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Large Solar PV

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Large solar PV

The drivers

Financial Incentives

- EU report (2008): well-adapted feed in tariff regimes are most efficient and effective support schemes for promoting renewable electricity. (Spain, Germany and Denmark)
- Financial incentives designed to:
 - Increase decentralised low carbon energy generation = reduce carbon emissions, diversify energy mix and reduce demand on grid
 - Reduce unit cost of technology = economies of scale reduce production costs
 - Grow low carbon economy = more business for manufacturers, suppliers and installers

Solar PV FIT Generation Rates

Technology	Size	2011/12 Rate (p / kWh)	Lifetime (years)
PV	≤4kW (new build**)	37.8	25
	≤4kW (retrofit**)	43.3	25
	>4-10kW	37.8	25
	>10-100kW	32.9	25
	>100kW-5MW	30.7	25

Impact of FIT

- According to Ofgem, the total installations to date (to 26 Jan 2011) under the FITs scheme are as follows:
 - Anaerobic digestion – 2 (< 0.01%)
 - Hydro – 178 (0.84%)
 - Micro CHP – 36 (0.17%)
 - PV – 19854 (93.64%)
 - Wind – 1132 (5.34%)
 - Total 76.66MW
- Hugely incentivised solar PV
- Created commercial investment opportunity

FIT currently under
review....

Huhne takes action on Solar farm threat (DECC press notice 7 Feb 11)

- Chris Huhne said: *“Large scale solar installations weren’t anticipated under the FITs scheme we inherited and I’m concerned this could mean that money meant for people who want to produce their own green electricity has the potential to be directed towards large scale commercial solar projects”*
- The FITs review will:
 - Assess tariff levels, administration and eligibility of technologies
 - Be completed by the end of the year, with tariffs remaining unchanged until April 2012 (unless the review reveals a need for greater urgency)
 - Fast track consideration of large scale solar projects (over 50kW) with a view to making any resulting changes to tariffs as soon as practical

What is Large Solar PV?

- **Commercial roof retrofit and stand-alone installations ('solar parks')**
- **Range of Financial Models:**
 - **Ownership Model**
 - Building / land owner invests in technology
 - 100% benefit from FIT payment & energy generation
 - **Merchant Model**
 - investor covers all costs & claim FIT
 - Property / land owner gets free or reduced rate electricity from PV and / or land rental income
 - **Joint Venture**
 - PV installer funds up to 50% (max) of capital costs
 - Share FITs in line with investment ratio with free or reduced rate electricity

What's the difference
between small and large
solar?

Small roof mounted array (1.5kW)





Morgan Lighting of Chorley © 2011

Small stand alone array (4kW)

Commercial roof mounted The ZICER building, Norwich 34kW peak





CIS Tower, Manchester

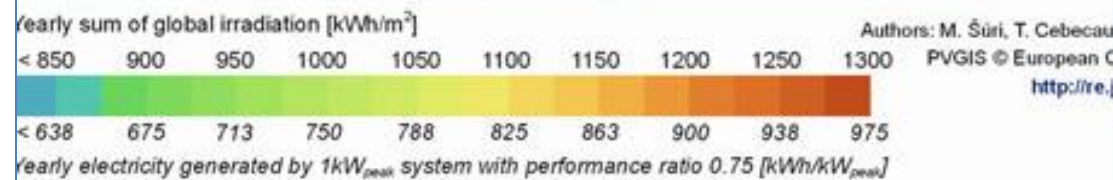
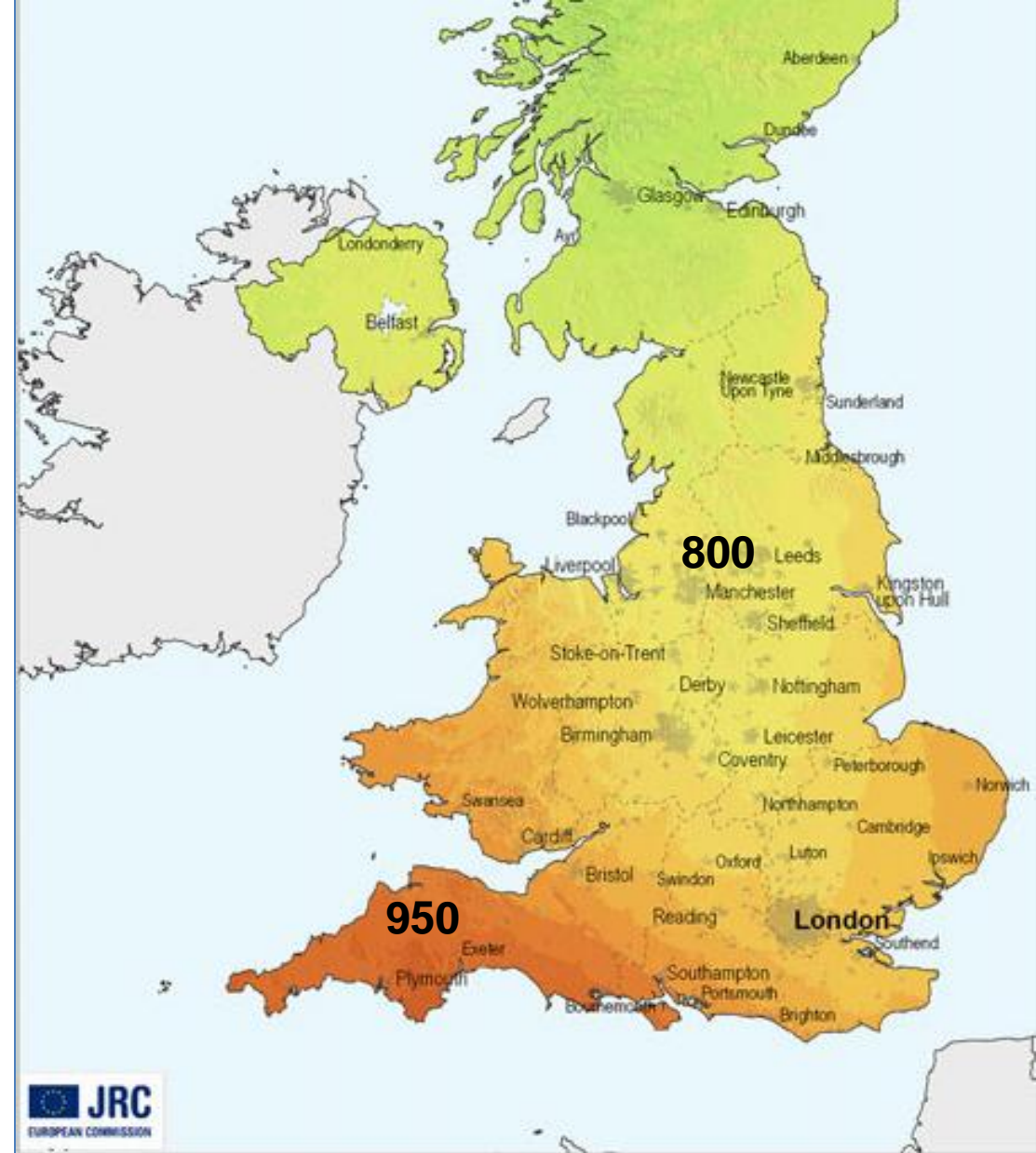
- Largest PV commercial façade in Europe
- Cladded in 400kW solar PV modules
- Cost £5.5m in 2005
- Produces around 185MWh each year-equivalent to the electrical needs of 60 homes.

Commercial solar park (>1MW)



Location?

- Unlike wind, solar is less constrained by location
- SW England has better solar resource, but PV is viable in NW
- Location not as important as site specifics

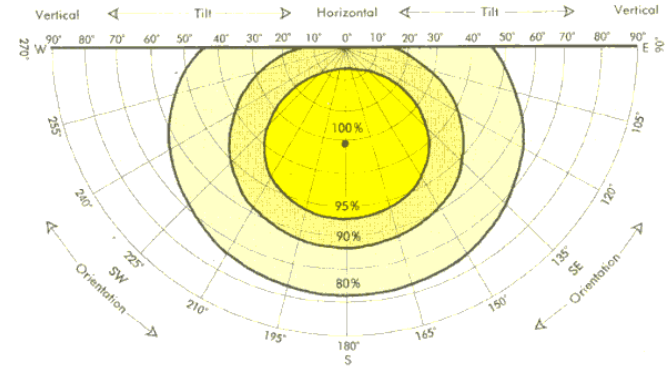


Large Roof Retrofit Site Selection



Large roof retrofit – site section criteria:

- **Remaining building life** - > 25 years
- **Roof orientation** – SE to SW facing
- **Shading & obstructions** -
 - Chimneys, skylights, aerials, ventilation ducts
 - Trees
 - Adjacent buildings (existing & planned)
- **Onsite energy demand** -
 - **Building occupiers:** FIT gives best return when the energy is used not exported - Need on-site daytime electricity demand
 - **Merchant schemes:** modelled on generation tariff (will give / sell energy to building occupants or export 100%)
- **Grid connection** - costs will affect project viability, depends on existing connection arrangement, loads, grid capacity



Is the roof space suitable?

- Roof size (need approx 8m^2 / 1kWp)
- Roof pitch – flat - 50° (32° - 35° is optimum)



- Roof strength – ability to hold an additional $16\text{kg} / \text{m}^2$
- Roof material & presence of hazardous substances - e.g. Asbestos
- Accessibility for construction and maintenance (yearly checks & cleaning)
- Insurance

Commercial roof retrofit planning considerations

- Unless Permitted Development Rights change, permission will be required for non-domestic retrofits
- Only commercial buildings have suitable roof area (office blocks and industrial buildings)
- Large installations will cover most suitable elevations
- Visual impact key consideration, esp. in Conservation Areas / historic buildings
- **Non sensitive locations & buildings**
 - is visibility a bad thing?



30kWp Quadrant Business Centre, Sheffield



51kWp London Transport Museum (listed building)

Solar Parks Site Selection



Solar parks – site selection criteria:

- **Greenfield site** - unlikely to be viable on unconstrained brownfield / vacant development plot (cannot compete with other uses e.g. housing / employment / retail)
- **Site size** - approx 2.ha per 1MW
- **Aspect** - flat ground or shallow south-facing slope
- **Access** – road / track suitable for HGVs
- **Substrata** – stable ground, minimal flood risk
- **Land designation** – not in sensitive area or on high grade agricultural land
- **Setting** - natural screening, minimal overshadowing and set away from residential area
- **Grid connection** – need substation or high voltage line nearby (excessive grid extensions make scheme unviable)



Commercial Solar Parks Planning Considerations



Planning policy context

- PPS1 Planning and Climate Change
Supplement states local planning authorities should not require applicants for energy development to demonstrate either the overall need for renewable energy and its distribution, nor question the energy justification for why a proposal for such development must be sited in a particular location

Key planning considerations

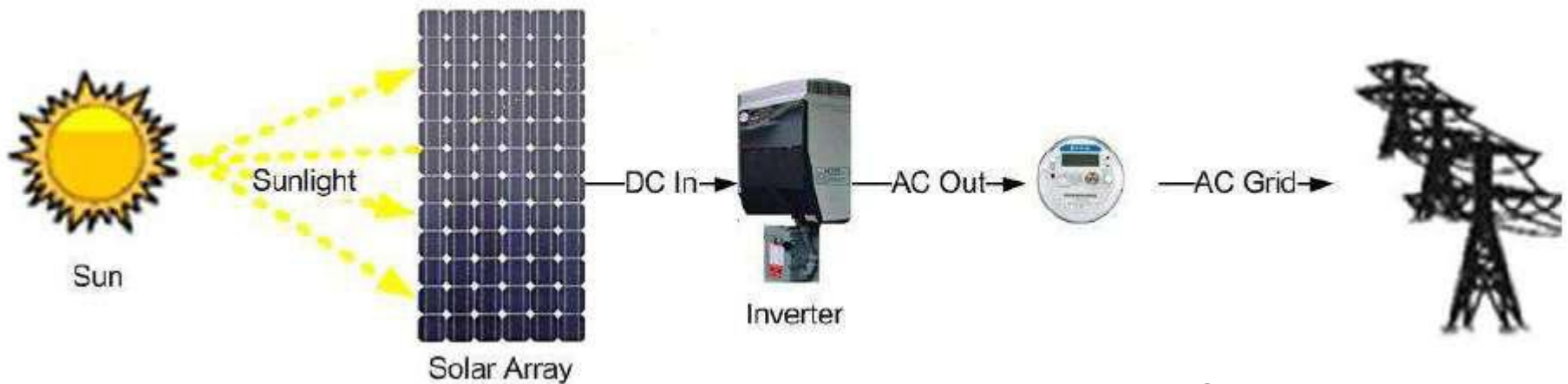
- Landscape & Visual Impact
- Ecological & Agricultural Impact
- Access & site maintenance arrangements
- Need for EIA?

Environmental Impact Assessment

- No specific reference to solar PV installations in EIA Regulations
- Paragraph 3 (a) of Schedule 2 requires EIA to be considered for industrial installations for the production of electricity, steam and hot water where the area of the development exceeds 0.5ha
- Cornwall County Council consider solar parks to be more akin to greenhouse development
- Prudent to require all schemes to be screened - LPA should provide screening opinion in accordance with Schedule 3 selection criteria

Key components of solar park

- Solar panels and mountings
- Inverter house and sub-station
- Security (fencing and lighting)
- Access track



Source: 35Degrees

Layout

- Panels fitted on fixed mountings in linear rows to aligned to sun, less than 2m high
- Inverter housed in small building (hard standing required)
- Access track servicing site
- Security fencing around perimeter



Security and screening

- Security fencing can be sympathetic & unobtrusive
- Maximise use of natural screening – hedges, trees etc
- Encourage planting of native species for additional screening



Ecological & Agricultural Issues

- Avoid ecologically sensitive sites & high quality agricultural land
- Opportunity to improve biodiversity (new planting along perimeter / encourage habitat creation)
- Animal grazing within large scale installations possible



Annual Output?

- Wheal Jane Solar PV Project, near Truro
- Consented Sept 2010 Cornwall CC (PA10/03993)
- 3 ha site
- 1.55 MW capacity
- Estimated average electrical output for the proposal would be 1578 MWh per year
- Based on a PV panel efficiency of 14% and expected system losses of 14%

Guidance?

- No National Planning Guidance on Solar Parks
- Most applications submitted in SW Region
- Regen SW planning for solar farms guidance note
- Cornwall Council guide to large solar developments (informal working guidance note)
- Cornwall have Planning Performance Agreement and good monitoring procedures in place
- To date:
 - received 28 planning applications
 - 8 approved
 - none refused

What about the rest of UK?

- Schemes coming forward elsewhere SW
- Consented scheme in Lincolnshire – similar solar resource to NW



- Some schemes in pre-planning stages in NW (none at submission stage)

Ecotricity Solar Farm, Lincolnshire

- East Lindsey District Council (ref: N/036/01536/10).
- 1MW solar PV scheme at Fen Farm, Conisholme on land next to 20-turbine wind farm.
- 2.1ha site consisting of 5000 panels up to height of 2m in 59 rows on 2,562 supports, together with access track, fencing and an electrical inverter container on agricultural land.
- LPA issued a negative screening opinion in June 2010 on basis it is not within sensitive area and is unlikely to have significant effects on environment.
- However planning application was accompanied by comprehensive Environmental Report (akin to ES).
- Permission granted November 2010.

Any Questions?

