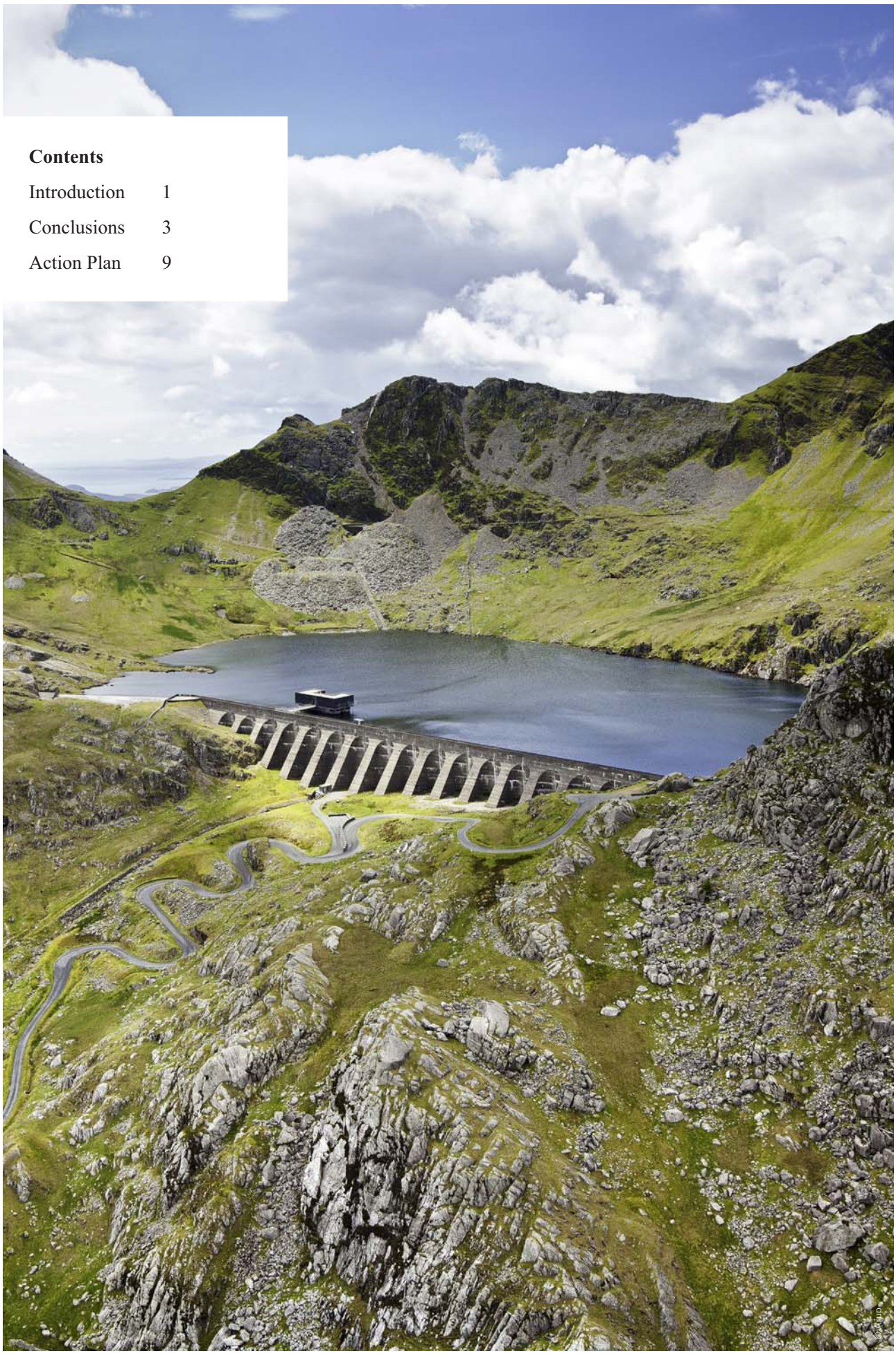
Gywnedd Werdd
October 2012

Scoping Renewable Energy Opportunities in Gwynedd
Executive Summary

Contents



Introduction

Gwynedd Werdd

Gwynedd Council's Economy and Regeneration Programme Board has prioritised Gwynedd Werdd in order to achieve the objectives of Result 1 in their Three Year Plan: 'Economic Prosperity – The economy of Gwynedd will prosper'. Gwynedd Werdd has been developed as part of a package of programmes to achieve this vision. Gwynedd Werdd's aim as part of the wider vision is promote "more self-sufficient sustainable communities, maximising the economic benefits from natural resources, local produce and services."

This is a long term aim, but action has been taken in the short term to promote areas including renewable and low carbon energy, of which this report forms part.

Aim of the Study

Arup has been commissioned by Gwynedd Council, on behalf of Gwynedd Werdd to scope the renewable energy opportunities for Gwynedd.

The prime objectives of the scoping exercise are:

1. To determine the economic potential of renewable energy opportunities in Gwynedd
2. To highlight barriers to achieving the economic potential of renewable energy opportunities in Gwynedd
3. To determine work streams and actions needed to overcome the barriers identified.

The scope of the study specifically excludes consideration of low carbon generation, energy efficiency measures, and of energy related to transport. This does not mean that these areas (and others) could not contribute to creating jobs and tackling climate change in Gwynedd, but this study is to consider renewable electricity and heat only.

This is not a planning document, though it may form part of the evidence base toinform the furture planning policy development. The planning process will still need to be adhered to for any future development.

Study Method

This study was carried out by Arup between March and August 2012. The work was a combination of desk-based research, workshops and semi-structured stakeholder interviews.

Desk-based research involved carrying out:

1. A baseline of existing policy, existing renewable energy installed, and the socio-economic context of Gwynedd
2. An assessment of the technically available renewable resource, using two methodologies:
   - *Welsh Government Practice Guidance: Planning for Renewable and Low Carbon Energy - A Toolkit for Planners* (June 2010, referred to as the "Welsh Government Toolkit").
   - Where appropriate, reference was also made to the *DECC / SQW Energy guidance, Renewable and Low-carbon Energy Capacity Methodology: Methodology for the English Regions* (January 2010, referred to as "the DECC methodology").

Any sites shown as having potential for renewable energy generation were analysed purely through desk study. Further work would be required to determine their acceptability and feasibility.

3. An assessment of the economic potential of the technically available resource, using the jobs per MW benchmarks are taken from a 2004 Department for Trade and Industry report entitled 'Renewable Supply Chain Gap Analysis'
4. A review of barriers and constraints to deployment of renewable energy.

Two workshops were held with local stakeholder representatives from local authorities, private sector, community groups, higher education and other public sector bodies to gather their understanding of the local context, barrier and constraints and the main areas of opportunity for Gwynedd.

In addition, semi-structured interviews took place face-to-face and over the telephone with stakeholders who were unable to attend the workshops to enable their views to be incorporated.

Context and Study Area

Gwynedd is a predominantly rural area, with a unique high quality natural environment and a population of 121,900 (census 2011).

There are a number of designated landscapes in Gwynedd. A large proportion of the area of Gwynedd has been designated a landscape of national importance – the Snowdonia National Park and the Llŷn Area of Outstanding Natural Beauty.

Approximately 63% of Gwynedd land area falls within Snowdonia National Park. One of the main purposes of Snowdonia National Park is the conservation and enhancement of the natural landscape, wildlife and cultural heritage of the National Park.

The resource assessment and detailed economic analysis carried out for this study focuses on that which is available within the Local Authority boundary, including the area which is situated within Snowdonia National Park, and on the tidal opportunities off the coast at the end of the Llŷn peninsula. However, it is recognised that there will be wider economic opportunities as part of the supply chain to renewables projects planned for further afield. Some of these wider opportunities for cross-boundary collaboration are considered as part of the action plan.

There is a growing body of policy at all levels that support the move towards renewable energy and the contribution that this can make to local economies. For example, Welsh Government has set out its ambitions in *Energy Wales: A Low Carbon Transition* (March 2012) and *Capturing the Potential: A Green Jobs Strategy for Wales* (July 2009). These documents set out the need to overcome barriers set by the planning system, for example, and the need to support skills development.

Neighbouring Authorities, such as Anglesey, are doing a lot of work in this area, and there will be benefits to Gwynedd working in partnership with them in many areas.

Conclusions

Detailed information on the work done to define the potential available renewable resource in Gwynedd, and the economic analysis of the benefits that this could bring locally are set out in chapters 5 - 7 of the main report. The results from this work are set out here.

Renewable Resource

Two methodologies (as set out above) were used to estimate the total technically available resource available in Gwynedd, as set out in **Table 1** below:

The biggest technically available resources available are heat pumps, onshore wind, solar, tidal and biomass.

However, the likely deployment of all technologies is not evenly spread and there are issues that will impact on the deployment rates of each of these technologies, making the maximum achievable technical resource unlikely to be realised in the short to medium term.

Table 1: Technically Available Resource in Gwynedd

Category	Sub-Category	Potential Capacity (MWe) [Electricity]	Potential Generation (GWh) [Electricity]	Potential Capacity (MWt) [Heat]	Potential Generation (GWh) [Heat]
Wind (onshore)	Wind Clusters	97.5	230.5	-	-
	Micro-wind	117.6	103.0	-	-
Hydropower	Small Scale Hydropower	1.1	3.6	-	-
Microgeneration	Solar	32.9	28	9	7
	Heat Pumps	-	-	304	-
Anaerobic Digestion	Sewage Sludge	0.3	2.4	0.5	2.0
	Poultry Litter	0.1	0.8	0.2	0.7
	Food Waste	1.1	8.2	1.6	6.8
	Animal Manure	0.9	7.1	1.4	5.9
Energy from Waste (EfW)	MSW and C&IW	0.9	7.4	1.9	8.3
	Waste Wood	0.5	4.3	1.1	4.8
Biomass	Managed Woodland	4	31.3	8	34.7
	Energy Crops	13.9	109.6	27.8	121.8
Tidal	Tidal	40	87.6	-	-
Total	**-**	**310.8**	**623.8**	**355.5**	**192**

[1] Environment Agency, (2010) Mapping Hydropower Opportunities in England and Wales [online] [Accessed 19 April 2012]

It is important to note that the data available on the available hydropower resource is limited. We have used data from the Environment Agency's Mapping Hydropower Opportunities in England and Wales report for the purposes of this study. This data looks at what are described as small scale low-head opportunities (although the largest capacity identified is 1200MW) for existing 'barriers' (these are mostly weirs, but could also be other anthropogenic structures or natural features, such as waterfalls) to provide hydropower. This means that this assessment does not look into larger scale hydro (or pumped storage opportunities), where there may be no existing barriers in place.

Deployment Potential

It is assumed that the full technically available resource is not achievable in the short to medium term, as there are a number of political, infrastructure, environmental and economic barriers and constraints in the current system (these are discussed in more detail below). The assumed deployed renewables are set out in **table 2** below.

Table 2: Assumed Deployed Renewables by 2017

Technology	Total Technically Available Resource (MW)	Assumed Additional MW Deployed by 2017
Wind (onshore)	215.1	33.2
Hydropower	1.1	1.0
Solar (PV and thermal)	32.9	18.3
Heat pumps	304	30.4
Anaerobic digestion	6.1	2.2
Energy from waste	4.4	0.0
Biomass	53.7	18.6
Tidal	40.0	8.0
Total		**111.7**

Economic Potential

It is clear that there are a range of direct and wider economic benefits that can be realised if further investment and deployment in renewable energy is achieved in Gwynedd. There are also a range of barriers and market failures which need to be addressed, many of which are international in their nature and beyond the influence of the public or private sectors in Gwynedd to directly bring about changes. The action plan focuses on the areas which are most likely to bring about the greatest increase in renewable energy deployment, carbon reductions and economic benefits in Gwynedd. Whilst economic benefits are the focus for Gwynedd Werdd in this instance, an element of pragmatism is needed to ensure that renewable energy continues to meet its primary aim of 'greening the grid' and reducing carbon emissions.

Whilst direct job creation is limited in its nature, it is still extremely valuable locally and provides the opportunity to offer reasonably secure private sector employment to local people over the medium to long term. Should the potential renewables capacity for 2017 be reached as analysed above, then up to 160 operational jobs would be created along with 2,200 job years of manufacturing and installation jobs, of which over 300 job years relate specifically to the installation of the renewable energy in Gwynedd. This is set out in **table 3**.

This maximum potential equates to £455m of GVA of manufacturing and installation with £16.6m for the operational and maintenance employment.

It is the equivalent to 220 full time manufacturing jobs and 30 full time, local installation jobs.

Table 3: Peak Medium Term Job Creation Potential up to 2017

	Additional MW Deployed	Manufacturing and Installation Jobs	Operational and maintenance jobs
Wind (onshore)	33.2	199	3
Hydropower	1.0	20	0
Solar (PV and thermal)	18.3	579	9
Heat pumps	30.4	964	15
Anaerobic digestion	2.2	35	10
Energy from waste	0.0	0	-
Biomass	18.6	335	123
Tidal	8.0	76	2
Total	**111.7**	**2,207**	**162**

Source: Mott Macdonald data and Arup analysis, 2012

Barriers and Constraints

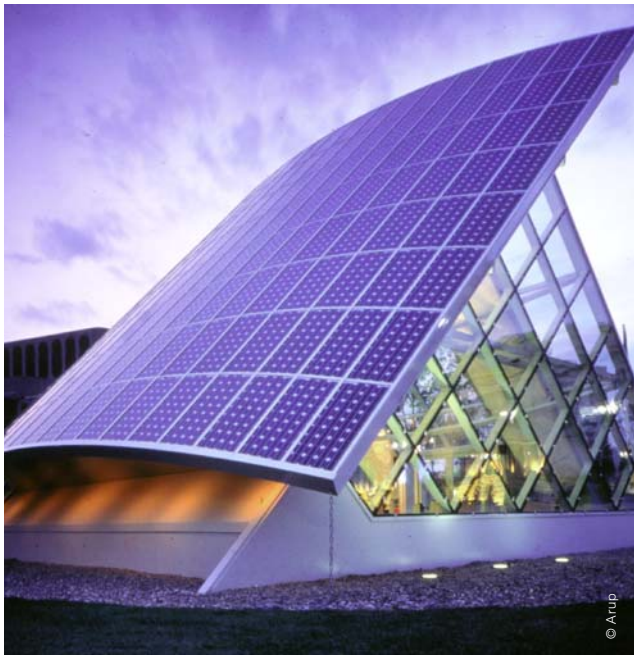
The main constraints identified in this study were:

- Difficulty in obtaining planning permission and environmental consents;
- The ability to raise capital;
- Uncertain payback periods;
- Market failures;
- Lack of local skills base; and
- Real and perceived grid constraints.

There are perceived and actual difficulties in obtaining planning permission and environmental consents, particularly in and around the National Park.

This is particularly an issue for larger scale developments. For micro-generation and community scale development this is perceived to be less of an issue. There are opportunities for both Gwynedd and Snowdonia National Park Authority to develop supportive planning policies, but work could also be done with the new Single Environmental Body for Wales to ensure that other environmental consents do not remain a barrier.

Market failures in the provision of finance for renewable energy can be largely attributed to the relatively new, evolving and innovative nature of the renewable energy sector. There is information asymmetry which stems from lack of track record in many renewable energy technologies and as a result financial institutions tend to be cautious when pricing up risks associated with renewable energy investments.



Another key constraint, with regards to capturing the local benefits, relates to the local skills base. The most recent Skills Strategy for Gwynedd and Ynys Môn points towards difficulties recruiting engineers. Thus, it is crucial that local education resources are utilised to provide relevant skills to take full advantage of renewables employment opportunities.

The real and perceived difficulties of connecting new development to the grid remain an important constraint. Some of this is related to perception, as the DNO will explore options of how to connect to the grid for any proposed development. However, in many more rural parts of the county and for smaller scale development, the cost of connection can be prohibitive, and whilst there are proposed upgrades to the grid connection to Anglesey, this is unlikely to provide opportunities for Gwynedd.

The action plan that follows is aimed at addressing and overcoming many of these barriers.

Wider Opportunities for a Sustainable, Low Carbon Economy

It is recognised that whilst renewable energy has an important role to play in creating a sustainable, low carbon economy for Gwynedd, further work would be required to transform the economy to help create the sustainable future desired.

This could include looking at opportunities presented by the wider Environmental Goods and Services (EGS) sector, using the definition used by UK and Welsh Government. It could also look more widely at key existing economic sectors, and consider opportunities for “greening” these. This could include researching the economic benefits of sustainable tourism, for example, or looking in more detail at how to value ecosystems services.

Action Plan

The aim of this report was to determine work streams and actions needed to maximise the economic potential of renewable energy opportunities in Gwynedd. The action plan that follows aims to help Gwynedd Werdd and its partners to work towards achieving this aim.

Based on the research above, the outcomes of the stakeholder workshops and experience from elsewhere, we developed a long list of actions. This long list was further prioritised, based on the following three criteria:

- **MW of Renewable Energy:** the deployment potential up to 2017;
- **Local Influence:** This is the influence held by Gwynedd Werdd and its partners, including: Gwynedd Council, local business, community groups;
- **Scale of Economic Impact:** This is local economic impact, measured in terms of direct job potential.

The priority actions are set out below. All actions are further expanded in the delivery plans in the main report.

Category	Headline Action
Technology-Specific	The identified **hydro** potential is focused on small scale in line with the EA data. Larger scale potential for hydro should be explored further.
	Explore potential for a **biomass processing plant** in Gwynedd or North Wales
	Work with the District Network Operator to clarify and communicate more widely **the grid connection options and process** for distributed generation in Gwynedd
Skills and training	Support for **microgen installation training**, esp. heat pumps and PV
Finance and Governance	Identify and pursue new capital and investment from private funds, Welsh Govt, ERDF, UK Green Investment and the European Investment Bank for example
	Provide political leadership to ensure the delivery of the Gwynedd Werdd Vision and Action Plan
	Provide resource to enable the delivery of the Gwynedd Werdd Vision and Action Plan
Planning and Sites	Use evidence to develop **renewable energy SPG for SNPA**
	Use evidence to develop policies and allocate sites in JLDP
	Maximise the potential of the **Snowdonia Enterprise Zone, Trawsfynydd**
Community	**Support local community groups** working in partnership with Gwynedd Werdd to deploy renewable energy

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