INTERNATIONAL ENERGY AGENCY

CO-OPERATIVE PROGRAMME ON PHOTOVOLTAIC POWER SYSTEMS

Task 1

Exchange and dissemination of information on PV power systems

National Survey Report of PV Power Applications in Belgium 2012

Prepared by APERe

July 2013

TABLE OF CONTENTS

Definitions, Symbols and Abbreviations

For the purposes of this and all IEA PVPS National Survey Reports, the following definitions apply:

PV power system market: The market for all nationally installed (terrestrial) PV applications with a PV power capacity of 40 W or more.

Installed PV power: Power delivered by a PV module or a PV array under standard test conditions (STC) – irradiance of 1 000 W/m^2, cell junction temperature of 25°C, AM 1,5 solar spectrum – (also see 'Rated power').

Rated power: Amount of power produced by a PV module or array under STC, written as W.

PV system: Set of interconnected elements such as PV modules, inverters that convert DC current of the modules into AC current, storage batteries and all installation and control components with a PV power capacity of 40 W or more.

CPV: Concentrating PV

Hybrid system: A system combining PV generation with another generation source, such as diesel, hydro, wind.

Module manufacturer: An organisation carrying out the encapsulation in the process of the production of PV modules.

Off-grid domestic PV power system: System installed to provide power mainly to a household or village not connected to the (main) utility grid(s). Often a means to store electricity is used (most commonly lead-acid batteries). Also referred to as 'stand-alone PV power system'. Can also provide power to domestic and community users (plus some other applications) via a 'mini-grid', often as a hybrid with another source of power.

Off-grid non-domestic PV power system: System used for a variety of industrial and agricultural applications such as water pumping, remote communications, telecommunication relays, safety and protection devices, etc. that are not connected to the utility grid. Usually a means to store electricity is used. Also referred to as 'stand-alone PV power system'.

Grid-connected distributed PV power system: System installed to provide power to a grid-connected customer or directly to the electricity grid (specifically where that part of the electricity grid is configured to supply power to a number of customers rather than to provide a bulk transport function). Such systems may be on or integrated into the customer's premises often on the demand side of the electricity meter, on public and commercial buildings, or simply in the built environment on motorway sound barriers etc. They may be specifically designed for support of the utility distribution grid. Size is not a determining feature – while a 1 MW PV system on a rooftop may be large by PV standards, this is not the case for other forms of distributed generation.

Grid-connected centralized PV power system: Power production system performing the function of a centralized power station. The power supplied by such a system is not associated with a particular electricity customer, and the system is not located to specifically perform functions on the electricity grid other than the supply of bulk power. Typically ground mounted and functioning independently of any nearby development.

Turnkey price: Price of an installed PV system excluding VAT/TVA/sales taxes, operation and maintenance costs but including installation costs. For an off-grid PV system, the prices associated with storage battery maintenance/replacement are excluded. If additional costs are incurred for reasons not directly related to the PV system, these should be excluded. (E.g. If extra costs are incurred fitting PV modules to a factory roof because special precautions are required to avoid disrupting production, these extra costs should not be included. Equally the additional transport costs of installing a telecommunication system in a remote area are excluded).

Field Test Programme: A programme to test the performance of PV systems/components in real conditions.

Demonstration Programme: A programme to demonstrate the operation of PV systems and their application to potential users/owners.

Market deployment initiative: Initiatives to encourage the market deployment of PV through the use of market instruments such as green pricing, rate based incentives etc. These may be implemented by government, the finance industry, electricity utility businesses etc.

Final annual yield: Total PV energy delivered to the load during the year per kW of power installed.

Performance ratio: Ratio of the final annual (monthly, daily) yield to the reference annual (monthly, daily) yield, where the reference annual (monthly, daily) yield is the theoretical annual (monthly, daily) available energy per kW of installed PV power.

Currency: The currency unit used throughout this report is euro (€)

PV support measures:

Feed-in tariff	an explicit monetary reward is provided for producing PV electricity; paid (usually by the electricity utility business) at a rate per kWh that may be higher or lower than the retail electricity rates being paid by the customer
Capital subsidies	direct financial subsidies aimed at tackling the up-front cost barrier, either for specific equipment or total installed PV system cost
Green electricity schemes	allows customers to purchase green electricity based on renewable energy from the electricity utility business, usually at a premium price
PV-specific green electricity schemes	allows customers to purchase green electricity based on PV electricity from the electricity utility business, usually at a premium price
Renewable portfolio standards (RPS)	a mandated requirement that the electricity utility business (often the electricity retailer) source a portion of their electricity supplies from renewable energies
PV requirement in RPS	a mandated requirement that a portion of the RPS be met by PV electricity supplies (often called a set-aside)

Investment funds for PV	share offerings in private PV investment funds plus other schemes that focus on wealth creation and business success using PV as a vehicle to achieve these ends
Income tax credits	allows some or all expenses associated with PV installation to be deducted from taxable income streams
Net metering	allows PV customers to incur a zero charge when their electricity consumption is exactly balanced by their PV generation, while being charged the applicable retail tariff when their consumption exceeds generation and receiving some remuneration for excess electricity exported to the grid
Net billing	the electricity taken from the grid and the electricity fed into the grid are tracked separately, and the electricity account is reconciled over a billing cycle
Commercial bank activities	includes activities such as preferential home mortgage terms for houses including PV systems and preferential green loans for the installation of PV systems
Activities of electricity utility businesses	includes 'green power' schemes allowing customers to purchase green electricity, operation of large-scale (utility-scale) PV plants, various PV ownership and financing options with select customers and PV electricity power purchase models
Sustainable building requirements	includes requirements on new building developments (residential and commercial) and also in some cases on properties for sale, where the PV may be included as one option for reducing the building's energy foot print or may be specifically mandated as an inclusion in the building development

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 23 member countries. The European Commission also participates in the work of the Agency.

The IEA Photovoltaic Power Systems 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 23 participating countries are Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), China (CHN), Denmark (DNK), France (FRA), Germany (DEU), Israel (ISR), Italy (ITA), Japan (JPN), Korea (KOR), Malaysia (MYS), Mexico (MEX), the Netherlands (NLD), Norway (NOR), Portugal (PRT), Spain (ESP), Sweden (SWE), Switzerland (CHE), Turkey (TUR), the United Kingdom (GBR) and the United States of America (USA). The European Commission, the European Photovoltaic Industry Association, the US Solar Electric Power Association and the US Solar Energy Industries Association are also members. Both Thailand and the International Copper Association are pending members.

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 facilitate the exchange and dissemination of information on the technical, economic, environmental and social aspects of photovoltaic power systems. 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 Belgian National Survey Report for the year 2012. 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 EXECUTIVE SUMMARY

1.1 Installed PV power

By the end of year 2012, Belgium had about 2698 installed MW, an increase of 641 MW (+25 %) compared to 2011. The majority of PV systems are grid-connected distributed systems. Belgium has different incentive schemes in each of the 3 regions, with a combination of a net-metering scheme, green certificates and tax credit. Incentives are also different for private households and for large scale systems.

Due to the strong decrease of the module prices during 2012, PV systems were almost too attractive. The governments of the regions have adapted their incentive schemes accordingly. The beginning of 2013 shows a decrease of the amount of installed PV systems.

1.2 Costs & prices

The installations completed in 2012 demonstrate turnkey system prices for medium (from 10 to 250 kW) to large scale (> 250 kW) "roof-tops" of around 1,3 to 1,8 €/Wp. The turnkey system prices of individual PV systems implemented during 2012 ranged from 1,8 to 2,7€/Wp depending mainly on the region and the size of the system (from 1,5 to 10 kW).

1.3 PV production

Module production was never a big industry in Belgium. The last factory that produced classical silicon PV modules (Photovoltec) went bankrupt in June 2012. The only actors left are specialized in BIPV (Issol, Soltech) or in amorphous silicon (Derbigum). Next to these three companies, a lot of companies work in all parts of the value chain of PV, making the Belgian PV market a very dynamic sector.

1.4 Budgets for PV

No data

2 THE IMPLEMENTATION OF PV SYSTEMS

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.

For the purposes of this report, **PV installations are included in the 2012 statistics if the PV modules were installed between 1 January and 31 December 2012, although commissioning may have taken place at a later date**.

2.1 Applications for photovoltaics

The national electric grid covers almost the whole Belgium and leaves little room for stand-alone applications besides the traditional low-power niche applications such as signalling, garden lights, telemetry & telecommunication and urban furniture such as parking meters and information displays.

Grid connected PV applications are seen as the largest potential in Belgium, in particular building applied or integrated applications on single family houses, apartment buildings, commercial and office buildings. The public interest for building applied PVs is very high, especially in Flanders where almost 80 % of the PV power is installed.

2.2 Total installed photovoltaic power

Table 1: installed PV power during calendar year 2012 in 4 sub-markets.

Sub-market/ application	off-grid domestic	off-grid non-domestic	grid-connected distributed	grid-connected centralized	Total
PV power installed in 2012 (MW)	No data	No data	631,8 MWp	9,69 MWp	641 MWp

The information comes from regional regulators. Brussels (BRUGEL) gives information in MWp, Flanders (VREG) and Wallonia (CWaPE) give information in kVA A correction factor of +5 % was applied to transform these numbers into MWp. Grid-connected centralized installations are bigger than 250 kWp.

Table 2a: PV power and the broader national energy market.

Total national (or regional) PV capacity (from Table 2) as a % of total national (or regional) electricity generation capacity	New (2012) PV capacity (from Table 1) as a % of new electricity generation capacity	Total PV electricity production as a % of total electricity consumption
13,8 %*	40 %	2,67%**

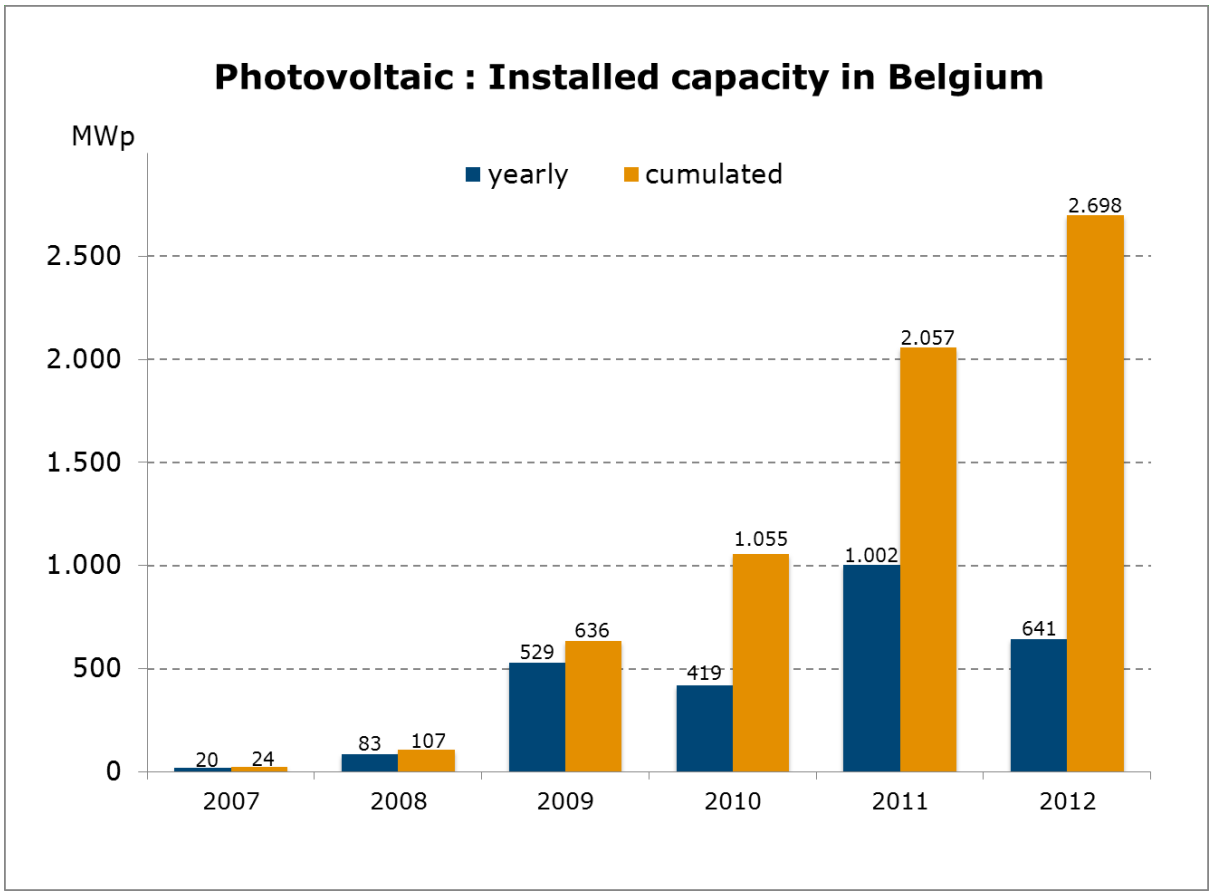
* Total electricity generation power capacity in Belgium was 19,5 GW on the end of 2012 (CREG + update APERe for renewables)

** Total final energy consumption in Belgium was 82,1 TWh in 2011 and 81 TWh in 2012 (Synergrid). Distribution of new installed capacity is supposed to be constant during the year.

The photovoltaic market really started in Belgium in 2007. The evolution of the cumulative installed PV power in the 3 main sub-markets in Belgium is shown in table 2: < 10 kVA installations (AC max power) which represents almost all the residential market, between 10 and 250 kVA installations and over 250 kVA installations.

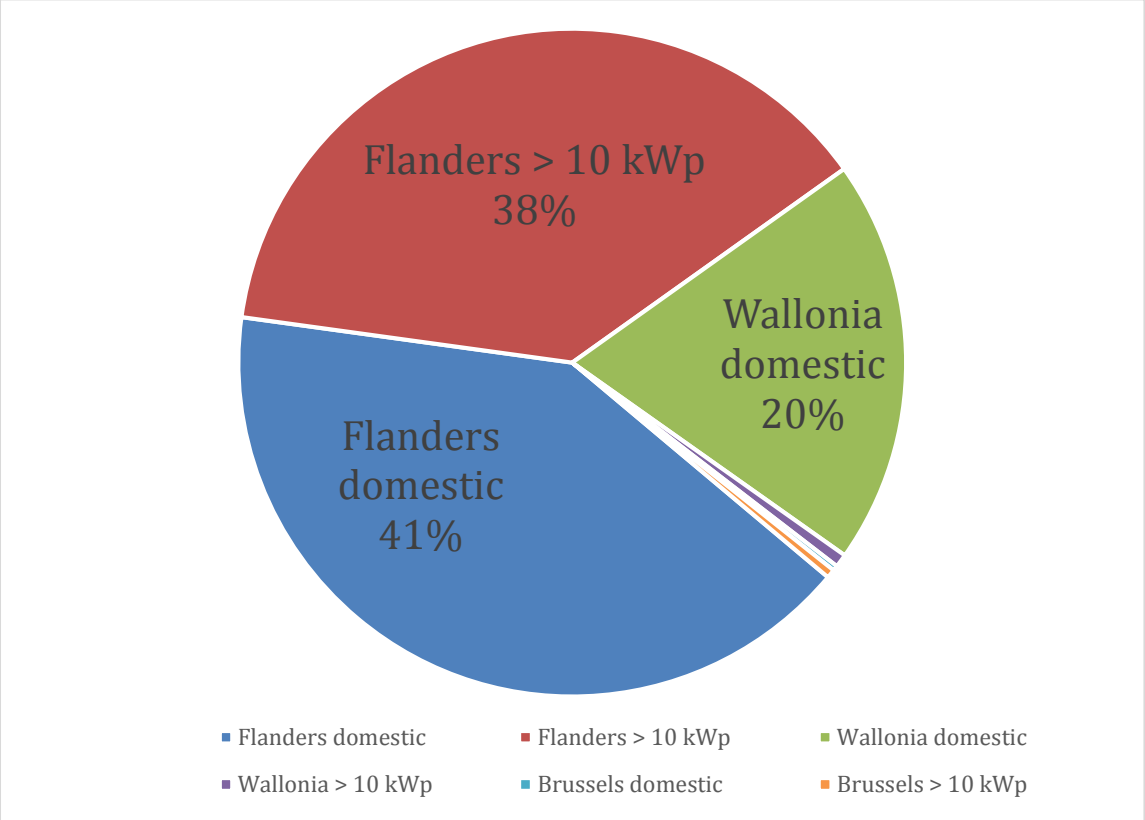
Table 3: The cumulative installed PV power in 3 sub-markets (kWp)

	Cumulative installed capacity as at 31 December					
Sub-market	2007	2008	2009	2010	2011	2012
Stand-alone domestic	-	-	-	-	-	-
Stand-alone non-domestic	-	-	-	-	-	-
Grid-connected distributed (< 10 kVA)	14.710	71.586	341.585	546.386	1.126.440	1.396.882
Grid-connected distributed (10 to 250 kVA)	4.251	13.815	94.463	167.418	360.513	475.162
Grid-connected centralized (> 250 kVA)	4.714	21.653	199.691	341.136	569.915	579.602
TOTAL (kWp)	23.674	107.055	635.740	1.054.940	2.056.867	2.698.337



- At the end of 2012, installed capacity reached almost 2,7 GWp (Flanders 79 %, Wallonia 20 % and Brussels 1%)

- In Flanders, the market growth in 2012 was significantly lower than in 2011, a record year. It had everything to do with the various reductions in the guaranteed price for green certificates. Reasons of these support scheme reductions are explained in point 4. For large PV systems (> 250 kW) the certificate price fell from 150 to 90 euros per MWh on January 1, 2012. Small PV systems (up to 10 kW) had to face an already scheduled quarterly decrease in the first half of 2012 and a drastic reduction from August 2012 (from 210 to 90 euros per MWh). The abolition of the tax credit for energy-saving investments (on federal level) in December 2011 caused a peak in the number of installations in the first months of 2012, when the most part of the market growth took place. 303 MW were installed before August 1, 2012 and only 22 MW after that.
- In Wallonia, the installed capacity doubled in one year. This record is due to residential facilities (96% of installed capacity). Two factors explain this success. On the one hand, the price of PV decreased rapidly on the Belgian market. On the other hand, to respond to this decreasing trend, support mechanisms (green certificates) were adapted in April and September. Each reduction (including abolition of tax credit on federal level) caused a rush in the installers' order books. Installed capacity increased from 257 MWp to 547 MWp.
- In Brussels, market boomed thanks to the stable legislation context and high support scheme guaranteeing a 7-year ROI. Installed capacity increased from 8,3 MWp to 18,1 MWp mainly thanks to big installations (> 10 kVA) that receive the same amount of green certificates as the small ones. The amount of green certificates (GC) was adapted once in October 2012 (5 to 4 GC/MWh)
- Market structures :



- Number of PV systems: 320.000 (<10 kVA) which represent1/15 households in Belgium or 7% of penetration rate.

2.3 PV implementation highlights

2.3.1 Support mechanisms

In 2012, main changes in support schemes were focused on the green certificates mechanism and consisted in a reduction of the support (amount of GC or value of a GC depending on the region)

Net metering on annual base for small installations (< 10 kVA for Flanders and Wallonia, < 5 kVA for Brussels) was not questioned in Belgium during 2012 but DSO's started to point that net metering generates loss of income for the maintenance of the grid. DSO's from Flanders planned for 2013 to introduce a fixed tariff for all PV owners. This tariff varies from 55 to 83 €/kVA installed. Main argument used by DSO's to introduce it is not the loss of income but a question of equity between all grid users (PV owners use the grid but don't pay for it)

2.3.2 Major projects

MetaPV

MetaPV is a research and demonstration project on grid hosting capacity for variable renewable power[1], 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.

MetaPV aims to assess, on a technical and financial level, the possibility of doubling grid hosting capacity for photovoltaic power, at a fraction of the cost of standard grid reinforcements, through the use of smart inverters and controls to reactive power levels.

It is a first step towards a reliable solution for PV integration, which would prove that more PV, with advanced control systems, can be a source of more stability.

The active grid support from PV is demonstrated on two sites: a residential/urban area of 128 households with 4 kW each, and an industrial zone of 31 PV systems with 200 kW, both in the Belgian province of Limburg.

Flobecq

The Flobecq Municipality (Wallonia) has developed a third-party investor project that allowed 30% of its population to be equipped with solar panels for free (300 systems). Users get the green electricity and the municipality gets the green certificates. Flobecq has been rewarded with the title of "capital of PV" in the Renewable Energies championship[2].

This initiative led to a new project from the grid operator. ORES is now analysing how the grid reacts to this unique penetration of PV.

ELIOSYS

First Belgian solar-climatic chamber of big dimensions, able to accommodate any equipment sensitive to the vagaries of the outside world. Thanks to its range of climatic facilities, ELIOSYS is not only an active member of the Belgian photovoltaic world, but is also a figure in the field of material testing.

[1] www.metaPV.eu

[2] www.championnat-er.be

2.3.3 Field test programs

The Walloon administration (SPW-DGT2) started in 2009 a field test program (1,5 million €) on the quality of PV equipment available on the market. 30 pieces of equipment (± 60 kWp of different type of modules) are being monitored and analyzed by the free university of Brussels in Daussoulx (PEREX center). The first results will be available in 2014.

Brussels also started a monitoring program of different big PV installations. The goal of this program is to measure not only performance but also quality and financial profitability of the monitored installations. The results are expected end 2013.

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

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

Project Name	Description	Belgian R&D partner	Technology	Level
Organext	R&D and industrial cluster on Nano-materials and innovative deposition	IMEC University of Hasselt University of Liège Tweed	Organic PV Thin-Film	European
SBO-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	Create new, promising printing technologies thus enabling more efficient and cheaper processes to lead to further spread of PV-technology	Flamac IMEC	Printed CIGS Organic PV	Regional
Solar Flare	The goal of the Solar Flare project is to support regional projects to develop thin film solar energy with higher efficiency and lower cost.	IMEC University of Hasselt	Thin-film	European
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
Solliance	Solliance works in close cooperation with industry, both to fulfil short-term needs of industry, and to convey promising lines of mid- and long-term research. Its research stretches across the entire field, from fundamentals of materials science to sophisticated production technologies.	IMEC	Organic PV Thin-film	European

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

No data

Table 4: Public budgets for R&D, demonstration/field test programmes and market incentives.

	R & D	Demo/Field test	Market incentives
National/federal	n.d.	n.d.	n.d.
State/regional	n.d.	n.d.	n.d.
Total	n.d.		

3 INDUSTRY AND GROWTH

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.

3.1 Production of feedstocks, ingots and wafers

No such activities in Belgium.

3.2 Production of photovoltaic cells and modules

No production lines of classical cells are active on Belgian territory anymore. The last Belgian cell producer, Photovoltech, a spin-off of IMEC, went bankrupt in October 2012 and 267 jobs were lost. Solartec (Mexican producer) bought the production line.

Issol is the last producer of classical modules, but it is not their main activity. With Soltech, they are the two main companies focussing on BIPV applications.

3.3 Module prices

No data

Table 5: Typical module prices for a number of years

Year	1992						2012
Standard module price(s): Typical							
Best price							
PV module price for concentration (if relevant)							

3.4 Manufacturers and suppliers of other components

3.4.1 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.

3.4.2 Cell & Modules:

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

3.4.3 (Smart)PV – Modules:

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

3.5 System prices

Table 7 gives turnkey prices (excluding VAT/TVA) per W for the various categories of installation. Prices do not include recurring charges after installation such as battery replacement or operation and maintenance. Additional costs incurred due to the remoteness of the site or special installation requirements are not be included.

Table 6: Turnkey Prices of Typical Applications (end of 2012)

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 1 -5 kW	roof-mounted system in city center	2,5-3,5 €
GRID-CONNECTED 1 -5 kW	roof-mounted system out of city center	2-3 €
GRID-CONNECTED 5 to 10 kW	roof-mounted system	1,8-2,5 €
GRID-CONNECTED 10 to 250 kW	Industrial roof-mounted system	1,5-1,8 €
GRID-CONNECTED 250 to 750 kW	Industrial roof-mounted system	1,2-1,5 €

Table 7a: National trends in system prices (current)

YEAR	2008	2009	2010	2011	2012
Price €/Wp (small systems:< 10 kWp)	5,5	5	4	3,5	2

3.6 Labour places

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

Nevertheless, we can estimate it based on some parameters taken from EPIA fact sheet[3]. With 641 MW installed last year we can estimate that there was a minimum of 6.410 direct full time employment (FTE) jobs and 14.102 indirect jobs[4]. The all PV sector (direct + indirect) probably represented more than 20.500 FTE jobs in 2012.

Table 7: Estimated PV-related labour places in 2012

Research and development (not including companies)	n.d.
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	
Total	±20.500

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

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

3.7 Business value

Table 8: Value of PV business

Sub-market	Capacity installed *in 2012* (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	**631,78**	**2,2 €**	*631.78 x 2,2*	*1 389,9 Million €*
Grid-connected centralized	**9,69**	**1,5**	*9,69 x 1,5*	*14,5 Million €*
Value of PV business				*1 404,4 Million €*

4 FRAMEWORK FOR DEPLOYMENT (NON-TECHNICAL FACTORS)

Table 9 lists the main support measures (definitions at start of guidelines) for PV during 2012. Further details on these are to be provided on the following pages.

Table 9: PV support measures

	On-going measures	Measures that commenced during 2012
Feed-in tariffs (gross / net?)		
Capital subsidies for equipment or total cost	In Brussels only for passive and low-energy houses	
Green electricity schemes		
PV-specific green electricity schemes	Regional level	Reviewed in 2012
Renewable portfolio standards (RPS)		
PV requirement in RPS		
Investment funds for PV		
Income tax credits	Not for private installations	Reviewed in 2012
Net metering	Regional level (on annual base)	
Net billing		
Commercial bank activities e.g. green mortgages promoting PV	Some banks have established some Energy loans	
Activities of electricity utility businesses		
Sustainable building requirements		

In November 2011, tax credits (40% of investment) were canceled by the federal authority. It had a big impact on 2011 and 2012 installed capacity. Installers filled their order books for almost 6 month after the 30th November 2011 so that their clients could still benefits from this tax credit.

In 2012, the green certificates (GC) system was revised in the 3 regions to adapt to the lowering prices of PV and the financial constraints of public services. The end of year 2012 and beginning of 2013 were marked by a heated debate on the support of photovoltaics in Flanders and Wallonia.

Flanders

As explained in point 2.2, Flanders government decided to lower GC support drastically in august 2012 (from 210 to 90 € per MWh for 10 years). This change was a first answer of the Flemish government to the overheated PV market in Flanders. Like other European countries, the region faced a much stronger cost reduction of PV systems than expected coupled with a support scheme that couldn't react fast enough to these changes. Result of this was an unsustainable growth of installed capacity.

For 2013, the authorities decided to change the GC system completely, into a similar system to the one applied in Brussels since July 2011, which links the GC value to real costs of PV. Flemish government created an observatory inside its administration to analyze the PV market and to fix a GC price in order to guarantee a return on investment of 5 %. This observatory publishes a report twice a year to overcome overheats of the market and to guarantee a sustainable growth of the sector.

For the beginning of 2013, the GC amounts to 21,4 €/MWh during 15 years. This decrease of the GC slowed the market down and significantly brought down the installation rhythm.

Concerned by the situation, the PV sector (PV Vlaanderen) started a campaign to rebuild a positive image of PV in Flanders.

Wallonia.

In Wallonia, green certificates support scheme is included in a photovoltaic implementation plan named "Solwatt" that was established since 2008. It included also a broad support for PV installations, training of installers and R&D. A new implementation plan Qualiwatt is foreseen for 2014. This plan will define support scheme for PV but also measures for the training and certification of installers and includes support criteria concerning the choice of facilities.

2012 and begin of 2013 were marked by a crisis of the green certificate support scheme. Despite two adaptations of the GC system during 2012, people continued to install PV. The stock of green certificates peaked: in early 2013, 4.5 million units remain unsold. Demand exceeds supply by far, the market was unbalanced, speculation has swollen and the price of green certificates has approached its threshold (65 euros). But legally, this guaranteed minimum price must be supported by the TSO (Elia), and therefore ultimately by the consumers. The global bill of the support scheme became too big. As answer, the Walloon government lowered in April 2013 its support to the sector (1,5 GC/MWh during 10 years for installations between 0 and 5 kWp and 1 GC/MWh during 10 years for installations between 5 to 10 kWp). After this transition phase, the new support scheme named Qualiwatt will start, based essentially on the quality of the installations in Wallonia.

Brussels

The Brussels Region had already adapted its GC mechanism in 2011 to make it more responsive to market changes. An annual revision ensures a payback on investment of up to 7 years. There was one change of the amount of GC in October 2012: from 5 GC/MWh to 4 GC/MWh. Another change is planned for August 2013 (from 4 to 2,4 CV/MWh). The market price of GC in Brussels is very stable (85 €/CV).

Net metering

Besides green certificates, a net metering scheme on annual basis is the other big support scheme in Belgium. This has never changed since 2007. Users can have this support only if PV install is smaller than 10 kVA (max AC power). In Brussels, the limit is fixed at 5 kVA. Nonetheless, since the beginning of 2013, Flanders introduced an annual net fee for all PV owners during 20 years. This tariff is a fixed without taking in account the percentage of injection. There is a possibility to have a tariff linked to the amount of injected electricity but it is only interesting if producer reaches 75 % of self-consumption…

This net tariff is studied by the Walloon region but not yet applied.

4.1 Indirect policy issues

The debate on the final bill for the transition requires a long-term reflection: the investments made today to develop sustainable energy services must be weighed against the money lost in the purchase of fossil fuels ruled by international markets.

4.2 .Interest from electricity utility businesses

The high penetration rate of PV in some parts of the network is new for DSO's and it started to cause some troubles. They have to face overvoltage, capacity issues, and reactive power balance.

To face these new challenges, DSO's started many research partnerships with universities to find long-term solutions.

4.3 Interest from municipalities and local governments

Some municipalities have taken the lead to help people to install PV on their roofs. The most successful initiative (Flobecq) has already been described in point 2.3.2.

4.4 Standards and codes

Belgium follows EC norms and standards.

All PV systems have to follow the Synergrid (federation of the Belgian DSO's) C10/11 prescriptions. Synergrid also edited a document "What to do if my PV install often disconnect from the grid?[5]"

A non-exhaustive list of norms and regulations is downloadable here (French – p 12)

5 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 has already been beaten in 2011. Late 2012 projections hoped to reach between 4,8 and 7 GW installed in 2020.

This national target has not been translated yet into regional objectives. There are no concrete objectives for PV at this level.

If PV is doing better that the early objectives to reach these 13%, the study "2020 keep on track"[6] still gives worrying conclusions for Belgium.

However a study[7] made by ICEDD, VITO and the Federal planning Bureau shows that Belgium could reach 100% of renewable energy sources by the year 2050. In the different tested scenarios, PV reaches 50 and even 170 GW.

[5] http://www.synergrid.be/index.cfm?PageID=16832#

[6] http://www.keepontrack.eu

[7] http://www.icedd.be/I7/index.php?option=com_k2&view=item&id=1228&lang=en

ANNEX A: COUNTRY INFORMATION

This information is meant to give the reader some background about the national environment in which PV is being deployed. It is not guaranteed to be 100 % accurate nor intended for analysis, and the reader should do their own research if they require more detailed data.

1) Retail electricity prices (June 2013 – CREG):

Household: (3.500 kWh) 22,31 c€/kWh

Commercial (50.000 kWh): 18,73 c€/kWh

2) Typical household electricity consumption: 3500 kWh per year (CWaPE, VREG)

3) Typical metering arrangements and tariff structures for electricity customers:

Customers can choose between single and day/night metering. Tariff structures depend on the grid operators and voltage.

4) Typical household income: 3 133 €/month (KUL, vacature, Le soir survey)

5) Typical mortgage interest rate: around 3 %

6) Voltage: 230 V / 380 V

7) Electricity industry structure and ownership:

Since 2007, Belgium has a separated structure: generation (several producers), transmission (High voltage: ELIA) and distribution (several Grid Operators). A federal Regulator (CREG) and three regional regulators (Vreg, CWaPE, Brugel) control the proper functioning and transparency of the market.

8) Price of diesel fuel: 1,53 €/L (statbel)

9) Typical values kWh/kWp for PV systems: 947 kWh/kWp (PVGIS)