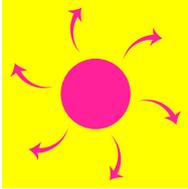
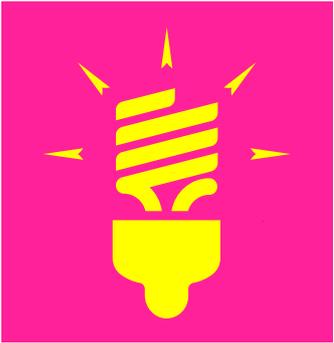


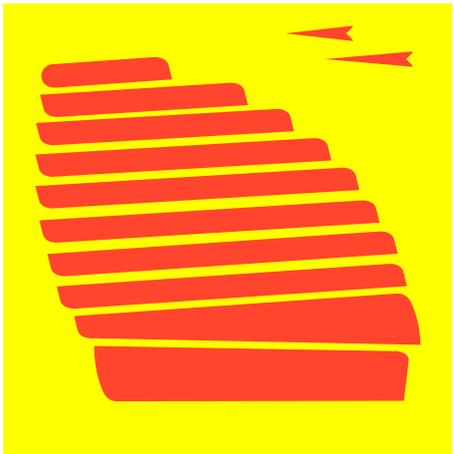
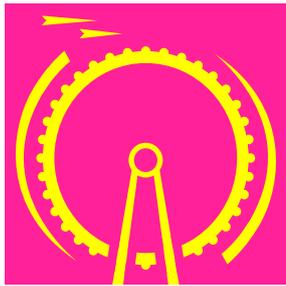
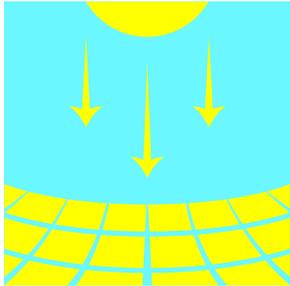
# LONDON



# CAN'T WAIT



# FOR SOLAR



How the new Mayor of  
London can start a Solar  
Revolution in 2016



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## FOREWORD

London is failing on solar, risking its decentralised energy and climate targets. The new Mayor can change the capital's poor performance record, and ensure the future is bright for solar in the city.

London is a world leader in many arenas but when it comes to solar power it is trailing behind all other UK towns and cities. Despite ambitions to build energy resilience and cut emissions, barely any of London's electricity is currently produced by photovoltaics. By exploiting London's immense amounts of roof space, this could easily change. But strong leadership on solar is lacking, and the capital has been overtaken by every other big British city.

Solar power will be a crucial part of the world's future energy mix; it is already the runaway success story of 21st-century electricity generation. Prices have fallen by a staggering 80 per cent in less than a decade, while jobs and investment in the solar industry are soaring globally. Towns and cities across the world are actively embracing solar power, along with the environmental, economic and social benefits it brings.

From suitable rooftops to first class business know-how and financing, London has everything it needs to unleash a solar revolution that can create jobs, cut bills and slash emissions. Recent cuts in central government support for renewables could hold the UK solar industry back, which is why it's more important than ever for London to step up and lead the way. What the capital is crying out for is a solar champion, someone who provides leadership and practical support. The election of a new Mayor represents a significant opportunity to transform London into a solar city.

Turning our houses, businesses, schools and hospitals into power hubs will provide cheap, safe, clean energy for hundreds of thousands of Londoners. To do this, the future Mayor of London needs to provide strategic policy direction, and use convening and planning powers to support solar projects. The Mayor needs to offer staff resources and project advice to solar projects, and lobby for stable subsidies, including offering short-term financial support in the shape of grants, loans and, potentially, an innovative London Feed in Tariff, which will all aid the smooth transition to subsidy-free solar. While the price of photovoltaics is projected to fall, there remains a need for the Mayor to stimulate investment in London solar projects across all sectors.

Solar should become a central way for London to achieve its decentralised energy and climate goals. We're calling on the future Mayor to establish a dedicated Solar Taskforce and commit to a ten-fold increase in solar capacity from today's levels, setting a solar target of at least 750MW, to be met by 2025. London needs to act fast – that's why *London Can't Wait for Solar* outlines in detail how this ambitious but essential solar target can be met.

*Greenpeace, February 2016*

## EXECUTIVE SUMMARY

London has a huge problem with solar. Out of all the major UK cities, it sits right at the bottom of the pile when it comes to generating solar power. At the end of 2015, only 0.5 per cent of London's 3.4 million households had any solar photovoltaic (PV) capacity installed.

But London has enormous solar potential. The capital could be producing up to 9GW of its own electricity, that's almost 20 per cent of what the city currently consumes. London has extensive roof space to host solar, while Londoners are increasingly interested in creating and supporting local energy projects.

While targets to decentralise energy and reduce emissions are in place, so far solar has only had a minor role in helping London to decarbonise. A range of carbon reduction and energy programmes have been put in place by the current Mayor of London, but they are delivering a pitiful amount of solar capacity for the capital.

Strong leadership and strategic policy making could see the future Mayor of London significantly increase the capital's solar capacity. As well as adding solar to existing energy programmes that currently exclude it, the new Mayor could actively explore new ways to increase the uptake of photovoltaics.

To ensure London's energy future is bright, the future Mayor of London must

- **Set an ambitious solar target** – commit to increase solar PV capacity to at least 750MW by 2025.
- **Establish a London Solar Taskforce** – develop a London Solar Action Plan by December 2016.
- **Champion solar** – London needs a strong leader to promote solar uptake across the capital.
- **Identify suitable solar sites** – the Greater London Authority (GLA) estate is a massive untapped source of solar energy.
- **Make solar part of planning** – require developers to explore solar; create a London Solar Map.
- **Support community energy** – identify suitable sites that could be loaned to solar projects.
- **Make solar central to 'License Lite'** – actively encourage London solar projects to tender.
- **Fund growth** – to stimulate investment in London solar across all sectors, where action could include:
  - introducing a London Feed in Tariff ;
  - creating a limited, upfront London Solar Grant;
  - releasing a green bond specifically to fund London solar;
  - supporting solar through phase II of the London Green Fund;
  - de-risking London's community energy solar projects;
  - exploring how zero carbon development offset funds could stimulate solar;
  - using the Green Investment Bank to fund London's larger solar schemes;
  - pushing the London Pension Fund Authority to invest in London solar;
  - identifying areas in London's electricity network where solar could be incentivised under the new 'RIIO' (Revenue = Incentives + Innovation + Outputs) framework;
  - using the London Rental Standard to support landlords to invest in solar.

By ensuring solar is a key part of an ambitious London Energy Plan, the future Mayor can ensure London fully exploits the environmental, economic and social benefits that the wider use of solar power can bring.

## INTRODUCTION

Right now, London is missing out while the rest of the world embraces a solar revolution. Despite extensive roof space to host solar photovoltaics, increasing awareness of environmental issues and higher-than-average levels of household disposable income, London is by far the worst performing region in the UK when it comes to installed solar capacity.

But why is London being left behind like this? A range of London-specific challenges are often cited to explain the capital's incredibly low levels of solar in comparison to other UK cities, including: a greater proportion of Londoners live in flats rather than houses, many more people rent rather than own, and there is a perceived hassle factor associated with installing photovoltaics in a busy capital city.

The London Assembly Environment Committee undertook a study of these issues in 2015 and concluded that, while these factors do represent challenges that could slow the uptake of solar in London, they did 'not fully explain why London has the lowest uptake [of solar] of any region in mainland Britain'<sup>1</sup>.

The current Mayor of London has put targets in place for the capital to generate 25 per cent of its heat and power needs from local, decentralised energy sources by 2025. While a wide range of innovative carbon reduction and energy programmes have been initiated by the Mayor over the past decade, solar has been a largely cursory consideration until very recently.

In fact, leadership on solar has been weak, if not completely lacking. The government's former Minister for Renewable Energy neatly summarised the situation, stating that, on solar, the 'record in London over the last five years is crap'.<sup>2</sup>

The Department for Energy and Climate Change's recent, drastic cuts to the Feed in Tariff support framework are likely to cause significant setbacks across the UK solar industry, only exacerbating the challenges solar power faces in the capital.

In this context, the need for strong leadership on solar in London couldn't be clearer. Many solar initiatives have been rolled out across the UK and strong leadership has been central to their success. The future Mayor of London has a crucial role to play in ensuring that solar, within an ambitious integrated London Energy Plan, can help ensure the city's climate and decentralised energy targets are met.

This report reviews London's progress on solar to date. It then sets out a series of key recommendations that a new Mayor could embrace to catalyse the growth of solar in London up to 2025.

## CHAPTER 1: WHY LONDON IS BEING LEFT BEHIND ON SOLAR

### CHAPTER SUMMARY

- London is lagging well behind the rest of the UK on solar.
- While there are installation challenges, they don't fully account for low take-up.
- Without action, London risks its already low proportion of solar generation dropping even further as electricity use increases.

The introduction of the Feed in Tariff (FIT) support mechanism for solar electricity in 2010 has been a powerful driver for the installation of photovoltaic (PV) systems. In just over five years, more than 700,000 solar arrays have been installed across the UK.<sup>3</sup>

But regional variations in the installation of solar have emerged, with London trailing far behind all other UK towns and cities. This is despite strong support from the Mayor for London for the capital to generate 25 per cent of its heat and power from local, decentralised energy sources by 2025.

London has approximately 18,000 PV systems in place (domestic and non-domestic), which represent 2.6 per cent of the UK total. The total number of domestic PV systems in London stood at 17,359 in December 2015, with an installed electrical capacity of 54MW.<sup>4</sup> The capital has 3.4 million homes,<sup>5</sup> which means just 0.5 per cent of them are using solar.

Many Londoners live in flats, which is often cited as a key reason for London's lacklustre take-up of solar technology. Indeed, flats make up just over half of London's accommodation, compared to less than 20 per cent in the rest of the country.<sup>6</sup> But, of London's homes that are not flats, only one per cent currently use PV. This means there is significant potential for much more domestic solar in the capital.

Data on solar electricity generated (GWh) by London's PV systems is only available for 2014,<sup>7</sup> but it shows that 53.3GWh of electricity was produced that year, representing just 1.3 per cent of the UK's total solar output and, more importantly, only 0.13 per cent of London's electricity use that year.

After a period of falling electricity consumption, London's electricity use is now growing.<sup>i</sup> London consumes 14 per cent of electricity generated nationally. Looking to the future, the Mayor's *London Infrastructure Plan* is currently working on the assumption that, 'with an expected shift away from gas towards electricity, this is likely to mean a doubling of demand for electricity [in London] by 2050'.<sup>8</sup> Increasing electricity consumption places additional emphasis on the need for more solar, in terms of meeting the Mayor's decentralised energy and climate targets.

London's slow take up of solar in comparison with other UK regions is highlighted by Ofgem's quarterly regional FIT data, as shown in Figure 1.<sup>9</sup>

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<sup>i</sup> London's electricity consumption decreased by 0.1 per cent over the period 2005 to 2014. However, electricity use increased 2.3 per cent between 2013 and 2014, and has been steadily growing since 2011. Chart 1, p8, *Sub-national electricity and gas consumption summary report 2014*, DECC, 22 December 2015.

**FIGURE 1**

Regional PV capacity (MW) growth under FITs

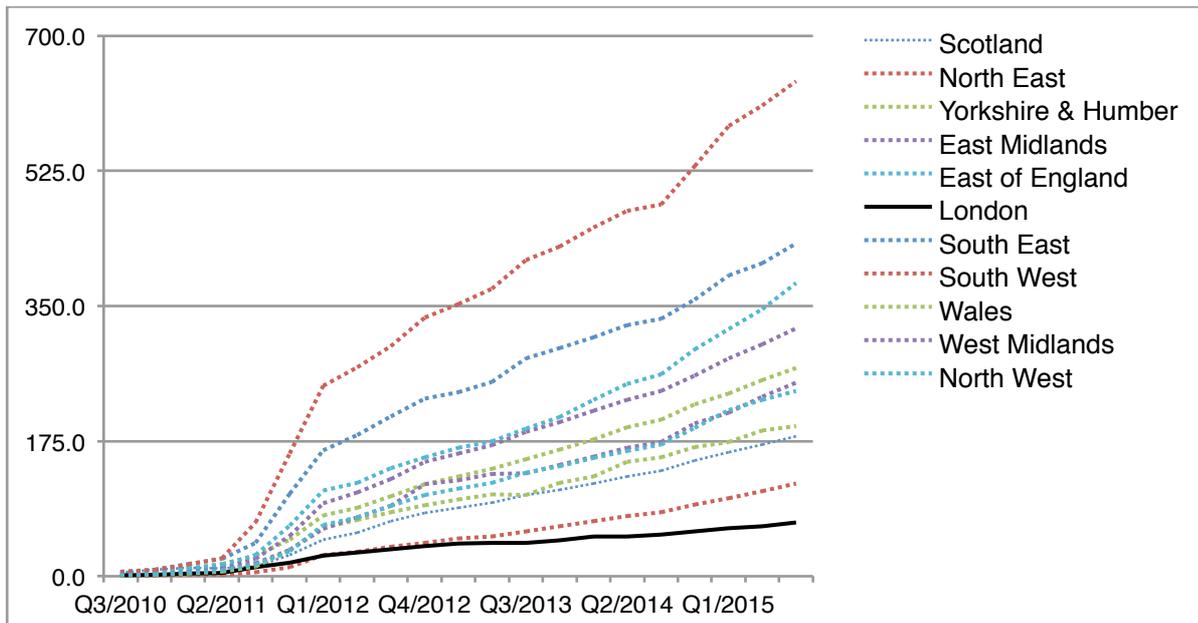


Table 1 contrasts each UK region's solar generation output – Renewables Obligation (RO) and FIT installations – against their electricity use, while Table 2 focuses in on London.

**TABLE 1**

Solar generation output against electricity use by UK region

Region	Total PV generation capacity 2014 /GWh	Regional electricity consumption 2014 /GWh	PV generation as share of region's electricity consumption /2014
South West	1,139.4	25,262	4.51%
East of England	665.8	26,969	2.47%
South East	611.1	38,183	1.60%
East Midlands	353.9	21,479	1.65%
Wales	234.3	16,451	1.42%
Yorkshire and The Humber	196.0	23,940	0.82%
West Midlands	181.8	25,568	0.71%
North East	78.6	11,575	0.68%
Northern Ireland	45.7	7,807	0.59%
North West	167.1	32,611	0.51%
Scotland	131.7	26,831	0.49%

London	53.3	41,402	0.13%
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**TABLE 2**

The current role of solar PV in London

		London as percentage of UK
London electricity consumption 2014	41,402 GWh	14.0%
Number of homes in London	3,380,983	12.9%
Number of PV installations in London supported through FITs (domestic + non domestic) December 2015	18,291	2.6%
PV electrical capacity of FIT systems (domestic + non domestic) December 2015	70.825 MW	2.1%
PV electricity generation output (FIT + RO supported PV projects) December 2014	53.3 GWh	1.3%

Tables 3 and 4 look at the share of PV installations on a borough by borough basis, separating out inner and outer London boroughs.

**TABLE 3**Inner London boroughs' domestic PV installations<sup>10</sup>

London borough	Estimated number of households	Number of domestic PV installations	Percentage of households in borough with PV
Lewisham	121,134	537	0.44%
Greenwich	105,265	420	0.40%
Wandsworth	132,195	385	0.29%
Lambeth	135,720	378	0.28%
Islington	98,153	268	0.27%
Hackney	106,439	276	0.26%
Camden	100,617	214	0.21%
City of London	4,602	9	0.20%
Hammersmith and Fulham	80,227	151	0.19%
Westminster	108,785	195	0.18%

Kensington and Chelsea	77,497	84	0.11%
Tower Hamlets	108,440	112	0.10%
Total Inner London	1,179,074	3,029	Average Percentage
			0.24%

**TABLE 4**Outer London boroughs' domestic PV installations<sup>11</sup>

London Borough	Estimated number of households	Number of domestic PV installations	Percentage of households in borough with PV
Waltham Forest	100,319	1,298	1.29%
Havering	99,103	1,169	1.18%
Barking and Dagenham	72,422	717	0.99%
Bromley	133,988	1,298	0.97%
Bexley	94,148	788	0.84%
Sutton	81,049	627	0.77%
Croydon	149,910	1,134	0.76%
Kingston upon Thames	66,017	494	0.75%
Ealing	127,464	930	0.73%
Richmond upon Thames	81,612	580	0.71%
Redbridge	103,389	614	0.59%
Harrow	87,309	509	0.58%
Merton	81,353	474	0.58%
Hillingdon	104,609	604	0.58%
Hounslow	99,535	504	0.51%
Barnet	141,894	640	0.45%
Enfield	124,300	531	0.43%
Brent	113,946	443	0.39%
Haringey	106,753	385	0.36%
Wandsworth	132,195	385	0.29%
Newham	107,576	309	0.29%
	2,208,891	14,433	Average Percentage

Total Outer London			0.67%
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The data highlights that:

- At the end of December 2015, only 0.5 per cent of all London households had some solar PV capacity installed.
- This decreases to 0.24 per cent for inner London boroughs, and increases to 0.67 per cent for outer London boroughs.
- The London Borough (LB) of Waltham Forest has by far the highest level of domestic PV installation at 1.29 per cent. The higher levels observed are a result of council funding for 1,000 PV installations on Ascham Homes domestic properties in 2012/13.<sup>ii</sup>
- Of the outer London boroughs, LB of Havering (1.18 per cent), LB of Barking and Dagenham (0.99 per cent) and LB of Bromley (0.97 per cent) have the next highest percentage levels of installation.

Table 5 compares London installation levels to the percentage of domestic PV installed in the Core Cities group.<sup>iii</sup>

**TABLE 5**

Domestic PV installation rate in London compared to other core cities

Local Authority	Estimated number of households	Number of domestic PV installations	Percentage of households with PV
Nottingham	127,452	4,514	3.54%
Manchester	209,925	4,926	2.35%
Sheffield	233,159	4,587	1.97%
Cardiff	146,075	2,871	1.97%
Bristol, City of	185,618	3,273	1.76%
Leeds	324,974	5,343	1.64%
Newcastle upon Tyne	118,484	1,913	1.61%
Birmingham	418,845	5,551	1.33%
Liverpool	209,492	2,535	1.21%
Glasgow City	286,792	1,884	0.66%
<b>London</b>	<b>3,380,983</b>	<b>17,359</b>	<b>0.51%</b>

<sup>ii</sup> This award-winning scheme provides residents with energy bill savings of around £145/year and an additional income to the council of between £8m and £10m over 25 years, which will be reinvested into Ascham Homes' work in the local community. See following press release for further details: <http://www.utilita.co.uk/news/detail/ascham-homes-win-best-green-initiative-in-this-year%E2%80%99s-nfa-awards-sponsored-by-utilita-energy>

<sup>iii</sup> The 10 Core Cities are the economically largest areas in England, Scotland and Wales outside of London.

Points to note:

- All Core Cities have a higher percentage of households with PV installed than London.
- On average, the Core Cities have a domestic PV installation rate three times higher than London – 1.8 per cent compared to London's 0.51 per cent.
- Eight out of ten Core Cities have higher levels of domestic PV installation than London's outer boroughs.

A number of unique challenges have been cited for London's poor progress on solar when compared to other cities and regions across the UK. The London Assembly Environment Committee undertook an analysis of these factors in their 2015 inquiry into solar, publishing a report in October 2015.<sup>12</sup>

Issues highlighted to the Committee during the inquiry included:

- London's 'cityscape of thin, tall buildings, as well as terraced housing with little roof space;
- a lower proportion of owner-occupied homes, with more than 50 per cent of households renting and, therefore, a more transient population;
- a lower appetite for solar technologies, and a lower level of interest among householders for investing in renewable energy'.<sup>13</sup>

The Committee concluded that, although these things were challenges, they did 'not fully explain why London has the lowest uptake [of solar] of any region in mainland Britain' and that, 'Overcoming these barriers will require determined leadership and support from the Mayor and GLA over the years to come. The focus should also be on reliable financial support programmes, targeted policy and performance approaches, and London-specific resources for information and advice.'<sup>14</sup>

London hasn't benefitted as readily from the government's FIT and RO policies, which have been more attractive to developers of larger-scale, multi-megawatt 'solar farm' schemes rather than PV projects of a size better suited to urban rooftops. As a consequence, while commercial and industrial roofs dominate the solar market in Europe, UK commercial roofs account for only five per cent of all solar deployment to date.<sup>15</sup>

Despite London's slow progress, a small number of excellent and diverse PV projects have emerged in the capital, which help illustrate how London could capture the full potential of solar with the right support in place.

## CASE STUDIES

### COMMUNITY PV

Repowering London<sup>16</sup> has facilitated the development of three community-owned projects in Brixton, south London. Brixton Energy Solar 1 (BES1) attracted 103 investors who mostly live in Lambeth, raising £58,000 in less than a month to fund the installation of a 37kW PV system on Elmore House on the Loughborough Estate, which began operation in March 2012. BES2's share offer raised £61,000 for a 45kW system also installed on the Loughborough Estate, while BES3 saw the installation of a 52kW system on the roofs of the Roupell Park Estate, Brixton.

Part of the income generated is being reinvested in a Community Energy Efficiency Fund directed towards energy-saving improvements in the local area, such as home energy audits and retrofits. Working with Hackney Council and the local community, Repowering London has also helped raise

£149,500 through a share offer for the development of a 102kW PV array on Banister House in Hackney, which started operating in October 2015.<sup>17</sup>

### **COMMERCIAL RETROFIT PV**

Completed in June 2015, a 750kW rooftop array consisting of 2,500 solar panels has been installed on the roof of the Integrated Waste Management Facility, close to the Old Kent Road in Southwark. It is operated by Veolia in partnership with Southwark Council.<sup>18</sup>

One of the largest Local Authority solar PV projects to date has been developed by LB Hounslow at the Western International Market in Southall. The 6,000 panel rooftop array has a capacity of 1.68MW and includes battery storage technology. Approximately 80 per cent of the power produced is consumed onsite by this large wholesale fruit, vegetable and horticultural market, helping to reduce the Local Authority's carbon emissions by 791 tonnes every year.<sup>19</sup>

### **SOCIAL HOUSING PV**

As part of a major retrofit on the Edward Woods Estate in Hammersmith,<sup>20</sup> three tower blocks have been clad in solar PV on their external facades, generating around 82,000kWh of electricity a year. A 50kW solar PV system was also added to the facade of the 23-storey Ferrier Point tower block in central London during a refurbishment.

## CHAPTER 2: HOW TO UNLOCK LONDON'S SOLAR POTENTIAL

### CHAPTER SUMMARY

- Currently the Mayor is on course to miss the 2015 target for decentralised energy generation, and the number of future projects in the pipeline is far short of what's needed by 2025.
- A major *Decentralised Energy Capacity Study*, published by the Mayor in 2011, showed that solar PV under a business-as-usual scenario has the potential to supply up to 2GW of London's electricity by 2031. Additional research suggests the technical potential could actually be as high as 9GW, which represents almost 20 per cent of the capital's current consumption.
- Issues such as air quality and availability of space are limiting other decentralised energy technologies like biomass, wind and heat pumps. Solar needs to be made a priority if London is to achieve its target of 25 per cent decentralised energy by 2025.
- The Mayor has commissioned work to update PV scenarios as part of a forthcoming *London Energy Plan*. Progress on the installation of solar in other UK regions indicates London has significant untapped potential for solar.

### THE LONDON DECENTRALISED ENERGY CAPACITY STUDY

Solar was one of the technologies assessed in a major *Decentralised Energy Capacity Study* for London, funded by the Department of Energy and Climate Change (DECC). The study was part of a review of the renewable energy potential of the different UK regions and was published by the GLA in 2011.<sup>21</sup>

DECC provided a guideline methodology as to how these studies should estimate the potential of renewable energy in their area.<sup>22</sup> However, the London report also developed an additional 'tailored methodology' to take into account London's unique characteristics. The subsequent report provided results on the basis of both of these methodologies, to determine opportunities for low carbon and renewable, decentralised energy generation in the capital.

On solar, DECC's methodology adopted an approach whereby a fixed proportion of different property types were taken as being suitable for PV, and a fixed generation capacity was applied to each property type. The GLA study stated that, DECC's 'methodology's assumption of only 25 per cent of homes being suitable for PV, with PV arrays of a fixed 2kW peak rated capacity per home, substantially underestimates the housing roof area that could in fact be available for PV installations. The analysis also suggests that the DECC methodology underestimates the available roof area of non-domestic buildings in London by limiting array size.<sup>123</sup>

For the tailored methodology, a more detailed approach was taken, using Office for National Statistics data on domestic and non-domestic buildings in the capital to help estimate London's roof space. The tailored methodology also differentiated between pitched and flat roofs, assuming that only 25 per cent of existing domestic roofs, 40 per cent of commercial roofs and 80 per cent of industrial roofs are suitable for PV. Additionally, the technical potential only included south facing parts of an individual roof and further constraints were also then applied, such as the impact of overshadowing and competing roof space uses. Finally, consideration of London borough conservation areas was also taken into account when calculating the overall potential.<sup>iv</sup>

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<sup>iv</sup> Recent work by the GLA's RE:NEW team adopt similar constraint levels with desktop PV feasibility studies assuming 50 per cent of London roofs (across all locations/typologies) ruled out as unsuitable for PV due to one or a combination of factors and the remaining 50 per cent giving a varied performance, with some roofs failing at site survey stage due to issues with electrical connections, roof structure or accessibility. *GLA response to London Assembly Solar Investigation*, London Assembly, September 2015.

An assessment of the use of PV on new developments up to 2031 was also made using data from the *Strategic Housing Land Availability Assessment for London*, alongside projections for non-domestic development, which together provided the estimated growth for both types of new build.

Under the tailored methodology, the potential in new buildings was estimated as per the DECC methodology, where 50 per cent of all new buildings are assumed to be suitable for PV. Conservative system capacities of 2kW and 5kW PV systems for domestic and non-domestic properties respectively were assumed. No account was made for increases in PV system efficiency.

There was a considerable difference in the estimates of solar PV potential between the two methodologies and, despite taking additional steps to take into account possible constraints on deployment, the London tailored estimate was more than four times higher than that calculated through DECC's methodology.

The tailored route suggested solar PV had the greatest renewable electricity potential of all the technologies assessed, with the ability to supply up to almost 20 per cent of London's electricity (based on 2008 demand).

The PV results from this detailed London *Decentralised Energy Capacity Study* are summarised in Table 6.

**TABLE 6**

London PV technical potential under the DECC methodology and the London 'tailored' methodology

	London PV Technical Potential			
	Installed capacity/MW	Electricity generated (GWh)	CO <sub>2</sub> savings (Mt pa)	Percentage of London's electricity demand 2008
DECC Methodology	2,108	1,744	0.7	4.4%
London 'Tailored Methodology'	9,247	7,647	3.0	19.2%

From *Decentralised Energy Capacity Study, Phase 1 Technical Assessment*, GLA, October 2011

There are a number of key points about solar that come out of the 2011 *Decentralised Energy Capacity Study*.

- Even when taking the lowest estimate from the deployment potential study, the business-as-usual scenario still projects potentially 2GW (i.e. 1,991MW) of PV capacity operating in London by 2031. Although this represents less than one quarter of the technical potential, it is still equivalent to more than 25 times the current London PV capacity.
- The study highlights that, if we are to meet the Mayor's decentralised energy and climate targets by 2025, all renewable and low carbon technologies will need to be exploited. Although solar typically falls behind renewable technologies such as wind and biomass in reducing CO<sub>2</sub> emissions per unit of cost, progress on the installation of wind and biomass in London is highly

challenging due to space, visual impact and air pollution issues. Therefore, solar PV remains one of the single most cost-effective ways of reducing London's CO<sub>2</sub> emissions and energy costs.

- The assumptions used for PV capacity related to new build domestic and non-domestic buildings are conservative at 2kW and 5kW respectively, which under-represents the average size of PV installation in both sectors. It is likely that the capacity of PV installs across both sectors will increase, especially as the cost of solar has decreased and is projected to fall further.
- For new build estimates to 2031, the study used the *London Strategic Housing Land Availability Assessment and Housing Capacity Study*, 2009. Since then, 2011 census data used to inform a revised 2013 housing assessment<sup>24</sup> has found that London is growing at a faster rate than anticipated, such that the housing need in London is projected to be at least 49,000 homes a year, a significant increase above the 32,000 target estimated in 2011. As Mayoral candidates for the 2016 election have all pledged to increase London's housing build, and with London's zero carbon planning requirements still in place,<sup>25</sup> it is likely there will be increased demand for solar in the new build sector.
- The report only appears to consider conventional PV systems, i.e. those just able to work efficiently on south-facing, sloped roofs. New technologies based around thin-film PV will allow solar power to be captured on a variety of surfaces, such as vertical walls, including those that are not south facing. Significant cost reductions around building integrated PV (BIPV) products are also being made, allowing for less visually intrusive solar systems to be installed. PV is also now being installed in a variety of other structures, ranging from carports to canopies and conservatories. None of these areas are considered in the GLA's study.
- Despite the significant improvements in panel outputs regularly being observed in the solar market,<sup>26</sup> no allowances are made for future efficiency increases in PV technology.

Significant work has been undertaken by London government and London boroughs to support the uptake of decentralised energy, however it is clear there remains much to do if London is to take greater control over its energy needs and achieve its decentralised energy goals. The last assessment of progress against the Mayor's 2025 decentralised energy target by the London Assembly stated, 'The Mayor expects to miss his milestone for decentralised energy generation for 2015. The pipeline of future projects is far short of the delivery needed by 2025.'<sup>27</sup>

Challenges to the development of wind and biomass projects in London place a greater emphasis on those technologies more suited to an urban environment. Alongside heat-led generation solutions such as Combined Heat and Power (CHP) and district heating, maximising the use of photovoltaics will be essential if London's climate change goals are to be achieved.

## THE LONDON ENERGY PLAN

In July 2014 the Mayor announced plans to establish a new *London Infrastructure Plan 2050*. He highlighted that an urgent investment programme for new infrastructure was needed if London was to continue to operate efficiently in response to a 37 per cent forecasted rise in the capital's population.<sup>28</sup>

The *London Infrastructure Plan 2050* consultation paper<sup>29</sup> raised concerns about future energy provision, suggesting that London could be facing an energy crisis in the near future as demand begins to outstrip supply. It also suggested that more local energy production will be needed to provide greater resilience.

Modelling work undertaken for the consultation paper suggested an incredible £148 billion of capital expenditure is required on energy infrastructure in London up to 2050.<sup>30</sup> This equates to an approximate annual spend of £4 billion a year for the next 35 years. In response to this, the GLA is now in the process of developing an energy plan to 2050 based on the *London Infrastructure Plan* recommendations.<sup>31</sup>

At the time of writing this paper, the GLA was preparing a series of energy scenarios and spatial maps of London's energy supply and demand for 2025 and 2050. The scenarios will include projections of heat and electricity infrastructure, retrofitting of the built environment to reduce demand, and use of electric vehicles. It will also consider the potential of 'smart' energy demand shifting and storage options.

The GLA will also be developing a model to estimate the potential for solar PV up to 2050,<sup>32</sup> and to provide an estimate of solar PV's contribution to the achievement of London's 2025 decentralised energy target.<sup>33</sup> We will review this research when it is published.

## CHAPTER 3: WHY LONDON NEEDS A SOLAR CHAMPION

### CHAPTER SUMMARY

- A wide range of innovative carbon reduction and energy programmes have been initiated by the GLA over the past decade, but solar has largely been left out until very recently.
- The future Mayor can increase the uptake of solar by: providing strategic policy direction and leadership; using planning powers; offering staff resources and project advice; and lobbying for stable subsidies and policy.
- Transport for London's extensive land and property holdings provide a significant opportunity to drive the use of solar, including supporting London's growing community energy sector.

The Mayor has little power over London's existing energy infrastructure, things like electricity and gas distribution networks, existing buildings' energy use or power stations. However, the planning process means the Mayor does have considerable influence over the energy strategies and standards adopted by new developments and housing projects supported by the Mayor's investment programmes. The Mayor also has power and influence over London's transport infrastructure.

The Mayor has a statutory duty<sup>34</sup> to produce a *Climate Change Mitigation and Energy Strategy* (CCMES), the latest version of which was published in 2011.<sup>35</sup> The strategy sets out a wide range of Mayoral programmes, including supporting the growth of lower carbon, decentralised energy systems, improving the energy efficiency of London's buildings, and reducing emissions from the transport sector. An annual report provides an update on the progress of these various programmes.<sup>36</sup>

The CCMES has no specific policies in place in relation to solar but does have policies in place to promote micro-generation through the Mayor's domestic and workplace retrofit programmes – policies 6 (RE:NEW) and 8 (RE:FIT) respectively. Policies 3, 4 and 5 of the strategy are related to identifying, delivering and enabling the growth of decentralised energy in London, but broadly in the context of supporting district heating projects.

The Mayor also has opportunities to drive environmental behaviour by engaging, coordinating and convening green initiatives in London and, most importantly, supporting best practice across the GLA group's extensive London estate,<sup>v</sup> including brownfield land owned by the Mayor. With an annual budget in excess of £16 billion,<sup>37</sup> the Mayor is able to fund specific programmes of activity – such as his existing RE:NEW, RE:FIT and decentralised energy programmes, as well as driving green behaviour through sustainable procurement.

There has been a strong push by some members of the London Assembly, especially the Green Party, for the Mayor to do more on solar. In a 2014 study,<sup>38</sup> Assembly Member Jenny Jones set out a series of actions the Mayor could undertake as part of a wider solar programme for London. Jenny Jones also proposed an amendment to the GLA's 2015/16 budget for the Mayor to fund a modest solar team in the GLA.<sup>39</sup>

The London Assembly Environment Committee recently undertook an inquiry into solar, publishing their findings in a report in September 2015.<sup>40</sup> But the current Mayor has largely dismissed calls to act on

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<sup>v</sup> The GLA's operates many hundreds of buildings across its five functional bodies comprised of the Mayor's Office for Policing and Crime (MOPAC); the Metropolitan Police Service (MPS); the London Fire and Emergency Planning Authority (LFEPA); Transport for London (TfL); the London Legacy Development Corporation (LLDC), and the new Old Oak Common and Park Royal Development Corporation (OPDC).

solar, instead responding that existing programmes such as RE:NEW and RE:FIT, and existing *London Plan* policies, are sufficient to the task.

Strong leadership and strategic policy making could see the future Mayor of London significantly increase the capital's solar capacity. There are a various schemes already in place that the new Mayor could exploit to champion solar solutions, including:

## THE LONDON PLAN

This is the Mayor's strategic spatial strategy for London. It specifies the use of renewable energy solutions on new developments as part of an energy and carbon hierarchy. An energy assessment is required for each planning application that is referred to the Mayor, setting out how *London Plan* energy policies will be met within the development. Specifically, applicants are required to set out how the proposals apply to the following hierarchy:

1. Be lean: use less energy.
2. Be clean: supply energy efficiently.
3. Be green: use renewable energy.<sup>41</sup>

Solar PV deployment has been supported in new developments as a result of the *London Plan's* carbon reduction requirements, which are set at a higher level than national building regulations. Since 2010, a total of 22MW of solar PV capacity has been committed across more than 350 large-scale developments in London. While PV has remained the most popular renewable energy technology used by developers, the Mayor has conceded that given 'typical timescales for build out of major developments, it is likely that the majority of developments considered since 2010 have not yet been completed', so little of this PV is operational yet.<sup>42</sup>

More solar is being promised on new developments in boroughs such as Barking and Dagenham, Greenwich and Croydon. This is likely due to the potential to incorporate higher volumes of PV on the lower-rise developments that are more typical in outer London boroughs.<sup>43</sup>

The Mayor has announced that the *London Plan* will maintain its requirement of a zero carbon target for new developments from 2016,<sup>44</sup> despite the Chancellor's recent decision to abandon the zero carbon standard and accompanying 'Allowable Solutions' offsetting policy.<sup>45</sup> London boroughs are already encouraged to establish 'offset funds' so developers can cover any shortfall in CO<sub>2</sub> savings not met onsite through cash payments or investing in a low carbon development elsewhere in the borough.

The Mayor's supplementary planning guidance on *Sustainable Design and Construction* states that, 'Boroughs may agree with a developer for the developer to directly offset any shortfall in carbon dioxide reductions from a scheme by installing a carbon dioxide saving project off site. Measures could include directly funding or installing community energy and retrofitting projects. For example, a developer could install photovoltaics on a nearby school.'<sup>46</sup>

While the *London Plan* requires boroughs to put this offsetting mechanism in place, the number that actually have is unclear. The GLA is currently reviewing this,<sup>47</sup> as without the mechanism in place, councils cannot require developers to make up any CO<sub>2</sub> emissions shortfall through a cash payment or the development of an offsite measure.<sup>48</sup>

The *London Plan* also includes opportunities for developers to work in partnership with community energy groups to drive solar through a commitment that states, 'The Mayor and Boroughs will also encourage community-led initiatives for renewables and low carbon energy and examine how they can

be supported through neighbourhood planning.<sup>49</sup> However, only one neighbourhood plan has been formally adopted to date in London.<sup>50</sup>

## RE:NEW

This is the Mayor's domestic energy efficiency programme. It was established in 2009 and has operated through several phases since then. The first two phases delivered retrofit measures via area-based projects across London. Local Authorities were given grants and a procurement framework to appoint delivery partners to install 'easy measures'<sup>vi</sup> in over 100,000 homes across London. Although the promotion of micro-generation technologies were a stated aim of the RE:NEW programme, as set out in the CCMES,<sup>51</sup> solar PV was not included as a measure that householders could explore using.

A revised Phase 3 of the RE:NEW programme has been in operation since 2013, which now provides expert guidance and support to housing providers to help get retrofit programmes up and running. RE:NEW established a specific solar work-stream in October 2014 to provide support to housing associations and Local Authorities to analyse the opportunity to install solar, including help with procurement, feasibility studies and investment modelling.

The government's FIT review has had a serious impact on these projects. The Mayor's response to DECC's FIT consultation paper stated that, 'the RE:NEW solar PV pipeline contained £7.3 million of projects. Since [the FIT Review consultation], £1.6 million worth of projects have been cancelled, £5.1 million remain in the pipeline but are at a high risk of either reduction or cancellation, and £600,000 are either already in contract or in procurement.'<sup>52</sup>

## RE:FIT

This is the Mayor's non-domestic retrofit programme. It offers support to London boroughs, schools, universities, hospitals, leisure centres and museums to implement retrofit projects and achieve large financial savings.<sup>53</sup> The RE:FIT programme procurement framework has supported a number of public sector organisations in the development of solar PV projects. These include one of London's largest solar arrays (1.68MW), installed by the London borough of Hounslow.<sup>54</sup>

One of the priorities of the current 2015/16 phase of the programme is to support public sector organisations, including schools, to install solar PV.<sup>55</sup> The Mayor has highlighted in his response to DECC's FIT review that, at the time the consultation was published, RE:FIT had one solar project well advanced and a £2 million PV project in the pipeline. As a result of the proposed FIT changes, this second project is now being reconsidered and, depending upon the payback period, may not go ahead.

Ministers in central government have indicated a shift in support is needed to increase the deployment of solar on commercial and industrial roofs.<sup>56</sup> A 1GW solar target on government estate has also been put in place in DECC's *Solar Strategy*,<sup>57</sup> although limited progress appears to have been made.<sup>58</sup>

## DECENTRALISED ENERGY

The Mayor's Decentralised Energy Project Delivery Unit (DEPDU) has been working to drive investment in large-scale decentralised energy, predominantly supporting gas-fired CHP and district heating projects. The Mayor's work through DEPDU has helped produce a series of heat capacity studies for

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<sup>vi</sup> Such as low energy light bulbs, radiator panels, draught proofing and hot water tank jackets.

each London borough,<sup>59</sup> a London Heat Map,<sup>60</sup> as well as tailored technical and project management support to boroughs for over 20 CHP and district heating projects.

But solar PV decentralised energy projects are not supported through DEPDU, the Mayor explaining the reason for this as follows:

My Decentralised Energy (DE) Capacity Study (2011) suggested that only about 5 per cent of London's energy could be generated from PV by 2031. The same study suggested that 22 per cent of London's energy could be supplied from larger Decentralised Energy schemes linked to heat networks and therefore I am currently focusing my resources in this area.<sup>61</sup>

The contribution of solar PV should be viewed against London's electricity use, rather than energy use and, as mentioned in the previous section, the GLA has identified up to 2GW of deployment capacity of solar PV in London by 2031. In addition, as mentioned on page 6, it is London's electricity consumption that is growing, and further action needs to be taken to help decarbonise.

The Mayor has recently approved further funding for this programme,<sup>62</sup> which will operate from February 2016 to July 2019, and will continue to support decentralised energy networks through activities similar to those previously undertaken.

### **TRANSPORT FOR LONDON (TfL)**

Despite being one of London's largest landowners, TfL has just 11 solar PV arrays with an installed capacity of 250kW.<sup>63</sup> TfL has typically looked at the potential of PV only in relation to new buildings or where existing buildings are being retrofitted, rather than evaluating the full potential of solar, which could in fact be exploited across many of its building and land holdings.

TfL has only recently started to examine the potential for PV across its existing roof spaces, partly in response to DECC's 1GW government estate target,<sup>64</sup> including looking at opportunities on sites such as car parks it owns or operates.<sup>65</sup> And, following an innovative study conducted by Network Rail,<sup>66</sup> TfL has stated it will examine the potential for trackside solar PV installations.<sup>67</sup>

TfL owns 5,700 acres of land across the capital including buildings, land attached to Tube stations, railways and highways.<sup>68</sup> TfL is now strengthening its strategy to maximise the commercial potential of its building assets and land. It is looking to increase commercial revenue from stations, from leasing more space for retail use to getting more directly involved in property development. TfL admits much of its brownfield land may be challenging to develop for housing or commercial development, but this new drive to realise the financial potential of the organisation's assets could and should extend to examining the potential for developing new low carbon and renewable generation capacity.

### **LONDON GREEN FUND (LGF)**

This was launched by the Mayor in October 2009 and is a £120 million fund set up to invest in schemes that cut London's carbon emissions. It is made up of £60 million from the London European Regional Development Fund Programme, £32 million from the Greater London Authority, £18 million from the London Waste and Recycling Board, and £10 million from private funding at project level.

The LGF is split into three sub-funds that invest directly in waste, energy efficiency, decentralised energy and social housing projects. They are 'revolving' investment funds, where monies invested in one project are repaid and then reinvested in one of the other projects. As of 30 June 2015, the Fund had invested £97 million in 16 projects valuing approximately £700 million.

Of these projects, only four have some element of solar.<sup>69</sup> These include two housing association estates, one hospital and a major loan to LB Croydon for a range of low carbon initiatives. The GLA is now reviewing options for establishing a London Green Fund II, which will operate to 2020. Decentralised energy has been identified as one of the areas where continued investment is needed.

It is clear that the Mayor's programmes have not supported the delivery of solar in London to any significant extent. In contrast, councils across the UK have used the FIT to drive the use of solar, especially in social housing and to help people in fuel poverty. The London Assembly Environment Committee recently stated, 'If London had installed the UK average level of solar PV between 2010 and 2014, we calculate that London's CO<sub>2</sub> emissions would have been 100,000 tonnes lower, and Londoners would have benefitted from an extra £50 million of government subsidies.'<sup>70</sup>

## CHAPTER 4: HOW TO UNLEASH LONDON'S SOLAR REVOLUTION

Examples of solar initiatives across the UK show that strong leadership is central to their success. What London needs is a new Mayor who will ensure that solar, within an ambitious integrated London Energy Plan, can play its full part in helping the capital meet its climate and decentralised energy targets. By acting on the following recommendations, the future Mayor could help catalyse a solar revolution in London.

### 1. SET A LONDON SOLAR PV TARGET

The Mayor should create a London solar PV (MW) target as part of the existing target to achieve 25 per cent decentralised energy by 2025. On the basis of previous work on London's technical and deployment potential for solar, this report recommends a target to increase solar PV capacity to at least 750MW by 2025. This represents a ten-fold increase in the amount of solar that will be in place when the new Mayor takes office in May 2016. To get to this level, London will need to achieve annual installation rates comparable to regions such as the East and West Midlands. Mayoral support, along with forecasted reductions in PV panel costs, increased forecasts of new build development in London and the use of innovative solutions such as BIPV, should all make the 750MW target achievable.

### 2. DEVELOP A LONDON SOLAR ACTION PLAN

The Mayor should establish a London Solar Taskforce to develop a London Solar Action Plan no later than December 2016. The Taskforce would be similar to the London Green Infrastructure Taskforce, which provided a detailed series of recommendations to the Mayor in December 2015.<sup>71</sup> The Solar Taskforce would examine areas such as: the impact of recent FIT cuts on London's solar sector; existing training and support for PV installers, with a view to reduce the cost of labour associated with the installation and maintenance of solar systems; and innovative opportunities to drive solar in London, such as collective purchasing initiatives. All these things could help reduce the price of solar panels for Londoners.<sup>vii</sup>

### 3. PROVIDE GREATER LEADERSHIP ON SOLAR

The Mayor should champion solar's potential in London, especially at a time when changes to the FIT have caused uncertainty in the sector. The Mayor should promote best practice solar projects in the capital (commercial, public sector, residential), and work with London's solar businesses to explore opportunities to streamline the installation process and help reduce costs for London households to take up PV.

### 4. IDENTIFY SUITABLE SITES FOR SOLAR ACROSS THE GLA ESTATE

The Mayor should assess where solar PV could be installed across the GLA's extensive property holdings, with a particular focus on TfL and the Mayor's Office for Policing and Crime buildings. The

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<sup>vii</sup> In May 2015 councils in Norfolk launched the first scheme of its kind in the UK, Solar Together Norfolk. This collective purchasing scheme's aim was to achieve a more competitive price for solar panels and their installation on properties in Norwich and throughout Norfolk. The scheme is being led by Norwich City Council in partnership with Broadland, South Norfolk and North Norfolk councils and specialist collective purchasing company iChoosr. A one-day auction was held on 18 June 2015 and has led to over 800 householders accepting their personal offer of this council-led solar scheme. See *Solar Together Norfolk*, Norfolk City Council website. Full details of 18 June 2015 auction results on [www.solartogether.ichoosr.com](http://www.solartogether.ichoosr.com).

Mayor should also encourage GLA functional bodies to undertake a greater level of direct investment in the development of new PV projects on land and buildings they own.<sup>viii</sup>

## 5. PLANNING FOR SOLAR

As part of the *London Plan's* zero carbon requirements, the Mayor should require developers to fully explore opportunities to use PV in their energy assessment studies,<sup>72</sup> submitted as part of planning applications. The Mayor should also accelerate the development of London borough carbon offset mechanisms to ensure that any shortfalls in CO<sub>2</sub> emissions related to new development can be met through further action, including funding offsite PV projects. The Mayor should also examine opportunities for Local Development Orders<sup>ix</sup> to drive the development of larger-scale solar projects, especially in key London Opportunity Areas,<sup>73</sup> and sites such as brownfield or contaminated land.<sup>x</sup> Following on from resources such as the London Heat Map and the new London Land Commission Register,<sup>74</sup> the Mayor should also develop a London Solar Map identifying ideal sites for public sector PV projects to be installed. This could be extended to include commercial solar projects, or to highlight residential streets where solar would be most suitable.<sup>xi</sup>

## 6. SUPPORTING COMMUNITY ENERGY PV PROJECTS

London is home to an enthusiastic, active and growing number of community energy groups looking to develop community-owned, crowd-funded, local solar projects. Considerable challenges exist for these groups in identifying locations suitable for projects of a viable scale. Despite this, some world-class community schemes have been developed in Brixton and Hackney, and further groups are examining the feasibility of projects in Vauxhall, Lewisham, Wandsworth and Hoxton, among others.

With cuts to the FIT and damaging tax relief changes to community energy recently introduced by the Treasury (an issue the current Mayor wrote to the government about expressing his concerns<sup>75</sup>), many projects are now at risk. But there are excellent examples of Local Authorities championing community energy including Bristol City Council,<sup>xii</sup> Edinburgh City Council,<sup>xiii</sup> and Cannock Chase Council in Staffordshire.<sup>xiv</sup>

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viii A number of Local Authorities across the UK have invested in large scale solar on council land to provide future revenue streams. Wrexham Borough County Council recently inaugurated a 2.64 MW 8,800 panel solar farm.

ix Swindon Borough Council used a planning measure, known as Local Development Orders (LDOs), to speed up the planning process for low carbon energy generation. In June 2015 a LDO was approved allowing for 20 different larger solar projects in the area to proceed without the need for planning permission. Included amongst the 20-plus sites - which have a combined capacity of around 50MW - are a number of ground-mounted solar farms, solar car park canopies and two 'solar sound barriers' for the M4 and A419 roads. *30 solar power sites in council's sights*, Swindon Advertiser, 5 February 2015.

x Rochdale Borough Council has developed a 250kWp solar array on one acre of contaminated land located near Rochdale Leisure Centre. Total project cost was approximately £2m, but the project is estimated to bring in £7m revenue to the Council. *Rochdale is home to the first publicly-owned solar farm open in Greater Manchester*, Manchester Evening News, 30 March 2015.

xi Bristol City Council has already undertaken similar work to produce a solar map of the city. In their response to the London Assembly's solar inquiry, the organisation 10:10 recommended that LIDAR mapping be undertaken across the capital with the data then made publicly available.

xii Bristol City Council announced a community energy competition in May 2015 inviting groups to apply for the use of a range of council owned buildings to deliver the benefits of community energy to local residents. Bristol Energy Co-op was selected to deliver this programme across 20 housing association sites across the city, and the Co-op has already initiated a series of crowd-funded solar projects with the first installs going ahead in January 2016. *Bristol Community Energy Public Briefing*, 28 May 2015; and direct communication with Bristol City Council, 18 January 2016.

xiii In May 2015 Edinburgh City Council formed a partnership with the Edinburgh Community Solar Co-operative (ECSC) - supported by Energy4All - to deliver what is believed to be the largest community-owned urban renewable energy project in the UK. Schools, leisure and community centres will be chosen to host the solar arrays *The future's bright for community-owned solar project*, Edinburgh City Council press release, 25 May 2015.

A new Mayor should support community energy projects in London, most importantly by identifying suitable locations across the GLA group estate that could be loaned out for PV projects. The Mayor should also provide opportunities for community energy groups to access technical, commercial and legal support through the Mayor's Decentralised Energy Projects team, and establish a grants/loans fund to help pay for project development work.<sup>xv</sup> The Mayor should also accelerate the production of Neighbourhood Plans,<sup>76</sup> which could help identify new community solar opportunities.

## 7. LICENSE LITE

The Mayor has stated that he plans to launch a Licence Lite initiative.<sup>77</sup> This new scheme is possible because the GLA has effectively been granted a 'junior' electricity supply licence by Ofgem, starting in early 2016.<sup>78</sup> The ambition of Licence Lite is that it will improve the business case for London's decentralised energy generators, by purchasing their exported electricity at a better price than they presently attract. This electricity will then be sold to Transport for London.<sup>xvi</sup> The focus of Licence Lite has been securing the output from London's CHP generators, but solar projects have also been encouraged to apply to the GLA's tender for generation.<sup>79</sup> See Appendix 3 for more information about the Licence Lite model.

The Mayor should actively support applications from London solar projects, especially social housing and community-led solar projects, to tender electricity through the GLA's Licence Lite initiative. Once launched, the Mayor should also explore opportunities for the Licence Lite programme to purchase electricity from as many of London's solar projects as possible.

## 8. FUNDING THE GROWTH OF SOLAR IN LONDON

While the price of PV is projected to fall, there remains a need for the Mayor and London boroughs, at least in the short-term, to stimulate investment in London solar projects across all sectors. There are a number of routes the Mayor could explore in relation to sourcing new investment for solar, as well as other decentralised energy solutions:

- A proposal to introduce a new and separate London FIT mechanism, as an alternative to the national FIT scheme, has been dismissed by the current Mayor.<sup>80</sup> But a London FIT could support the uptake of PV in London during a period of considerable uncertainty for the solar industry. We estimate that if the Mayor adopted the Solar Trade Association's (STA) '£1 plan',<sup>81</sup> and with a target to double the rate of installation of PV per quarter over that achieved through the national FIT programme, the total cost to the GLA for the London FIT would be around £30m.<sup>xvii</sup>
- The GLA could fund a time limited, upfront grant, where PV installation would then not qualify for the national FIT scheme, as a result of state aid rules. Such a programme would have some

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A priority allocation of shares was given to Edinburgh residents. As of January 2016, £1.5m had been raised through the share offer *Energy4All raises millions for community solar as concerns over future support emerge*, Solar Power Portal, 13 January 2016.

<sup>xiv</sup> Cannock Chase Council initiated a project, Chase Community Solar, in November 2014 - the first scheme in the UK aiming to put solar panels on the roofs of Council properties funded by a community share offer. The project set a target to raise up to £1 million to install solar panels on council-owned bungalows. *Cannock Chase residents to benefit from pioneering community solar investment project* 30 October 2014. Their funding target was achieved in February 2015 and PV was installed on all properties by September 2015. <http://chasesolar.org.uk/news>.

<sup>xv</sup> DECC's Urban Community Energy Fund (UCEF) provides funding for detailed project development costs, however, the loans are repayable with a one-off 45 per cent premium, which has been said deters many groups from applying.

<sup>xvi</sup> See Appendix 3

<sup>xvii</sup> Further consideration of the London FIT is set out in Appendix 4

similarities to the GLA's recently introduced 'boiler cashback' scheme, where qualifying households benefit from a £400 grant.<sup>82</sup>

- TfL released a Green Bond offer in April 2015, the first to be issued in the UK by a public sector authority and one that was successful in raising £400m to fund a number of low carbon transport initiatives.<sup>83</sup> The current Mayor has stated that the GLA has no plans to issue further bonds to fund environmental projects.<sup>84</sup> There is, however, increasing interest from the investment community in green bonds, and the GLA is well placed in the scale and breadth of environment programmes it has in place to offer further opportunities to the market. London should look to Gothenburg, which has become a pioneer city in this area, with two green bonds issued to date, funding a range of green projects across transport, water and energy sectors.<sup>85</sup> The *London Infrastructure Plan 2050* has set out the massive scale of investment needed in the capital over the coming decades. The Mayor should explore opportunities for green bonds as a potential route to fund new solar capacity, as well as other green objectives for the city.
- The Mayor should ensure that opportunities for solar are supported through the new phase of the London Green Fund, which has already prioritised decentralised energy as an area of continued investment.
- The Mayor could unlock the spending power of Londoners by helping to de-risk community energy solar projects. Providing sites in London where community-led PV projects could be developed could catalyse crowd funding of local projects. A number of community energy projects have already shown there is appetite to support the growth of community solar this year,<sup>86</sup> but the importance of partnership with Local Authorities has also been highlighted as key, a result of adverse changes to tax relief conditions for community energy made in the 2015 Autumn Statement.<sup>87</sup> Swindon Borough Council has led the way by offering co-investment opportunities for 'solar bonds'.<sup>88</sup>
- Working with boroughs, the Mayor should explore how zero carbon development offset funds (see page 17) could be best directed to stimulate the growth of decentralised energy, including solar, across London.
- The remit of the Green Investment Bank (GIB) has recently been extended to allow it to invest in larger solar power schemes, smart grids and other energy infrastructure projects.<sup>89</sup> The GIB is already working with Local Authorities and other public sector organisations on energy efficiency retrofit projects. It has highlighted that, the 'largest opportunity [for distributed renewables] is in rooftop solar PV which offer considerable further potential for use in the urban environment. Across the UK, rooftop solar alone offers a potential investment opportunity of between £2bn and 4bn to 2020.'<sup>90</sup>
- The London Pension Fund Authority (LPFA) – in partnership with Greater Manchester Pension Fund (GMPF) – has recently undertaken its first direct investment in a renewable energy project, a food waste biomethane-to-grid project in North Yorkshire.<sup>91</sup> This follows other renewable energy investments by Strathclyde Pension Fund (offshore wind) and Lancashire County Pension Fund, which was the first pension fund to invest in a community solar project in 2013.<sup>92</sup> The GMPF and LPFA joint venture has stated that it is actively reviewing several other UK infrastructure opportunities, and it seeks to fully deploy the initial £500 million commitment over the next two years. This could present funding opportunities for London-based solar projects.

- The Mayor could also explore opportunities with London's main distribution network operators (DNOs), UK Power Networks and Scottish and Southern Energy to identify areas on London's electricity network where solar PV projects could be incentivised under the DNO's new 'RIIO' (Revenue = Incentives + Innovation + Outputs) framework.
- It is estimated that 80 per cent of London's existing buildings will still be standing in 2050.<sup>93</sup> From April 2018, landlords will be required by law to get their most inefficient buildings to an energy efficiency rating of at least Band E, evidenced by an up-to-date Energy Performance Certificate. Importantly, this includes the non-domestic private rented sector. The Mayor could work through the London Rental Standard to support landlords to invest in energy efficiency and solar, to ensure their buildings comply with new regulations.

## CONCLUSION

London is a world leader in many things but is trailing far behind the rest of the UK when it comes to generating its own solar power. While there are challenges unique to the capital, these don't explain or justify why London is proving so slow on the uptake of solar PV.

Despite targets to decentralise energy, make London more energy resilient and cut emissions, solar remains a largely untapped resource. London has very limited opportunities to use other renewable technologies such as wind and biomass – solar therefore has to be a central component of the capital's clean energy future.

The election of a new Mayor is a significant opportunity to initiate a solar revolution and transform London into a city full of photovoltaics. That is why we are calling on the future Mayor to commit to a ten-fold increase in solar capacity from today's level, establishing a target of at least 750MW, to be met by 2025.

Central government has recently slashed support for the Feed in Tariff, which is likely to cause significant setbacks across the UK solar industry. In this context, strong leadership on solar from the Mayor of London is more important than ever. By ensuring solar is a key part of an ambitious London Energy Plan, the Mayor can ensure London fully exploits the environmental, economic and social benefits that the wider use of solar can bring.

## APPENDIX 1: THE UK FEED IN TARIFF

The Feed in Tariff – known as the FIT – is a financial incentive designed to encourage small-scale energy users, like homes, small businesses and schools, to generate their own electricity. It was introduced by the government in 2010 to encourage the development of clean energy in the UK, so that we can meet our renewable energy targets and reduce CO<sub>2</sub> emissions.

FIT offers three key benefits to people who produce their own electricity:

- a payment is made for all electricity generated, even if the producers use it themselves;
- there is an additional bonus payment for electricity exported to the grid;
- people’s electricity bills drop because they’re producing their own power.

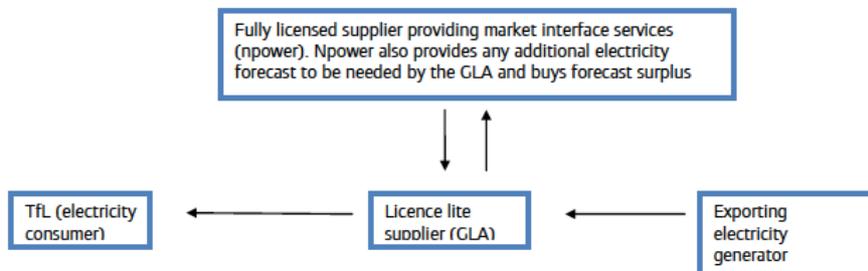
## APPENDIX 2: THE RENEWABLES OBLIGATION

The Renewables Obligation (RO) is one of the main support mechanisms for renewable electricity projects in the UK. It places an obligation on UK electricity suppliers to source an increasing proportion of the electricity they supply from renewable sources.

## APPENDIX 3: THE LICENSE LITE MODEL

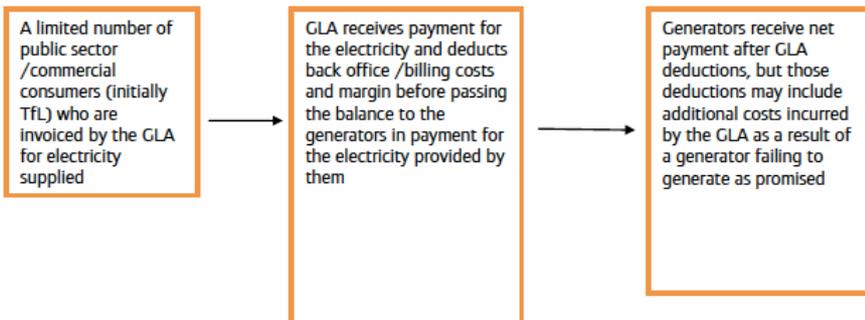
### *The supply of electricity from generator to consume*

The GLA as a licensed electricity supplier buys the electricity wholesale from the electricity generators and supplies it to its customers (initially TfL) as a licensed electricity supplier. However, under the licence lite scheme, the GLA is not a party to the electricity industry agreements (and has no liabilities under them) but contracts with a third party (npower) which is. The GLA’s exposure to the market systems has been negotiated between it and npower.



### *Cash flows*

The licence lite business model is designed around simplicity and the pass through of costs and liabilities to the electricity generators who benefit from the licence lite operation. The GLA receives payment for electricity supplied from TfL and deducts its own costs and margin before passing the balance to the generators.



Source: GLA

## APPENDIX 4: THE LONDON FEED IN TARIFF

To help ensure that the London solar sector can continue to grow and contribute to the Mayor's decentralised energy and carbon reduction targets, this proposal considers the Mayor establishing a London FIT mechanism based around the Solar Trade Association (STA's) '£1 plan'.

Liaising with the STA, the following assumptions were used to calculate the potential costs of establishing a London FIT:

- The London FIT would adopt the STA's £1 proposal FIT support rates

Tariff bands	Previous FIT tariff rates in place from 1 October 2015 (p/kWh)		New DECC tariff bands from February 2016	New DECC tariffs from February 2016	STA £1 proposals 1Q 2016
<4kW	12.47		<10kW	4.39	8.00
4-50kW	11.30		10-50kW	4.59	6.50
50-150kW	9.63		50-250kW	2.70	5.00
150-250kW	9.21		250-1000kW	2.27	4.50
250-5000kW	5.94		>1000kW	0.87	4.00
Stand alone	4.28		Stand alone	0.87	4.00

- The London FIT would be based on stimulating the rate of installation in London to double that recently observed, from 2.5MW to 5MW per quarter. A deployment cap could be linked to this capacity level.
- The London FIT would be based around 50 per cent support being directed to domestic installations, 25 per cent to smaller commercial roof installations, and the remaining 25 per cent to larger commercial rooftop installations (as evidenced in the table, the STA's proposals adopt successively lower FIT rates respectively across these three sectors).
- There could be higher London FIT rates for community energy PV projects and for social housing PV projects. Many social housing PV projects are already being considered by the Mayor's RE:NEW energy efficiency retrofit programme.
- The London FIT would require installers to fulfil existing requirements under the national FIT programme in relation to the Micro-generation Certification Scheme and Renewable Energy Consumer Code.

- The London FIT would taper down, phasing out completely by Q4 2019. Several independent analyses show different UK submarkets in solar will reach parity with fossil fuels around 2020.<sup>94</sup>
- The London FIT would only provide support to projects for a maximum of 10 years – as compared to the 20-year period offered by existing national FIT programme.
- The London FIT would allow some flexibility around Energy Performance Certificate requirements for solid wall properties and properties in conservation areas.
- There would, however, be a requirement that a smart meter is installed with every London FIT supported installation, requiring the Mayor to ensure that a more coordinated approach is adopted in relation to the smart meter roll out in London. PV export payments would be based on actual volumes of electricity exported as measured through the smart meter.
- The Mayor would commit to examine opportunities for his License Lite programme to purchase electricity from all London PV installations, including those using the London FIT.
- Similar to the GLA's Licence Lite initiative, the Mayor may enter into arrangements with a limited number of energy suppliers in order to help the delivery of the London FIT.

Under these proposals, it is estimated (through the STA's model) that the cost to fund the London FIT would be of the order of £3 million per year by 2020. The cumulative cost to London government of the London FIT would be around £30 million. However, a full cost benefit analysis of this proposal is required to understand the employment and economic benefits that could be provided through an increase in the rate of PV installation in the capital.

The GLA could also work in collaboration with London's 33 Local Authorities on the London FIT – potentially through an agreed payment schedule provided by each borough to support the London FIT, based on the number of projects installed per borough.

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