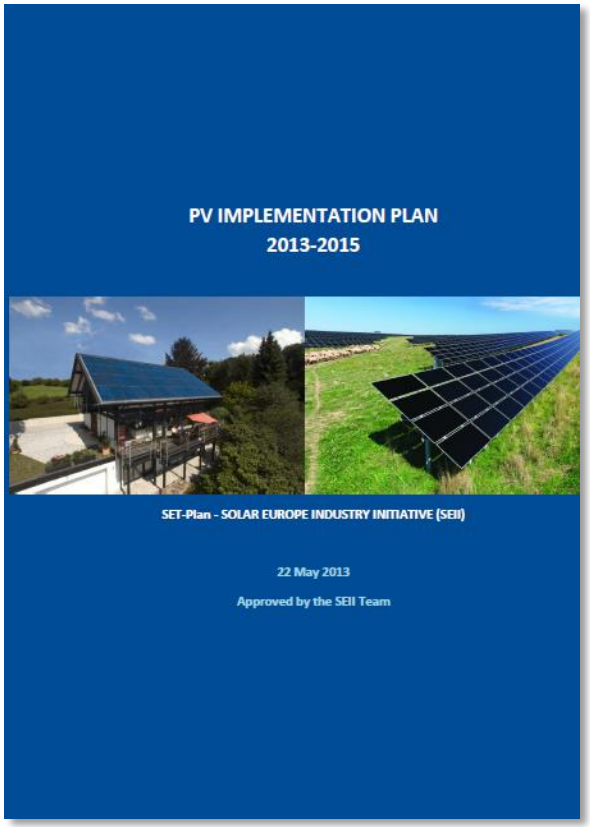
- Technology-driven developments
- Incentive-driven markets
- Small contributions to the energy system
- Growth limited primarily by generation cost, not by integration
- Strong position of Europe over the entire value chain

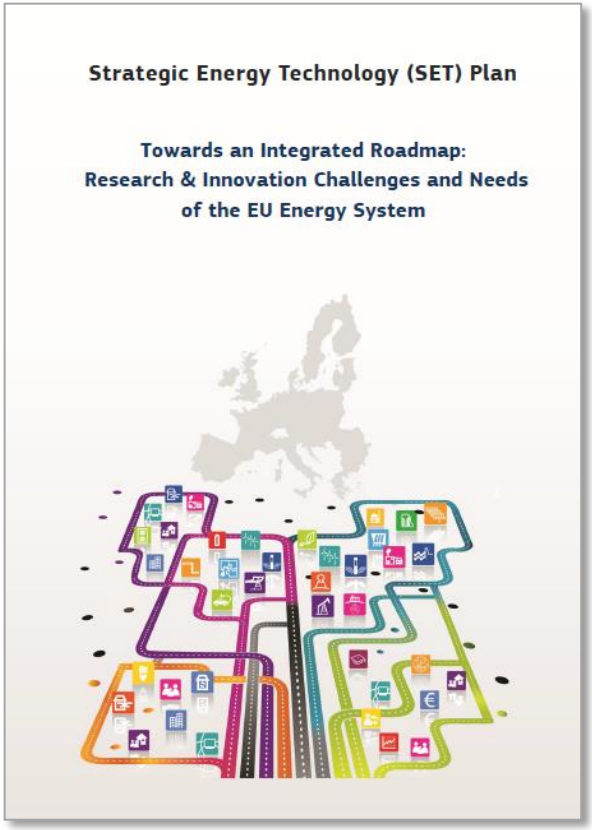
TO:

- Market- and application-driven developments
- Self-sustained commercial markets within a sustainable market design
- Major contributions to the energy system
- Growth limited primarily by integration, not by generation cost
- Fierce global competition; Europe's position continuously challenged

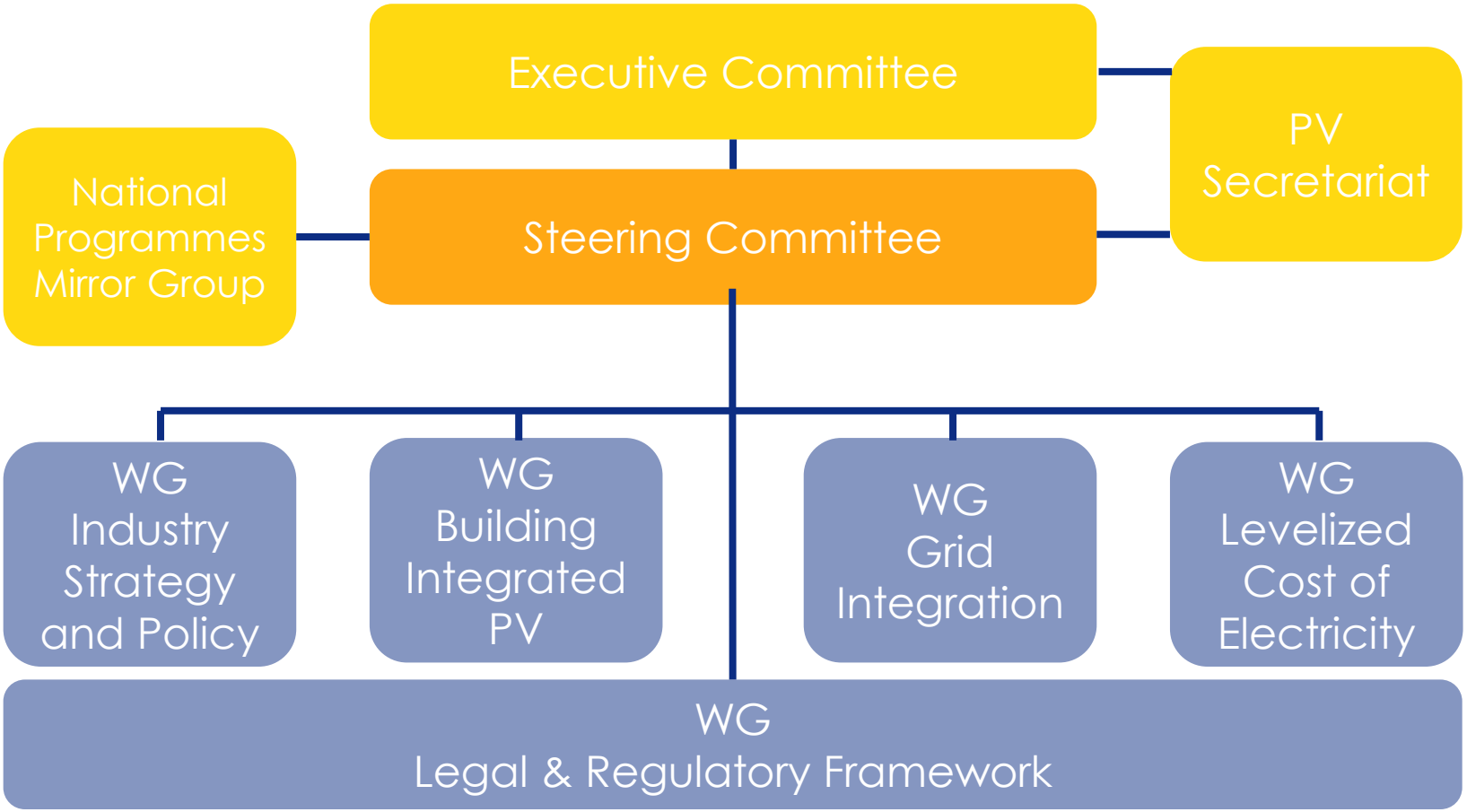
Addressing the challenge: recent documents







Organigram of EU PV TP



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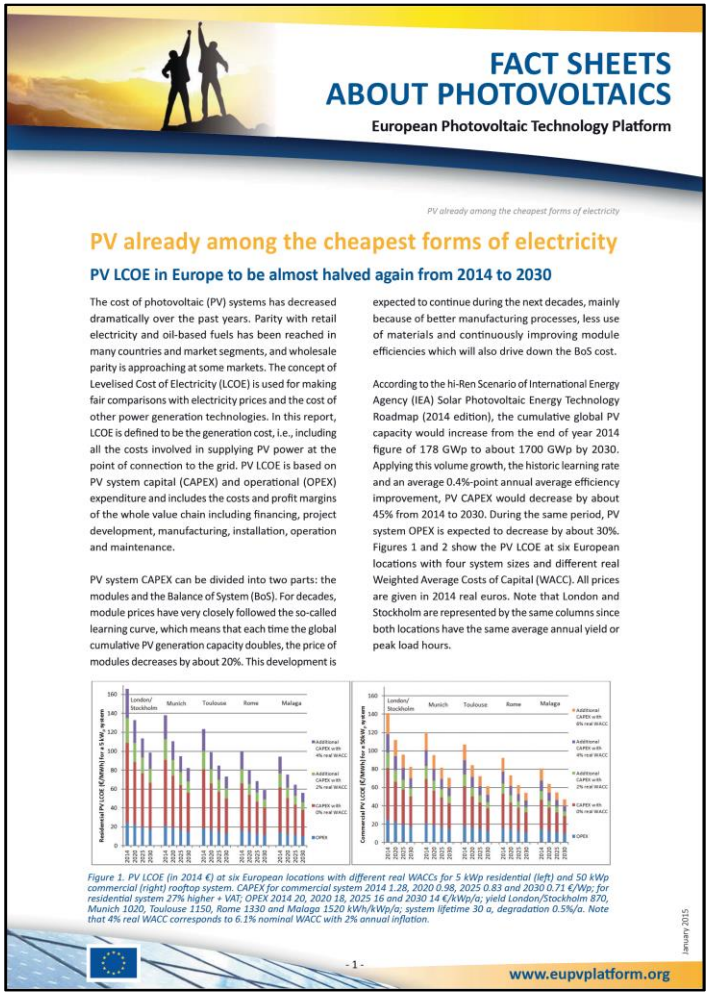
Fact Sheets – LCOE and BIPV



FACT SHEETS ABOUT PHOTOVOLTAICS

European Photovoltaic Technology Platform

PV already among the cheapest forms of electricity

PV already among the cheapest forms of electricity

PV LCOE in Europe to be almost halved again from 2014 to 2030

The cost of photovoltaic (PV) systems has decreased dramatically over the past years. Parity with retail electricity and oil-based fuels has been reached in many countries and market segments, and wholesale parity is approaching at some markets. The concept of Levelised Cost of Electricity (LCOE) is used for making fair comparisons with electricity prices and the cost of other power generation technologies. In this report, LCOE is defined to be the generation cost, i.e., including all the costs involved in supplying PV power at the point of connection to the grid. PV LCOE is based on PV system capital (CAPEX) and operational (OPEX) expenditure and includes the costs and profit margins of the whole value chain including financing, project development, manufacturing, installation, operation and maintenance.

PV system CAPEX can be divided into two parts: the modules and the Balance of System (BoS). For decades, module prices have very closely followed the so-called learning curve, which means that each time the global cumulative PV generation capacity doubles, the price of modules decreases by about 20%. This development is expected to continue during the next decades, mainly because of better manufacturing processes, less use of materials and continuously improving module efficiencies which will also drive down the BoS cost.

According to the hi-Ren Scenario of International Energy Agency (IEA) Solar Photovoltaic Energy Technology Roadmap (2014 edition), the cumulative global PV capacity would increase from the end of year 2014 figure of 178 GWp to about 1700 GWp by 2030. Applying this volume growth, the historic learning rate and an average 0.4%-point annual average efficiency improvement, PV CAPEX would decrease by about 45% from 2014 to 2030. During the same period, PV system OPEX is expected to decrease by about 30%. Figures 1 and 2 show the PV LCOE at six European locations with four system sizes and different real Weighted Average Costs of Capital (WACC). All prices are given in 2014 real euros. Note that London and Stockholm are represented by the same columns since both locations have the same average annual yield or peak load hours.

Figure 1. PV LCOE (in 2014 €) at six European locations with different real WACCs for 5 kWp residential (left) and 50 kWp commercial (right) rooftop system. CAPEX for commercial system 2014 1.28, 2020 0.98, 2025 0.83 and 2030 0.71 €/Wp; for residential system 27% higher + VAT; OPEX 2014 20, 2020 18, 2025 16 and 2030 14 €/kWp/a; yield London/Stockholm 870, Munich 1020, Toulouse 1150, Rome 1330 and Malaga 1520 kWh/kWp/a; system lifetime 30 a, degradation 0.5%/a. Note that 4% real WACC corresponds to 6.1% nominal WACC with 2% annual inflation.

January 2015

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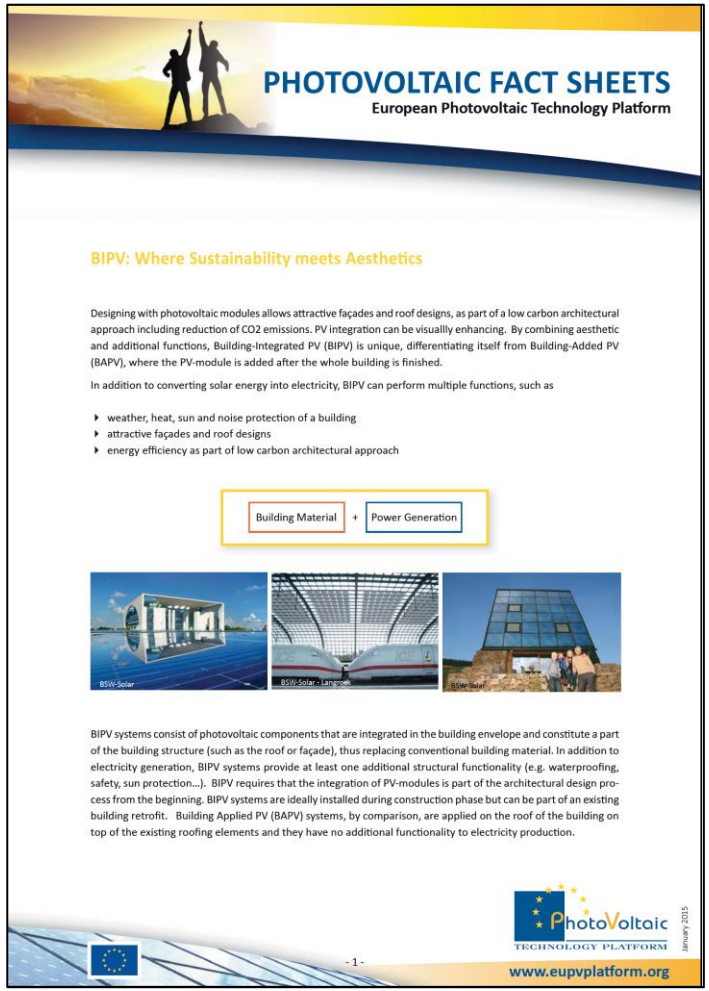

PHOTOVOLTAIC FACT SHEETS

European Photovoltaic Technology Platform

BIPV: Where Sustainability meets Aesthetics

Designing with photovoltaic modules allows attractive façades and roof designs, as part of a low carbon architectural approach including reduction of CO2 emissions. PV integration can be visuallly enhancing. By combining aesthetic and additional functions, Building-Integrated PV (BIPV) is unique, differentiating itself from Building-Added PV (BAPV), where the PV-module is added after the whole building is finished.

In addition to converting solar energy into electricity, BIPV can perform multiple functions, such as

- weather, heat, sun and noise protection of a building
- attractive façades and roof designs
- energy efficiency as part of low carbon architectural approach

Building Material + Power Generation

BIPV systems consist of photovoltaic components that are integrated in the building envelope and constitute a part of the building structure (such as the roof or façade), thus replacing conventional building material. In addition to electricity generation, BIPV systems provide at least one additional structural functionality (e.g. waterproofing, safety, sun protection...). BIPV requires that the integration of PV-modules is part of the architectural design process from the beginning. BIPV systems are ideally installed during construction phase but can be part of an existing building retrofit. Building Applied PV (BAPV) systems, by comparison, are applied on the roof of the building on top of the existing roofing elements and they have no additional functionality to electricity production.

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Where sustainability meets aesthetics

Energy efficiency in buildings and Building-Integrated Photovoltaics (BIPV)

One-day conference
8 July 2015 • Royal Institute of British Architects, London

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EU PVTP ad hoc Working Group

BIPV

Silke Krawietz, Chair BIPV group / EU PVTP
Jef Poortmans, Co-Chair BIPV group / EU PVTP

Structure of the BIPV group

BIPV group and objectives

- The aim of the workgroup is **to define more clearly status, needs and benefits of BIPV** and to translate these into well-defined R&D-objectives.
- BIPV offers numerous **new opportunities** for a European-based industry and service deployment, supported by the ambitious targets of the European Union **in relation to the energy efficiency of buildings**.

  Collaboration with the building industry is essential.
- Multidisciplinary composition of the various **subgroups**:

1) **Regulatory EU framework, specifications and Building codes**
2) **Cost targets and competitiveness**
3) **Design & Innovation / R&D Challenges**

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Why this conference?

1. **Energy Union and SET Plan:** Energy Efficiency and Renewable Energy are core issues
2. **European regulations for Nearly Zero Energy Buildings (NZEB) and** future **Plus Energy Buildings (PEB)**
3. **BIPV is an important element in combination with energy efficiency in buildings**
4. **BIPV offers great opportunities for design and innovation**
5. **Explore the needs and visions of architects, building industry, developers and designers in collaboration with the PV and BIPV industry**

Programme outline

Session 1:

The opportunities offered by energy efficient, PV-equipped buildings

Keynotes from leading architects, engineers and industry representatives

Session 2:

A shared vision? Boosting the market for energy plus buildings with BIPV solutions

Interdisciplinary **panel discussion** where investors, architects, developers and representatives from the construction and BIPV industries compare their needs. Can those needs be met simultaneously at the right price?

Session 3:

The way ahead: collaboration to build beautiful PV-equipped buildings

What might be the ways in which architects, builders and PV technology suppieres work more closely together?

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Panel discussion 'Enhancing the BIPV market and the future energy plus buildings'

Objective: **Interdisciplinary discussion** where investors, architects, developers and representatives from the construction and BIPV industries compare their **needs**. Can those needs be met simultaneously at the right price?

Overarching question: What are the **vision and the needs** of **architects, engineers and developers** as regards BIPV and how can BIPV products and services meet the architects' and building industry's **expectations**?

→ Position paper summarizing the results

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Thank you for your attention

Enjoy the conference!