CLASP. Climate Change Local Area Support Programme

Planners' reference guide no. 4: Meeting the North West's renewable electricity targets

Introduction

There are a range of renewable and low carbon electricity technologies which range in size from the micro to the commercial scale; the applicability of each technology varies depending on the type of building and the site specific location. This Guide is designed to demonstrate the scale of each technology and its potential contribution to our energy and CO_2 reduction targets.

Renewable electricity targets

The UK has committed to supply 15% of its energy needs from renewable sources by 2020. In order to meet this target, we need to generate 30% of our electricity from renewables. Offshore wind and marine technologies are expected to generate 13-14% of the total energy demand or just under half of the electricity target.

The North West (NW) electricity demand in 2020 is expected to be around the same as the 2008 total, i.e. 34,500 GWh/yr. The NW contribution to the national renewable electricity target from on-shore sources is therefore around 5,700 GWh/year.

NW Electricity Demand and Targets

Projected Electricity Demand 2020	34,600 GWh
Renewable Electricity Target 2020	10,380 GWh
Contribution from offshore wind 2020	4,667 GWh
Onshore Target 2020	**5,713 GWh**
Current Renewable Electricity	2,566 GWh
Remaining Onshore Target 2020	**3,147 GWh**

A recent report (SQW, 2010) showed that the NW has the theoretical capacity to generate between 62,000 GWh/year from renewable electricity, of which 6,000 – 7,000 GWh is practically deployable by 2020. Together with the expected offshore and marine technologies this will meet the 30% target.

Electricity supply technology comparison

The table below shows the typical power capacity and annual electricity output from each technology, assuming that each has been installed in a suitable location, and the total number of installations required to meet the *remaining* NW contribution to the national target of 30% renewable electricity generation by 2020, if each technology were the only provider.

	Capacity (each) kW	Output (each) MWh	Number of Installations to meet remaining NW target	Number of Installations equivalent to one 25MW windfarm
Wind farm - 10 x 2.5MW turbines	25,000	65,000	48	1
Energy from Waste/Biomass - 5MW	5,000	25,000	126	3
Large Wind Turbine - single 2.5MW	2,500	6,500	484	10
Hydro - large - 1MW	1,000	6,000	525	11
Solar Farm - 1MW	1,000	1,000	3,147	65
Hydro - small - 100kW	100	500	6,294	130
Hydro - very small - 30kW	30	120	26,225	542
Small wind turbine - 11kW	11	25	125,880	2,600
Commercial Solar PV - single system - 20kW	20	20	157,350	3,250
Domestic Solar PV - single system - 2kW	2	2.0	1,573,500	32,500

The ratio of Actual Output to the theoretical maximum Rated Output is known as the Load Factor. i.e.: **Actual Output = Load Factor x Rating x 8760 hours/year.**

The Load Factor varies between technologies, and takes into account physical constraints, technical efficiency and the available energy from the renewable source at the location of the installation (e.g. solar radiation, wind speed). Typical Load Factors are shown below:

Technology	Load Factor
Combustion (Landfill, EfW, Biomass)	40 – 60%
Hydro	50 – 70%
Large Wind	25 – 35%
Small Wind	15 – 30%
PV	8 – 11%

Further information

Northwest renewable and low carbon energy capacity and deployment (SQW, 2010) –

http://www.sqw.co.uk/file_download/343

UK renewable energy policy & targets - www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/renewable_ener.aspx

This reference guide forms part of the CLASP technical support and training programme for North West local planning authorities, delivered by Envirolink, Quantum Strategy & Technology and AECOM (2011).