APSE Scotland Solar PV Toolkit

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1. BACKGROUND TO APSE ENERGY

APSE Energy - Our Vision

“The vision is to form an effective collaboration of a large number of local authorities to enable and facilitate the local municipalisation of energy services. **By this we mean the public and community, as well as private, ownership and managerial control of local energy generation, distribution networks and delivery of energy efficiency works.** Local authorities working together in this way would have great influence and would be able to deliver economies of scale in green energy to promote economic growth and combat fuel poverty.”

Aims

The aims of **APSE energy** are to support councils to deliver the local municipalisation of energy services and in doing so:

- address social objectives and deliver community benefits, such as a reduction in fuel poverty and increases in jobs and skills;
- save money and make money for local authorities to safeguard local services.

Members of APSE Energy

1. Aberdeen City Council
2. Basingstoke and Deane Council
3. Barnsley Metropolitan Borough Council
4. Bradford City Council
5. Bridgend County Borough Council
6. Buckinghamshire County Council
7. Cardiff City Council
8. City of Edinburgh Council
9. Cheshire East Council
10. Cumbria County Council
11. Darlington Borough Council
12. Doncaster Metropolitan Borough Council
13. Derbyshire County Council
14. Dudley Metropolitan Borough Council
15. East Dunbartonshire Council
16. East Riding Council
17. Falkirk Council
18. Fife Council
19. Flintshire County Council
20. Gedling Borough Council
21. Glasgow City Council
22. Gloucestershire County Council
23. Guildford Borough Council
24. Knowsley MB Council
25 Lancaster City Council
26 London Borough of Havering
27. Maidstone Council
28. Middlesbrough Council
29. Midlothian Council
30. Monmouthshire Council
31. Newcastle City Council
32. Nottingham City Council
33. Nottinghamshire County Council
34. North Ayrshire Council
35. North Yorkshire County Council
36. Northumberland County Council
37. Oxford City Council
38. Peterborough City Council
39. Portsmouth City Council
40. Preston City Council
41.. Reading Borough Council
42. Sefton MB Council
43. Selby District Council
44. Stevenage Borough Council
45. Stirling Council
46. Southampton City Council
47. South Lanarkshire Council
48. Stockton-On-Tees Borough Council
49. Swansea City and County Council
50 Wakefield Metropolitan District Council
51. Warwickshire County Council
52 Wrexham County Borough Council
53. Wolverhampton City Council
54. York City Council

2. CONTEXT TO SOLAR PV

An endless procession of bad news……

- Withdrawal of the code for sustainable homes – March 2015.
- Closure of the Renewables Obligation to on-shore wind farms and changes to planning guidance – June 2015.
- Removal of the Climate Change Levy Exemption for Renewable Energy – Budget in July 2015.
- Zero carbon homes requirement and allowable costs withdrawn – July 2015.
- Green Deal funding ended – July 2015.
- Support for sub 5MW solar farms to be withdrawn and pre-accreditation for Feed-in-Tariff (FIT) to be removed – July 2015.
- Feed in Tariff slashed by 87% - August 2015.
- Enterprise Investment Scheme (EIS) & Social Investment Tax Relief (SITR) exclude community energy.
- Renewable Heat Incentive (RHI)???

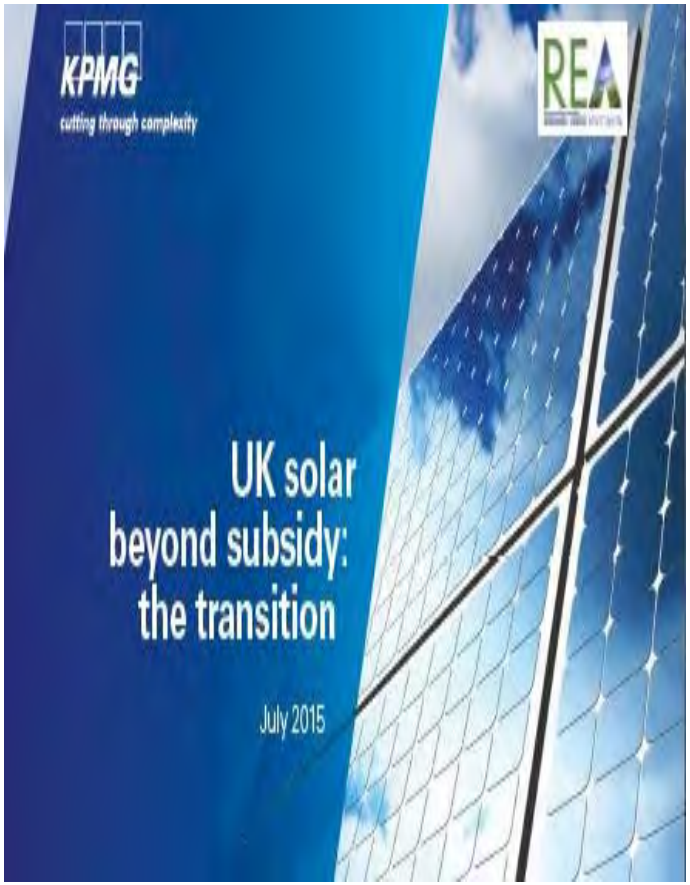
With predictable consequences…..

Government Impact Assessment on its plans for the early closure of the Renewables Obligation to onshore wind:

- Lifetime CO2 emissions could be up to 63MtCO2e higher than they would otherwise have been
- Under the central estimate, total lost benefit to communities would be around £1m a year
- Under the central estimate, there would be around a £0.30 (0.05%) reduction on the average annual household electricity bill

Solar PV - Beyond subsidy KPMG Report for the REA

- Grid Parity for Solar PV by 2020 if Government provide a “smooth transition”.
- Need for a “National Energy Strategy” to include a comprehensive overview of the national grid and the importance of storage technologies alongside solar, and the need to investigate the potential of alternative ways to support the solar industry financially.
- potential of certain tax breaks for solar projects instead of specific subsidies, which would reduce the burden on the over-budget Levy Control Framework, as well as net-metering schemes that have helped nurture other international markets such as the US.



Solar PV – Projected costs

Table 3:

Relative PV System Cost Reduction by component (US and Europe for systems>100kW)

	2014	2015	2017	2019	2022	2025
Modules	58%	54%	47%	43%	37%	33%
Inverters	12%	11%	10%	9%	9%	8%
Wiring	8%	8%	8%	8%	7%	7%
Mounting	14%	15%	13%	13%	12%	10%
Ground	8%	7%	6%	6%	6%	6%
Total Costs Reduction	100%	95%	85%	79%	71%	65%

Source: ITRPV 2015. Note: these do not include planning costs, grid connection, financing and overall 'soft' costs that can vary by country and project.

How can we make renewable projects pay?

- Falling costs of technology (e.g. modules, invertors & switchgear).
- Minimum Import Price (MIP)
- Rising energy prices.
- Energy storage.
- Power sales and/or use.
- Smart grids.
- Scale and deployment.
- Wider social and economic benefits.

Energy storage

- Residential
  - Behind-the-meter benefit for residents
  - Front-of-meter benefit for utilities and wider network
  - Aggregation into one system.
  - Post FiT benefits
  - Retrofitting
- Commercial and off-Grid storage
  - Fall in prices of lithium iron batteries will make storage competitive within 3 years (US).
  - Taking companies off Grid and reducing energy consumption
  - Supporting grid connections where there are constraints.

3. SOLAR PV TOOLKIT

Solar PV Toolkit brief

"It is increasingly recognised by local authorities in Scotland that the deployment of solar PV on local authority land and buildings is an effective way of maximising the use of local authority assets in terms of generating income streams to support local services, reduce energy costs and tackle the blight of fuel poverty in many communities.

APSE Scotland is seeking to commission a piece of work from APSE Energy to develop a solar PV toolkit for local authorities in Scotland as a guide to the development and implementation of solar PV for:

- Domestic roofs – social and private
- Public and commercial 'big roofs' including schools
- Land based systems both under and over 5MW of capacity"

Solar PV Toolkit structure

- Section 1 – Strategic Analysis.
- Section 2 – Project methodology.
- Section 3 – Business case.
- Section 4 – Financial case.
- Section 6 – Funding options.
- Section 7 – Procurement.
- Section 8 – Economic and social benefits.
- Section 9 – Compendium of resources.
- Section 10 – Solar mapping/GIS offer.

Strategic Analysis

- Government Policy
- The APSE medium-term strategy for solar PV.
- Financial and non-financial benefits to councils.
- Links to climate change and green strategies.
- Grid issues
- Storage of electricity.

Financial model - drivers

- Location – irradiance levels = yield
- Scale/capacity
- Grid access
- Site conditions – Geotech/Access
- Planning
- Timing and incentives
- Indexation – RPI and power price inflation
- Interest rates

Financial model

Key Components

Revenue

- Electricity sales
- FiT/ROC incentives

Costs

- Development costs
- Capital costs
- Grid connection
- Operation & maintenance
- Insurance
- Business rates
- Rent (if applicable)
- Community benefit (if applicable)

Variations

- Use of power on site
- Private wire/private power sales
- Sleeving

Outputs

- Plant size
- Irradiance – kWhrs/kWp
- Yield – kWhrs per annum
- FiT/ROCS and PPA revenue
- Total development costs
- Funding structure and ratios (Equity and Debt)
- Project IRR
- Payback
- NPV
- Cash flow

Economic and social benefits

- Community leadership
- Energy security
- CRC / carbon benefits
- Growth in the local economy
- Development of supply chains
- Jobs, skills and training
- Fuel poverty
- Education
- Reduction in energy use
- Planning and building regs for new build
- Local multipliers

Resources

- Best practice – e.g. Storage, grid, deployment, costs
- Useful references – Scottish Government, SFT, Resource Efficient Scotland, CES, Universities etc.
- Current Industry knowledge and reports – REA, STA etc.
- On-line references and research.
- Access to skills and training and support.
- Whose who in the solar industry in Scotland.
- Solar mapping tools and costs.

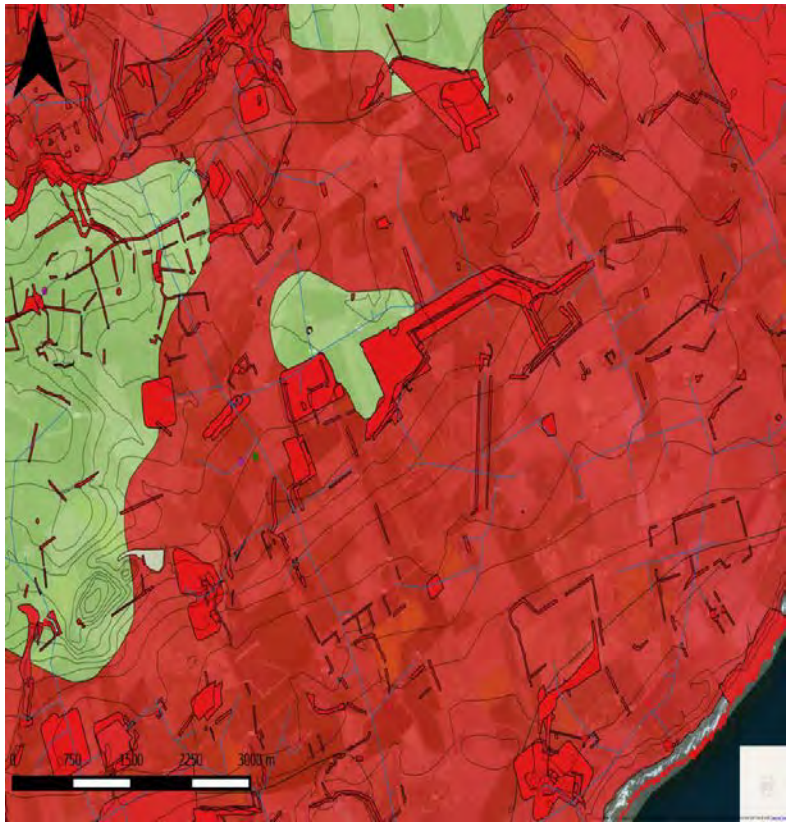
Solar mapping

- Options
  - DIY
  - Commercial offer
  - Universities
- Costs
  - By asset type
  - By authority
  - Land/houses/flats/civic and commercial

Solar mapping – Large scale ground mount

A Local Authority Solar Development Assessment map would utilise the following layers of information:

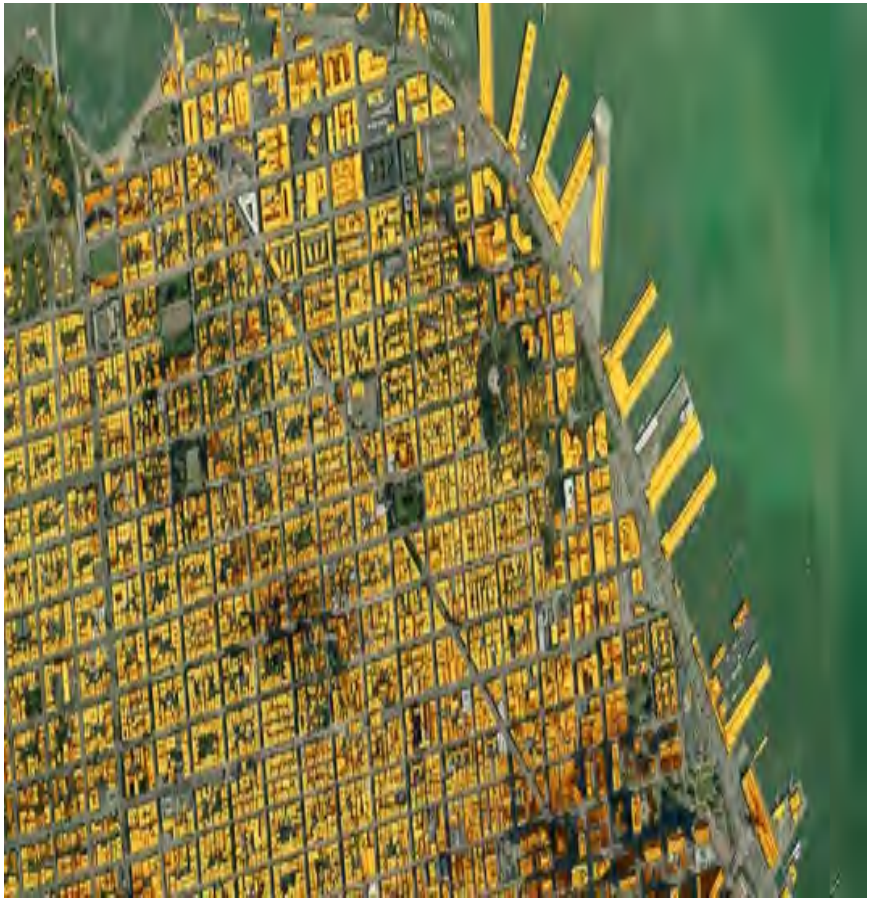
- Areas of Land Capability for Agriculture, 'prime agricultural land' in Scotland.
- All areas considered unsuitable for solar development, or areas where significant planning issues are likely to be encountered, e.g., green belt.
- Areas with statutory designations, e.g. European Designated (SAC, SPA, Ramsar), National Parks, National Scenic Areas, Scheduled Monuments, Listed Buildings.
- Areas with non-statutory designation e.g. Ancient and semi-natural ancient woodland, Wild Land Areas, country parks.
- Grid Infrastructure e.g. substations, 33 kV and 11 kV lines, and grid capacity (where data is available).
- Renewable energy developments including solar and wind from the DECC Database.
- Topography including slope gradient calculations and orientation.



Solar mapping - roofs

The mapping in each LA area will take into account local planning designations (e.g. conservation areas) and grid constraints where that data is available. Costs will be on a per roof basis and will be dependent upon:

- the quality of the asset register/ data supplied
- the number of assets mapped
- the level of investigation required



Proposed timetable

- Draft by mid December 2015.
- Comments back by early January 2016.
- Final draft before end of January 2016.
- Launch at Housing and Renewables seminar in Dunblane 18/19 February 2016