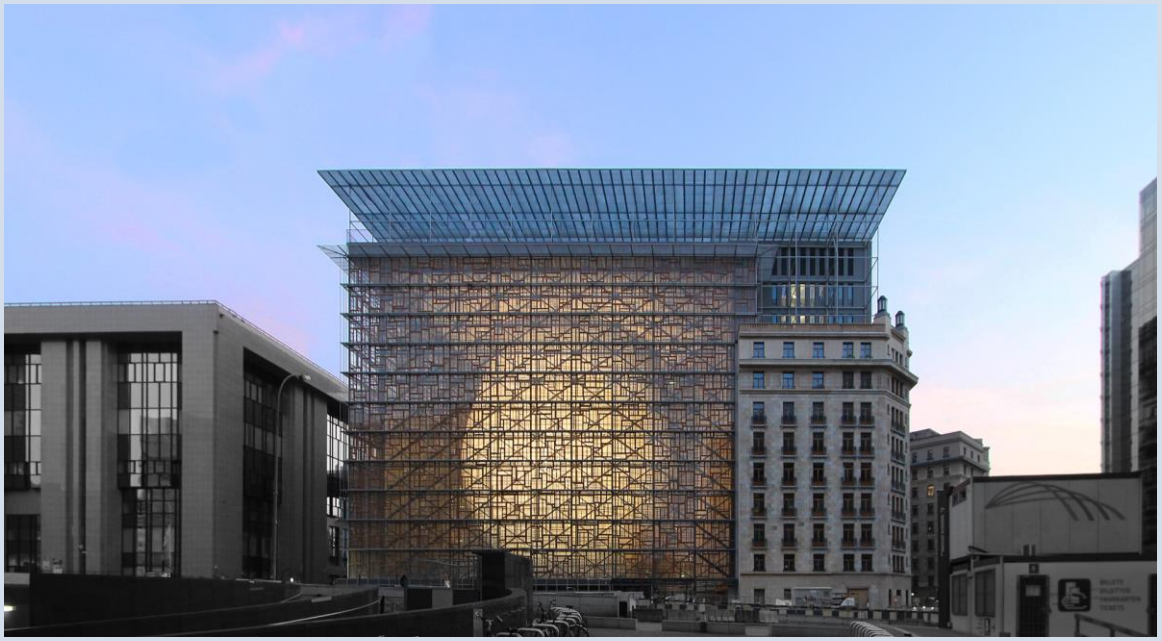
IEA INTERNATIONAL ENERGY AGENCY

RÉGION DE BRUXELLES-CAPITALE

IEA-PVPS

National Survey Report of PV Power Applications in Belgium
2014



PVPS

PHOTOVOLTAIC POWER SYSTEMS PROGRAMME

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TABLE OF CONTENTS

FOREWORD

The International Energy Agency (IEA), founded in November 1974, is an autonomous body within the framework of the Organisation for Economic Co-operation and Development (OECD) which carries out a comprehensive programme of energy co-operation among its member countries

The IEA Photovoltaic Power Systems Technology Collaboration Programme (IEA-PVPS) is one of the collaborative R & D agreements established within the IEA and, since 1993, its participants have been conducting a variety of joint projects in the applications of photovoltaic conversion of solar energy into electricity.

The participating countries and organisations can be found on the www.iea-pvps.org website.

The overall programme is headed by an Executive Committee composed of one representative from each participating country or organization, while the management of individual Tasks (research projects / activity areas) is the responsibility of Operating Agents. Information about the active and completed tasks can be found on the IEA-PVPS website www.iea-pvps.org

INTRODUCTION

The objective of Task 1 of the IEA Photovoltaic Power Systems Programme is to promote and facilitate the exchange and dissemination of information on the technical, economic, environmental and social aspects of PV power systems. Task 1 activities support the broader PVPS objectives: to contribute to cost reduction of PV power applications, to increase awareness of the potential and value of PV power systems, to foster the removal of both technical and non-technical barriers and to enhance technology co-operation. An important deliverable of Task 1 is the annual "*Trends in photovoltaic applications*" report. In parallel, National Survey Reports are produced annually by each Task 1 participant. This document is the country National Survey Report for the year 2014. Information from this document will be used as input to the annual Trends in photovoltaic applications report.

The PVPS website www.iea-pvps.org also plays an important role in disseminating information arising from the programme, including national information.

1 INSTALLATION DATA

The PV power system market is defined as the market of all nationally installed (terrestrial) PV applications with a PV capacity of 40 W or more. A PV system consists of modules, inverters, batteries and all installation and control components for modules, inverters and batteries. Other applications such as small mobile devices are not considered in this report.

For the purposes of this report, **PV installations are included in the 2014 statistics if the PV modules were installed and connected to the grid between 1 January and 31 December 2014, although commissioning may have taken place at a later date**.

1.1 Applications for Photovoltaics

In Belgium, the majority of PV systems are grid-connected distributed systems on buildings. Land-use density does not allow a significant development of ground-mounted systems. The main off-grid systems are road signs with dynamic display.
The residential segment represents 60 % with 358.000 installations (1/13 households). Commercial and industrial segments represents each 20 %.

1.2 Total photovoltaic power installed

By the end of year 2014, Belgium had about 3.152 installed MWp, an increase of 94 MWp (+3 %) compared to 2013. These number are based on the official statistics of the 3 regional regulators (VREG for Flanders, CWaPE for Wallonia and BRUGEL for Brussels). Some small adjustments can still happen (less than 1%) for systems installed during 2014 but not yet declared.

Table 1: PV power installed during calendar year 2014

AC			**MW installed in 2014**	**MW installed in 2014**	**AC or DC**
Grid-connected	BAPV	Residential	94	52	DC
		Commercial		36	DC
		Industrial		6	DC
	BIPV (if a specific legislation exists)	Residential	n.d.		
		Commercial			
		Industrial			
	Ground-mounted	cSi and TF	n.d.		
		CPV			
Off-grid		Residential	n.d.		
		Other	n.d.		
		Hybrid systems			
		Total	94		DC

Table 2: Data collection process:

If data are reported in AC, please mention a conversion coefficient to estimate DC installations.	For Flanders, data are reported in AC with a conversion coefficient of 105% For Wallonia data are partially reported in DC and in AC. We took the same conversion coefficient. For Brussels, data are reported in DC.
Is the collection process done by an official body or a private company/Association?	APERe (Association) collects information from official bodies of each region. (VEA, CWAPE, BRUGEL)
Link to official statistics (if this exists)	- Wallonia : ○ < 10kVA : http://www.cwape.be/?dir=6.1.13 http://www.cwape.be/?dir=6.2.08 ○ >10kVA : http://www.cwape.be/?dir=3.1.08 - Flanders : http://www.vreg.be/maandelijkse-statistieken-groene-stroom (not complete)
	Estimate accuracy: 99%.

Table 3: PV power and the broader national energy market.

MW-GW for capacities and GWh-TWh for energy	2014 numbers	2013 numbers
Total power generation capacities (all technologies)	18.676 MW	19.423 MW
Total power generation capacities renewables (including hydropower)	5.439 MW	5.295 MW
Total electricity demand (= consumption)	80,4 TWh	80,7 TWh
New power generation capacities installed during the year (all technologies)	372 MW	852 MW
New power generation capacities installed during the year renewables (including hydropower)	317.4 MW	852 MW
Total PV electricity production	2,81 TWh	2,65 TWh
Total PV electricity production as a % of total electricity consumption	3,56 %	3,29 %

Table 4: Other informations

	2014 Numbers
Number of PV systems in operation in your country (a split per market segment is interesting)	**≤ 10 kVA:** 358.261 systems (+9.650) **> 10 kVA et ≤ 250 kVA :** 6.064 systems (+342) **> 250 kVA :** 941 systems (+11) **TOTAL** : 365.266 (+10.003)
Capacity of decommissioned PV systems during the year in MW	n.d.
Total capacity connected to the low voltage distribution grid in MW	1.893. MWp : All the residential systems. (Some small systems can be connected to MV or HV but it is less than 1 %)
Total capacity connected to the medium voltage distribution grid in MW	n.d.
Total capacity connected to the high voltage transmission grid in MW	At least 653,1 MWp : All systems > 250 kVA

Table 5: The cumulative installed PV power in 4 sub-markets (MW).

Sub-market	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Stand-alone domestic	-	-	-	-	-	-	-	
Stand-alone non-domestic	-	-	-	-	-	-	-	
Grid-connected distributed (<250 kVA)	18,9	86,6	440,9	719,9	1517,3	2200,6	2410,9	2499,6
Grid-connected centralized (>250 kVA)	4,7	21,9	207,0	345,7	588,1	598,9	647,4	653,1
TOTAL (MW)	23,6	108,5	647,9	1065,6	2105,4	2799,5	3058,3	3152,6

2 COMPETITIVENESS OF PV ELECTRICITY

2.1 Module prices

There are no official statistics about module prices in Belgium

Table 6: Typical module prices for a number of years

Year							2014
Standard module crystalline silicon price(s): Typical	No data						
Lowest prices							
Highest prices							

2.2 System prices

Table 7: **Turnkey Prices of Typical Applications – local currency**

Category/Size	Typical applications and brief details	Current prices per W
OFF-GRID Up to 1 kW	n.d.	n.d.
OFF-GRID >1 kW	n.d.	n.d.
Grid-connected Rooftop up to 10 kW (residential)	Range 5 kWp system price	1,8 - 2,3
Grid-connected Rooftop from 10 to 250 kW (commercial)	Range based on CWAPE and VEA stats	1,4-1,5
Grid-connected Rooftop above 250kW (industrial)	Range based on CWAPE and VEA stats	1,2-1,4
Grid-connected Ground-mounted above 1 MW	n.d.	n.d.
Other category (hybrid diesel-PV, hybrid with battery…)	n.d.	n.d.

Table 8: National trends in system prices (current) for different applications – local currency (€)

Price/Wp	2008	2009	2010	2011	2012	2013	2014
Residential PV systems < 10 KW	5,8	5,2	4,2	3,4	2,7	2,3	2,0
Commercial and industrial	n.d.	n.d.	n.d.	n.d.	n.d.	1,4	1,45
Ground-mounted	n.d.	n.d.	n.d.	n.d.	n.d.	1,3	1,3

2.3 Cost breakdown of PV installations

It appears not possible to obtain this information for commercial reasons. The members of the different PV federations are reluctant to provide this degree of detail.

2.3.1 Residential PV System < 10 kW

No reliable data

2.3.2 Utility-scale PV systems > 1 MW

No reliable data

2.4 Financial Parameters and specific financing programs

Table 11: PV financing scheme

Average rate of loans – residential installations	2,1-3,1%
Average rate of loans – commercial installations	2,6 %
Average cost of capital – industrial and ground-mounted installations	1,8%

2.5 Specific investments programs

Third Party Ownership (no investment)	Several private companies have set up third party ownership solutions for residential, commercial or industrial rooftop PV systems.
Renting	
Leasing	
Financing through utilities	No
Investment in PV plants against free electricity	No
Crowdfunding (investment in PV plants)	Some cooperatives invest in renewables energy solutions (PV, wind, biomass…). Citizens can buy shares of the cooperative and so indirectly invest in PV systems.
Other (please specify)	/

2.6 Additional Country information

Table 12: Country information

Retail Electricity Prices for an household - 3,5 MWh/year	19,2-22,5 c€/kWh (APERe)
Retail Electricity Prices for a commercial company -50 MWh/year	18,1-18,87 c€/kWh (CREG)
Retail Electricity Prices for an industrial company – 50 à 2000 MWh	9,16 c€/kWh (Eurostats)
Population at the end of 2013	11 203 992 (Eurostats)
Country size (km^2)	30 528
Average PV yield (according to the current PV development in the country) in kWh/kWp	900-950 kWh/kWp
Name and market share of major electric utilities.	Electrabel (GDF-Suez) 67% EDF-Luminus 13 % E.ON : 11 % Others : 9 % (CREG)

3 POLICY FRAMEWORK

This chapter describes the support policies aiming directly or indirectly to drive the development of PV. Direct support policies have a direct influence on PV development by incentivizing or simplifying or defining adequate policies. Indirect support policies change the regulatory environment in a way that can push PV development.

3.1 Direct support policies for PV installations

3.1.1 New, existing or phased out measures in 2014

3.1.1.1 Description of support measures excluding BIPV, and rural electrification

Next to the net-metering on a yearly basis (for small systems), the main support is the system of green certificates (GC). There were some changes in 2014 depending on the size of the installation and the region where it was installed.

In Flanders

The GC system was reconsidered in 2013. PV systems have a certain amount of GC/MWh during 15 years to reach a financial goal of 5% of IRR. This amount is be recalculated every 6 month. In 2014, the amount for small PV systems (<10 kW) was 49 €/MWh for the first 6 month and dropped to 0 €/MWh for the 6 last month.

For bigger system, the support in GC is higher because they do not benefit from the net-metering support but the financial goal is the same (5 % IRR).

In Wallonia

- For small systems (<10 kW) : The Walloon government had to reorganise its support scheme as the overflow of green certificates on the market linked to photovoltaic support led to the devaluation of the price of green certificates. In October 2014, the Walloon Government approved the reduction of the duration of green certificates from 15 to 10 years for small photovoltaic systems implemented between 2008 and 1 December 2011. This measure affects about 79,000 PV installations in total. In addition, the Government has committed to maintain a minimum of 7% rate of return for project developers who have invested in PV projects. However, many PV owners have announced their intention to challenge the decree in court. PV owners argue that the investments they made were based on an income calculated over 15 years.
  The Walloon government decided also to abandon to green certificate support scheme for new installations and replace it by the Qualiwatt plan (march 2014): a direct capital subsidy spread on the first 5 years and calculated to obtain a simple payback time of 8 years (5% IRR for a 3kWp installation after 20 years). Besides the financial aspects, this new plan also introduces strong quality criteria on the equipment (European norms, factory inspection), the installer (RESCERT trainee) and the installation (standard conformity declaration, standard contract) to give trust back to the new investors.

- For bigger systems (>10 kW)
  The support scheme was the same as the previous years until the first of august 2014:
    - For systems between 10 and 250 kW, the support was 4 GC/MWh (260 €/MWh) if the following conditions were met: 50 % of self-consumption and a cogeneration study. If it was not the case, the support decreased to 1 GC/MWh (65 €/MWh)
    - For larger systems (>250 kW), the support was fixed to 1 GW/MWh (65 €/MWh)

  After that, there was a transitional support scheme preparing the new mechanisms coming in 2015 :

    - For systems between 10 and 250 kW, the support was 2,5 GC/MWh (162 €/MWh) if there is 60 % of self-consumption on yearly base.
    - For larger systems (> 250 kW, the support was fixed to 1 GW/MWh (65 €/MWh)

In Brussels

The Brussels Region had already adapted its GC support in 2011 to make it more responsive to market changes. An annual revision ensures a payback on investment of 7 years. There were no changes in 2014. The amount of GC for all systems is 2.4 GC/MWh (204 €/MWh).

3.1.1.2 BIPV development measures

Nothing specific.

3.1.1.3 Rural electrification measures

Nothing specific.

3.1.1.4 Support for electricity storage and demand response measures

Nothing specific.

Table 13: PV support measures (summary table)

	On-going measures residential	Measures that commenced during 2014 - residential	On-going measures Commercial + industrial	Measures that commenced during 2014 – commercial + industrial	On-going measures Ground-mounted	Measures that commenced during 2014 – ground mounted
Feed-in tariffs	No					
Feed-in premium (above market price)	No					
Capital subsidies	No	Yes	No	No	No	No
Green certificates	Yes	No	Yes	No	Yes	No
Renewable portfolio standards (RPS) with/without PV requirements	No	No	No	No	No	No
Income tax credits	No	No	Yes	No	Yes	No
Self-consumption	Yes	No	Yes	No	Yes	No
Net-metering	Yes	No	No	No	No	No
Net-billing	No	No	No	No	No	No

Commercial bank activities e.g. green mortgages promoting PV	No	No	No	No	No	No
Activities of electricity utility businesses	No	No	No	No	No	No
Sustainable building requirements	Yes	No	No	No	No	No
BIPV incentives	No	No	No	No	No	No

3.2 Self-consumption measures

			Residential	Commercial/industrial
PV self-consumption	1	Right to self-consume	yes	yes
	2	Revenues from self-consumed PV	Savings on the electricity bill	
	3	Charges to finance Transmission & Distribution grids	None	None
Excess PV electricity	4	Revenues from excess PV electricity injected into the grid	Retail Electricity Prices	Only if a PPA is signed. Otherwise = 0.
	5	Maximum timeframe for compensation of fluxes	One year	None
	6	Geographical compensation	On site only	None
Other characteristics	7	Regulatory scheme duration	Unlimited	Unlimited
	8	Third party ownership accepted	Yes	Yes
	9	Grid codes and/or additional taxes/fees impacting the revenues of the prosumer	Capacity based fee (Flanders)	None
	10	Regulations on enablers of self-consumption (storage, DSM…)	None	None
	11	PV system size limitations	Up to 10 kW (5 kW in Brussels)	Above 10 kW
	12	Electricity system limitations	None	None
	13	Additional features	Green Certificates for the PV production	Green Certificates for the PV production

3.3 Tenders, auctions & similar schemes

No tenders, auctions or other schemes are proposed by the regions to install PV systems.

3.4 Financing and cost of support measures

Almost all the support measures (green certificates, net-metering, capital subsidy) are impacting the electricity prices for all the electricity users.

For the green certificates, providers have to buy a certain amount of GC depending of a regional fixed percentage of their furniture. The costs are reported directly to their customers.
In Wallonia, the decision to reduce the allocation period for green certificates will allow the reduction of their number on the market by 12 to 13 million between 2018 and 2027. This measure shall thus generate savings amounting to over 780 million EUR for all Walloon electricity consumers who cover the costs of the certificate scheme.

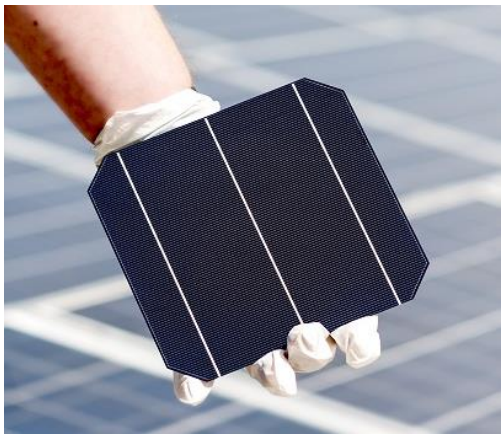
Net metering and capital subsidy (Qualiwatt in Wallonia) are impacting DSO revenues. They report their losses directly on the customer's bills.

The tax credit on investment for non-residential PV is supported by the Federal government.

3.5 Indirect policy issues

In Flanders, the government introduced a measure that force all new buildings to have a minimum share of renewable energy. It can be produced by solar thermal, PV, heat pumps or other renewables systems. For PV, the minimum contribution is about 0.7 kWp. The effect of this measure are already visible and kept a minimal PV market alive.

4 HIGHLIGHTS OF R&D



4.1 Highlights of R&D

R & D in Belgium is a very active sector. For many years, the Belgian PV research activities have mostly been focused on highly efficient crystalline silicon solar-cells, thin film and organic solar-cells.

The involved research organizations and companies participate in various national and European projects as well as in different tasks of the IEA-PVPS TCP (Task 13 and 14).

Here is an alphabetical list of the main PV research projects:

Project Name	Description	Belgian R&D partner	Technology	Level
AER II 2014-2016	Industrialization and System Integration of the Aesthetic Energy Roof Concept	Soltech	BIPV	Eur
ArtESun 2013-2016	ArtESun develops highly efficient organic solar cells with an increased lifetime and a decreased production cost. The ultimate goal of the ArtESun project is to OPV towards introduction into the competitive thin-film PV market.	IMEC	Organic PV	Eu
Bfirst 2012-2016	BFIRST project will deal with the design, development and demonstration of a portfolio of innovative photovoltaic products for building integration, based on cell encapsulation within fibre-reinforced composite materials.	Vue sur Mons	BIPV	Eu
CHEETAH 2014-2017	Cost-reduction through material optimisation and Higher EnErgy outpuT of solAr pHotovoltaic modules - joining Europe's Research and Development efforts in support of its PV industry.	IMEC	all	Eu
Hyb2Hyb 2014-2017	Improve storage characteristics of Li -ion battery / super hybrid electrochemical capacitors and their performance with hybrid photovoltaic energy systems	UCL, UMons, ULB	all	Regional
Linear 2009-2014	The Linear project studies **ways in which households can tailor their electricity consumption** to the amount of solar and wind energy available, both in terms of technology and user interaction.	20 partners	All	Eu
NANEL + Nano-structuring 2012-2014	The NANEL joint exchange project aims to establish long-lasting research cooperation between Portuguese, Bulgarian, Belgian, Belarusian and Russian scientists in the field of electrochemical synthesis of advanced nano-structured materials. The partners bring the complementary experiences and experimental facilities which are essential for effective development and testing of the nano-materials for to be applied in sensors and photovoltaics.	VUB	Nano-PV	World
Novacost 2014-2017	Non Vacuum Based Strategies for Cost Efficient Low Weight Chalcogenide Photovoltaics	Advanced Coatings & Construction Solutions	Thin film	
MetaPV 2009-2014	MetaPV is a research and demonstration project on grid hosting capacity for variable renewable power., funded by the European Commission It is the first practical demonstration of a European photovoltaic Smart Grid, implemented in Belgium on Infrax low and medium voltage distribution grids.	3E Infrax	All	Eu
Orga |next | Generationt 2014-	R&D and industrial cluster on Nano-materials and innovative deposition.	IMEC University of Hasselt University of Liège	Organic PV Thin Film	Eu

Project Name	Description	Belgian R&D partner	Technology	Level
Pv4Facades 2014-2016	Photovoltaics for High-Performance Building-Integrated Electricity Production Using High-Efficiency Back-Contact Silicon Modules	Eliosys Eternit IMEC Soltech Wienerberger	BIPV	Eur
PVCROPS 2013-2015	PVCROPS addresses 3 key objectives of the call topic: 1) Improvement of performance, reliability and lifetime 2) Cost reduction of PV systems 3) Better integration of PV into grid	APERe	All	Eu
PV-GUM 2010-2015	The PV-GUM project aims at developing new manufacturing technologies and equipments which will produce a low cost highly efficient flexibly BIPV solar cell on a bituminous roofing membrane	Imperbel	BIPV	Eu
Smart PV	Demonstrating module technology for thin BC Si-solar cells (level efficiencies>20%, operational lifetime > 25 years) Module-level power converters based on high bandgap materials Increased energy yield of Si-PV modules A holistic design and control approach with the purpose to maximize energy yield	IMEC KU Leuven University of Gent VITO	BC Silicium	Regional
SIM SOPPOM-program 2010-2018	The objective is to drive down costs of thin-film PV CIGS & OPVthrough • Increasing efficiency at the cell, module & system level • Decreasing cost of productions process	University of Gent University of Leuven University of Atwerpen University of Hasselt IMEC Flamac, Solvay, Umicore	Printed CIGS Organic PV	Regional
Solar PV comice	Solar PV comice is a working group of the Walloon Alliance for Research in Energy (WARE). 23 research units gather their research skills in line with the Joint Programme defined by EERA on Photovoltaic Solar Energy.	- 5 Universities (FUNDP, UCL, ULg, UMons, ULB) - 4 research centers (CRM Group, Materia Nova, Multitel, CSTC) - High schools	Silicon Thin Film Organic Module technology CPV	Regional
Solarrok 2012-2015	SOLARROK promotes a resource efficient Europe by boosting innovative capacities and cooperation of European Photovoltaics clusters striving for enhanced PV efficiency on production and system level.	IMEC	All	Eu
Solliance	Solliance is a cross-border cooperation between six research institutes (from the Netherlands and Belgium) that have joined forces in the field of thin-film solar cells. Together with industry, Solliance focuses on the entire value chain – from new materials and concepts to production technology and applications.	IMEC University of Hasselt	Organic PV Thin film CIGS	Eu
SmartBlind 2013-2015	The SMARTBLIND project aims at developing an Energy Efficient Smart Window including a hybrid film constituted of an electrochromic LC film and a photovoltaic film both printed on the same long-lasting flexible substrate.	VUB	Thin film	Regional
Sunflower 2011-2016	Development of highly efficient, long-lasting, cheap and environmentally friendly printed organic photovoltaics.	U. Antwerpen AGFA--GEVAERT	Organic PV	Eu

4.2 Public budgets for market stimulation, demonstration / field test programmes and R&D

No data

5 INDUSTRY

TWEED, the Cluster of Energy, Environment and Sustainable Development technologies in the Walloon Region has developed a map of the activities in all the value chain of PV in Wallonia and Brussels. (www.pvmapping.be)
IMEC also did a similar job focused on the value chain of PV in Flanders.

The following information is based on these two initiatives.

5.1 Production of feedstocks, ingots and wafers (crystalline silicon industry)

No such activities in Belgium.

Table 15: Production information for the year for silicon feedstock, ingot and wafer producers

Manufacturers (or total national production)	Process & technology	Total Production	Product destination (if known)	Price (if known)
	Silicon feedstock	tonnes		
	sc-Si ingots.	tonnes		
	mc-Si ingots	tonnes		
	sc-Si wafers	MW		
	mc-Si wafers	MW		

5.2 Production of photovoltaic cells and modules (including TF and CPV)

Module manufacturing is defined as the industry where the process of the production of PV modules (the encapsulation) is done. A company may also be involved in the production of ingots, wafers or the processing of cells, in addition to fabricating the modules with frames, junction boxes etc. The manufacturing of modules may only be counted to a country if the encapsulation takes place in that country.

There are 4 companies active in modules production in Belgium: Soltech (since 1989), Issol (since 2006), Reynaers (since 2008) and Final 24 (since 2014). Soltech, Renaers and Issol produce BIPV solutions (on-demand size and color), Final 24 makes classical modules.

All cells are imported.

Total PV cell and module manufacture together with production capacity information is summarised in Table 16 below.

Table 16: Production and production capacity information for 2014

Cell/Module manufacturer (or total national production)	Technology (sc-Si, mc-Si, a-Si, CdTe)	Total Production (MW)		Maximum production capacity (MW/yr)	
		Cell	Module	Cell	Module
Wafer-based PV manufactures					
1 Issol	Si		12,5		20
2 Final24	Mono-Si Poly-Si		0,24 0,01		10
3 Soltech	Mono-Si Poly-Si		0,3 0,4		
Total			***13,45***		***30***

Cell/Module manufacturer (or total national production)	Technology (sc-Si, mc-Si, a-Si, CdTe)	Total Production (MW)		Maximum production capacity (MW/yr)	
		Cell	Module	Cell	Module
Thin film manufacturers					
none					
Cells for concentration					
none					
TOTALS			***13,45***		***30***

5.3 Manufacturers and suppliers of other components

Here is a list of active companies in other components

5.3.1 Materials & substrates integration:

Agc, Agfa-Gevaert, Amos, Bekaert, Centexbel, Cookson Electronics,Coretec Engineering, CRM Group, Cytec, Dow Corning, Drytec, Ducatt, Elsyca, Esco Drives, Multitel, OCAS, Saint-Gobain, Solvay, Sibleco, Umicore.

5.3.2 Cell & Modules:

3M, BASF, Cenareo, Derbigum, Ecostream, Fabricom (GDF Suez), Icos Vision System, Issol, IPTE, IZEN, Soltech, Total.

5.3.3 (Smart)PV – Modules:

Eliosys, Laborelec, Melexis, NXP, OnSemi, Soltech.

6 PV IN THE ECONOMY

6.1 Labour places

There is no direct way to have the exact amount of labor places generated by PV in Belgium.

Nevertheless, we can estimate it based on some parameters taken from EPIA fact sheet[1]. With 94 MW installed in 2014 we can estimate that there was a minimum of 940 direct full time employment (FTE) jobs and 2068 indirect jobs[2]. The whole PV sector (direct + indirect) probably represents more than 3.000 FTE jobs in 2014.

Table 17: Estimated PV-related labour places in 2014

Research and development (not including companies)	
Manufacturing of products throughout the PV value chain from feedstock to systems, including company R&D	
Distributors of PV products	
System and installation companies	
Electricity utility businesses and government	
Other	
Total	±3.000

6.2 Business value

Table 18: Value of PV business

Sub-market	**Capacity installed *in 2014* (MW)**	**Price per W** *(from table 7)*	**Value**	**Totals**
Off-grid domestic	*n.d.*	*n.d.*	*n.d.*	*n.d.*
Off-grid non-domestic	*n.d.*	*n.d.*	*n.d.*	*n.d.*
Grid-connected distributed	**88**	**1,8**[3]	*88 x 1,8*	*158,4 Million €*
Grid-connected centralized	**6**	**1,3**	*6 x 1,3*	*7,8 Million €*
				166 Million €
Export of PV products				*n.d.*
Change in stocks held				*n.d.*
Import of PV products				*n.d.*
Value of PV business				*166 Million €*

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[1] http://www.epia.org/news/fact-sheets/

[2] Direct jobs: 10 FTE /MW installed during the year. / Indirect jobs: 22 FTE/MW

[3] Based on table 7. Weighted average price

7 INTEREST FROM ELECTRICITY STAKEHOLDERS

7.1 Structure of the electricity system

The Belgian electricity landscape is based on a liberalized market with separation between producers (private and cooperatives), one Transmission System Operators (ELIA – private company designed by the federal state) and eight Distribution System Operators (Mixed companies: public – municipalities - and private).

The electricity retailers (sometimes also producers) have to source a portion of their electricity supplies from renewable energies (RPS system). This portion is different for each region.

Belgium has one federal regulator, the Commission for Electricity and Gas Regulation CREG, and three regional regulators:

- The Walloon Energy Commission (CWaPE) in Wallonia; renewable electricity quota of 23,1% in 2014, 37,9% in 2025.
- Brussels Gas and Electricity (BRUGEL) in the Brussels-Capital Region; renewable electricity quota of 3,8% in 2014, 14% in 2025.
- The Flemish Electricity and Gas Regulator (VREG) in Flanders. renewable electricity quota of 15,5% in 2014, 20,5% in 2018.

7.2 Interest from electricity utility businesses

Distributed renewable energies as PV, just like rational energy use, generates a loss of income for retailers, historical producers, TSOs and DSOs. So you could think they would naturally try to slow down the development of PV and other renewables.

However, some DSOs are proactive and implement PV business models for their municipalities. It is for example the case of RESA that has developed a new **cooperation agreement** to support municipalities with their "green" strategies.

Other DSOs (Infrax, ORES) are more active in **research programs** on PV: How to integrate high shares of PV in the net, smartgrid and PV.

7.3 Interest from municipalities and local governments

The development of renewables energies is a regional competence. The main barriers and key drivers are decided at this level. The European project PVGRID (www.pvgrid.eu) described it for Belgium.

Nevertheless, many local initiatives have emerged at municipality level. Municipalities installs PV on their roofs thanks to third party ownership. (Auderghem for example)
Other municipalities (Jette, Molenbeek) installs PV on their roof with the help of cooperatives, giving the opportunity to their citizens to own a share of the PV installation.

8 HIGHLIGHTS AND PROSPECTS

The Belgian National renewable energy action plan fixed a target of 1,34 GWp installed in 2020 in order to reach the national target of 13 % renewables in 2020 set by the European directive. This objective had already been reached in 2011.

On their own initiatives, Flanders and Wallonia have fixed their targets.

In Flanders, the government defined indicative production objectives for each renewable energy source with the overall objective to reach a share 10.5% renewable energy in total final energy consumption by 2020. For PV, the target in 2020 is a production of 2,670 GWh. In 2014, about 1,948 GWh are produced by the Flemish PV park. Annual growth should be close to the 120 GWh/year (133 MWp) to reach the objective in 2020 which is more than the national growth.

In Wallonia, in line with its air-climate-energy plan, the government wants to source 20% of its energy consumption from renewable energy sources by 2020. A quarter would be produced by photovoltaic (1250 GWh).
In 2014, about 735 GWh are produced by the Walloon PV park. Annual growth should be close to the 85 GWh/year (95 MWp) to reach the objective which is more than the national growth.

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