

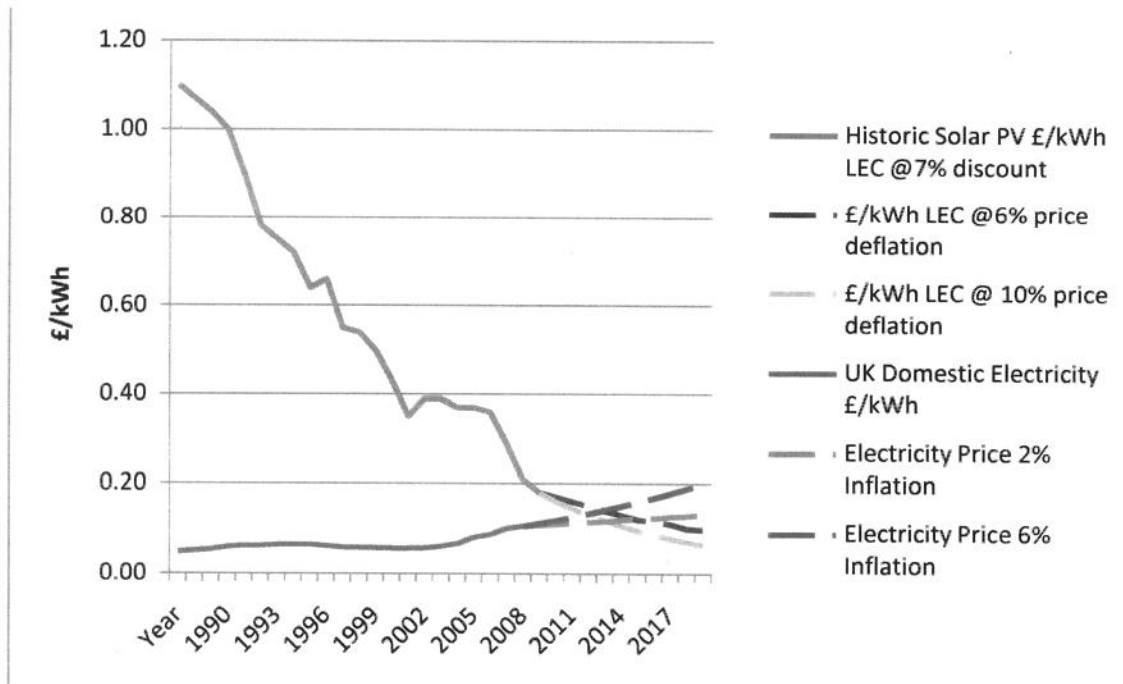
## Utility Scale Solar PV is competitive with offshore wind, and faster to deploy than nuclear.

Britain's energy policy is in a mess. Old power stations are being turned off faster than new ones are being built<sup>1</sup> and plans to roll out renewable energy are years behind schedule<sup>2</sup>. In both cases, the UK faces EU infringement proceedings and fines. The Government themselves refer to the predicted "energy gap" in 2017 as 'sweaty palm time' with power cuts anticipated for the first time since the 1970s<sup>3</sup>. There is little time left for construction as building new power stations takes many years. The government has sought a lot of advice on the problem, with at least four reports in the last year<sup>4 5 6 7</sup>. All four reports dismiss solar PV (which makes electricity from light) without looking into the facts.

### Solar PV has the fastest reducing costs compared to all other generation technologies

In fact, the cost of solar PV has dropped faster than any other generating technology<sup>8</sup>. The dynamics of the PV industry cost structures are similar to computer chips<sup>9</sup> where prices have plummeted since Moore's law was first predicted in 1966<sup>10</sup>.

Levelised Electricity Cost is the standard method for comparing generation technologies taking whole life system costs into account. The chart below shows how Solar PV Levelised Electricity Cost in £/kWh<sup>11</sup> compares to rising UK domestic electricity prices<sup>12</sup>. Solar PV will reach 'grid parity' when no subsidies are required sometime between 2013 and 2016, depending on the rate of PV price deflation and electricity price inflation. For illustration the graph shows electricity price inflation in the range 2-6%, and PV price deflation at 6-10%: continuing the trends of the past 20 years.



Even BP concedes that electricity from Solar PV will be cheaper than fossil fuels by 2020<sup>13</sup>.

This drop in price isn't just the dream talk of industry strategists: In the last 12 months, market volume and competition, encouraged by Britain's feed-in-tariff, has brought UK domestic prices down by 50% to £3,000/kW. At a domestic level Solar PV is tantalisingly close to requiring no feed-in-tariff subsidies in Japan, Austria, Denmark, Germany, Cyprus, Italy, Portugal, Spain, and Brazil where there is combination of market volume, higher electricity bills or high levels of irradiance (sunlight).<sup>14</sup>

In Germany, domestic feed-in-tariff rates almost match electricity costs and support mechanisms are now used mainly to provide contractual certainty so banks can finance upfront capital costs, secured on the future income stream from the panels. This is similar to the more complex proposals in this Government's Electricity Market Reforms for "Contracts for Difference"<sup>15</sup>.

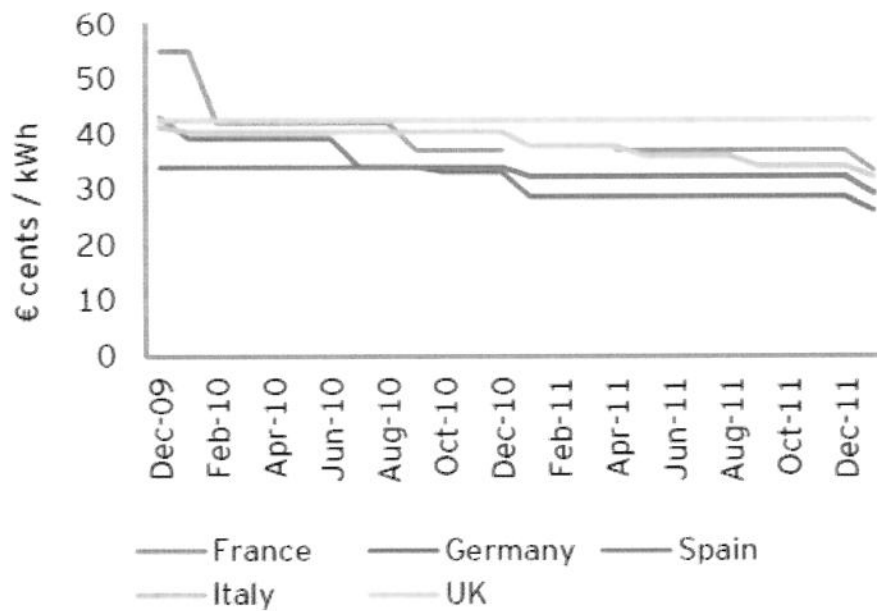
### Utility Scale PV must be a serious part of energy policy

The price of installing utility scale solar PV has fallen even further than domestic installations, halving from £4,400/kW in 2005 to £2,200/kW in 2010<sup>16</sup>. Utility scale solar PV already requires no subsidy in some parts of Europe and USA. In Britain it is competitive with the next phase of off shore wind. When the two technologies are compared, utility scale PV operating costs are cheaper, grid connection costs are cheaper, projects are less risky so capital is cheaper, and installation costs are falling faster.<sup>17</sup> Additionally, electricity generation from solar PV is more predictable which means less capacity is needed on standby.

Solar PV Installation prices are not falling because of a hoped for technology breakthrough. It's been around for since 1839<sup>18</sup> and in mass production for fifty years.<sup>19</sup> Prices are falling due to cost reductions throughout the supply chain brought on by competition, volume and improved processes. In contrast offshore wind technology is actually rising in price and nothing suggests costs or required subsidies will fall in the next 10 years.<sup>20 21</sup>

### Maintaining Investor Confidence

Compared to other European countries, the subsidies set in the UK were mid range when they were initially devised, as illustrated in the graph below showing domestic feed-in-tariff rates for major European markets<sup>22</sup>. The UK Government have pump-primed the market, and now UK feed-in-tariff subsidies should be aligned with the rest of Europe in an open and predictable manner that does not undermine investor confidence. Changing feed-in-tariff rates is a bit like reversing an articulated lorry. Small tweaks can produce huge swings in the market.



### False Choice

The Government's intention to review the feed-in-tariff at short notice is based on the concern that utility scale solar PV will deny domestic households from claiming feed-in-tariffs<sup>23</sup>. Not only is the government's behaviour creating political uncertainty which undermines investor confidence across the

infrastructure sector but it is also based on a false choice. The choice is not domestic versus utility scale solar PV. Both have their uses: domestic PV is currently an expensive carbon abatement technology<sup>24</sup>, but its part of the Big Society agenda and it won't be expensive for long. Utility Scale PV is about solving serious energy security and climate change problems and should be compared to off shore wind farms and nuclear.

As for the Government's fear that the feed-in-tariff budget being usurped by utility scale solar PV, the fact is that only £6m of the £30m – 50m budget for year 1 has been spent so far.

### **Solar PV is the fastest technology to roll out**

As for the time left to build new power stations before the lights go out, solar PV comes up trumps. It took Britain 5 years of planning, and 9 years of construction to build the last nuclear power station, Sizewell B, which has capacity to power 2 million homes<sup>25</sup>. Who knows how long it will take to build the next one.

Globally only 2GW of off shore wind, enough for 1.1million homes, has ever been built. There are huge uncertainties about how fast this technology can be rolled out., The British offshore wind industry hopes to install 6-9GW by 2015<sup>26</sup>, a further 25GW in "round 3"<sup>27</sup>. Betting the country's electricity supply on off shore wind risky

In stark contrast, last year alone the Germans installed 8GW of solar PV<sup>28</sup>, enough to power 1.4 million homes<sup>29</sup>. A typical utility scale solar farm takes 18 months to plan, and 3 months to build.

### **British companies can still play on the global stage of Solar PV**

One wonders why the British don't take solar PV more seriously as a utility scale technology.

It might be because the Government prefers an industrial policy that waits until prices fall further so lower subsidies are required. This is the wrong policy for two reasons:

The first is that by delaying the deployment of new generation capacity they risk running Britain into the energy gap. No government would survive power cuts and by continuing to operate the old power stations they run the risk of a nuclear accident or EU infraction proceedings.

The second reason not to wait is Britain's position in the globalised marketplace. It's taken the Germans 10 years to build their industry to employ 133,000 people and now they have massive purchasing power and control the supply chains. A typical German solar farm construction company locks in Chinese manufacturing capacity worth tens of millions of pounds many years in advance<sup>30</sup>. This enables them to drive down costs and undercut British construction companies, currently by over 25%.

The recently introduced British feed-in-tariff enables British companies to grow and start to build purchasing power. There is still time for British companies to catch up and play on the global stage but by threatening to cut British feed-in-tariffs at short notice, this Government has undermined business and investor confidence further. It was already low: in January 2011 a survey showed only 13% of companies believed the government was creating the conditions for clean tech success.<sup>31</sup>. Low investor confidence delays the roll out of all kinds of new generating capacity and pushes up the cost of capital.

This Government is misinformed and not thinking of solar PV as a competitive generation technology to off shore wind, or nuclear power stations. This means that when utility scale solar PV does finally get built in the UK, it will be Germans that do it, just as it's the French who will build the nuclear power stations, and Danish who will build the off shore wind turbines. The Germans have brought the price of Solar PV down, now let's have an industrial policy to help Britain benefit.

## Recommendations for the UK Government

1. Review subsidies in an open manner to a predictable and stable timetable. Ideally with 24 months notice on changes to the timetable for review. Investor confidence in this Government is already low. Don't make it worse.
2. Bring UK feed-in-tariff subsidies in line with other EU countries at the next scheduled review.
3. Reallocate Utility Scale Solar PV to the Renewables Obligation budget as it is comparable to off shore wind and nuclear
4. Remove all technology specific subsidies in the long term and introduce a carbon floor price and technology neutral Contract for Difference subsidies
5. Establish an independent body to manage subsidy level changes through an open and predictable mechanism which is not vulnerable to short term political interference. .

[REDACTED]

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<sup>1</sup> Rebuilding Security: Conservative Energy Policy <http://www.conservatives.com/~media/Files/Green%20Papers/Rebuilding-Security.ashx?dl=true>

<sup>2</sup> Public Accounts Committee: <http://www.parliament.uk/business/committees/committees-a-z/commons-select/public-accounts-committee/news/pac-7th-report/>

<sup>3</sup> OFGEM project Discovery: [http://www.ofgem.gov.uk/Media/keyspeeches/Documents1/sbgi\\_5-3-09.pdf](http://www.ofgem.gov.uk/Media/keyspeeches/Documents1/sbgi_5-3-09.pdf)

<sup>4</sup> Mott McDonald: <http://www.decc.gov.uk/assets/decc/statistics/projections/71-uk-electricity-generation-costs-update-.pdf>

<sup>5</sup> Parsons Brinckerhoff <http://www.pbworld.co.uk/index.php?doc=7&aid=126>

<sup>6</sup> Policy Exchange: <http://www.policyexchange.org.uk/publications/publication.cgi?id=197>

<sup>7</sup> Centre Forum: [http://www.centreforum.org/index.php?option=com\\_content&view=article&id=234:green-growth&catid=38:publications&Itemid=56](http://www.centreforum.org/index.php?option=com_content&view=article&id=234:green-growth&catid=38:publications&Itemid=56)

<sup>8</sup> German Agency for Renewable Energy (this is residential rather than large-scale) [http://www.unendlich-viel-energie.de/uploads/media/Kostenentwicklung-Photovoltaik\\_01.jpg](http://www.unendlich-viel-energie.de/uploads/media/Kostenentwicklung-Photovoltaik_01.jpg)

<sup>9</sup> [http://www.oup.com/uk/orc/bin/9780199286416/01student/interactive/lipsey\\_extra\\_ch03/page\\_01.htm](http://www.oup.com/uk/orc/bin/9780199286416/01student/interactive/lipsey_extra_ch03/page_01.htm)

<sup>10</sup> <http://www.intel.com/technology/mooreslaw/>

<sup>11</sup> German Agency for Renewable Energy (this is residential rather than large-scale) [http://www.unendlich-viel-energie.de/uploads/media/Kostenentwicklung-Photovoltaik\\_01.jpg](http://www.unendlich-viel-energie.de/uploads/media/Kostenentwicklung-Photovoltaik_01.jpg)

<sup>12</sup> <http://www.decc.gov.uk/assets/decc/statistics/publications/prices/1085-qepdec10.pdf>

<sup>13</sup> <http://www.bp.com/sectiongenericarticle.do?categoryId=9019305&contentId=7035199>

<sup>14</sup> Global overview on Grid Parity Dynamics Ch. Breyer and A. Gerlach [http://www.q-cells.com/medien/presse/publikationen/downloads/6CV.4.11\\_Breyer\\_GlobalGrid-Parity\\_paper\\_25thPVSEC\\_final.pdf](http://www.q-cells.com/medien/presse/publikationen/downloads/6CV.4.11_Breyer_GlobalGrid-Parity_paper_25thPVSEC_final.pdf)

<sup>15</sup> <http://www.decc.gov.uk/assets/decc/consultations/emr/1041-electricity-market-reform-condoc.pdf>

<sup>16</sup> [http://www.epia.org/index.php?eID=tx\\_nawsecuredl&u=0&file=fileadmin/EPIA\\_docs/documents/Solar\\_Generation\\_6\\_2011\\_Full\\_report\\_Final.pdf&t=1298913148&hash=a59eb09734fad0374b386dfcb68d349a](http://www.epia.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/EPIA_docs/documents/Solar_Generation_6_2011_Full_report_Final.pdf&t=1298913148&hash=a59eb09734fad0374b386dfcb68d349a)

<sup>17</sup> <http://webarchive.nationalarchives.gov.uk/+http://www.berr.gov.uk/files/file51142.pdf>

<sup>18</sup> <http://www.pyresources.com/en/history.php>

<sup>19</sup> <http://sharp-solar.com/history/index.html>

<sup>20</sup> <http://www.bwea.com/pdf/offshore/movingup.pdf>

<sup>21</sup> <http://www.bwea.com/pdf/publications/ChartingtheRightCourse.pdf>

<sup>22</sup> <http://email-emeia.ey-vx.com/exchange-sites/732/5502/february-2011/country-attractiveness-indices-28.asp?intEmailHistoryId=1712325&intEmailListId=1794&intEmailId=1610244>

<sup>23</sup> [http://www.decc.gov.uk/en/content/cms/news/fits\\_article/fits\\_article.aspx](http://www.decc.gov.uk/en/content/cms/news/fits_article/fits_article.aspx)

<sup>24</sup> <http://www.hm-treasury.gov.uk/d/nationalinfrastructureplan251010.pdf>

<sup>25</sup> <http://www.british-energy.com/pagetable.php?pid=96>

<sup>26</sup> <http://www.bwea.com/pdf/publications/CapReport.pdf>

<sup>27</sup> <http://www.bwea.com/pdf/Round3Briefing.pdf>

<sup>28</sup> 7.7 GW installed in Germany in 2010

[http://www.bundesnetzagentur.de/cae/servlet/contentblob/161274/publicationFile/8924/PVLeistungMonat\\_2009\\_2010pdf.pdf](http://www.bundesnetzagentur.de/cae/servlet/contentblob/161274/publicationFile/8924/PVLeistungMonat_2009_2010pdf.pdf)

<sup>29</sup> Digest of United Kingdom energy statistics 2005

<http://webarchive.nationalarchives.gov.uk/+http://www.berr.gov.uk/energy/statistics/publications/dukes/2005/page19311.html>

<sup>30</sup> [http://www.juwi.com/press\\_events/press/archive/detail/juwi\\_solar\\_and\\_miasole\\_sign\\_600\\_mw\\_long\\_term\\_framework\\_agreement-2.html](http://www.juwi.com/press_events/press/archive/detail/juwi_solar_and_miasole_sign_600_mw_long_term_framework_agreement-2.html)

<sup>31</sup> <http://www.ey.com/UK/en/Newsroom/News-releases/Power---11-01-21---Confidence-in-UK-cleantech-sector-falters>