

Study

# MARKET INFO UNITED KINGDOM – PHOTOVOLTAICS

dena-Market Information System

[www.export-erneuerbare.de](http://www.export-erneuerbare.de) or <http://exportinitiative.dena.de>

Supported by:



on the basis of a decision  
by the German Bundestag

# IMPRINT

## **Publisher**

Deutsche Energie-Agentur GmbH (dena) - German Energy Agency  
Renewable Energies  
Chausseestraße 128 a  
10115 Berlin  
Phone: + 49 (0)30 72 61 65-600  
Fax: + 49 (0)30 72 61 65-699  
Email: [info@dena.de](mailto:info@dena.de)  
Internet: [www.dena.de](http://www.dena.de)

## **Creation/Editing**

Thomas Wenzel

November 2014

All rights reserved. Use of this document shall be subject to the consent of dena.  
All content has been compiled with all possible care and to the best of the compiler's knowledge.  
dena does not guarantee the topicality, correctness and completeness of the information provided.  
dena shall not be liable for any material or immaterial damage caused directly or indirectly by the use or non-use of the information presented, so long as dena cannot be charged with any demonstrably intentional or grossly negligent fault.

## **Official websites**

Homepage: [www.export-erneuerbare.de](http://www.export-erneuerbare.de)  
Online shop: <http://exportinitiative.dena.de>

Supported by:



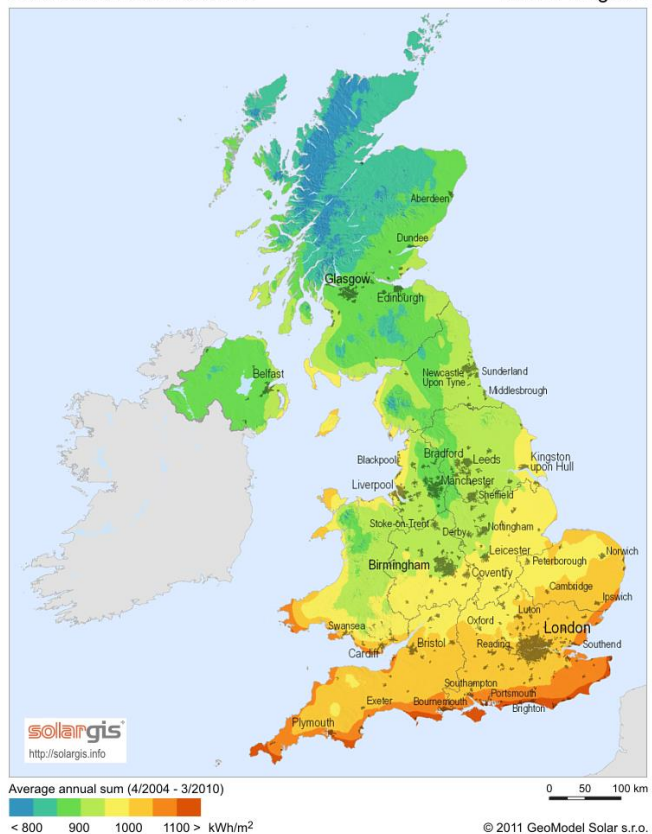
Federal Ministry  
for Economic Affairs  
and Energy

on the basis of a decision  
by the German Bundestag

# SOLAR IRRADIATION & POPULATION DENSITY

## Annual global solar irradiation

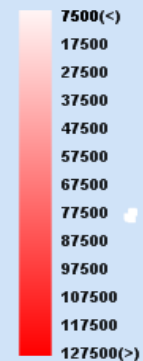
Global horizontal irradiation United Kingdom



Source: SolarGIS (2010)

## Population density

Person per km<sup>2</sup>



Metropolitan areas:

1. London(7556900)
2. Birmingham(984333)
3. Glasgow(610268)
4. Liverpool(468945)
5. Leeds(455123)
6. Sheffield(447047)
7. Edinburgh(435791)
8. Bristol(430713)
9. Manchester(395515)
10. Leicester(339239)

Source: Populationlabs (2012)

# BASIC DATA

General basic data (2013)			
Area	243,610 km <sup>2</sup>	GDP (2014 est.)	1,648.4 bn £ (~1,992.8 bn €)
Population (2013 est.)	64.1 m	GDP per capita	25,300 £ (~29,800 €)
Language	English	GDP growth	1.7 %
Government type	Constitutional monarchy with parliamentary system	Inflation	2.6 %
Administrative division	Four countries: England, Scotland, Wales and Northern Ireland	Unemployment rate	7.5 %
Basic energy market data (2013)			
Electricity consumption (total/per capita)	323.3 TWh / ~ 5,051 kWh		
Electricity import (net)	14.427 TWh		
Electricity price (industrial 500 – 2,000 MWh/a)	0.118€ / kWh (excluding taxes)		
Electricity price (residential 2.500-5,000 kWh/a)	0.174€ / kWh (including VAT)		
Share of renewable (gross electricity generation in 2012)	11.9 %		
Increase of electricity consumption (2002 - 2012)	-0.46 %		
Annual global solar irradiation	900 – 1,200 kWh / m <sup>2</sup> a		

Currency exchange rates see European Central Bank ([ECB](#))

# PHOTOVOLTAIC MARKET INDICATORS

Indicators				
Market size (annual installed capacity)	2011: 813 MW	2012: 925 MW	2013e: 1,450 MW	2014e: 3,000 MW
National target (2020)	<ul style="list-style-type: none"> <li>PV capacity: 10 GW</li> </ul>		<ul style="list-style-type: none"> <li>15 % share of renewable energy of final energy demand</li> </ul>	
Main market drivers 2014	<ul style="list-style-type: none"> <li>Large-scale systems &gt; 5 MW : quota system (certificates), for small-scale systems: FIT (generation tariff)</li> <li>Ambitious goals of the government in the area of climate protection and expansion of renewable energies: there is an increased pressure to act because reaching the goal of covering 15 % of energy demand by renewables by 2020 might not be accomplished according to market observers.</li> <li>Based on rapidly falling prices for PV modules in the last three years especially large-scale systems have become more attractive in UK .</li> </ul>			
PV Support in 2014	<ul style="list-style-type: none"> <li>The UK support policy up to now has been based on the Renewable Obligation-System (RO), which is a market based quota system (certificate trade for systems &gt; 5 MW) as well as on a FIT for communities and end users of PV-systems with a capacity ≤ 5 MW (details on support scheme see next slide).</li> </ul>			
Changes in PV regulation in 2013/ 2014	<ul style="list-style-type: none"> <li>Since April 2013 new rules concerning the ROCs have been in force. The promotion for PV systems that were accredited from 31/03/2013 is regulated in the Renewables Obligation (Amendment) Order 2013 and in regulations concerning each region (England/Wales, Scotland, Northern Ireland).</li> <li>Last changes to the FIT apply to installations since 1<sup>st</sup> July 2014. The current tariff rates since 1<sup>st</sup> October remain unchanged and will be valid until 30<sup>th</sup> December 2014.</li> <li>In 2014, the so called “Contract for Difference Model (CfD)” for PV systems &gt; 5 MW was introduced. The Renewable Obligation Scheme with tradable certificates will be phased out in a transition period until 1<sup>st</sup> April 2015 for PV power plants. The CfD focusses on current electricity market prices.</li> <li>For details on the CfD model see slide 9.</li> </ul>			

# MAIN PV SUPPORT SCHEME – GENERATION TARIFF

PV-Support	Details
FIT Program in 2014	<ul style="list-style-type: none"> <li>The FIT system is a generation tariff, which means the payment is independent from feeding electricity into the grid . If a plant operator feeds into the grid, a bonus of 4.77 p / kWh (~5.79 € ct / kWh*) will be added. The FIT is being paid for 20 years.</li> <li>Eligible PV systems must be installed by a registered installation company with certified components. Maximum PV capacity per system is 5 MWp.</li> <li>Tariffs for PV systems depend on PV capacity (six categories), energy efficiency criteria and on the validity of multi-installations tariffs: Based on a scheme, the system will be rated as „high”, „medium” and „low” efficient **.</li> <li>The tariffs below apply to installations from 1<sup>st</sup> July until 30<sup>th</sup> September 2014 and also apply unchanged to installations from 1<sup>st</sup> October until 30<sup>th</sup> December 2014. The tariffs will be adjusted every quarter.</li> </ul>

tariff / capacity and efficiency	≤ 4 kW	4-10kW	10 - 50 kW	50 kW - 150 kW	150 kW - 250 kW	> 250 kW / ground mounted PV systems
low**	638 p / kWh (7.74 € ct / kWh*)	6.38 p / kWh (7.74 € ct / kWh*)	6.38 p / kWh (7.74 € ct / kWh*)	6.38 p / kWh (7.74 € ct / kWh*)	6.38 p / kWh (7.74 € ct / kWh*)	exchange rate 1 £ = 1.21340 €
medium**	12.94 p / kWh (15.7 € ct / kWh*)	11.73 p / kWh (14.23 € ct / kWh)	10.92 p / kWh (13.25 € ct / kWh*)	9.31 p / kWh (11.29 € ct / kWh*)	8.9 p / kWh (10.79 € ct / kWh*)	
high**	14.38 p / kWh (17.45 € ct / kWh*)	13.3 p / kWh (15.81 € ct / kWh*)	12.13 p / kWh (14.72 € ct / kWh*)	10.34 p / kWh (12.54 € ct / kWh*)	9.89 p / kWh (12.0 € ct / kWh*)	



\*\* Detailed guidelines from the Office of Gas and Electricity Markets (Ofgem) are available in at [„Feed-in Tariffs: Guidance for renewable installations”](#).

# FURTHER PV SUPPORT SCHEMES (1/2)

Support	Details
The Renewable Obligation Order (2010): Quota system (RO Certificates)	<p><b>Renewable Obligation Scheme (ROCs)</b></p> <ul style="list-style-type: none"> <li>Operators of PV plants earn a certain amount of certificates (Renewables Obligation Certificate - ROC or ROS in Scotland) per generated MWh depending on the capacity of the plant.</li> <li>The ROC allocation system, which has been in place since April 2013 determines a yearly reduction in the prices for certificates a plant operator receives per generated MWh until 2017.</li> <li>All utilities have to comply with a steady increasing renewable electricity quota, e. g. by purchasing renewable obligation certificates.</li> <li>Alternatively utilities can pay a fixed tariff of 43.30 £ (ca. 52.54 € *) per MWh directly to Ofgem (Gas and Electricity Markets Authority) for 2014-2015. The tariff will be adjusted based on the inflation rate.</li> <li>New PV plants &gt; 5 MWp can be accredited no later than 31<sup>st</sup> March 2015 under the ROC system and get the 20-year funding period (to 2035). After that date the ROC system for new PV plants &gt; 5 MWp will be closed.</li> </ul>
Reduced / exemption of VAT	<ul style="list-style-type: none"> <li>PV systems on existing roofs (on residential or public buildings): 5 % VAT (instead of 20 % VAT),</li> <li>PV systems on new buildings: exempt from VAT</li> <li>PV systems are only eligible if they have been installed by registered installation companies.</li> </ul>
Exemption of climate change levy (CCL)	<ul style="list-style-type: none"> <li>PV plant operators are exempt from the climate change levy.</li> <li>Utilities have to pay a climate change levy for fossil fired electricity generation, which is then added to the consumer's electricity bills.</li> </ul>

\* exchange rate : 1 £ = 1.21340 €



Detailed guidelines from the Office of Gas and Electricity Markets (Ofgem) of April 2013 are available at: „[Renewable Obligation: Guidance for Generators](#)”

# FURTHER PV SUPPORT SCHEMES (2/2)

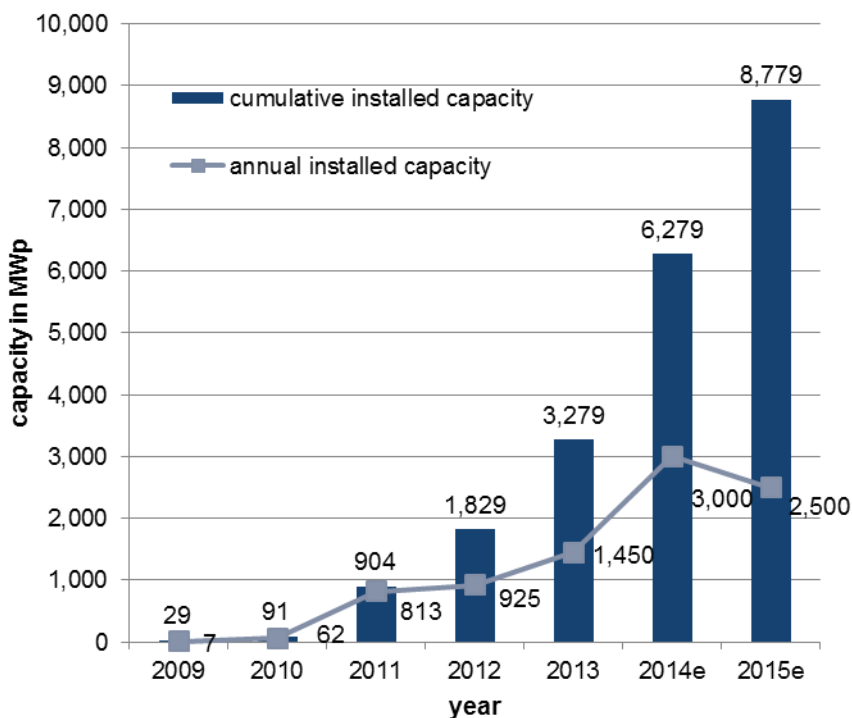
Support	Details
<p>Planned (Contracts for Difference - CfD) based on Energy Act 2013</p>	<ul style="list-style-type: none"> <li>▪ February 2014: The CfD model is expected to come into force in 2014.</li> <li>▪ In Northern Ireland the new model cannot be applied before 2016 .</li> <li>▪ October 2014: Operators of accredited large PV systems (&gt; 5 MW) can select between the new CfD model and the ROC system (- see slide 7 Renewables Obligation) until 31<sup>st</sup> March 2015.</li> <li>▪ From 31<sup>st</sup> March 2015 onwards operators of new PV plants &gt; 5 MW only can use the CfD model.</li> <li>▪ According to the CfD model, an operator of a large PV system receives the difference between the purchasing price ("strike price") and the market price for electricity ("reference price ") through a private contract - concluded with a state-owned company.</li> <li>▪ If the market price of electricity is below the level of remuneration agreed in the contract, the electricity producer receives a premium on top of the market price. If the market price of electricity is above the current contract price, the PV electricity producer must refund the excess.</li> <li>▪ The following reference prices have been set for the PV systems:             <ul style="list-style-type: none"> <li>▪ in 2014/2015: £ 120 / MWh (about € 145.6 * / MWh)</li> <li>▪ in 2016/2017: £ 115 / MWh (about € 139.5 * / MWh)</li> <li>▪ in 2017/2018: £ 110 / MWh (about € 133.5 * / MWh)</li> <li>▪ in 2018/2019: £ 100 / MWh (about € 121.3 * / MWh)</li> </ul> </li> </ul>

\* exchange rate : 1 £ = 1.21340 €



# MARKET DEVELOPMENT AND BARRIERS

## Development of installed PV capacity



## The main barriers in the UK PV market

### Dominance of conventional resources

The UK energy supply is mostly (~ 95 %) based on local primary energy sources like oil, natural gas and coal (status 2011).

- The government focusses on:
  - Carbon Capture and Storage (CCS) to improve the carbon balance sheet for existing coal power plants.
  - The development of nuclear power plants as a climate-friendly technology
  - Exploration of shale-gas and oil deposits.

### Support mechanisms are changed frequently:

- In 2014 the FIT system will be amended every 3 months. In April 2014 the FIT was reduced for all system categories (see slide 6)

Sources: EPIA (2013), Solar Power Portal (2014)

# MARKET NEWS (1/3)

Date	Topic	Source
09/10/2014	<p><a href="#">Lightsource teaming up with local installers to expand rooftop business in UK</a>            Lightsource Renewable Energy - with an operating portfolio of more than 600 MWp, the U.K.'s largest producer of solar energy - is looking to expand its rooftop solar business. The company has so far invested some £1.1billion into the U.K. solar industry, the lion's share in large-scale ground-mounted projects, but that is now changing. Due in part to the shift in government support for solar, Lightsource says it is seeking to "deploy significantly more investment into rooftop installations" and is looking to build long-term relationships with rooftop installers who the company says will gain from its industry expertise, supply chain and funding.</p>	PV-Magazine
02/10/2014	<p><a href="#">UK Foresight Solar Fund to raise up to £100 million</a>            The fund plans to acquire two PV plants with a combined capacity of 74 MW and expects to continue acquisitions of plants below and above 5 MW following the introduction of next year's CfD scheme.</p>	PV-Magazine
02/10/2014	<p><a href="#">£300 million budget to launch UK auctions for renewables</a>            Renewable electricity projects will compete for £300 million in support this autumn – an increase of £95 million from the indicative budget published in July, Energy and Climate Change Secretary Ed Davey announced today. The funding for Contracts for Difference, which provide long-term certainty for investors, are a cornerstone of the Government's reforms to the electricity markets, designed to drive investment in a new generation of clean, secure electricity supplies.            The Government is also changing the way it supports rooftop-mounted solar power, in line with the Solar Strategy. This includes changes to the Feed-in Tariff Scheme (FITs), with a new degression band for solar installations over 50 kW, which will help to protect existing levels of financial support for this type of rooftop-mounted solar, as well as consulting on changes that would enable businesses and other organisations to take their panels and FITs with them when they move premises.</p>	GOV.UK (Press Release: Department of Energy & Climate Change)

## MARKET NEWS (2/3)

Date	Topic	Source
17/09/2014	<a href="#">Suntech, Greenfield team up with youmex in UK</a> Continuing the ambitious worldwide expansion of its project business, Shunfeng Photovoltaic International has unveiled a new partnership with two German players, EPC provider Greenfield Solar International and clean energy financing and investment group youmex, to finance and sell their solar farm projects pipeline in the United Kingdom.	PV-Magazine
12/08/2014	<a href="#">UK hits 5 GW solar PV capacity</a> Solar analysts NPD Solarbuzz have today published data that shows the U.K. has now installed 5 GW of cumulative solar PV, making it the sixth country in the world to surpass this landmark figure. The analysts' finding reveal that 90 % of the U.K.'s capacity has been installed in the past three years (with 1 GW coming online in the first six months of this year), and nearly half of all deployed PV in the country is located in England's southern regions – the South West and South East of England combined account for 46 % of all PV capacity. The dry, sunny east of England boasts 15 % of installed capacity, whereas cramped London and cloudy Northern Ireland can only muster 1 % each.	PV-Magazine
01/08/2014	<a href="#">Planning barrier to UK solar could be removed</a> The government has proposed raising the bar for commercial rooftop systems needing planning permission, from 50 kW to 1 MW. The STA says more needs to be done for the 50 kW-to-5 MW rooftop market in the UK. UK trade body the Solar Trade Association (STA) has welcomed a government proposal to remove the requirement for commercial businesses to secure planning permission for PV rooftops of 50 kW to 1 MW in scale. But with only 65 MW of large commercial rooftop systems – defined as 50 kW to 5 MW – installed in the UK in the 12 months to June, the STA says a lot more must be done to boost that segment of the PV market.	PV-Magazine

# MARKET NEWS (3/3)

Date	Topic	Source
16/05/2014	<p><a href="#">UK Moves to Cut Support for Large Scale Solar PV</a>            DECC, the UK’s Department of Energy and Climate Change, has unveiled proposals for further reform of the country’s renewable energy support program. The measures include plans for the closure of the Renewables Obligation scheme to new solar PV capacity above 5 MW from 1st April 2015. Outlining the plans at the launch of a series of consultations, the government argues that the proposals are designed to maintain the growing momentum behind renewable electricity investment in the UK and a smooth transition to the new Contracts for Difference (CfD) support scheme, while continuing to deliver value for consumers. In one of the key measures of the new proposals, the government points out that large-scale solar is deploying much faster than expected. Industry projections indicate that by 2017 there could be more than the 2.4 to 4 GW set out in the electricity market reform (EMR) delivery plan deployed. This is behind the consultation on proposals to close the RO to new solar PV capacity above 5 MW from 1st April 2015, though the proposals do include grace period arrangements to protect developers, which have already made significant financial commitments to projects. The proposals also envisage keeping the RO open for projects under 5 MW, which are not eligible for the new Contracts for Difference (CfDs). Projects above 5 MW will be able to apply for CfDs – part of the Electricity Market Reform Programme that is slowly progressing.</p>	Renewable Energy World
13/05/2014	<p><a href="#">UK proposes incentive cuts to large-scale solar</a>            Consultation published on Tuesday by the government suggests removing the renewables obligation certificate (ROC) for plants over 5 MW by April 1, 2015.</p>	PV-Magazine
14/01/2014	<p><a href="#">UK solar PV demand reached 1.45 GW in 2013: large-scale grows by 600%</a>            Large-scale solar PV installations in the UK grew by an incredible 600 % during 2013, driving the UK to a record 1.45 GW of new solar PV capacity added. Ground-mounted installations accounted for over 90 % of new large-scale solar PV added in the UK in 2013. The UK was ranked in sixth place globally for large-scale solar PV, and is one of just six countries that had, or approached, a GW-level large-scale solar market during 2013.</p>	Solarpowerportal UK

## CONTACT INFORMATION

Category	Name	Website
Ministry of Energy	Department of Energy and Climate Change (DECC)	<a href="http://www.decc.gov.uk">www.decc.gov.uk</a>
Ministry of Economics	Department for Business, Innovation and Skills (BIS)	<a href="http://www.bis.gov.uk">www.bis.gov.uk</a>
Ministry of Environment	Department for Environment, Food and Rural Affairs (Defra)	<a href="http://www.defra.gov.uk">www.defra.gov.uk</a>
Energy Market Regulator	Office of Gas and Electricity Markets (Ofgem)	<a href="http://www.ofgem.gov.uk">www.ofgem.gov.uk</a>
Solar Energy Association	Solar Trade Association British Photovoltaic Association (BPVA)	<a href="http://www.solar-trade.org.uk">www.solar-trade.org.uk</a> <a href="http://www.bpva.org.uk">www.bpva.org.uk</a>
Renewable Energy Association	Renewable Energy Association (REA)	<a href="http://www.r-e-a.net">www.r-e-a.net</a>
National Partner for Project Financing and Development	UK Trade and Investment (UKTI)	<a href="http://www.ukti.gov.uk">www.ukti.gov.uk</a>

## REFERENCES

- BDEW, Bundesverband der Energie- und Wasserwirtschaft e.V. (2013): Europäischer Strompreisvergleich 1. Hj. 2013: [https://www.bdew.de/internet.nsf/id/39BAE817DA547139C125796B00460F4B/\\$file/2013\\_01\\_Europ%C3%A4ischer%20Strompreisvergleich\\_1.Hj.2013.pdf](https://www.bdew.de/internet.nsf/id/39BAE817DA547139C125796B00460F4B/$file/2013_01_Europ%C3%A4ischer%20Strompreisvergleich_1.Hj.2013.pdf) , accessed on 30.10.2014.
- CIA, Central Intelligence Agency (2014): The World Fact Book. <https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html>, accessed on 30.10.2014.
- DECC, Department of Energy & Climate Change (2014): <https://www.gov.uk/government/publications/electricity-section-5-energy-trends>, accessed on 30.10.2014.
- Deutsche Energie-Agentur GmbH (dena) (2013): Länderprofil Großbritannien, Berlin.
- Deutsche Energie-Agentur GmbH (dena) (2013a): Förderübersicht Photovoltaik 2013, Berlin.
- ENTSO-E (2013): <https://www.entsoe.eu/data/data-portal/exchange/>, accessed on 25.04.2013.
- EPIA, European Photovoltaic Industry Association (2013): Global Market Outlook For Photovoltaics 2013 - 2017, EPIA, Brussels.
- Eurostat (2014): <http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/database>, accessed on 30.10.2014.
- EZB (2014): <http://www.ecb.int/stats/exchange/eurofxref/html/index.en.html>, accessed on 30.10.2014.
- Gtai (2014): Wirtschaftsdaten kompakt: Vereinigtes Königreich: [http://www.ahk.de/fileadmin/ahk\\_ahk/GTaN/vk.pdf](http://www.ahk.de/fileadmin/ahk_ahk/GTaN/vk.pdf) , accessed on 30.10.2014.
- IMF (2014): [http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/weorept.aspx?sy=2011&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=112&s=NGDP\\_RPCH%2CNGDP%2CNGDPPC%2CPCPIPCH%2CLUR&grp=0&a=&pr1.x=80&pr1.y=14](http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/weorept.aspx?sy=2011&ey=2018&scsm=1&ssd=1&sort=country&ds=.&br=1&c=112&s=NGDP_RPCH%2CNGDP%2CNGDPPC%2CPCPIPCH%2CLUR&grp=0&a=&pr1.x=80&pr1.y=14), accessed on 30.10.2014.
- Ofgem (2012): Feed-in Tariffs: Guidance for renewable installations. <http://www.ofgem.gov.uk/Sustainability/Environment/fits/Documents1/FIT%20generator%20guidance.pdf>, accessed on 20.06.2012.
- Ofgem (2014): Feed-in Tariff Payment Rate Table for Photovoltaic Eligible Installations for FIT (1 October 2014 – 31 December 2014) <https://www.ofgem.gov.uk/ofgem-publications/89096/fitpaymentratetableforpublication1october2014pvtariffs.pdf> , accessed on 30.10.2014.
- Populationlabs: UK population density. [http://www.populationlabs.com/UK\\_Population.asp](http://www.populationlabs.com/UK_Population.asp), accessed on 20.11.2012.
- Renewable Energy World (2014): <http://www.renewableenergyworld.com/rea/news/article/2014/05/uk-moves-to-cut-support-for-large-scale-solar-pv?cmpid=SolarNL-Saturday-May17-2014> , accessed on 12.06.2014.

## REFERENCES

- SolarGIS (2010): [http://solargis.info/doc/\\_pics/freemaps/1000px/ghi/SolarGIS-Solar-map-United-Kingdom-en.png](http://solargis.info/doc/_pics/freemaps/1000px/ghi/SolarGIS-Solar-map-United-Kingdom-en.png) , accessed on 11.06.2014.
- Solar Power Portal (2013): [http://www.solarpowerportal.co.uk/guest\\_blog/uk\\_exceeds\\_0.5\\_gw\\_pv\\_demand\\_in\\_q113\\_grabs\\_almost\\_10\\_global\\_share](http://www.solarpowerportal.co.uk/guest_blog/uk_exceeds_0.5_gw_pv_demand_in_q113_grabs_almost_10_global_share), accessed on 02.06.2013.
- Solar Power Portal (2014): [http://www.solarpowerportal.co.uk/guest\\_blog/uk\\_large\\_scale\\_solar\\_pv\\_grew\\_by\\_600\\_in\\_2013\\_with\\_annual\\_demand\\_reaching\\_1.4](http://www.solarpowerportal.co.uk/guest_blog/uk_large_scale_solar_pv_grew_by_600_in_2013_with_annual_demand_reaching_1.4) , accessed on 11.06.2014.
- Solarserver (2013): <http://www.solarserver.com/solar-magazine/solar-news/current/2013/kw44/115-mw-of-solar-pv-goes-online-through-the-uks-feed-in-tariff-in-q3-2013.html>, accessed on 31.10.2013.