Renewables Action Plan

Renewable Energy Division

June 2009

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Ministerial Foreword

Since day one this Government has made clear that our overarching purpose is sustainable economic growth. With climate change and the economy ever more prominent as two of the dominant themes in the international political debate, the commitment we made in 2007 to pursue sustainable economic growth for Scotland is of more relevance than ever – and has now been backed up by our world-leading Climate Change legislation.

Energy has long been part of Scotland's story, and Renewable Energy represents one of our most powerful areas of competitive advantage. The dawn of the boom years of North Sea oil and gas are now being replicated three decades on, as a unique partnership between public and private sectors emerges to exploit not fossil fuels but the power of our wind and our seas. These hold some of the most concentrated potential not only across the UK and Europe, but in the world, with an estimated 25% of Europe's offshore wind and tidal potential and 10% of wave potential. The benefits for Scotland in exploiting this resource are very significant, and very tangible. Jobs are being created, in sectors as diverse but thoroughly interlinked as engineering and environmental assessment. Exportable technology is being developed and tested, ranging from fuel cells and the hydrogen sector, to marine energy and off-shore wind. Direct financial benefit is flowing into our communities from the generation and sale of renewable electricity. And at the same time, with nearly 6 Gigawatts of renewable energy now either installed or in the pipeline, we are well on our way to meeting our baseline target of 50% of electricity demand from renewables by 2020.

Since the installation of the first Scottish hydro-electric plants in the post war years, much has been achieved. With highly stretching, but, we are convinced, eminently achievable targets out to 2020 and beyond, much remains to be done. As our track record over the past two years demonstrates, we are committed to the task. Since coming to power in 2007, Ministers have consented no less than 22 major renewables projects, with a 9 month target turnaround time for new applications. We recently switched on Europe's largest operating on-shore windfarm, and have already consented a project which will exceed even that one in capacity. Construction work finished in 2008 on the largest new Scottish hydro plant in 40 years, just a few months before we launched the £10 million Saltire Prize for marine renewables – one of the largest innovation prizes anywhere in the world - which has already attracted over 100 registrations of interest from 24 countries across the globe.

However we have no intention of resting on our laurels. In February the Cabinet Secretary for Finance and Sustainable Growth launched our ten energy pledges, the blueprint to create thousands of green energy jobs. The first of these was a commitment to support and accelerate the implementation of renewable energy through the Renewables Action Plan, which it is my great pleasure to now introduce.

As with our Economic Recovery Programme, the Renewables Action Plan is more

than a set of measures to cope with short-term challenges.

Not only does it mark the way towards 2020 and beyond, to our 2050 targets for carbon emissions reduction, but it embodies the collaborative approach that will be needed to meet them. The Plan highlights milestones along the way, identifies the necessary key actions, and specifies the required stakeholder contributions. It does not contain all the answers, for the pace of change demands a constantly-evolving framework of action, undertaken collectively by the Scottish Government, public bodies, local government and other partners, in concert with the private sector and international interests. At its simplest, the plan seeks to drive low carbon energy production, in a way which capitalises on Scotland's unique resources, and delivers maximum benefit to her people and her economy.

That process begins now – and I look forward to working with you on its implementation.

Jim Mather MSP
Minister for Enterprise, Energy and Tourism

Executive Summary

Introduction

The imperative for action to address climate change (demonstrated by Scotland's world leading carbon reduction target of 42%) is driving development across a host of policy interests.

Scotland is currently committed to achieve a headline target of 20% of total Scottish energy use coming from renewables sources by 2020. Specific targets include 50% of electricity demand, a 10% target for renewable transport and 11% target of heat demand. Scotland's Renewables Action Plan sets out a framework for action in the specific area of renewable energy. Other strands which are being led by the Scottish Government are as follows:

- Energy Efficiency Action Plan due to publish by December 2009
- Low Carbon Vehicles – consultation in Summer 2009
- Carbon Capture and Storage – development of sectoral routemap by end of 2009
- In addition, Renewable Heat, while included in the RAP, will be covered in more detail in the forthcoming Renewable Heat Action Plan which will be published in Summer 2009

Purpose of the RAP

- identify what needs to happen and by when to achieve objectives;
- focus on the actions needed over the immediate 24 month period;
- establish in the public domain what will effectively become a live document – a portal for the development of the sector, subject to ongoing input and revision as new opportunities arise, as technology moves forward, and as new requirements become apparent.

Key objectives:

- to establish Scotland as a UK and EU leader in the field;
- to ensure maximum returns for our domestic economy,
- to meet our targets for energy from renewables, and for emissions reductions, to 2020 and beyond;

The Role of Government

Leadership, coordination and communication

- The Scottish Government is focused on driving progress and identifying and overcoming obstacles to energy generation, business success, jobs growth, and carbon reductions. We will coordinate and facilitate the highest degree of partnership working between the public and private sectors and reinforce the

role of the Energy Advisory Board, and its Renewable Energy sub-group (FREDS), as the "centre of gravity" for renewables in Scotland. We will also continue to engage closely with UK Government and the EU to ensure Scotland's needs and contribution are reflected in their policies.

Short Term Key Actions – Phase 1

Area	Milestone/Event/Tasks	Task length
Infrastructure	National Renewables Infrastructure Project. Develop a clear spatial framework for port and port-side land and landward infrastructure that can support the manufacturing, construction, and operation and maintenance of offshore wind devices and commercial wave and tidal machines. Identify infrastructure dependencies	June –Oct 2009
	Decision on Beauly-Denny transmission line	End 2009
	Continue to make the case for a fairer transmission charging regime to Ofgem and National Grid	Ongoing
Supply Chain	Take forward a study on the renewable energy supply chain in Scotland which will consider in detail the potential economic value and employment potential from clean energy developments over the next decade	End 2009
	SE/HIE study of Scottish renewables supply chain companies	Summer 2009
	Marine Energy Group supply chain study for wave and tidal sectors	Summer 2009
	Crown Estate "marketplace" events for off-shore wind supply chain	Late 2009/early 2010
R DD & D	To profile / map Scottish funding for energy RDD&D across the range of relevant organisations and create a database / portal / interface where this information can be made available to external bodies	Late 2009
	To undertake a critical analysis / benchmarking of spend against industry need, and produce recommendations for Ministers regarding future funding and structures	Late 2009
Energy Consents and Planning	Consider efficacy of Section 36 framework and, with the UK Government, opportunities for reform	ongoing
	Facilitate cross-working and understanding among decision makers through a series of workshops with Local Authorities and key stakeholders, helping to assist the realization of their renewables ambitions and strategically address barriers to achievement	End 2009 to deployment
	Through the creation of a Scottish Renewable Energy Ornithological Steering Group to broker the sharing of environmental information to better inform planning and consenting regimes	
	Through MESPG, with feed-in from MSSF, produce a non-statutory Interim Marine Spatial Plan for the Pentland Firth and Orkney	Early 2010

	Waters	
	Through MESPG, with feed-in from MSSF, take forward an SEA for Offshore Wind Energy development in Scottish Territorial Waters	Early 2010
	Through MESPG, recommend simplified guidance for consents and licensing for marine renewables.	2009/10
Skills	Develop apprenticeship frameworks – early opportunities in microrenewables and onshore wind	2009/10
	Develop up-skilling programmes	Late 2009
	Develop a programme to support skills development and continue to develop the Renewable Energy Skills Group's workplan	Autumn 2009
Communities	Deliver and review CARES and consider any changes to retain best value for money and maximise delivery	End 2011
Research and Analysis	Production of a Renewable Energy Baseline Study to provide accurate estimates of employment and economic value of the renewable energy sector in Scotland	Summer 2009
	Research to provide an updated assessment of Scotland's renewable resource across each sector	End 2009
Heat/Bioenergy	Ensure that Scottish interests are taken into account in the design of the RHI.	End 2009
	Continue to provide funding through various grant programmes, including CARES, SBHS and SRDP to support renewable heat installing including district heating.	End March 2011
Hydro	Through FREDS Hydro Group, agree on best level for S36 threshold and implementation of change if required.	June 2010
	Abolition of Fisheries Committee through UK Government	In Hand
	Establish a new industry group on Micro-hydro to galvanise action and consider barriers and report to FREDS	2009-2010
Hydrogen	Early commercial demonstrators on grid balancing and transport corridor	2012
	SHFCA to galvanise members to buy in to clear vision for sector. Also FREDS Group on Green Hydrogen and Fuel cells to be established to oversee progress	End 2009
Onshore Wind	Map and identify solutions to aviation/radar issues, particularly in the South and West of Scotland	End 2009
	Consider need to conduct an onshore wind supply chain study	January 2010
	Continue to improve s36 Consents process and reform of planning system to aid delivery of appropriate projects	Ongoing
Offshore Wind	Champion and co-ordinate the delivery of appropriate Scottish regions as clusters for integrated innovation, manufacturing, port and grid infrastructure	Autumn 2009 onwards
	Deliver of the SEA for Offshore Wind in Scottish Territorial Waters	Early 2010

	Establish SG group to design a marine consenting regime with appropriate structure and resources for handling of numerous offshore wind applications.	2009-2010
	Direct engagement in DECC's consultation on proposal in Budget to raise ROC banding for offshore wind.	Summer 2010
Marine Energy	MEG to publish a Marine Energy Road Map and work towards delivering the key recommendations.	Summer 2009
	Findings of commissioned supply chain study to be used to strategically plan the types (and locations) of infrastructure and supply chain needs necessary to manufacture, deploy and service devices.	Summer-Autumn 2009
	To continue promoting the Saltire Prize at an international scale, encouraging new marine developers and innovators to deploy in Scottish waters.	Ongoing
Communication and progress reporting	RAP to be updated every 6 months via a new online resource for Renewables in Scotland	End 2009

1. Introduction

The imperative for action to address climate change is driving development across a host of policy interests. With Scotland's world-leading Carbon Reduction target of 42% by 2020, the country is set for a decade of unprecedented activity in this sphere.

Of the 4 transformational outcomes identified in the Climate Change delivery Plan, 2 fall within the scope of the Renewable Action Plan:

- the decarbonisation of electricity supply by 2030, primarily through renewable generation,

and

- a largely de-carbonised heat sector by 2050, including a massive increase in the use of renewable or low carbon heating.

En route to these longer term outcomes, the Scottish Government's Climate Change delivery plan identifies the primary Electricity and Heat milestones for 2020 as more than 50% of electricity and 11% of heat from renewable sources.

The Renewables Action Plan sets out a framework for action in the specific area of renewable energy, and includes a sectoral routemap for renewable heat. It is consistent with the 50% and 11% targets for 2020, both of which are regarded as indicative interim ambitions, which will clearly need to be exceeded in due course.

Energy efficiency and sustainable transport sit alongside decarbonising the electricity and heat supplies as key objectives. Waste policy, land use, planning, construction – these are some of the specific areas, too, where change over the next decade will be required to deliver against the stretching targets for emissions reductions.

The Renewable Action Plan is not intended to cover the entire spectrum of activity relating to climate change mitigation, other principal strands of which are being led by the Scottish Government as follows:

Energy Efficiency Action Plan due to publish by December 2009

Improving energy efficiency is widely recognised as the most cost effective means of reducing carbon dioxide emissions, and needs to be pursued in parallel with measures to increase renewable energy use. Our Climate Change Bill includes a mandatory provision to introduce an Energy Efficiency Action Plan for Scotland. The Scottish Government will also establish an Energy Efficiency Programme Board to monitor the development and implementation of the plan.

Renewable Heat – Action Plan to publish summer 2009

A sectoral routemap for Renewable Heat is included in the current Renewables Action Plan. This critical policy area will be addressed in more detail in the forthcoming Renewable Heat Action Plan (RHAP) which is now mandated under the Climate Change Bill.

Low Carbon Vehicles – consultation in summer 2009

The Scottish Government consulted on renewable fuels for transport last year as part of the Renewable Energy Framework (REF). The next step is our consultation on Low Carbon Vehicles (LCVs), which is being undertaken this summer. This LCV consultation considers how the public sector and the wider Scottish fleet will make greater use of low carbon vehicles and alternative fuels, posing questions around vehicles powered by renewable electricity and other sources of renewable energy. It also demonstrates why emissions from road transport must be addressed, and how low transport technologies and renewable fuels are expected to play an important part in helping to ensure that 10% of Scotland's transport fuels come from renewable energy sources by 2020.

Carbon Capture and Storage (CCS) – development of sectoral routemap by end of 2009

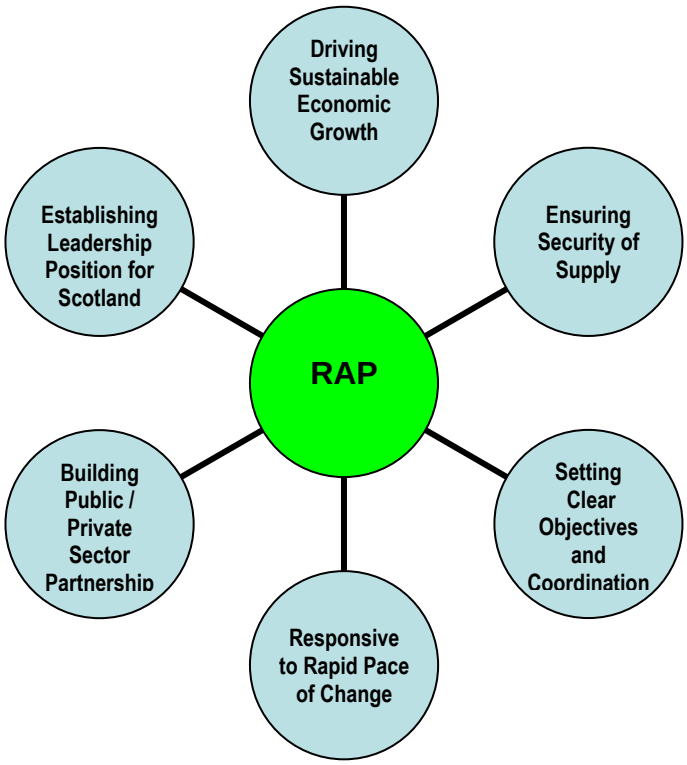
CCS and clean coal technologies represent an enormous opportunity for Scotland. The first comprehensive study of CCS to be undertaken in the UK (published on 1 May 2009) found that Scotland has the ability to safely accommodate industrial emissions generated in Scotland and North East of England for the next 200 years, and that our offshore storage capacity for carbon emissions is greater than the Netherlands, Denmark and Germany combined. The route map will expand on the steps required to leverage the knowledge and expertise in our universities and industry, the infrastructure in the North Sea, and government leadership to make this happen.

Purpose of the RAP

As with all these areas, the pace of change in renewables is rapid, and depends on the coming together of both public and private sectors in areas such as technology, finance, legislation, research, and leadership and coordination. The purpose of this plan is therefore to:

- identify what needs to happen and by when to achieve objectives;
- focus on the actions needed over the immediate 24 month period;
- establish in the public domain what will effectively become a live document – a portal for the development of the sector, subject to ongoing input and revision as new opportunities arise, as technology moves forward, and as new requirements become apparent.

FIGURE 1: MAIN PRINCIPLES



In developing a renewables action plan for Scotland, we have been mindful of 6 main principles:

- that the extent & richness of Scotland's low carbon energy potential provides enormous opportunities for sustainable economic growth, coupled with the creation and retention of more wealth in Scotland;
- that security of energy supply from renewables and clean coal and gas can be achieved, hand in hand with the creation of employment, wealth and investment;
- that we are not only wholly in step with international developments in this area, but in many concrete ways we are ahead of the game. Scotland is already taking a leadership position Europe-wide on renewables, and that is a position we are setting out to bolster, to the benefit of our economy, and the international climate change agenda;
- that progress will depend on the evolution of an unprecedented partnership between government, industry and the wider public sector. Meeting the global CO2 reduction challenge will require the increasing integration of systems for planning and support, for regulation, for environmental protection, for project deployment and skills development, involving all the current bodies active in this sector and more;
- that it is neither possible, nor desirable, for Government to direct operations. To achieve the required degree of join up between multiple agencies and organisations, Government therefore needs to act in a coordinating, facilitative role, against a set of clearly defined leadership objectives;

- that the pace of change is enormous. A renewables action plan produced as recently as 8 months ago would have been blind to the outcomes of the Crown estate territorial waters round – yet we are now gearing up to facilitate the development of up to 6.4 GW of off-shore wind through this process.

Leading the way - our renewables objectives:

- to maximise the economic, social and environmental potential of Scotland's renewables resource, across different technologies;
- to establish Scotland as a UK and EU leader in the field;
- to reduce the time for renewables to become cost-effective;
- to ensure maximum returns for our domestic economy, in terms of jobs created, company wealth and IP generated, inward investment secured, and tonnes of carbon saved;
- to meet our targets for energy from renewables, and for emissions reductions, to 2020 and beyond;
- to maximise the confidence of developers, investors, and the workforce that these are unambiguous, long term commitments - Scottish Government-led, but with durable cross-party political backing;
- to ensure an advantageous integration between the activities of the Scottish Government, the UK government, and Europe.

Policies for delivery focussed on:

- understanding the needs of the sector, from individual company to trans-national infrastructure level, and putting in place the right support mechanisms to meet them;
- coordinating and facilitating the highest degree of partnership working across the public sector, and providing the most coherent interface possible with the private sector;
- developing, welcoming, and enabling the strong overseas interest and investment in the Scottish low carbon economy;
- promoting innovation through RD&D (Research, Development, Demonstration and Deployment) funding and associated delivery programmes;
- communicating the opportunities – to investors, to developers, to communities, to supply chain companies, and to the labour market;
- contributing to a clear proposition for renewables UK-wide which recognises and caters to Scotland's outstanding natural and supply chain advantages.

2. Energy Targets and Key Milestones for Delivery

Scotland's Targets

Scotland is currently committed to achieve a headline target of 20% of total Scottish energy use coming from renewables sources by 2020 as follows:

- Electricity - 50% of gross electricity consumption from renewable sources by 2020, with an interim target of 31% by 2011.
- Transport - 10% target for renewable transport by 2020. Set to be consistent with overall EU approach.
- Heat - 11% target of heat demand to be met from renewable sources by 2020.

Background to the calculation of Scotland's renewable energy targets, and on energy demand, can be found at Annex B.

Milestones for delivery of targets

2009

- Action Plans published: Renewables, Renewable Heat, Energy Efficiency
- Ministers to determine application for Beauly-Denny grid upgrade
- Offshore renewables infrastructure plan announced
- Marine Energy Road Map published by the Marine Energy Group (MEG)
- Crown Estate awards its commercial Round 3 offshore wind leases
- SEGEC fully operational and promoting industry successes in Europe
- World-leading Climate Change Bill in Scotland passed by Parliament

2010

- Scottish Marine Bill passed by Parliament
- UK Renewables Action Plan submitted to European Commission
- Feed in Tariffs for (small-scale) renewable electricity introduced in the UK
- Strategic Environmental Assessment (SEA) for Offshore Wind Energy development in Scottish Territorial Waters completed
- Saltire Prize Grand Challenge period begins

2011

- Scotland's proportion of electricity generated from renewable sources to increase to 31%
- Scotland's proportion of heat generated from renewable sources to increase to 2%
- Renewable Heat Incentive introduced
- Scottish Biomass Heat Scheme current rounds completed

2014

- Saltire Prize Output Generation Competition closes

2015

- Scotland's proportion of heat generated from renewable sources to increase to 6.5%
- Announce Saltire Prize winner

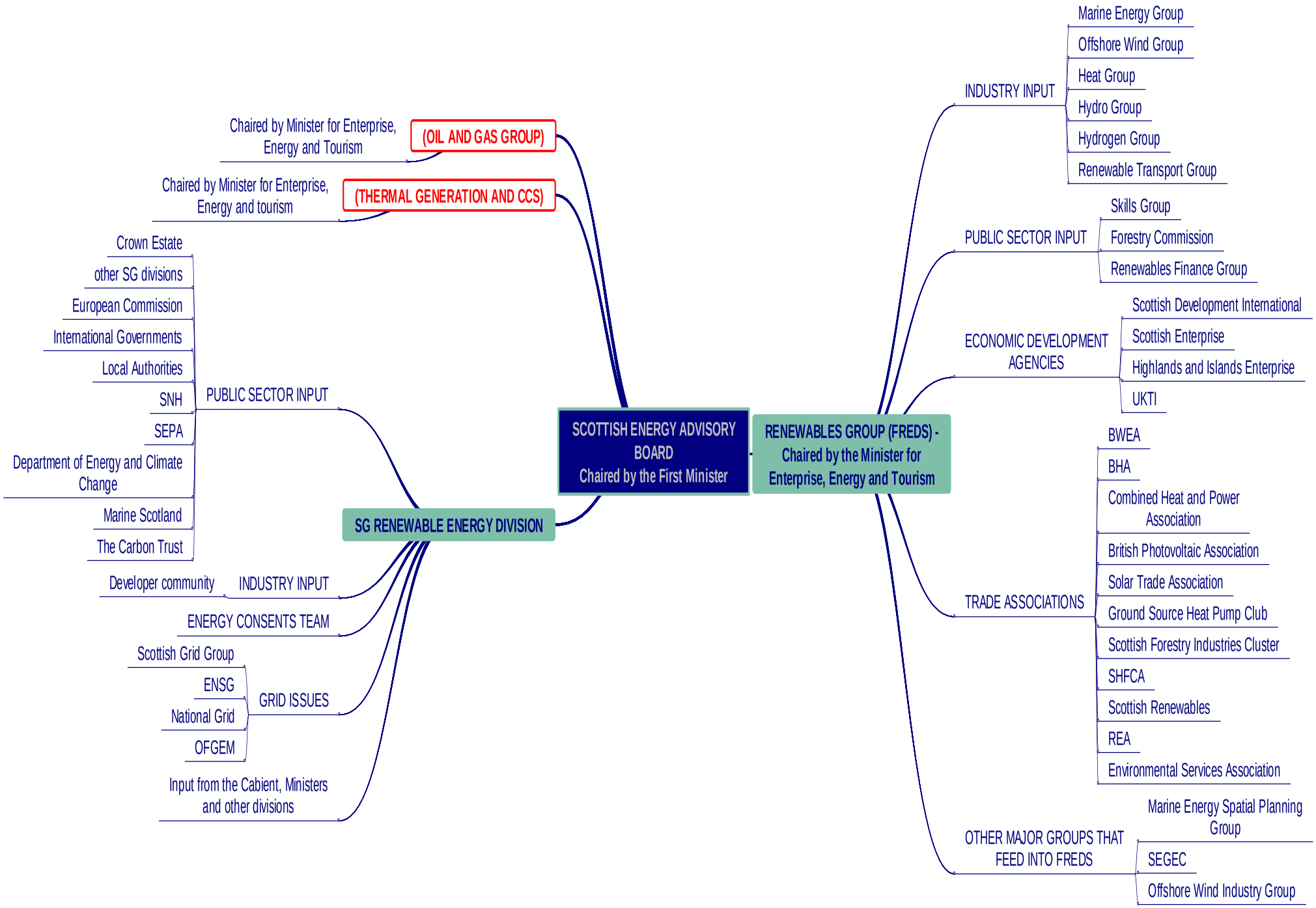
2020

- Scotland's proportion of electricity generated from renewable sources to increase to 50%
- Scotland's proportion of heat generated from renewables to increase to 11%
- Scotland's proportion of energy generated from renewable sources to increase to 20%

3. The Role of Government

Leadership, coordination and communication

Figure 2: Current structures (overleaf)


SCOTTISH ENERGY ADVISORY BOARD
Chaired by the First Minister
RENEWABLES GROUP (FREDS) - Chaired by the Minister for Enterprise, Energy and Tourism
SG RENEWABLE ENERGY DIVISION
(OIL AND GAS GROUP)
Chaired by Minister for Enterprise, Energy and Tourism
(THERMAL GENERATION AND CCS)
Chaired by Minister for Enterprise, Energy and tourism
PUBLIC SECTOR INPUT
Crown Estate
other SG divisions
European Commission
International Governments
Local Authorities
SNH
SEPA
Department of Energy and Climate Change
Marine Scotland
The Carbon Trust
INDUSTRY INPUT
Developer community
ENERGY CONSENTS TEAM
GRID ISSUES
Scottish Grid Group
ENSG
National Grid
OFGEM
Input from the Cabient, Ministers and other divisions
INDUSTRY INPUT
Marine Energy Group
Offshore Wind Group
Heat Group
Hydro Group
Hydrogen Group
Renewable Transport Group
PUBLIC SECTOR INPUT
Skills Group
Forestry Commission
Renewables Finance Group
ECONOMIC DEVELOPMENT AGENCIES
Scottish Development International
Scottish Enterprise
Highlands and Islands Enterprise
UKTI
TRADE ASSOCIATIONS
BWEA
BHA
Combined Heat and Power Association
British Photovoltaic Association
Solar Trade Association
Ground Source Heat Pump Club
Scottish Forestry Industries Cluster
SHFCA
Scottish Renewables
REA
Environmental Services Association
OTHER MAJOR GROUPS THAT FEED INTO FREDS
Marine Energy Spatial Planning Group
SEGEC
Offshore Wind Industry Group

Scottish Government Objectives:

- to provide unambiguous backing for the renewable energy sector, driving progress and identifying and overcoming obstacles to energy generation, business success, jobs growth, and carbon reductions;
- to coordinate and facilitate the highest degree of partnership working across the public sector, with increasing alignment behind the Government's renewables objectives, and our binding Climate Change obligations;
- to provide the most coherent interface possible with the private sector, building on the strong existing connections between agencies and organisations, including public/private partnership working in key areas such as technology development;
- to reinforce the role of the Energy Advisory Board, and its Renewable Energy sub-group the Forum for Renewable Energy Development in Scotland (FREDS), as the "centre of gravity" for renewables in Scotland;
- to lead by example in exploiting renewables potential on the public estate.

Case Study: Leading the way on the Scottish National Forest Estate

- Recent studies show that the untapped potential for wind and hydro developments on the publicly owned national forest estate in Scotland could amount to several GW – or collectively the equivalent of one of the largest on-shore windfarms in the world.
- The Scottish Government is of course determined to develop an exemplary process to exploit the renewables potential within its own estate. The multi-GW estimate is an indication of the power available – safeguarding the environment will naturally limit the eventual scope of developments.
- Objectives are to capitalise on the natural energy resource, maximising potential carbon reduction in harmony with the environment, and to provide maximum direct benefit to the economy, at both national and local levels, in terms of income generated, and jobs created.
- Through the Climate Change (Scotland) Bill, Ministers are seeking powers to allow Forestry Commission Scotland to take a more strategic approach to realising this potential.
- An excellent opportunity exists to establish new, mutually beneficial models for public/private/local partnership, and concrete options under consideration include the formation of companies and joint ventures with developers and local communities.
- Decisions will be taken with community interests to the fore, with a project team currently developing options, and decisions on progress to be announced later in the year.

Public sector power goes greener

The Scottish Government is leading by example - negotiating a new electricity deal that will save taxpayers up to £10 million a year and help public bodies go greener. Scottish Power and SSE have been awarded innovative new contracts to supply renewable electricity. They're available to the whole public sector whose electricity spend is around £200 million a year. A large proportion will come from the Whitelee wind farm, currently the largest onshore wind farm in Europe and Glendoe, the new hydro electric scheme which is Scotland's first conventional large scale hydro electric power station for 50 years. There is also access to a range of low carbon and renewable technologies, such as combined heat and power, solar and biomass. All public bodies including every council, health board, university and college can take advantage of the contracts from this autumn.

Scottish Government Progress to date:

- Over the past 8 months, the Scottish Government has more than doubled the staff resource within its energy teams (from around 30 to around 60 people, including energy consents).
- A new Renewable Energy Division was created in September 2008, with 3 teams covering energy consents and deployment, on-shore renewables, strategy and communications, and off-shore renewables.
- Simultaneously, the expansion of the Energy Markets Division has increased the Government's capacity and ability to engage with the energy efficiency agenda, European institutions, carbon capture and storage (CCS), and the electricity transmission grid.
- New and refreshed industry groups have been set up to establish the necessary flow of information between public and private sectors, to map needs and agree on required actions.
- The Energy Advisory Board has met for the first time.

Securing Inward Investment in the Face of Global Downturn

- In 2008, Scotland was named European Region of the Future by the Financial Times Foreign Direct Investment magazine, over 38 other European Regions.
- Scotland scored highest in terms of economic performance, HR, IT and telecommunications, transport links, quality of life and FDI promotion strategy, with Edinburgh, Glasgow and Scotland featuring in the top ten 'Most Business Friendly' cities or regions in Europe.
- Scottish Development International is turning this potential into reality, recording its 3rd highest ever figure for High Value Added jobs in 2008-09.
- During the same period the Scottish economy saw over £500 million of commitment from companies in the form of capital expenditure and salaries and over 4,000 jobs created/safeguarded through SDI's activities.
- With 30% of all SDI projects representing first time Scottish investment, confidence in Scotland amongst international investors is clearly robust.

Scottish and UK structures

The Scottish Government is continuing to engage very closely with the UK Government on the shape and scope of renewable energy legislation and the financial incentives which they create. This engagement is long standing, and traces back to the introduction of the Renewables Obligation (RO) mechanisms across the UK in 2002. The Scottish Government, with its Renewables Obligation (Scotland) legislation, believes fully that this constructive approach has delivered great benefits, with the separate ROs combining to create a fluid and powerful market for renewable electricity that has delivered hundreds of MW of new capacity across the country. At the same time, Scottish Government has acted independently where there is a strong case for us to do so – such as in the introduction of higher support levels for wave and tidal power.

With banding now in place, we are working with UK colleagues on the further changes to the RO required to align it with the demands of the EU 20% target, as well as on the emerging details of a feed-in tariff mechanism for microgeneration and a renewable heat incentive. These are complex issues, and we are determined to ensure that Scotland's voice is heard and our interests reflected in the final analysis. We will be consulting on these matters during the coming months.

Renewables – Financial Incentives

Mechanism	Scottish Position / Input	Timeline
Renewables Obligation Scotland (ROS)	• Separate RO covering Scotland, made using devolved powers; • Scottish RO works alongside UK equivalents to create strong UK market for renewable electricity; • Scottish RO has incorporated higher support for wave and tidal power since April 2007.	• Banding introduced to ROS in April 2009; • Amendment to ROS on higher wave and tidal support introduced June 2009; • Consultation on further changes to UK RO and ROS (taking EU 20% target into account) due to publish in Summer 2009.
Feed-in Tariff (FIT)	• FITs made possible through changes introduced by Energy Act 2008; • Reserved matter – required legislation will be delivered at UK level; • Ministers to be consulted on details as they emerge.	• FITs slated to take effect from April 2010; • Consultation on details due to publish in July 2009.
Renewable Heat Incentive (RHI)	• Reserved matter – required legislation will be delivered at UK level; • Ministers to be consulted on details as they emerge.	• RHI not expected to take effect until 2011; • Preliminary consultation due to publish in July 2009.

Scottish and EU structures

In Spring 2007, European leaders reached a historic agreement for the first time to create a common European energy policy. The resulting Energy Policy for Europe sets out the EU's vision for Energy in the period to 2020 and is based on three fundamental 'pillars':

- sustainability;
- security of supply;
- competitiveness.

The EU's Energy Policy for Europe presents Scotland with major opportunities to capitalise on outstanding potential, an estimated 25% of Europe's offshore wind and tidal potential and 10% of wave potential. The commitments made by EU leaders and by the EU institutions have now set out concrete proposals for renewable energy, carbon capture and storage, and the development of new grid infrastructures where Scotland has significant potential to play a leading role in delivery. When taken together, the proposals set out in the package on CCS, the development of offshore renewable energy, the construction of a North Sea Offshore Grid, and with the considerable remaining reserves of North Sea oil and gas, show that Scotland is ideally placed to play a central role in ensuring the security of Europe's energy supplies in future.

The Scottish Government wants Scotland to be at the heart of Europe's low carbon energy revolution. We are working to forge European partnerships through the creation of the Scottish European Green Energy Centre (SEGEC). We are also

achieving this through collaboration with the Energy Technology Partnership (ETP) of Scotland's universities; through joint work with Scotland Europa, the Enterprise Agencies and industry in the Scottish EU Energy Network; and by working closely with the European Commission to deliver EU-wide priorities.

Infrastructure and accessing EU funding

The growing recognition and prominence of Scotland's renewables sector in the European context is strongly underlined by critical recent developments.

As part of their Economic Recovery Package announced in March the Commission has announced a proposed list of projects that would benefit from European co-funding. In the energy sector the list includes several projects of huge significance to Scotland including the development of the North Sea offshore grid (€165 million), the development of an offshore wind test centre in the Aberdeen area (€40 million), and enhanced financial support for CCS demonstration (€180 million for up to 4 UK potential projects, one of which is Longannet).

Scotland is now part of the European Working Group on North Sea Grid Connections and is now also represented on the European Working Group on Sustainable Fossil Fuels - on carbon capture & storage.

The Commission has most recently published its Directive on Renewable Energy, and the Scottish Government is undertaking work to see how this can be used to help Scotland's renewables sector, particular in terms of regulation of the grid.

The Prize

The Scottish Government is determined to lead by example and to establish the right structures for coordinated engagement and support to allow the renewables sector to grasp the unique opportunity now before us and to deliver to 2020 energy targets.

4. Overview of sectors

Annex A comprises routemaps for each of the technologies that will contribute to the 2020 electricity and heat targets. Particular focus is given to actions over the next 12-24 months, with the intention that this element of the Renewables Action Plan will be updated regularly to reflect progress and new priorities.

The delineation of routemaps according to individual technology sectors does not imply that such work will be addressed in technology silos. It is fully recognised that progress will need to be achieved through a systems approach, where policy impacts can be made across sectors, and this approach is reinforced throughout the Renewables Action Plan – particularly in Skills, Infrastructure and Deployment. However, it is also the case that categorisation by technology sector helps to highlight key themes, including cross-cutting regulatory and other issues, and to harness industry engagement and feedback.

Each of the technology sectors in the Annex will have its own part to play in helping Scotland meet its energy targets, and Ministers are committed to a diverse renewables mix to maximise the scope to match supply with demand, and to enhance security of supply.

However, in terms of policy attention and allocation of budgets, there has to be a degree of prioritisation. Policy support to date has focussed on the embryonic and emerging sectors such as marine energy, offshore wind, biomass, and hydrogen/fuel cells, and this focus will continue in order to grow the market and capitalise on economic development opportunities. In marine energy in particular, Scotland has the potential to be a world leader. However, given the early stage of the technologies, marine energy is unlikely to make a significant contribution to the 2020 electricity target, and thus it will be important not to lose sight of other technology opportunities, and to continue to promote the development of onshore and offshore wind. Offshore wind development will be a key policy focus in the short to medium term, not only for its generation potential, but also in terms of manufacturing and infrastructure opportunities.

Renewable heat is also a top priority for policy support, given the scale of the challenge and the relative lack of incentives to date. Whilst a routemap for renewable heat is included here, this will be supplemented by a detailed Renewable Heat Action Plan in due course to drive forward development. Biomass will deliver the majority of this capacity in the short to medium term, and is an important sector in its own right, but growth of the heat pump and solar markets also needs to be encouraged.

The hydro sector is well established, but while it currently makes up about 50% of all renewables installed capacity in Scotland, this percentage is expected to fall in relative terms as new hydro schemes are likely to be mainly small and micro-scale. Hence hydro policy may be considered low priority in terms of additional contribution to the target but nonetheless important economically for rural diversification and local energy security. Moreover, while there is limited potential for further large scale development, pumped storage projects, appropriately sited, could a provide useful grid balancing solution as the level of renewables generation on the grid grows.

Finally the Hydrogen and Fuel Cell sector is small (unlikely to make a large impact by 2020) but with a huge economic development potential. Applications cut across transport, electricity and heat, with scope to improve energy security, and provide grid balancing solutions. In policy terms, there will be a need to provide focussed support to encourage growth, including awareness raising, and with a focus on Scottish niches – namely rural and remote community applications and storage.

The wider potential for energy storage in Scotland cuts across sectors and will be assessed through an independent study over the coming year.

Progress in all the sectoral routemaps needs to be monitored closely, and short-term actions updated regularly. It is proposed that key FREDS industry sub-groups are established to undertake this task, without duplicating the sectoral focus that bodies such as Scottish Renewables are able to apply.

5. Infrastructure

Overview:

The substantial existing network of renewables-related infrastructure in Scotland is experiencing rapid growth and investment, from the European Marine Energy Centre (EMEC) at Orkney, to recent investments in the fabrication yard at Arnish Point in Stornoway, and the on-shore wind tower production facility at Machrihanish. Building on this strong existing base, the scale of Scotland's renewables resource means that more will be required to maintain current momentum across a range of categories.

Objectives:

- to continue to improve the infrastructure in Scotland, to enable the continued expansion of the Renewables sector, and deliver maximum benefit to the domestic economy;
- to stimulate investment in the infrastructure that will serve emerging industries.

Principal categories of infrastructure needs include:

OFF SHORE SUPPORT	Port and land-side facilities for manufacturing, construction and operations and maintenance in off-shore wind and marine energy sectors
TEST FACILITIES	A network of test facilities across a range of technologies, building on the strength and success of EMEC
RENEWABLE HEAT	For community and district heating, and for secure provision of fuelstocks.
RENEWABLE TRANSPORT	Options to be considered in wake of renewable transport consultation, summer 2009.
TRANSMISSION GRID	Upgrades required to bring increased renewable generation on-stream
DISTRIBUTION GRID	New solutions needed at community generation level

Non-grid Infrastructure

The Scottish Government is taking a strategic and targeted approach to the task, which will be addressed though a phased process of review, recommendation, and delivery. In line with recommendations from the newly established Energy Advisory Board, we have selected the off-shore wind and marine energy sectors as the focus for the first phase of scoping work.

- Clarity on where we see this industry developing will assist us in planning infrastructure investment both in sites and local access, as well as developing the logistics chain that will support new industry in these locations.

- The table below details the timetable for a focussed project to assess off-shore infrastructure needs and opportunities.

Renewables infrastructure – 3 major steps in 18 months:

Scottish Enterprise (SE)/Highlands and Islands Enterprise (HIE) will:

- work with infrastructure owners to identify further need;
- identify any market failures requiring public sector investment;
- develop appropriate funding and delivery solutions.

Step 1 – Open for Business

- Objective: to make Scotland a first choice location for companies and individuals with the scope and ambition to help us realise our renewable energy potential.

Actions (already completed or currently underway):

- Establishment of a new Renewable Energy Division within the Scottish Government (effectively doubling our staff resource in energy in 12 months);
- integration of the Energy Intermediary Technology Institute (ITI) within Scottish Enterprise, to ensure coordinated drive of progress in the renewables sector;
- re-organisation of Scottish Development International (SDI) (our overseas sales and inward investment agency) enables increased focus on renewables, through a coordinated network of 120 overseas offices;
- development of a Renewables Action Plan, which will be subject to progress updates on 6 monthly basis, and annual refresh of route map actions;
- Ministers charge development bodies (SE/HIE) to ensure necessary infrastructure is in place;
- Establish single point of contact through our economic development agencies for all those interested in investing in Scotland and making this country their home base for taking the global new energy opportunity.

Step 2 – Identification of Key Strategic Sites

- Scottish Enterprise and HIE have been tasked with developing a clear spatial framework for port and port-side land and landward infrastructure that can support the manufacturing, construction, and operation and maintenance of offshore wind devices and commercial wave and tidal machines. (June – Oct 09)
- Alongside this core infrastructure review and forward plan, work is also progressing to identify infrastructure dependencies such as transportation of raw materials and finished components; power and other basic service infrastructure, locations for training facilities and the role and linkage between key testing centres such as EMEC, the Advanced Forming Research Centre (AFRC) at Strathclyde University, the New and Renewable Energy Centre (NAREC) in Blyth and developing a Power Networks Demonstration Centre (PNDC) at Cumbernauld.

- Discussions are currently underway with industry partners to achieve a common understanding of the needs and opportunities.
- The Minister for Enterprise, Energy and Tourism will be leading a study visit to a model site in Europe in the autumn, followed by an Off-shore Renewables Infrastructure consultation event. (Sept/Oct 09)
- This will feed in to the scoping project, which will report in October 2009 with recommendations for the identification of an initial clutch of key Scottish Renewables Infrastructure Projects. (Oct 09)
- The focus will immediately switch to delivery, whilst FREDS and the EAB will be tasked with advising on the next category of infrastructure to be developed, thereby establishing a rolling programme of review, forward planning, and delivery across the full range of infrastructure needs.

Mapping Scotland's Renewables Potential – Identification of Key Strategic Sites

Following an ongoing series of discussions with port and near port landowners, Scottish Enterprise are producing a map which will show the Scottish Government's current view of where the key developments may best take place in Scotland. This includes potential integrated manufacturing locations; sites where component manufacturing could take place, where maintenance and vessel support bases could be sited and where the clusters of the marine renewables sector could emerge.

The map is set to be the first output of the National Renewables Infrastructure Project, led by SE/HIE on behalf of Scottish Government, which will report to Ministers in October 2009.

Step 3 – Making Investment

- SE and HIE are simultaneously reviewing the investment requirements that are needed to take advantage of the Crown Estate offshore wind and marine renewables licensing processes.
- By early autumn they have been tasked with producing an investment plan that will make Scottish Renewables Infrastructure Projects ready for action and private sector investment; particularly around the key projects needed to create the platform for growth.
- Given the scale of the economic growth opportunity and the potential for private sector profit, it is envisaged that investment needs for infrastructure can be addressed.
- SE/HIE are discussing the scale of need with infrastructure owners and investors, how investment might be structured, and how in partnership both shareholders and taxpayers can reap the rewards of early investment.
- The projects identified are envisaged as sound investments, which will be positioned to ensure that the assets developed are flexible in their use, and connected to local communities and companies who will benefit from employment and other spin off expenditure.

Grid Infrastructure

Grid capacity is a key issue for the future of renewable energy deployment in Scotland. The purpose of the proposed Beauly-Denny 400kV overhead transmission line is to increase the transmission capacity between the Highlands and central Scotland, so as to accommodate the level of contracted renewable generation in the north of Scotland. The overhead line would be 220km long, running between Beauly, west of Inverness, and Denny, near Falkirk. The objections of the 5 local authorities through whose land the line would pass necessitated a Public Local Inquiry, the Report from which is with Ministers for consideration. Ministers will make a decision on the proposal in the course of 2009.

Grid access is another key issue, and the Scottish Government is keen that renewable and small generators should not face significant connection delays, unnecessarily high costs or administrative burdens in applying for or obtaining connection to distribution networks.

We are also keen that the thresholds determining whether or not applicants in particular areas face higher costs or delays relating to transmission access or upgrades are set sensibly and with our policy of support for Scottish and small generators firmly in mind. We are conscious that delays in connection time and a lack of strategic prioritisation of consented capacity is preventing renewable projects from coming on stream to meet Scottish, UK and EU renewable energy targets. We have become increasingly aware that many small developers are facing significant delays in connection dates.

We welcome the findings of Ofgem's Transmission Access Review (TAR) and its recognition of the need for a holistic model for the allocation and pricing of transmission access rights, finding ways to maximise access to existing capacity, and prioritising projects with consents and financing in place. Overall we recognise

that Ofgem and National Grid are aware of the scale of the issues, and are coming forward with activity to try to address them. While there has been some improvement recently, with Ofgem announcing a derogation from GB quality and security of supply rules to advance the connection of up to 450MW from renewable energy projects in Scotland, there is still significant progress to be made. We are urging UK Government, Ofgem and National Grid to move quickly on the Transmission Access Review proposals and deliver an enduring access regime that is fit for purpose and connects, transports and exports Scotland's renewable energy resources.

Key recent grid developments in Scotland:

The Scottish Government will continue to work closely with Ofgem, National Grid and DECC, to build on the following positive recent developments:

- Ofgem approval of investment in the subsea cables to the Scottish islands.
- DECC and Ofgem support for upgrading both onshore and offshore transmission connections from Scotland to England through the Electricity Networks Strategy Group.
- Progress on developing sub sea grid in the North and Irish seas, and interconnectors with other parts of the UK and EU member states and other nations.
- Earlier connection of renewables projects in Scotland through a derogation for access of 450 MW of new renewable projects across Scotland.

Locational Charging and Balancing

In addition to working to develop the grid network, the Scottish Government has made clear its view that the current distance based transmission access and charging regime applied by Ofgem presents a bias in the UK transmission regulatory system against remote generation. The current system focuses on the existing generation mix, and works against developing a more mixed energy supply, with a significant renewable energy element (as the best sources of renewable energy are found in parts of the UK distant from main demand centres).

Further potential changes to the system of managing constraints, currently under consideration by Ofgem and National Grid, have the potential to increase costs to Scottish electricity generators, and renewable generators in particular.

Next Steps

Government, Ofgem and National Grid are key players in working to deliver a low carbon economy and a thriving and sustainable renewable energy sector. While there inevitably are areas where we will seek discussion, we remain committed to engaging productively with Ofgem, National Grid and DECC on the longer term vision that we all share:

- to deliver Scottish and UK renewable energy potential;
- to address grid access and constraints issues;
- to deliver a suitable and sustainable long term grid network that is fit for purpose to deliver a low carbon economy;
- to reinforce and upgrade Scotland's interconnectors to the rest of the UK and the EU for mutual and lasting benefit.

The Scottish Energy Advisory Board provides a forum to discuss appropriate and proportionate energy regulatory frameworks for Scotland, in an integrated UK and Worldwide energy market.

In addition, 4 key actions, which call for a partnership approach between industry and Government on Grid issues are currently are in hand:

- The Scottish Government is working with the energy sector to respond to the National Grid's consultation (launched 19th May 2009), seeking evidence that the existing locational charging arrangements are stifling competition or discouraging investment in renewables, and is keen for the renewables sector to engage with National Grid on this debate. The Scottish Government's alternative approach to transmission charging, proposed in conjunction with Scottish Power, Scottish and Southern Energy and the Scottish Renewables, can be accessed via the link below[1].
- Ofgem have asked National Grid to undertake further analysis[2] and consideration of the impacts of the proposed new system of locational balancing. The Scottish Government is keen for the renewables sector to engage fully in this assessment.
- We will also work to identify and help resolve individual and collective grid access issues for the renewables sector and on transmission charging and the constraints balancing regime in particular. Liaison on these issues will also continue with Energy company representatives and the wider Scottish business and industry community, including the Scotland's renewable and conventional energy industry interests, trade unions, business representative organisations, local authorities and others.
- The European Commission Directive on Renewable Energy[3] which came into force on 25th June 2009 provides a new regulatory framework at a European level for developing and connecting renewable energy sources. This wide ranging Directive clearly states that the charging of transmission and distribution tariffs by Member States should not discriminate against electricity from renewable energy sources, particularly those sited in peripheral regions. The Scottish Government will undertake further work to establish how this Directive can help develop Scotland's renewables sector.

1 http://www.nationalgrid.com/NR/rdonlyres/5348F0B0-8E79-4008-9DEF-5968C266A9DD/34369/GBECM17ConsultationvFINAL_HRCM.pdf

2 http://www.nationalgrid.com/NR/rdonlyres/B76ADE86-908E-4BD1-B10C-992CFD29B866/35078/090617LetterreanalysislocationalBSUoSfinal.pdf

3 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF

Stakeholder view: Key recommendations from SCDI's contribution to the UK Parliament's inquiry into 'The Future of Britain's Electricity Networks':

Recommendation:

- The largest single expansion of the grid in the UK since the 1960s to connect up to 11.4GW of renewable electricity generated in Scotland.
- The development of subsea 'bootlaces' around the Scottish coasts and connections to the Scottish islands within the next 5-10 years, as a springboard for developing the North and Irish Sea Grids and, ultimately, the incremental development of a Europe-wide electricity super-grid
- Changes to the grid connection system to accommodate larger number of smaller energy projects seeking access to the grid, reduce uncertainties for generators and stimulate investment in grid infrastructure and generation projects
- The reform of transmission charges which particularly disadvantage renewable energy generators in areas with the best resources
- The piloting of smart-grids for decentralised energy in the north of Scotland and on the islands.
- Roll-out of smart grid technologies to encourage innovation, open new markets and revenue streams, and create high end jobs.

6. Supply Chain

Scotland's existing strengths in design, manufacturing and engineering provide an ideal base for the further development of domestic supply chains to service the growing renewables sector, across a range of technologies.

With world-class assets and skills in our off-shore industries, in hydro power, and in the installation of our many existing renewables projects, there are clearly a range of excellent opportunities for developers and suppliers alike, from environmental services to fabrication and testing, through to the fast expanding need for operations and maintenance activity.

The growth in several technology families, including renewable heat, will require the scaling up of supply chains still in their relative infancy. Key needs to assist this development across all technologies include:

- understanding current provision capabilities;
- understanding needs and the scale of need for future development;
- raising awareness of the long term renewables opportunities amongst the company base (including the need for mass and batch production);
- one to one engagement with companies to provide advice and facilitate connections with developers;
- attracting investment to achieve scale-up

3 key actions over 2009:

SE/HIE study of Scottish renewables supply chain companies
This report is based on a Scotland-wide survey of companies with the potential to be active in the supply chains across the renewable technologies. It will serve as a critical tool in targeting future development activity (summer 09)

Marine Energy Group supply chain study for wave and tidal sectors
This industry-led initiative will not only detail for the first time the supply chain needs of the marine energy sector, but also provide a template for further similar studies in other sectors (summer 09)

Crown Estate "marketplace" events for off-shore wind supply chain
The Crown Estate is coordinating a series of events across Scotland for consortia involved in offshore wind development to meet and explore Scottish and UK wide opportunities with local supply chain companies (late 2009 / early 2010).

Further suggestions from a June meeting of the Forum of Renewable Development in Scotland included:

Assessment of need in other sectors:
Using the template developed by the Marine Energy sector, studies will in due course be undertaken on other technologies from off-shore wind to renewable heat. The timing and recommendations of these studies will be determined by the various industry-specific advisory groups, in conjunction with the FREDS group.

Scottish Enterprise to consider:
Tasking the Scottish Manufacturing Advisory Service to develop a renewables focus and implementing a supplier development programme, akin to the model for the electronics sector.

SEPA to consider:
Tracking of legislation and changes in regulation made available to support the supply chain.

These ideas are being further explored, and will be revisited at the next FREDS meeting, with subsequent agreed actions to be updated within this plan.

7. RDD&D – Research, Development, Demonstration & Deployment

Key Investments

The Scottish Government, and the previous administration, have an impressive record of delivery in renewables innovation. Notable landmark investments, many involving partnership approaches across government, industry and academia include:

- ✓ Wave and Tidal Energy Support Scheme (WATES) - £13 million capital and revenue grant
- ✓ Establishment of EMEC - £16 million investment
- ✓ Carbon Trust - £5.5 million sponsorship in 2009/10
- ✓ Beatrice Downvind Project - £3 million Government support
- ✓ Scottish European Green Energy Centre – Being established in 2009
- ✓ Energy Technology Partnership (ETP) - £40-£50 million annual budget
- ✓ Saltire Prize - £10 million innovation prize for wave and tidal energy

Energy Technology Partnership (ETP)

- The ETP brings together applied energy researchers from the Scottish universities.
- The ETP is an alliance of strong, independent Scottish Universities, currently engaged in world class energy Research, Development and Demonstration (RD&D).
- The ETP spends £40-50 million annually on low carbon energy research and development – from Scottish Funding Council, UK and EU grants.
- The ETP has a strong track record in the delivery of RD&D excellence and is actively engaged in numerous UK and international partnerships.
- The ETP also has well developed links with industry and a wide range of ongoing collaborations.

The Saltire Prize

- In 2008, the Scottish Government announced one of the largest innovation prizes in history, to focus leading minds on the production of clean, green wave and tidal energy.
- The £10 million Saltire Prize aims to deliver a step change in the commercial deployment of wave and tidal energy, and will be awarded to the team that best achieves the Saltire Grand Challenge.
- With a marine resource which is unparalleled in Europe, home to the European Marine Energy Centre for testing, birthplace of Pelamis - the world's first wave energy device - and with a dynamic company base in the sector, Scotland is uniquely placed at the forefront of this technology.
- The Saltire Prize has helped to confirm this world-wide leadership position.
- As the X Prize Foundation shows, not only can an innovation prize drive 10-40 fold the amount of the prize purse spent cumulatively by the competing teams, it can also change what people believe is possible – the potential for innovation and scientific breakthrough is enormous.
- Full details are available on www.saltireprize.com

R&D Grant Support

In addition to support for key energy investments highlighted above, the Scottish Government is firmly committed to fostering and supporting innovation and bringing new concepts through from the laboratory to commercial reality. A number of support mechanisms are available to support this activity, including:

- Proof of Concept Programme - Fund to support pre-commercial research in Scotland's Universities and Research Institutes.

- SMART:SCOTLAND - R&D support to SMEs undertaking leading edge technology projects – individual project support available up to £600k.

- Scottish Enterprise R&D scheme – R&D support available to companies of any size in Scotland.

Proof of Concept Project - Efficient hydrogen generation for transmission and storage of renewable energy

- If Scotland's renewable energy is to be harnessed and distributed to major areas of population such as South East England, then extremely expensive cables and related infrastructure need to be provided or alternative distribution mechanisms sought.
- St Andrews University has secured funding through Proof of Concept to develop an alternative strategy for the distribution of electrical energy from renewable resources in remote locations. This strategy will convert the energy into a chemical fuel that can be transported to where it is needed for electrical generation or transport applications. It will produce high value hydrogen through renewable resources.
- Scotland has excellent resources for wind and wave generation of renewable electricity, having more than 25% of Europe's wind and wave energy resource. There is one major limitation for such renewable power; electricity is often generated in remote areas where it is least needed.

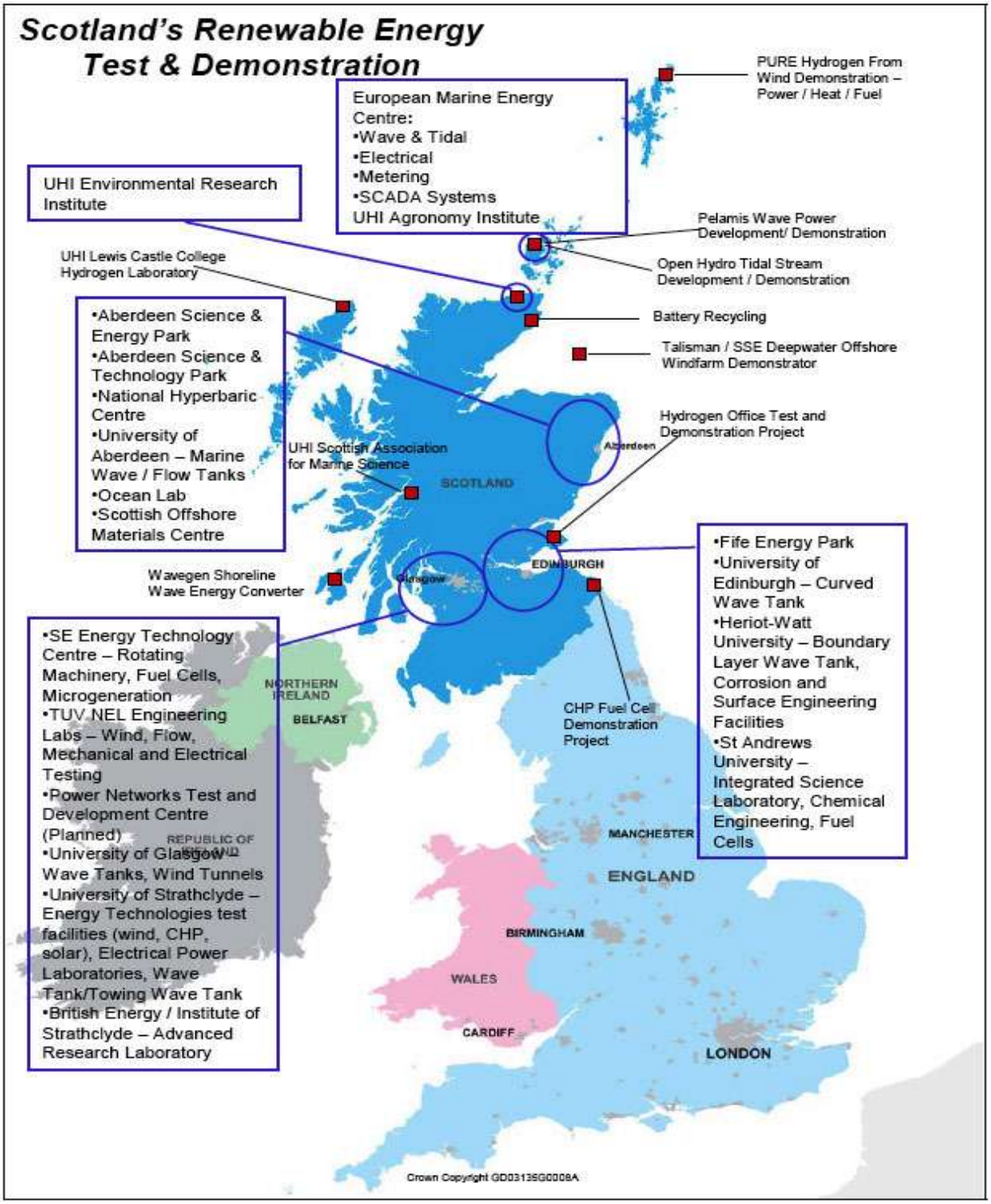
SMART:SCOTLAND Case Study – Subsea Energy Ltd

- Subsea Energy (Scotland) Ltd of Tayport, Fife secured a SMART Award in £70,000 in 2009 to take forward its novel "RiverFish Power Generation Device".

- This feasibility study is to develop a prototype river flow turbine system that harnesses the power exploitable from fast-flowing rivers and uses it to generate electricity.

Scotland's Renewable Energy Test and Demonstration Facilities

This map and further details are contained within our November 2008 "Renewable Energy Framework" http://www.scotland.gov.uk/Publications/2008/11/05115324/12)



Future Actions

RDD&D support and funding involves a network of organisations across Scotland, the wider UK, Europe, and beyond, with partner organisations including the Scottish Government, Scottish Enterprise, Highlands and Islands Enterprise, the UK Government, the Carbon Trust, and the Energy Technology Partnership.

With the integration of another body, the Energy Intermediary Technology Institute (ITI) within Scottish Enterprise, and the establishment of the Scottish European Green Energy Centre, the time is right for a focussed review of the innovation and R&D landscape in Scotland, including the funding streams available.

Future Actions: The Scottish Government is commissioning a project:

- to profile / map Scottish funding for energy RDD&D across the range of relevant organisations;
- to include in scope 'low carbon' energy technologies (renewables, Carbon Capture and Storage and Energy Efficiency), and where relevant, the oil and gas sectors;
- to create a database / portal / interface where this information can be made available to external bodies, and create a mechanism for updating it;
- to undertake a critical analysis / benchmarking of spend against industry need, and produce recommendations for Ministers regarding future funding and structures.

The reporting timescale for this work will be in Q4 2009.

A review of this kind has already been undertaken for the marine energy sector under the industry-led Marine Energy Group. Recommendations will be contained within the Scottish Marine Road Map, due to publish in July 09.

8. Energy Consents and Planning

Objectives:

- to continue our approach of continuous improvement in systems of planning, regulatory enforcement and consenting;
- for these processes to be characterized by speed and surety of decision;
- to develop a shared ethos of brokering and facilitation with agreed core principles. To develop a strategic relationship with industry and key stakeholders, ensuring Scotland's planning environment supports investment in, and deployment of, renewable projects swiftly and democratically;
- to reverse the perception that the planning system is a barrier to the deployment of renewable technologies and investment in Scotland, to demonstrate that in planning terms alone, Scotland is the ideal location for companies who are developing existing or emerging technologies;
- to develop closer working with Local Planning Authorities and other statutory parties, facilitating better sharing of information and experience. To address staff and other resource needs, and where necessary establish task groups to address local, regional or national constraints to renewable development;
- to lead engagement with relevant organisations to identify technology solutions, where these exist, as one aspect of removing barriers to deployment.

Renewables consenting in Scotland – real planning reform for real economic benefit

"For many years, the British Wind Energy Association (BWEA) and Scottish Renewables have been campaigning to speed up the decision making process for applications being determined under Section 36 of the Electricity Act in Scotland. In 2007 the incoming Scottish Government promised to improve the system in order to maintain investor confidence in what is effectively the renewable powerhouse of the UK. These promises were kept, with a flurry of decisions coming after Government took office and a further voluntary pledge to make decisions on Section 36 projects within nine months of submission. No less than a dozen projects have been determined since the new Government was formed, sending positive signals about Scotland's determination to reach not only 2010 renewable energy targets, but to remain open for business to help meet the more challenging 2020 targets. Of the 1.9GW of onshore consents secured in the UK in 2008, almost 1.3GW have come from eight Section 36 projects, seven of which are in Scotland.

BWEA – State of the Industry Report (Oct 08)

Overview

It is vital that developers have a clear understanding in the infancy of any proposed planning application of what is expected from them and from any application.

In 2008, Scottish Government introduced revised scoping procedures for on-shore developments, helping developers understand constraints and key opportunities, and promote the delivery of more comprehensive environmental statements at application. At the same time, early engagement with communities and stakeholders has been shown to assist the renewables industry to bring forward sensitively designed proposals and to expedite decision making. We have consequently been working to deliver cross-agency access and support throughout the planning process

from application to determination and onto the final commissioning of the development.

Of even more significance, perhaps, the Energy Consents and Deployment Team within the Scottish Government has undergone a transformation, with staff numbers doubling and the development of specific areas of expertise. Twenty-four months ago the team were running a routine administrative process and were perceived externally as having little regard to the commercial impact of decision timeframes, and limited contact with other organisations involved in the process. The expanded team has evolved into a real centre of expertise in energy consents, enabling Ministers to make fully informed, expertly advised decisions within dramatically reduced timeframes, and helping developers to navigate within an increasingly streamlined system.

Consent Applications

Good applications routinely involve:

- well developed, well researched propositions
- extensive pre-screening consultation
- flexibility, pragmatism and a willingness to engage

Poor applications routinely involve;

Key to the success of the SG approach to consents has been a focus on:

- identifying areas where there is scope to play a facilitative role by encouraging pre-scoping dialogue between developers, statutory consultees and other stakeholders;
- working with other stakeholders to identify and overcome barriers to project deployment where technical solutions exist (e.g. radar issues);
- making champions of renewables projects and developers that employ best practice, enabling the development community to learn from its own members.

Next steps

- Scottish Natural Heritage (SNH), the Scottish Environmental Protection Agency (SEPA) and local authorities have been engaging on an ad hoc basis in ‘pre-applications groups’ to assist developers in preparing their applications. This early engagement has been hugely beneficial to all parties. Scottish Government will work with industry and stakeholders to establish this as common practice where possible, recognizing that this process can be resource intensive.

- Flexibility on conditions (e.g. to handle changing specifications from turbine manufacturers) to ensure the terms of the consent are not an undue burden on the realisation and delivery of the development.
- Focus on post-consents support and engagement by playing a brokering role between developers and other stakeholders to attempt to resolve any barriers to deployment.

Specific Actions:

Consents

- Consider efficacy of Section 36 framework and, with the UK Government, opportunities for reform.

Planning

- Create a supportive planning landscape. Over the last months the Scottish Government and its agencies have been working with industry and local authorities to look at a variety of ways that we can significantly increase co-operation and speed up the pace of planning reform that underpins confidence in investing in renewables projects in Scotland.
- Strategically work with Local Planning Authorities to realise their renewable energy ambitions and ensure that the planning and consenting regimes better support investment in renewables in Scotland.
- Facilitate cross-working and understanding among decision makers through a series of workshops with Local Authorities and key stakeholders, helping to assist the realisation of their renewables ambitions and strategically address barriers to achievement.
- Work to ensure that the principles of renewables planning policy are reflected in the reformed Scottish Planning Policy. The National Planning Framework 2 recognises the strategic importance of renewable energy and its associated infrastructure.
- Continue to work with Local Planning Authorities to develop their strategic locational guidance in line with Planning Advice Note (PAN) 45 and to ensure that the planning system produces decisions that are efficient, transparent, consistent and timely.
- Hold knowledge-exchange sessions within the Scottish Government to raise awareness of staff, increase understanding of the various stakeholder roles within the planning system and investigate methods of refining complex publicity and consultation procedures.

SW Scotland Regional Aviation Solution Group

Large scale wind farm proposals can impact significantly on both Primary Radar and Secondary Radar systems because they appear as clutter, potentially obscuring actual air craft in the same air space from view. This raises operational safety risks related to the development of large scale wind farms depending on their location.

In Scotland there are currently 10 section 36 projects with an objection in place concerning either civil or defence radar. With the inclusion of Council Planning Authority applications considered under the Town and Country Planning Act regime, there are at least 14 applications - equating to 1 GW of potential renewable energy - clustered in the south-west of Scotland which have an objection

Environmental

- Through creation of a Scottish Ornithological Steering Group (detailed on the following page), broker the sharing of environmental information to better inform planning and consenting regimes and maximise the sustainable exploitation of Scotland's renewable energy resources.
- Facilitate the development of a national data sharing centre. Improved collaboration across the renewable industry and coordination of scientific work will greatly assist in the assessment of environmental impacts of developments and help developers avoid environmentally sensitive areas.
- By collating and sharing the vast data that has already been gathered from developments, offer developers a more robust and quicker advice on their development. While we understand that developers have previously been reticent to share information that has a commercial value to competitors we have to be more strategic in our support of the renewable industry. Furthermore, such collaboration will be less resource intensive not only on key stakeholders but also on developers who in the past have had to support numerous local bird monitoring groups that are development specific.

Eskdalemuir Seismic Array: Noise Limit Solutions

Scottish Government officials are engaged with an action group comprising of BWEA, the MoD and academia to develop long term noise limit solutions.

The Eskdalemuir Seismic Array is one of 170 seismic stations across the globe used to monitor compliance with the Comprehensive Nuclear-Test-Ban Treaty. The UK is bound by the Test-Ban Treaty not to compromise the detection capabilities of the Eskdalemuir station, and it is the responsibility of the MoD to safeguard this station.

In 2005 a study concluded that micro-seismic noise is propagated by wind turbine structures, as the rotation of the blades excite modes of vibration of the tower, which in turn resonate at the detection frequencies of the seismic array. A maximum permissible background noise increase due to wind turbines (a noise budget) of 0.336nm at Eskdalemuir was recommended and it was agreed that MoD should introduce a statutory consultation zone of 50km around Eskdalemuir. MoD permitted development on a first come first served basis as projects entered the planning system, until this noise budget was reached.

Wind farm developments, either permitted or currently being considered in the planning system, have now consumed the calculated noise budget.

Meetings have been held between BWEA, MoD, Scottish Government, and Professor Styles from Keele University.

Scottish Renewable Energy Ornithological Steering Group

Since 2002 -2003 six approved wind farms have imposed specific conditions requiring ornithological research or monitoring studies to assess the effect of particularly sensitive species in specific circumstances. These have required the formation of an Ornithological Steering Group and it is suggested that a Scotland-wide steering group be developed to maximise the benefits of collaboration and co-operation.

The Group would offer the opportunity to better co-ordinate the bird monitoring data collated from all other consented wind farms throughout Scotland which can be analysed and used to better inform future site selection, planning decisions and operational requirements. The group would also act as a 'reference bank' for the sharing of data and recording of the results of implementing mitigation good practice which can be used as a model for other developers to follow and to inform future decisions.

The Group would comprise qualified and experienced ornithological and planning personnel, and be focussed on those sites with specific monitoring and research requirements. Representation would be present from Scottish Government Research and Science Division. SNH, Royal Society for the Protection of Birds (RSPB), Scottish Renewables and those developers involved in the commissioning and operation of the relevant wind farms. The group will convene as required, but regular meetings are likely to be twice a year to evaluate bird survey information relating to relevant wind farm development sites.

Application Update Meetings

Incomplete information or analysis within the Environmental Statement has been emphasised by the Energy Consents and Deployment Team as one of the main barriers to speedy determination. To attempt to ensure the information presented is of a quality and quantity to be considered sufficient by all consultees, a pre-consultation presentation of the development to the statutory consultees will be undertaken where necessary.

Further to this, a meeting between the Energy Consents and Deployment Team and the developer will be held prior to determination to ensure all information held is up to date and relevant for both parties.

Marine Consents and Marine Planning

Overview

The Scottish Parliament is currently considering new marine legislation which include proposals for integrated marine planning and consents. This links with proposals in the off-shore zone being considered by the UK Parliament. Both make provisions for improved planning and simplified regulation which will improve the regulatory framework for marine renewables.

The Scottish Government established Marine Scotland in April 2009 to draw together core marine policy and regulatory functions for the sea in one body. Marine Scotland will be the main body responsible for delivering the new responsibilities arising from new marine legislation. It will deliver sustainable economic growth from the sea, managing marine use to meet the long term needs of nature and people. Specific objectives include:

- Manage growing and competing demands for marine resources;
- Reduce the complexity of marine management, in line with wider objectives.

The Scottish Government's Marine Energy Spatial Planning Group is piloting and prioritising certain workstreams in relation to wave, tidal stream and offshore wind energy. This is in order to limit uncertainty for the sectors given the tight timescales involved in their development to 2020, and to pilot approaches for their sustainable development. These approaches will support the marine management framework which should be developed under the forthcoming marine legislation. The Marine Energy Spatial Planning Group is led by Marine Scotland, and comprises representatives from the renewables industry, Enterprise Agencies, Local Authorities, regulatory authorities, and The Crown Estate.

Alongside this, the Marine Strategic Studies Forum has been established to provide key feedback on studies affecting marine stakeholders. The focus of this Group will not be limited to studies relating to offshore renewables, but will be open to studies on other topics where these arise. Meeting quarterly, the Group includes representatives from environment, fishing, shipping and renewables interests.

Objectives

The proposed new marine legislation will provide the framework and objectives for a new marine planning system. In advance, specific actions will be taken forward to provide greater certainty in the planning system to allow offshore wind, wave and tidal developers to progress with projects.

Specific Actions: Marine Renewables

Planning:

- Through MESPG, the Scottish Government will continue to facilitate sustainable marine renewable energy development with The Crown Estate, Scottish Natural Heritage, SE, HIE, Scottish Renewables and the

other partners to strategically plan the areas of opportunity for renewables deployment.

- Through MESPG, with feed-in from MSSF, produce an non-statutory Interim Marine Spatial Plan for the Pentland Firth and Orkney Waters. A consultation period will be held later this year with final publication in early 2010.
- Review the Interim Marine Spatial Plan for the Pentland Firth and Orkney Waters as a priority after the Assent of the Scottish Marine Bill.

Consents & Licensing:

- Through MESPG, recommend simplified guidance for consents & licensing for marine renewables, including detailed guidance for developers on the Environmental Impact Assessment and Appropriate Assessment process.

Environment:

- Through MESPG, with feed-in from MSSF, carry out a strategic programme of environmental research necessary for the development of the marine energy sector
- In partnership with SNH, produce monitoring protocols for marine renewables.
- Through MESPG, facilitate a 'deploy and monitor' approach to early marine renewables developments

Through MESPG, stimulate and facilitate regional promotional initiatives for marine renewables.

Offshore Wind:

- Through MESPG, with feed-in from MSSF, take forward an SEA for Offshore Wind Energy development in Scottish Territorial Waters to be complete early 2010
- Consider what further environmental and planning work is required at the regional scale for offshore wind development after completion of consultation on the SEA. Meanwhile, encourage potential developers to consider existing users, uses and sensitivities in the marine environment as they move forward their projects.
- Through MESPG, recommend simplified guidance for consents & licensing for marine renewables, including detailed guidance for developers on the Environmental Impact Assessment and Appropriate Assessment process.

Key Marine Bill Proposals

- Integrated marine licence with specific provision to combine with electricity consent to create a single process for consenting marine renewables

- Statutory marine planning system including a UK Marine Policy Statement and a National Marine Plan for Scotland to support early, transparent examination of issues underpinning renewable marine opportunities.

9. Skills

Vision

To ensure that employers across the renewables sector in Scotland have the skills they need now and in the future.

Overview

To maximise the potential development of the renewable energy industry, it is important to get the right skills, in the right places, at the right time and in the right quantities. BERR analysis indicates that up to 160,000 jobs could be created to deliver the necessary investment in the UK, and the Scottish Government expect at a bare minimum that 16,000 of these could be created in Scotland. In addition, there is a need to develop the grid infrastructure, sustain employment during the economic downturn and up-skill the existing workforce to embrace and support the renewable energy agenda.

In order to address the skills demands of industry there is a requirement for collaborative working across government and its agencies. The following section provides an overview of current activities, highlights key skills issues and presents recommendations and actions to ensure the renewables sector has the skills it needs now and in the future.

Skills Landscape Scotland

There are a number of key organisations in Scotland with a remit for skills and manpower development and these organisations and their roles are explained below.

Skills Development Scotland (SDS)
As Scotland's new skills body, SDS brings together four partner organisations (Careers Scotland, Scottish University for Industry/learndirect Scotland, and key skills elements in Scottish Enterprise and HIE) with a shared vision to drive forward sustained change in Scotland's skills performance. SDS will deliver comprehensive information, advice and guidance for careers and learning as well as extensive support for skills development.

Scottish Funding Council (SFC)
The Scottish Funding Council (SFC) distributes more than £1.7 billion to Scotland's 43 colleges and 20 universities for teaching and learning, research and other activities in support of Scottish government priorities.

Jobcentre Plus (JC+)
Jobcentre Plus is a government agency supporting people of working age from welfare into work, and helping employers to fill their vacancies.

Sector Skills Councils and Bodies (SSC/Bs)
SSCs represent employers' views across the UK, and have increasing levels of influence over skills policy, qualification reform and the way in which learning provision is delivered.

The renewables labour market cuts across several sectors. As a result, AssetSkills, Cogent, ConstructionSkills, ECITB, EU Skills, Lantra, SEMTA and SummitSkills have formed a Renewable Energy Project Group and agreed a shared commitment to create a Skills Strategy to support the renewables agenda across the UK. A request for funding has been made to the UK Government to enable the Project Group to undertake analysis on skills needs, supply side provision, gaps, solutions and prioritisation of actions.

Scottish Renewables Energy Skills Group (RESG)

There is clearly a large amount of work being conducted on the skills needs for the sector, including at a UK level – through the work of the SSCs' Renewable Energy Project Group (REPG) above. However, Scotland is already ahead of the game, having last year formed the Renewable Energy Skills Group (RESG) in response to the increasing awareness that the predicted growth of the sector was in danger of not being matched by a parallel growth in adequately trained personnel. Hence some of the work planned by the REPG has already been carried out in Scotland, and the Scottish Government's aim is that, in 2009, the focus for action in Scotland should be via the Scottish RESG, with links to the UK Project Group.

Chaired by Paul McKelvie, Board member of the Scottish Funding Council, the Scottish RESG's membership is extensive. It includes representatives from the key sectors of higher and further education, Skills Development Scotland, Energy and Utility Skills, individuals from key renewables sectors and the Scottish Government. It has met three times since formation, and aims to report by the end of 2009.

The Scottish Government has already supported EU Skills to conduct a Renewable sector skills and education and training supply analysis for Scotland, in line with the methodology agreed by the UK REPG. The Scottish RESG is planning its future work on the basis of this report, including consideration of the barriers to meeting future skills needs and measures to overcome them, developing mechanisms to support and deliver futures skills requirements, the promotion of renewables as a dynamic area to work in and identifying the scope for up-skilling or re-skilling those currently in the sector or similar sectors.

Skills Issues

The recent research highlights the skills issues which are impacting on the renewables sector in Scotland as follows:

1. Sector recruitment and attractiveness

The EU Skills sector report suggests that the sector's image and attractiveness should be improved through engagement with Careers Advisers and schools to encourage greater awareness of careers in renewables and help to address the ageing profile of the industry.

Recent initiatives such as Skills Development Scotland's "The PATH IS Green" and, in the Highlands and Islands, HIE's "The Big Green Challenge" have been successful (see below).

Consideration will be given via the Scottish RESG as to how to build on existing initiatives, and link to emerging interventions such as the National Skills Academy for Power (NSAP).

The Path is Green provided internet access to information on green jobs e.g. in recycling, conservation and renewable energy. More than 1200 pupils across Scotland visited and entered an online quiz ran a competition for schools supported by a BBC weather forecaster that received entries from 40 teams. For every £1 spent on the project it generated nearly £15 worth of PR activity. There were 79,062 unique visits to the website over the duration of campaign and almost 20,000 have clicked through to the website from online adverts.

Following the success of the **Big Green Challenge** 2007, HIE ran the debating competition for S1-S3 pupils again during 2008-09. In total 43 teams from 26 secondary schools participated. There were three stages - local heats, semi final and grand final. At each stage the pupils had to research and debate renewable energy related motions. Each participating school had a visit from a renewables expert to help them prepare for the competition. The grand final was held in the Scottish Parliament, and televised online on Holyrood TV, allowing families, friends and in some cases the whole school to tune in and watch the proceedings. This was particularly appreciated given the distances the teams had to travel: Arran, Gairloch, Portree and Shetland. Sandwick Junior High won first prize and Portree came second. The first prize is a fact-finding trip to Iceland and second prize - a trip to the Eden Project in Cornwall. HIE is awaiting a full evaluation of the programme, but initial feedback has been very positive.

2. Key technologies requiring immediate support

- General lack of Engineers and in particular Electrical Engineers with grid transmission alone requiring 9000 engineers across the UK by 2014.
- Wind – turbine maintenance and offshore skills – EU Skills BWEA and REPG.
- Marine – emerging issues needs further investigation.
- Micro – developing the installer network requiring the education and training network of high quality provision.

3. Foresight activities

EU Skills have developed a workforce planning tool which enables companies to undertake their own long term workforce planning and then share that information to obtain industry intelligence. This has informed the National Skills Academy for Power work plan and it is expected that this tool will evolve to provide the intelligence to create an effective market place for power sector skills delivery. This also provides the basic modelling to understand skills needs. It will be important to provide this service to companies involved in large scale renewables, both to help them look at their long terms skills planning and to provide the basis for industry intelligence.

This tool could be linked to the technology foresight work currently being undertaken by Scottish Enterprise to inform longer term manpower and skills scenario planning.

Solutions

Large scale needs: National Skills Academy for Power (NSAP)

At a UK level, the power sector companies, working together on the Power Sector Skills Strategy Group (PSSSG), have identified the critical skills challenges faced by the Power Sector over the next 15 years. They believe that to address these

challenges a collaborative National Skills Academy Power (NSAP) will be required. Although National Skills Academies are an English initiative (supported through the Learning and Skills Council (England), the power companies across the UK are providing matched funding and want their NSAP to be UK wide.

The NSAP is due to become operational in October 2009. At the business planning stage the importance of the Scottish influence has been recognised in looking at how 'regional/devolved nations' activities are prioritised, highlighting in particular the significance of the renewables sector in Scotland.

There is real potential for Scotland to drive forward some of the early implementation work in renewables and the Scottish Government will continue to help develop the proposals for an NSAP and how the Academy may operate in Scotland.

Micro-Renewable needs: Scottish RESG to address

While the central nature of the delivery of the skills pipeline for the large scale renewables is recognised, the micro renewables technologies skills issues must also be addressed and this will be a particular focus of the Scottish RESG.

EU Skills are developing a map of current and planned education and training provision which will allow the Scottish RESG to identify gaps, and to inform the structured development of locally available high quality education and training.

There is also a need to ensure that related professions, such as architects, planners, and quantity surveyors are fully aware of the specifications required when installing micro-renewables. Scottish Renewables have carried out an initial gap analysis for the Scottish Government on this issue, and follow up work will be led in the first instance by the FREDS Renewable Heat Group under the Scottish Renewable Heat Action Plan, with recommendations made to the Scottish RESG where appropriate.

Framework for Action

THEMES	PRIORITIES	ACTION	TIMESCALES
Standards And Qualifications	Develop Apprenticeship frameworks	• EU Skills and Summit Skills currently building the micro-renewable skills elements into their qualification structures to ensure that renewables become mainstream. • SSC/Bs are working with BWEA on the development of apprenticeship programmes for the sector. It is anticipated that this will build on qualifications already under development. • SG will consider how to stimulate interest in these apprenticeship frameworks	• Micro – 09/10 • Initial meetings SSC/ BWEA summer 2009 • By October 2009
	Develop up-skilling programmes	• Summit Skills are leading on work with SQA to develop micro renewables units for Solar and Heat Pump technologies. • EU Skills has requested that SQA expand	• Autumn 2009 • Late 2009

		this to include Biomass. • The RESG will work to develop education and training provider network. • For large scale renewables this will link to the work of the RESG and the NSAP (dependent on its development in Scotland)	• Late 2009 • 09/10
	Develop standards and qualifications	• SSCs, through the REPG will consider Renewable Energy as part of the National Occupational Standards development plans. • EU Skills have a work plan for 09/10 to develop an Occupational Functional Map for large scale renewables and develop any National Occupational Standards required to support a comprehensive range of flexible qualifications and programmes.	• 09/10
Provision	Create database of provision	• EU Skills to develop FE and private provision database as a priority. • EU Skills will develop HE database	• Summer 2009 • Autumn 2009
	Develop sufficient, high quality provision	• The RESG will work with partners and industry to establish high quality provision	• To commence Autumn 2009 for micro
	Develop interim training centre for graduates	• Investigate potential to encourage graduates to undertake work experience to prepare them for the world of work	• 09/10 ongoing
	Develop flexible management and leadership programmes	• The RESG will work to address the need for more management and leadership courses required to develop the next generation of managers and address the high labour turnover rate for this group	• 09/10
Sector Recruitment and Attractiveness	Raise profile and sector image	• Through the RESG develop action plan with Skills Development Scotland (SDS) (Careers Scotland) and other partners. • This can build on lessons learnt from current activities such as 'The Path is Green'.	• 09/10 ongoing
	Encourage recession hit employees to consider career in renewables	• Develop links with SDS and the PACE (Partnership Action for Continued Employment) Teams	• Initiate discussions Summer 2009
Enablers	Understanding the future manpower and skills requirements	• A skills foresight tool similar to the gas and power sector workforce modelling tool developed by EU Skills should be applied to the renewable sector to identify further priorities going forward	• 09/10
	Develop a programme to support skills development	• Scottish Government will work with its agencies to consider the establishment of an Energy Skills Action Plan Fund built on the lessons learnt from the Construction Skills Action Plan	• Autumn 2009
	Develop interim strategy and action plan	• RESG to will work with members to develop an interim work plan and support the work of the REPG in developing a Renewables Skills Strategy for Scotland	• Autumn 2009

	Develop Knowledge Transfer Partnerships	• Knowledge Transfer Partnerships between employers, stakeholders and academia should be encouraged to develop a shared understanding of issues and requirements. • The RESG to build into their work plan	• Autumn 2009
	Support diagnostic audits of employers skills needs	• Scottish Government will investigate opportunities to support employers with Skills Development Scotland	• Summer 2009
	Build on current research findings	• The RESG will work with FREDS to identify any additional research requirements	• August/Sept 2009
	Link into UK wide work	• The REPG will consider current intelligence and work with the RESG to develop a Skills Strategy for Scotland	• July 2009

10. Community Renewables

Vision:

- To maximise the benefits for communities from renewable energy, not only in terms of access to locally produced low carbon energy, but in terms of social cohesion and economic development.

Headline Ambitions:

- added value for communities: including, increased skills base for local trades, a stronger partnership within communities delivering wider social and economic benefits from renewable projects, and greater awareness within communities of renewables and climate change;
- a reduction in reliance on imported energy by making communities more self sufficient on meeting their own energy needs, particularly in off-gas grid areas;
- an increase in renewable energy capacity in Scotland, contributing towards renewable targets in Scotland;
- a reduction in energy bills.

Overview

There is a high level of interest and enthusiasm within Scottish communities for developing their own energy projects, both as individual householders and as organised groups. These projects can bring real benefits to communities, helping to address energy costs and making a significant contribution towards Scotland's renewable energy and carbon targets.

There are a number of different models for wider community engagement in renewables which involve varying degrees of impact and risk and different ways of defining communities/ distributing benefits. It is for each community to decide which model best suits their needs, and there may particularly be a case for different modes of engagement and different solutions in rural and urban areas.

The different models include: 100% ownership by the community group,

voluntary community benefit “windfall” payment offered by the commercial developer, joint ventures or mixed ownership via a community body or co-ops. It should be noted that while policy support is primarily focused on maximising benefits in local communities, there is a wider definition of “community benefit”, typified by the co-op model, and supported by Co-operative Development Scotland, which includes communities of interest, not confined to a single locality.

It is critical that developers understand the needs of communities and engage in appropriate public consultation in order to reflect the interests across communities. The community engagement requirement placed on developers in the 2006 planning act can significantly improve the quality of applications. In some circumstances it may be possible for communities to engage with developers on the possible accrual of benefits, though it is worth stressing that each project must be considered on its own merit and such material considerations should not form part of the planning process.

Community engagement example

“When residents of the village of Fintry in Stirlingshire first heard about plans for a wind farm in the hills above them, their reaction took the developer by surprise.

Instead of opposing the scheme, the villagers asked the company to build an extra turbine and sell it to them to try to make the community one of the greenest in the UK.

The Fintry turbine has now been operating for more than a year, and has already earned £140,000 for the villagers, money that has been put aside for energy efficiency schemes. Around half of the 300 households have already had roof and cavity wall insulation fitted, and some residents have seen their heating bills cut by hundreds of pounds a year. When the loan on the £2.5 million turbine is paid off, Fintry could be making up to £500,000 a year from the electricity its turbine feeds into the National Grid.”

The Guardian May 2009

In addition there is potential to develop local produced community heat networks especially in off gas grid areas. District heating is in its infancy in Scotland and there is a role for social landlords and/or Energy Service Companies (ESCO’s) to develop local renewable energy schemes.

Scottish Government support to date through the Scottish Community and Householders Renewables Initiative (SCHRI) has resulted in over 400 community projects across Scotland. SCHRI has been revamped into the Communities and Renewable Energy Scheme (CARES) and will seek to maximise community benefits from renewables in terms of community cohesion, energy security and alleviation of fuel poverty, as well as contributing towards renewable energy targets.

A key aspect of SCHRI which will continue in the revamped CARES is the support and advice that is available from a team of dedicated development officers who operate across Scotland. The role of the development officers is to work with community groups, at a local level, to help develop projects from the initial inquiry stage thorough to post installation. This advice service has been key to the success of SCHRI.

The Climate Challenge Fund of £27.4 million over three years (2008-2011), is successfully enabling communities across Scotland to deliver their own solutions towards carbon emissions reduction. Whilst the fund doesn't directly support energy generation equipment it can and has supported the crucial community engagement and feasibility stages of energy generation project. For contact details and advice on CCF visit: www.infoscotland.com/climatechallengefund

There is a strong contrast between rural and urban community renewables with differing solutions and target bodies. For example, in urban areas, bodies such as local authorities and health boards may be more of a target than in rural areas.

Case Study: Communities Benefiting from Renewables

Aqualibrium Biomass Boiler

Campbeltown had been without a swimming pool since 2002. The council decided that a new swimming pool would be combined with the library, and the Aqualibrium was conceived. The new flagship building was to be as environmentally sensitive where possible and wood fuel was chosen as the method to heat the facility. A biomass boiler was installed, with wood fuel being supplied from the local sawmill using their waste and unwanted timber from the local forest. A SCHRI grant of £85,731 helped made the project happen.

Beattock Hall Heat Pump Project

The Beattock Hall Committee were looking to install a more cost effective heating system in order to improve accessibility to the Hall to all community groups in Beattock. With the support of a SCHRI grant of £20,000, a 17kW heat pump system was installed, feeding a wet radiator system.

Key Opportunities:

- signal commitment to community benefits from renewables by setting challenging targets under the CARES scheme for number of communities supported and other key metrics;
- carry out research to gain evidence of what community needs could be fulfilled by financial benefits obtained from renewable energy projects, use this to help communities understand the possibilities and set realistic expectations. This should also target commercial developers to establish whether there is a perception that community benefit via mixed ownership models is risky and consider any action necessary to promote greater engagement with communities;
- increase the capacity in communities to develop and own renewable projects across Scotland as groups through CARES; as householders through the Energy Saving Scotland – Home Renewables scheme; and as businesses through Energy Saving Scotland – Small Businesses scheme, Scottish Biomass Heat Scheme, and Scottish Rural Development Programme (SURD);
- increase the number of community heat networks, particularly in off-gas grid areas;

- work with key stakeholder organisations to facilitate a high level of collaboration in order that communities are provided with clear and concise information on the various options for developing projects;
- consider the funding mechanisms available to support community renewable projects and seek to address specific gaps;
- facilitate the adoption of a strategic approach to planning, for a number of community projects being brought forward in the same geographical area;
- maximise the community benefits from renewables in the Western Isles through the implementation of an Action Plan.

Specific Actions: The Scottish Government will:

- continue to support community renewables via the CARES programme;
- establish a stakeholder group to ensure that the sector works in collaboration to provide a holistic approach to developing community projects in Scotland;
- lead the Western Isles Steering Group to maximise community benefits from renewables and to promote lessons learned from that process;
- aim to increase the number of district heating projects in off-gas grid areas;
- through the CARES contract, the delivery agency, Community Energy Scotland, seek to obtain economies of scale for communities group through the implementation of a bulk procurement strategy;
- develop strategic policy direction for microgeneration as part of Energy Efficiency Action Plan;
- continue supporting householders via Energy Saving Scotland – Home Renewables;
- review CARES and consider any changes needed in light of feed-in tariff and renewable heat incentive proposals for the UK.

Note that onshore wind community renewables projects are also covered in the onshore wind section as there is a degree of overlap in terms of some of the key actions and milestones which are relevant to all wind projects whether led by a community group or developer.

Framework for Action

Area	**Milestone/Event/tasks**	**Timescale**	**Resource implications (e.g. staff and/or funding)**
Advice and support	• Delivery of CARES with inclusion of key targets	• March 2012	• Scottish Government
Advice and support	• Enhance Community Renewables Toolkit to provide summarised version and signposting to support organisations for different models	• By end 2009	• Scottish Government
Strategic approach to obtaining planning consent.	• Where appropriate, facilitate at a local level a strategic approach to	• By end 2009	• Scottish Government; Community

	community groups obtaining planning consent with the aim of reducing costs for grid connection for community groups.		Energy Scotland (CES); industry
Review the funding mechanisms available to support community renewables to identify any gaps.	• Review whether there is a need to provide early stage risk capital to help community projects to happen, particularly for those projects being developed by the co-op business model. • Consider potential for credit guarantee scheme as a solution.	• End 2009	• Scottish Government; CES; Enterprise Networks
Interim evaluation of Communities And Renewable Energy Scheme	• Review CARES and consider any changes to retain best value for money and maximise delivery.	• End 2011	• Scottish Government; CES
Supply chain	• As part of the CARES contract, CES to produce a bulk procurement strategy to provide a range of services, including, professional advice and capital equipment.	• End 2009	• Scottish Government; CES
Maximise community benefits from onshore wind	• Progress with Ofgem on accreditation of wind-to-heat projects for Feed in Tariff.	• By end 2009	• Scottish Government
Maximise community benefit	• Through the delivery of the CARES programme seek to maximise community benefit through: o Increase community cohesion o Skills development o Jobs o Local regeneration	• March 2012	• Scottish Government; CES

11. Research and analysis

Evidence base and monitoring progress:

Objectives:

- To establish a commonly agreed statistical and research evidence base for the renewable energy sector in Scotland. Scope to include analysis of resource potential by renewable sector and supply chain issues.
- To develop a measurement framework to monitor progress against sectoral targets and carbon abatement from the growth in renewable energy.

Current Status:

- Currently, there is a lack of robust employment and corporate data on the renewable energy sector in Scotland / UK as a whole. This is due to renewables not being classified as a standalone sector within the standard industrial classification system which is the basis of national data collections.
- There is a large body of evidence independently commissioned by different organisations covering a range renewable energy issues. There is often competing evidence due to differences in underlying assumptions, inherent uncertainty, and pace of development.
- There is reliable official data on renewable electricity installed capacity and output. However there is a lack of official data on renewable heat installed capacity and output in Scotland and a standard statistical approach to capture this data.

Forward work plan:

The Scottish Government:

- are working with Scottish Enterprise on a Renewable Energy Baseline Study to provide accurate estimates of employment and economic value of the renewable energy sector in Scotland. The study will also assess Scotland's comparative advantages in renewable energy including a review of strengths in research and development;
- will continue to work jointly with Scottish Enterprise to take forward a study on the renewable energy supply chain in Scotland which will consider in detail the potential economic value and employment potential from clean energy developments over the next decade. The analysis will provide information on potential job creation trajectories, sectoral breakdowns and the nature of employment. In addition, it will consider the range of constraints on energy industry development in Scotland - including regulatory and supply chain issues – which need to be addressed to ensure employment opportunities can be fully exploited;
- will commission research to provide an updated assessment of Scotland's renewable resource across each sector identified in the Renewables Action Plan;
- will commission research on the potential for energy storage in Scotland as a means of supporting renewable energy deployment. The work will consider the available technologies and timescales for development;

- will prepare a measurement framework for tracking progress against targets and measuring carbon abatement from renewable energy development in Scotland.

Area	Milestone/Event/tasks	Timescale	Resource implications (e.g. staff and/or funding)
Baseline Statistics	• Production of a Renewable Energy Baseline Study to provide accurate estimates of employment and economic value of the renewable energy sector in Scotland.	• Complete by end July 2009	• Scottish Government; Scottish Enterprise
Supply Chain	• Take forward a study on the renewable energy supply chain in Scotland which will consider in detail the potential economic value and employment potential from clean energy developments over the next decade.	• Commission Summer 2009 – Complete end 2009	• Scottish Government; Scottish Enterprise
Resource Base	• Research to provide an updated assessment of Scotland's renewable resource across each sector.	• Commission Summer 2009 – Complete March 2010	• Scottish Government
Energy Storage	• Research on the potential for energy storage in Scotland as a means of supporting renewable energy deployment.	• Commission Summer 2009 – Complete March 2010	• Scottish Government
Tracking Progress	• Framework for tracking progress against targets and measuring carbon abatement from renewable energy development in Scotland.	• End 2009	• Scottish Government

12. Communication and progress reporting

The Renewables Action Plan is a constantly evolving plan for delivery to 2020 and beyond, requiring periodic, visible updates and a mechanism for progress reporting. At the same time, with the rapid pace of change, there is a need for a visible "centre of gravity" – a coherent, easily navigable overview of the renewables sector.

- The Renewables Action Plan will therefore be placed at the centre of a new on-line resource for renewables in Scotland, and serve as a principal reference point for the sector.
- The site will act as a portal through which to access the rapidly changing and expanding sources of information and advice contained within different organisations' web pages, and will reflect on-going Government and industry activity.
- Either of itself or through links, it will include information on opportunities for individuals and communities, and for developers and supply chain companies.
- The site will be developed in the latter part of 2009, and will go live in 2010.
- The Action Plan itself will be subject to progress updates every 6 months.
- The Route Map actions will be refreshed and updated on an annual basis.

SCOTTISH GOVERNMENT – RENEWABLES ACTION PLAN

ANNEX A

SECTORAL ROUTEMAPS

including key actions 2009-11

RENEWABLE HEAT

Renewable Heat is simply heat produced from low carbon renewable sources such as biomass, heat pumps (ground source, air source and/or water source), heat from waste biomass and anaerobic digestion, including biogas, solar heating, wind to heat and geothermal heat. It can be produced as either heat only or Combined Heat and Power (CHP) but for the purposes of this routemap, **does not** include heat produced from renewable electricity.

Vision:
To build a commercially viable, diverse, renewable heat industry in Scotland in support of our 2020 renewable energy target and to help tackle climate change.

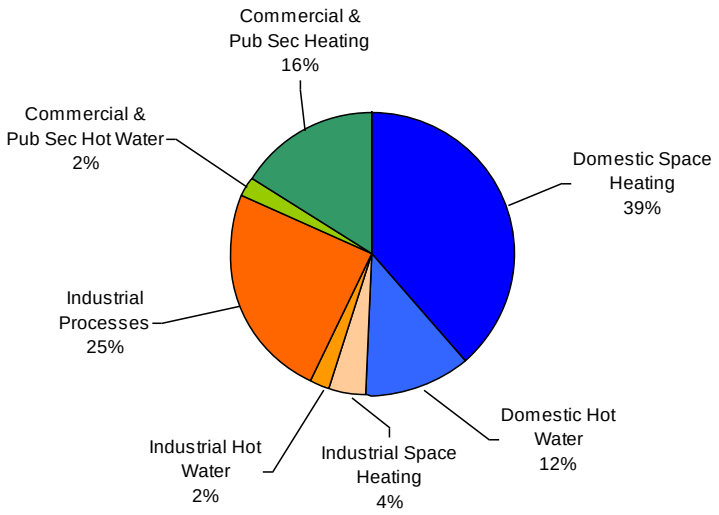
Headline Ambitions:
To at least meet the 11% target by 2020 through:

- having heat from renewable sources recognised as the first choice option for new developments in areas off the gas grid and maximising opportunities for retrofitting;
- having heat from renewable sources representing a cost effective option in the rest of the country;
- supporting the development of integrated local and regional community energy and utility cross-sectoral partnerships;
- creating a flexible, future-proofed delivery infrastructure, allowing for technological, financial and structural innovation;
- developing a supportive policy, planning and regulatory framework.

Overview:
Ministers attach high priority to the development of policy on renewable heat, and are introducing a statutory obligation, under the Scottish Climate Change Bill, to publish a separate, more detailed Renewable Heat Action Plan to meet the 2020 target and reduce carbon emissions.

Estimated heat use in Scotland is currently around 50% of overall energy demand, distributed between the following sectors:

Figure 4: Split of Scottish Heat Energy Demand



Forum for Renewable Energy Development in Scotland, Scotland's Renewable Heat Strategy, 2008

The target of delivering 11% of Scotland's projected 2020 heat demand from renewable sources, amounting to some 6.4TWh, is estimated to require an installed capacity of circa 2.1GW.

The Scottish Government commissioned the Sustainable Development Commission (SDC) to research the level of renewable heat currently in use in Scotland. The findings at Table 1 show that the current level of installed renewable heat capacity and output in Scotland is very small – about **1.4% of the projected 2020 demand** (or some 0.83TWh), with the market fragmented between differing technologies and scales of application.

SDC estimate a near doubling can be expected from plant under construction and if all projects remain on track then output in 2009/10 is estimated at **2.7%.** As for future projections, SDC identified a number of projects at various stages of planning which could bring the total to around **4.6% (**of projected 2020 demand**).**

Table 1: Scottish Renewable Heat Capacity as at 31st March 2009

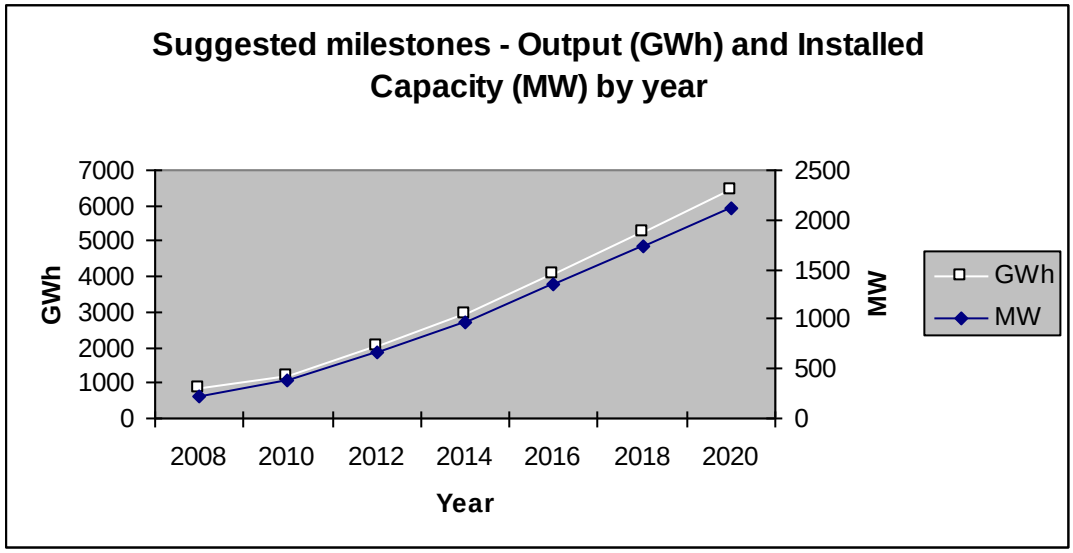
	2008/09 TOTAL CAPACITY		2008/09 TOTAL OUTPUT	
Biomass primary combustion	197.3	MW	758,682.5	MWh
Solar thermal	9.4	MW	6,666.0	MWh
GSHP	21.3	MW	55,454.3	MWh
ASHP	2.8	MW	8,021.7	MWh
WSHP	-		-	
Biomass CHP	-		-	
(Fuel Cell biomass)	-		-	
(Wind electricity)	-		-	

(Hydro electricity)	-		-	
TOTAL	**230.8**	**MW**	**828,947.5**	**MWh**

Using the findings from the SDC report, Figure 2 below suggests interim milestones for heat output and installed capacity to assist in monitoring achievement against the target.

NB: The increased rate of expansion after 2011 anticipates the introduction of a Renewable Heat Incentive.

Figure 5



The Renewable Heat routemap should be read in conjunction with the Bioenergy routemap as woody biomass and energy from waste (EfW) are very important fuel sources in our efforts to meet the renewable heat target. The opportunities and required actions which address woodfuel availability and supply are covered in the bioenergy routemap.

As stated in the Introduction to the Renewables Action Plan, energy efficiency and renewable energy are closely linked and both are important to deliver long term targets. This is recognised in the Scottish Climate Change Bill, which will include a statutory obligation to produce an Energy Efficiency Action Plan, as for renewable heat. Delivery of the Renewable Heat route map will be closely linked with the Energy Efficiency Action Plan.

All technological options and scales will need to play a part in the delivery of renewable heat, from microgeneration through to large scale industrial. In the short to medium term, systems which use woody biomass are likely to be the key technology, along with energy from waste which, in all its various forms, represents a rapidly developing sector. Currently industrial and commercial users are the key target market, but with some 50% of Scotland's heat demand being in the domestic sector it is essential to initiate change in this area as quickly as possible, with a particular focus needed to tackle the 2.4 million existing properties.

Case Study: Carbon Trust Biomass Heat Accelerator

During 2006, the Carbon Trust launched the Biomass Heat Accelerator (BHA) which is a 5 year, £5 million technology accelerator working to address the barriers specific to this technology. Core funding from the Scottish Government was received.

To date, the Biomass Heat Accelerator has worked with 20 existing installations in Scotland to gather detailed cost and performance data. In addition it has worked with three of Scotland's leading biomass heating equipment installation companies to improve cost-effectiveness.

A wider programme of knowledge dissemination has also reduced uncertainty over this technology for many potential users in Scotland, including the publication of a major technical guide: 'Biomass heating: a practical guide for potential users'.

The outcomes of the BHA project should enable a wide base of potential users to investigate and take advantage of this where they are best placed to do so. Scotland is ideally placed to take advantage of this technology due to the availability of fuel sources and the large number of heat consumers who do not have access to relatively cheap natural gas

In rural areas off the gas grid individual house solutions based on microrenewables such as biomass, solar thermal and heat pumps will be particularly important. The Energy Efficiency Action Plan will give further consideration to the role and place of low carbon equipment in the built environment for both heat and electricity generation. There are greater opportunities for the use of renewable based district heating, and potentially biogas, in urban and semi urban locations. The Energy Efficiency Action Plan will consider waste heat from non renewable sources for district heating.

Together this presents a considerable opportunity for growth in the numbers of skilled trades people to manufacture, install and maintain the equipment e.g. boilers, heat pumps, solar collectors and insulated pipe work for district heating networks, and to supply biomass. It is equally important to ensure that there is the capacity to provide the necessary professional services including designers, specifiers, building service engineers and planners.

The initial capital cost for purchase and installation of the required equipment is quite considerable, particularly new district heating networks, which represents both a barrier to uptake, and an opportunity for business in driving innovation on cost reduction.

It is worth highlighting that, in a constitutional context, responsibility for heat falls between reserved and devolved matters. Ministers have powers to promote renewable heat, but the development of a renewable heat incentive which involves a

levy on fossil fuel suppliers is reserved to the UK Government. However, Ministers will be consulted on its introduction, ensuring specific Scottish interests are taken into account in the design of the scheme.

Opportunities/Actions:

Supporting developments:

- Provide clear concise information on key drivers, opportunities and support available to encourage both high heat users and the public sector to give serious consideration to installing one or more of the most relevant renewable heat technologies.
- Provide an opportunity to enable interested bodies to learn from early adopters by facilitating engagement between them, including publication of appropriate case studies.
- Promote the heat options assessment tool to help developers to understand the opportunities and requirements for a cost effective district heating (DH) scheme and compare options for DH and individual installations of low carbon equipment, set in the context of a tightening of energy standards, as recommended by Sullivan report. Published on 22 June 2009 by Building Standards.
- Enable the development of commercial renewable heat projects, linking available resources with potential users/locations in close proximity.
- Ensure that best practice information on energy efficiency is available alongside renewable heat information provision.

Skills:

- Ensure that work carried out by the Scottish Renewable Energy Skills Group addresses the needs of the renewable heat sector**.**
- Identify solutions to any labour/skills barriers identified in the Scottish Enterprise baseline study into the Energy Supply Chain in Scotland with a view to developing a workforce with the capacity and skills necessary for exploiting opportunities in the renewable energy sector.
- Ensure renewable heat training incorporates guidance on energy standards.

Building Scottish Supply Chain:

- Provide advice and assistance to emerging and new start up supply chain companies.
- Enable development and co-ordination of supply chains.
- Support businesses growth in, and diversification into, the renewable heat sector.
- Facilitate targeted inward investment where required to address renewable heat supply chain needs and explore opportunities to develop the skills base and manufacturing infrastructure for renewable heat technologies.

Supporting Investment:

- In the short term: maximise the opportunities presented through the SBHS, WRAP, CARES, SRDP and, as appropriate, RSA support mechanisms, including demonstrator schemes for e.g. district heating and retrofitting in the domestic sector.
- Continue to work closely with the Department of Energy and Climate Change (DECC) to highlight Scottish needs in the consideration of mechanisms to enable the wider use of renewable heat, in particular the introduction of the RHI and the banded RO.
- Link sources of venture capital with major commercial renewable heat developments, in particular supporting new business models and partnerships between private sector, local authorities and communities for the delivery of heat through district heating.
- Consider the need for a credit loan guarantees scheme to facilitate development in the sector.

Technologies:

- Ensure information on all technologies is available to enable end users to make an informed choice about the most appropriate technology for their needs.
- Commission further work to explore the feasibility of introducing permitted development rights for air source heat pumps and wind turbines.

Building Regulations:

- Consultation on change to energy standards in Technical Handbooks 2009.

Demonstration project*(s)*/Regional Champions:

- Draw on experience of others, such as Sustainable Glasgow, to promote best practice.
- Seek to access European expertise on renewable heat, develop collaborative projects and source EU funding through the Scottish European Green Energy Centre (SEGEC).
- Identify at least one exemplar project, potentially through the Scottish Sustainable Communities Initiative, to explore cost effective provision of heat from renewable technologies.

Renewable Heat Key Actions 2009-11

Area	Action	Timescale	Lead
Supporting Developments Information and Advice	• Consider findings from gap analysis work undertaken by SRF and take appropriate action. (see the Skills section for further detail)	• End December 2009	• Scottish Government
Information and Advice	• Undertake a heat mapping pilot with Highland Council, in conjunction with CoSLA,	• End March 2010	• Scottish Government; Highland

	and promote the findings to all 32 LAs.		Council
Information and Advice	• Work with the Carbon Trust, through the Biomass Accelerator Programme, to target Scottish companies that are high heat users, with a view to getting them to switch to renewable heat.	• Contact 100 companies by End July 09. • Complete 20 energy audits by end December 2009.	• Carbon Trust
Information and Advice	• Publish case studies which have received Scottish Government funding to enable interested bodies to learn from early adopters.	• ongoing	• Scottish Government
Skills	• FREDS Renewable Heat group to consider specific skills needs for renewable heat and to feed this into the Renewables Skills Steering Group	• End December 2009	• FREDS Renewable Heat Group
Supply chain	• In conjunction with the Enterprise Networks produce a strategic plan to maximise supply chain opportunities across all areas, including: design and installation. Component supply, maintenance and servicing, manufacturing and innovation.	• End December 2009	• Scottish Enterprise; HIE; Scottish Government
Supporting Investment Grant programmes	• Continue to provide funding through various grant programmes, including CARES, SBHS and SRDP to support renewable heat installing including district heating.	• End March 2011	• Scottish Government
Fiscal measures	• Ensure that Scottish interests are taken into account in the design of the RHI.	• End December 2009	• Scottish Government
Fiscal measures	• Consider the need for a credit loan guarantee scheme to facilitate development of the sector	• End March 2010	• Scottish Government

BIOENERGY

Vision:

- To maximise the contribution of sustainable biomass to meet renewable heat and electricity targets, and reduce carbon emissions

Headline Ambitions:

- Substantial growth of bioenergy potential in Scotland in harmony with environmental and air quality obligations.
- Substantial increase in the uptake of heat from a range of bioenergy sources across the domestic, commercial and industrial sectors.

Overview:

Biomass technology is well-proven and widely used. Modern systems operate at high efficiencies, and are especially suitable for areas off the gas grid where much of the resource is located. It is a renewable energy source as it can either be part of a constant carbon cycle (such as woodfuel from sustainably managed forests or animal waste) or biomass waste which would otherwise go to landfill.

Material from biological sources, provide useful quantities of predictable, base load for electricity and/or heat generation. Indeed, bioenergy is likely to be one of the main means by which Scotland's 11% renewable heat target is to be met.

The use of bioenergy, particularly woodfuel, has increased rapidly over the last five years. However, with only about 230 MW thermal and 80 MW electricity installed capacity in Scotland, the bioenergy market is still at an early stage of development, with the need for significant ongoing growth. Existing capacity is a mixture of a few large wood processors (using wood for process heat), the major electricity generating plant at Lockerbie and a range of smaller projects (mostly) funded by the Scottish Biomass Support Scheme and the Scottish Community & Householders Renewable Initiative. The first large-scale biomass CHP plants in Scotland are about to be commissioned at UPM Caledonian Paper at Irvine and Balcas at Invergordon.

The supply chain has also developed to meet the growing demand. Companies in the forestry and recycling sector have put in place large-scale supply contracts and have been leading the way in mobilising new sources of supply such as forest residues. Local markets have also been growing rapidly and many rural businesses such as estates, farms and forestry contractors have taken advantage of capital grant through SBSS and SRDP to diversify into woodfuel supply. Forestry Commission Scotland (FCS) has initiated a GB-wide Woodfuel Suppliers Forum of the key trade association and agencies relevant to the woodfuel supply chain to promote coordination and networking in the biomass sector. REMADE Scotland have now published a report on wood waste data: which will provide certainty to the sector on available resource.
http://www.remade.org.uk/index.php?option=com_content&task=view&id=132&Itemid=341

Marine biomass is not yet commercially viable and is still at the R& D stage. There is some activity happening in Scotland undertaken by the Scottish Association for Marine Science who based outside Oban. See case study below.

Case Study: Biomara project

In March 2009, Scottish Association for Marine Science (SAMS) and its partners secured nearly €5 million from the European Union's INTERREG IVA Programme for the Biomara project.

Biomara is a UK and Irish joint project that aims to demonstrate the feasibility and viability of producing third generation biofuels from marine biomass. It will investigate the potential use of both macroalgae and microalgae as alternatives to terrestrial agri-fuel production. The practicalities of using algal biomass as a competitive, sustainable biofuel source will be considered in concert with wide stakeholder engagement, whilst environmental impacts of algal cultivation and extraction will be core considerations of the project.

Alongside this research the project will work with a cross-sectoral stakeholder group to ensure the results are used for onward end-use development and influence fuel supply and demand. This major research initiative is led by the Scottish Association for Marine Science (SAMS) but involves input from a number of partners from Ireland and Northern Ireland including Dundalk Institute of Technology, the University of Ulster, Queen's University Belfast, Dublin City University, Sligo Institute of Technology, and Scottish partner, University of Strathclyde.

Energy from Waste (EfW), particularly from commercial and industrial streams, can also contribute to energy targets, now and in the long term.

The Scottish Government's policy on waste is based on Zero Waste and the waste hierarchy contained in the EU Waste Framework Directive:

- Prevention
- Preparing for re-use
- Recycling
- Other recovery, e.g. energy recovery
- Disposal

The Scottish Government has said that for municipal waste we are aiming for 70% recycling and composting by 2025. Anaerobic Digestion will count towards this 70% target so long as the plants are taking source segregated organic material and not mixed waste. The Government has said that no more than 25% of municipal waste should be treated by technologies taking mixed waste, such as incineration. The energy from waste cap does not apply to commercial and industrial waste.

Scotland has to meet its share of the EU targets on reducing the amount of biodegradable municipal waste sent to landfill. The first such target due for 2010: this has been met. The subsequent targets in 2013 and 2020 represent an ongoing challenge. Infrastructure, such as energy from waste plant, to treat residual waste will play a role in meeting these targets.

For construction and demolition waste, the revised EU Waste Framework Directive lays down a target of recycling and re-use by 2020.

The Government has indicated that all energy from waste plants should aim for high levels of efficiency. Therefore, SEPA have produced guidelines on the Thermal Treatment of Waste:
http://www.sepa.org.uk/about_us/news/sepa_publishes_revised_guideli.aspx
The Scottish Government, along with the other administrations in the UK, has commissioned, through the Waste and Resources Action Programme Scotland, a project on the practicalities of introducing more landfill bans. This project is due to report later in 2009.

Anaerobic digestion (AD) is likely to be used increasingly in Scotland, particularly to treat food waste from households, business and the food processing sector. Work is on-going through WRAP on developing markets for recycled products, including digestate from AD plants.

Opportunities/Actions:

Top Level:

- Maximise available biomass resources to support the expanding bioenergy sector.
- Provide good quality information and advice that promotes the benefits of bioenergy to encourage end users to adopt the technology.
- Encourage next generation bioenergy, including marine biomass and advanced conversion technologies.
- Fully exploit the opportunities available from waste to energy compatible with Government policy on waste prevention and recycling.

Developing the Sector:

- Maintain progress against the actions identified in the Wood Fuel Task Force report. This includes working with industry to support the development of long-term contracts and greater transparency in the market.
- Continue to improve woodfuel supply forecasts including private sector supply and woody waste figures, taking into account existing markets for wood.
- Continue with the cross government bioenergy group to ensure policies are joined up.
- Ensure that the essential capacity building for bioenergy is included in proposals for skills development.
- Promote opportunities in the Energy from Waste sector, such as, encourage small, local district heating schemes, encourage AD of source segregated wastes, encourage partnership working across public and private sector, and explore opportunities in commercial and industrial waste.
- Continue to develop anaerobic digestion through the Waste and Resources Action Programme 2009 and 2011.

Support Investment:

- Continue to run the Scottish Biomass Heat Scheme until 2011. A total of £3.3 million of capital grants is available for heat-only business installation. Support

ongoing development of the biomass supply chain and renewable heat installations under the Scottish Rural Development Programme.
- Undertake evaluation of the Scottish Biomass Support Scheme in 2009 to help inform future support.
- Continue to encourage the next generation of bioenergy, including marine biomass.
- Continue to liaise with DECC to ensure Scottish bioenergy interests are met in the forthcoming Renewable Heat Incentive.

Guidance:
- Promote best practice in the use of biomass and air quality.
- A new National Waste Management Plan is currently being drafted.
- FCS will provide support and advice through the Regional Biomass Advice Network (RBAN), an Energy Forestry Handbook and associated Best Practice Guidance and case studies to be published in 2009. FCS is also co-ordinating a marketing programme through RBAN.
- Promote the Carbon Trust's guide to biomass heating "*Biomass heating: a practical guide for potential users."*

Planning:
- The Scottish Government should continue ongoing engagement with Ofgem and the UK Government to discuss grid access.

Energy from Waste:
- Quantify how much energy from waste (including AD) can contribute to renewable heat generation in Scotland.
- Investigate heat recovery from a waste management plant.
- Encourage operators of AD plants receiving public funding to make effective use of the heat by building in a contractual requirement to grant awards.
- Enforce thermal treatment guidelines to ensure energy from waste plants treating any form of waste aim to capture the heat efficiently and seek markets for that heat.
- Produce a new National Waste Management Plan.
- Provide advice and support to key firms in Scotland currently seeking to create and use energy from waste.
- Enable the creation and growth of CHP and/or heat networks in relation to energy from waste facilities with the aim of improving the competitiveness of business locations.
- Enable the development of an impartial national resource to assist companies in priority sectors in developing and delivering solutions to derive value from waste, including knowledge on heat demands.

Bioenergy Key Actions 2009-2011

Area	Milestone/Event/tasks	Timescale	Lead
Developing the woody biomass sector. Woodfuel availability and supply chain.	• Maintain progress against the actions identified in the Wood Fuel Task Force, keys tasks are: Improve accuracy of forecasting, and develop long-term contracts and greater transparency in the market.	• End 2011	• Forestry Commission Scotland (FCS)
Support Investment Grant Programmes	• Run the SBHS to assist SME's to adopt biomass heat technology. • Continue funding via CARES & SRDP to support renewable heat installations including demonstrator DH	• End March 2011	• Scottish Government; FCS
Fiscal and Regulatory measures. Electricity/CHP.	• Continue to support the generation of electricity from renewable sources via the RO, and continue to provide enhanced support for ACT and biomass CHP.	• Band introduced April 2009 with a commitment to end March 2027.	• Scottish Government
Heat	• Ensure Scottish interests are accounted fir in the design & introduction of the RHI (see heat routemap)	• End December 2009.	• Scottish Government
Information and Advice. Woody biomass.	• Provide support and advice through the Regional Advice Network (RBAN), key tasks: co-ordinate support/advice from other key agencies; undertake marketing programme.	• End December 2011	• FCS
Information and Advice	• Publish case studies which have received SG funding to enable interested bodies to learn from early adopters.	• End December 2009	• FCS
Air quality	• Promote best practice and provide guidance on air quality.	• ongoing	• Scottish Government
Skills	• Specific skills for bioenergy to be covered by the RESG (considered in more detail in the skills route map)	• ongoing	• Sector Skills Council
Energy from Waste	• Support development of AD through WRAP	• 2009-11	• Scottish Government
EfW	• Quantify how much energy from waste (including AD) can contribute to renewable heat generation in Scotland	• End December 2009	• Scottish Government
EfW	• Develop proposals for advancing Scottish innovation in relation to EfW technology	• Scope out initial proposal by December 2009	• Scottish Enterprise

HYDRO

Vision:

- Full exploitation of hydroelectric potential in Scotland in harmony with environmental obligations.

Headline Ambitions:

- Contribute to renewables targets by realising the sustainable potential identified by the 2008 FREDS Hydro Resource Study and any additional larger scale development.
- Increase the number of sustainably developed micro-hydro schemes to build confidence, resilience and wealth at community level as well as increasing the prevalence of sustainable, low carbon, affordable and secure energy.

Overview:

With over 1.4GW installed capacity, the hydro sector in Scotland is well established, including several large scale run of river which have been operating for several decades, and augmented most recently by the 100MW Glendoe scheme near Loch Ness. Hydro power is proven and reliable and, with pumped storage, can provide balancing services to manage intermittency associated with a higher penetration of renewables.

The potential impact of large scale hydro schemes on the environment, and the Scottish Government's obligations to comply with the Water Framework Directive (WFD), mean that there is probably limited scope for further large scale hydro development.

Opportunities:

In a more general context, as the proportion of variable generation grows, grid management solutions are likely to become more valuable. Hence while the scope for further large scale hydro development may be small, nevertheless, it will be important particularly to support the growth of appropriately sited pumped storage.

There continues to be interest in smaller schemes, and this opportunity has been highlighted by the FREDS Hydro Resource study which suggests up to 657MW of economically viable small scale hydro to be exploited in Scotland. While grid capacity constraints may reduce this figure in the short term, nevertheless, there is latitude to explore the resource identified, and this is precisely what the Forestry Commission Scotland is doing with its major project to develop renewables on the Forest Estate, highlighted earlier.

Given the potential for small scale schemes, there is scope for a new industry-based group on micro-hydro to supersede the FREDS Hydro Group and to build on its legacy. The sector would like to see a planning presumption in favour of micro-scale development, but this has to be weighed against Ministers' duty to ensure compliance with the WFD. There is certainly a need to ensure that micro-hydro development is not disincentivised by undue administrative and cost burdens in applying for water licences, and thus an early action will be to work with SEPA to

ensure – within the constraints of the WFD – that micro-hydro schemes are treated proportionately in the licensing process.

The Role of SEPA

SEPA is committed to continue to engage with the sector to ensure presentation of a streamlined implementation of the WFD via CAR. However, SEPA has a duty under CAR to take account of third party interests:

- guidance issued to SEPA by the Scottish Government makes clear that third party interests include recreational interests;
- unless derogation under the Water Framework Directive is applicable, SEPA has a duty to refuse authorisation where deterioration of status would otherwise result;
- the WFD's derogation tests are essentially balancing tests requiring SEPA to balance the social (e.g. recreation etc) and economic benefits of protecting the water environment and the benefits to sustainable development of the proposed scheme. SEPA cannot apply the tests without taking into account social, economic and environmental interests;
- SEPA is working closely with a number of local authorities to coordinate and streamline the information requirements. SEPA consults local authorities and SNH on recreation issues before reaching a decision;
- PAN 51 provides some guidance on the role of environmental regulators versus planning authorities. It identifies that the differences in the role of planning powers versus SEPA's powers can be approached by considering their relative abilities to secure environmental objectives: SEPA is better able than local authorities to predict the impact of changes to the water environment on the recreational resource (i.e. because it can asses how the flows etc will change). SEPA is also better able to control the impact recreational and other interests because it can set conditions on how much water can be abstracted and when etc – whereas local authorities cannot.

SEPA is also planning a workshop with local authorities in the early autumn to further coordinate respective functions.

While the roles of SEPA and the Fisheries Electricity Committee (FEC) have been aligned through a Memorandum of Understanding, it could be argued that SEPA's duty to implement the WFD through CAR undermines the case for FEC's continued existence. The Scottish Government has made the case to the UK Government to abolish FEC, and this action is now being taken forward in the current UK Parliamentary session.

The question of the threshold above which projects are determined under s36, rather than through local planning, has been debated over the past two years by the FREDS Hydro Group, and the sector will now put forward a case to raise the threshold from the current 1MW level to 50MW. In considering the need for such a change, it will be important to take into account any impact on local authority capacity.

Actions:

- consider the case expected to be made by the hydro sector (via FREDS) to raise the s36 threshold from 1MW to 50MW, and act accordingly. If a change is deemed appropriate, this should be achieved within 12 months;
- continue to engage with Ofgem, National Grid and the electricity transmission companies to ensure continuing progress in obtaining grid connections such as through derogation and Registered Power Zones;

- by the end of 2009, dissolve FREDS Hydro Group and establish new industry group on micro hydro to drive development, and to look at particular impact of CAR charges;
- engage with the sector on the development of the Feed in Tariff proposals (at UK Government level) and seek feedback to inform decision-making. (ongoing);
- by the end of 2009 conduct further analysis of resource study to identify jobs potential and ensure that skills needs are covered in work being taken forward by the Scottish Renewable Energy Skills Group.

Hydro Key Actions 2009-11

Area	Milestone/Event/tasks	Timescale	Lead
Regulatory improvements	• Through FREDS Hydro Group, agree on best level for S36 threshold and implementation of change if required.	• By June 2010	• Scottish Government; FREDS
	• Continue to work with SEPA to ensure that implementation of WFD via CAR does not create unnecessary barriers.	• Ongoing	• Scottish Government; Scottish Environmental Protection Agency (SEPA)
Legislation	• Abolition of Fisheries Committee.	• In Hand	• UK Government
Grid	• Continued engagement with Ofgem/NG and transmission operators on barriers to access.	• Ongoing/Urgent	• Scottish Government
Consents	• Timely decisions on proposals in system and aim for 9 month turnaround on new proposals.	• Ongoing	• SG Consents
Skills	• No clear figures on Green jobs post construction stage. • Conduct analysis on Jobs potential based on the Resource study. • Ensure that skills issues are covered by RESG.	• 2009 - 2010	• Scottish Government; Scottish Funding Council
Policy	• Establish a new industry group on Micro-hydro to galvanise action and consider barriers and report to FREDS. • Early priority to engage with SEPA on ensuring a proportionate approach. • Seek views and keep industry appraised on development of Feed in Tariff.	• 2009-10	• Scottish Governmet • Scottish Government; SEPA • Scottish Government, Enterprise Agencies

HYDROGEN

Vision:

- Recognising the cross-cutting benefits which the green hydrogen/fuel cell sectors can bring, including solutions for energy storage, energy security in remoter areas and low carbon transport, and, in promoting these solutions, to maximise the contribution of the green hydrogen/fuel cells sectors to the achievement of 20% of renewable energy in Scotland by 2020.

Headline Ambitions:

- Hydrogen storage to increase the effectiveness and penetration of intermittent renewable energy production.
- Hydrogen and fuel cells to enable decentralised energy, thereby increasing penetration of renewables.
- Hydrogen and fuel cells to provide solutions for off-grid sustainability, particularly in remote areas.
- Fuel cells to increase carbon efficiency across a range of heat and power applications.
- Increase the use of Hydrogen and fuel cells in transport.

Overview:

The Scottish Hydrogen and fuel cell sector is at an early stage of development, based on academic expertise, university spin-offs, and a small private sector cohort looking to find a niche in what is a globally driven market.

As an energy vector rather than an energy source, this technology does not benefit directly from incentives such as the RO. Much of what has been deployed in the past 2 years in Scotland has been as a result of the small Scottish Government grants scheme which is being evaluated. With the economic downturn impacting severely on this fragile sector based on young SMEs, it will be important to establish the most appropriate longer term stream of support to encourage growth.

There is certainly an opportunity for the sector to capitalise on the push for green energy – as increasing levels of variable generation enter the grid (hence increasing the need for grid balancing and storage) and communities seek solutions to fuel poverty and grid dependence. Exploiting such opportunities will entail strengthening consumer awareness and confidence in the technology as well as achieving greater sectoral alignment and consensus.

Larger players have entered the market – particularly on grid balancing and as customers for transport solutions. In this context, commercial demonstration appears to be the key next step to wider deployment.

Opportunities:

- Increasing levels of variable generation entering the grid will require a greater level of grid balancing and storage. While there are various options to manage intermittency, including international interconnectors, smart grid,

batteries in electric vehicles used as storage, compressed air storage and pumped hydro, there is a commercial opportunity for the hydrogen sector to demonstrate its own efficacy as one such potential grid balancing solution. There is some commercial interest in deployment and by 2020 Scotland should aim for hydrogen grid balancing schemes serving up to 100MW of onshore wind.

- While market development is global, Scotland should capitalise on its niche advantage for the development of green hydrogen and fuel cells solutions in rural and remote communities seeking better energy security and mitigation of fuel poverty. By 2020, Scotland should aim for at least 6 examples of hydrogen in decentralised applications, particularly focused on remote communities.

Case Study: PURE's hydrogen houses

PURE Energy Centre Ltd is leading the way in developing hydrogen solutions for remote communities. PURE received a grant of just over £240,000, under the Scottish Government's Hydrogen & Fuel Cell Support Scheme, to develop hydrogen systems for the first completely unplugged hydrogen houses in the world. The project addresses some of the environmental, electrical and heat supply issues found in so many housing schemes around the world. This scheme is a show case of technology that could potentially provide energy security to any unplugged houses.

The project involves building two Combined Heat and Power (CHP) systems. The CHPs will provide both heat and electrical power to the two non-grid connected houses in Northmavine on the Shetland Islands. The CHP systems are based on state-of-the-art hydrogen fuel cell technology, which the company sees as the way forward to increasing energy efficiency for houses, housing estates and buildings. With an efficiency of just over 90%, the CHP technology offers a great hope for individual housing units to generate their own 'personal clean energy'.

- Fuel cells could be used in applications across domestic, industrial and public sectors.
- Market development of hydrogen/fuel cell applications in transport is global, and the sustainable transport policy agenda in Scotland is being pursued along technology-neutral lines. The Scottish Government aims to consult on sustainable transport this summer. Nonetheless there is already some commercial interest in demonstrating the value of hydrogen/fuel cell transport applications, and Scotland should promote this potential and be prepared to examine barriers to further roll-out. On this basis, Scotland should aim for 10 major transport applications of hydrogen fuel cells by 2020.
- Other applications such as fertiliser and hydrogen in cooking.

Actions:

Cross-cutting themes:

- Scottish Government will take account of the potential contribution of hydrogen to the sustainable low carbon transport policy currently in development.

- Scottish Government will include hydrogen and fuel cells in its forthcoming assessment of energy storage requirements for Scotland.

Engagement:

- The Scottish Government will support awareness raising and early demonstrators – this includes support for Scotland's Hydrogen Future conference in September 2009.
- The Scottish Hydrogen Fuel Cell Association (SHFCA) will engage and achieve buy-in with the sector to determine a common position by the end of 2009 on key areas for development to determine where commercial demonstration can begin.

Supply Chain and Commercial Development:

- The Scottish Government and SHFCA will support early demonstrators for decentralised energy applications in remote communities and promote success by 2012.
- The Scottish Government will consider the scope for public sector infrastructure lead over the next year.
- The Private Sector will provide early demonstrators on Grid balancing and a transport corridor by the end of 2012.
- Scottish Development International will continue efforts to attract inward investment to the hydrogen/fuel cell industry.
- Scottish Enterprise will:
    - Promote supply chain opportunities and benefits of hydrogen within other sectors
    - Work with academic and other public sector partners in the development of a potential Scottish Hydrogen Fuel Cell Challenge programme during 2009-2010.
    - Help realise the potential of the Hydrogen Office at Methil during 09-11 and promote the development of an active H2/FC cluster at Methil by 2010.
- The Carbon Trust is scoping out a potential fuel cell accelerator, specifically focussing on reducing the cost of polymer fuel cell technology to be launched later in 2009 if appropriate projects can be found.
- The University of St Andrews will lead on establishing a Scottish Hydrogen Fuel Cell Research Platform (SHFCRP). This work is already ongoing.

Hydrogen/Fuel cells Key Actions 2009-11

Area	Milestone/Event/tasks	Timescale	Resource implications (e.g. staff and/or funding)
Establishment of Infrastructure	• Early commercial demonstrator on grid balancing and transport corridor.	• By 2012	• Private sector
Increased Consumer/industry awareness	• Support early demonstrators for decentralised energy applications in remote communities (including via CARES) and promote success. • Support major conference. • Consider scope for public sector infrastructure lead.	• By 2012 • Sept 2009 • 2009-10	• Scottish Government; Scottish Hydrogen and Fuel Cell Association (SHFCA); CES; project developers • Scottish Government • Scottish Government; Scottish Enterprise (SEn); Highlands and Islands Enterprise (HIE)
Sectoral alignment	• SHFCA to galvanise members to buy in to clear vision for sector.	• By end 2009	• SHFCA
Support sectoral growth	• Development of H2/FC cluster at Methil. • Attract inward investment. • Establish longer term access to R&D support – such as possible Scottish Fuel Cell programme. • Promote supply chain opportunities within other sectors. • Liaise with relevant authorities on potential regulatory barriers and gaps – such as health and safety requirements.	• By 2012 • Ongoing • By 2010 • Ongoing • ongoing	• SEn • Scottish Development International (SDI) • SEn • Scottish Government; SEn; SHFCA
Link to mainstream renewables	• SHFCA and Scottish Renewables active partnership.	• By 2010	• Scottish Government
Consolidate research base	• Establishment of Scottish Hydrogen and Fuel Cell Research Platform.	• In hand	• University of St. Andrews

Improve evidence base to inform policy	• Evaluate Scottish Hydrogen and Fuel Cell Grants Scheme and case for further funding. • Commission research on energy storage potential to support renewables targets.	• By end 2009 • By end 2009	• SG • SG
Ensure policy attention and cross-cutting policy approach	• Establish FREDS Group on Green Hydrogen and Fuel cells to oversee progress. • Assess role of sector in sustainable transport policy approach.	• By end 2009 • By end 2009	• SG Renewables • SG Transport

ONSHORE WIND

Vision:

- Continued expansion of portfolio of onshore wind farms to help meet renewables target, with robust planning framework supporting timely processing of consents applications and ensuring wind farms are consented where they are environmentally acceptable.

Headline Ambitions:

- Support the development of onshore wind farms in locations where it is environmentally acceptable, and hence contributes most effectively to sustainable economic growth.
- Maximise community engagement with onshore wind projects and provide support for small and community-scale developments, including encouraging wind-to-heat projects in remoter areas off gas grid.

Overview:

Onshore wind currently makes up about half of all renewables installed capacity in Scotland which in turn represents approximately half of the entire onshore wind capacity of the UK. The Scottish Government is committed to supporting the deployment of appropriately sited onshore wind, and to streamlining the regulatory framework for Consents. Over the past 2 years, 1.6GW of installed capacity has been consented by Ministers, compared with 1.2GW consented over 4 years by the previous administration. Given the proven status of the technology, and the known and anticipated quantity of applications in the system, onshore wind is expected to

provide the majority of capacity in the timeframe of our interim and 2020 renewable electricity targets.

CASE STUDY – Improving the Consenting regime

The Renewable Energy Directive places an obligation on Member states to take steps to ensure that processes for licensing and consenting new renewable infrastructure are clear, co-ordinated and proportionate. Scotland is already leading the majority of on-shore wind development in the UK and is delivering timely, evidence based and robust decisions towards achieving Scotland's renewable ambitions.

Scotland has shown a strong Ministerial commitment and alignment across its agencies to make renewable energy planning decisions quickly; helping developers to make key business investment decisions; while ensuring local communities are engaged in the design of developments and the decision making process.

Positive Actions underway

Our Renewables Planning policy looks for each local authority to adopt a spatial planning approach to renewable development, identifying key search areas suitable for development while still offering protection to more sensitive areas not best suited for a renewable project.

And in Scotland through a significantly revised scoping guidance procedure and the establishment of Early Engagement Key Stakeholder Groups we have developed a pro-active co-ordinated approach among key statutory environmental bodies and planners to advise and assist developers to best design and site developments.

Developers are further assisted through a gate-checking of any renewable application to ensure that the vital information required to make robust decisions is included in the application at the outset.

Future Opportunity

Scotland has been held as an exemplar in the UK in its adoption of renewable development licensing approach and will build on this positive practice by sharing our experience with UK colleagues through the Renewable Energy and Environmental Issues Project Board and by sharing best practice, training and environmental data with developers and stakeholders across Scotland to best inform the future consenting regime.

In the short term, a key factor impacting on the further development of the sector in Scotland will be the forthcoming decision on the Beauly-Denny grid upgrade, and, as renewables build develops further, grid capacity will become an increasingly significant factor affecting growth. Other key factors will be finding solutions to aviation issues, particularly in the South of Scotland, and whether the global supply chain will be able to keep up with increasing demand.

As there is burgeoning pressure on land for site development, so there will be a concomitant need to demonstrate "net sustainability" – including not only addressing significant environmental sensitivities and carbon issues associated with forested and peatland sites, but also supporting the Scottish Government's wider land use objectives. Whilst developers should be prepared to demonstrate good practice, in terms of mitigation and measurement of carbon impact, this must not become an unreasonable burden inhibiting development.

Opportunities:

- the Scottish Government has legislative powers to enhance the value of the Renewables Obligation if required, and will continue to engage with BERR, DECC and Ofgem to ensure that regulatory mechanisms are aligned fully with the need to exploit renewable resources;
- Scottish Enterprise and Highlands and Island Enterprise continue to promote Scotland as a centre for renewable energy in order to attract global companies to create a supply chain within Scotland, including on wind;
- there is a need to ensure development in harmony with environmental and planning sensitivities;
- an opportunity to maximise benefits to the community;
- carbon life cycle analysis of onshore windfarms can be conducted to demonstrate level of net carbon benefit and promote good practice – particularly in terms of peat soils and forestry impacts.

Western Isles Renewables Steering Group

The Scottish Government commissioned a study into how renewable energy and other projects can deliver economic and community benefit to the Western Isles while remaining consistent with conservations obligations. This followed the decision to refuse planning consent for the Lewis Windpower Ltd application on environmental grounds.

The report published in January 2009 confirmed that renewables hold the main economic potential for the Western Isles, with onshore wind offering the most opportunities in the short term, but that marine could play an increasing key role in the longer term.

Delivery of the actions coming out of the Study will be overseen by a Steering Group, chaired by the Scottish Government, and made up of local stakeholders.

Onshore wind Key Actions 2009-11

Area	Milestone/Event/tasks	Timescale	Resource implications (e.g. staff and/or funding)
Grid Key Priority	• Decision on Beauly-Denny upgrade.	• By end 2009	• SG
Consents Key Priority	• Map and identify solutions to aviation/radar issues, particularly in the South and West of Scotland.	• By end 2009	• SG
Storage	• Commission study on how best to tackle the issue of excess energy generation at times of low demand and consider the potential for more storage capacity on the Grid.	• By end March 2010	• SG
Supply Chain	• Consider need to conduct an onshore wind supply chain study and follow up with components manufacturers identified in the study to raise awareness of the short and medium term supply chain opportunities in the onshore wind sector. • Consider possible incentives to encourage more onshore wind supply chain start-ups close to areas of peak demand.	• By January 2010 • By April 2010	• FREDS • FREDS
R & D	• Continue to promote awareness of SMART, SPUR and other schemes amongst small turbine manufacturers and encourage applications.	• ongoing	• SG/SEn
Wind to Heat	• Promote micro- business take-up of wind to heat systems through support mechanisms for SMEs, with a particular focus on rural areas.	• By 2010	• SRDP
Strategic approach in sensitive areas	• Measurable Progress on Western Isles Economic and Community Benefits: Renewables Implementation Plan.	• By end 2009	• SG, Comhairle, other local stakeholders
Public Relations	• Via the redesigned Scottish Government Renewables website, promote the less-heralded benefits of onshore wind developments.	• By end 2009	• SG

Consenting/ Planning process	• Continue to improve s36 Consents process and reform of planning system to aid delivery of appropriate projects. • Encourage all local planning authorities to implement SPP recommendation to develop preferred areas for renewables development. • Encourage a Scotland-wide consistency in approach to the application for and consideration of on-shore wind developments through a series of seminars involving LPAs and developers.	• ongoing • 2009	• SG • SG • SG/SRF
Good practice on carbon accounting	• Build on work undertaken by University of Aberdeen and Forest Research on carbon life-cycle analysis of windfarms on peat soils and forestry in order to provide robust openly available model for inclusion in EIA as good practice.	• By 2010	• SG, FCS, Forest Research, University of Aberdeen
	• Consult with a view to determining acceptable carbon payback levels on peatland developments. • Ensure that the Scottish Government's policy on control of woodland removal is promoted to developers and key stakeholders and guidance established for its appropriate implementation.	• By 2010 • 2009	• SNH/SG • FCS/SG

OFFSHORE WIND

Vision:

- To make a significant contribution to 2020 renewables targets and beyond. To maximise economic benefits to the Scottish economy, and enable a young industry to establish, whilst working in harmony with the marine environment.

Overview:

Scotland has a strong story to tell on offshore wind development, with our world-class manufacturing and operational experience, much of it gained over 40 years in the offshore oil and gas industry. Scotland is a leader in deepwater offshore wind technology, with experience of building, installing and maintaining the European FP6 DOWNVInD offshore wind demonstrator, known as Beatrice. Together these will be key to Scotland realising its full offshore wind potential, estimated to be 25% of Europe's offshore wind potential[4].

It is therefore no surprise that The Crown Estate's recent announcement of the granting of 10 "exclusivity agreements"[5] for offshore wind developments within Scottish Territorial Waters (STW)[6] was widely welcomed as an ambitious yet realistic challenge for the industry. Developments on such a scale will make a significant contribution to the 2020 renewable target for electricity generation, with 6.4GW of potential renewable power estimated for the STW sites and a further 2 Round 3 sites bordering on Scottish waters having also been identified.

Offshore wind development of this scale has yet to be seen in Scotland, the UK and Europe. The scale of STW and Round 3 developments (30GW+) makes the UK the number one European market for offshore wind. Given our offshore wind experiences to date, Scotland is well placed to be a front runner, capitalising on the technology and supply chain challenges facing this new industry, securing high value skilled jobs in Scotland and contributing to Scotland's sustainable economic growth. However Scotland's ambitions are much greater than only focusing on domestic opportunities. Given the scale of Round 3 developments in UK waters and the increase in offshore wind throughout Europe, the opportunities for Scotland to position itself as a European hub for offshore wind development, be it manufacturing or maintenance, are huge. Scottish companies must act now to seize these opportunities. For these reasons SDI, SE and HIE are working closely with Scottish companies to ensure they are ready to embrace this challenge.

[4] Scotland's Resource Potential , 2001

[5] Link to CE press release, http://www.thecrownestate.co.uk/newscontent/92-scottish-offshore-windfarm-awards.htm

[6] Up to 12 nautical miles from Scotland's shore

Experience of Beatrice demonstrator offshore windfarm project

The Beatrice Wind Farm is the world's first deep water offshore windfarm. This demonstrator project, known as DOWNVInD, has been undertaken by Talisman Energy Ltd in partnership with Scottish and Southern Energy, having secured £3 million funding support from the Scottish Government as well as funding from the UK Government and European Commission.

The Beatrice Demonstrator is located adjacent to the Beatrice oil platform in the Moray Firth, and aims to prove the viability of wind farms in deeper water (up to depths of 45 metres). At an overall height from below the sea bed to blade tip of 234.5m, they are the world's largest turbines to be used in an offshore installation. The 2 wind turbines with a capacity of 5 MW are providing 30% of Beatrice oil platform's 14MW daily electricity requirements.

Several Scottish companies were involved in the manufacturing and realisation of the Beatrice windfarm. This flagship project for offshore wind energy development in Scotland, the UK and Europe demonstrates the importance of a strong local supply chain.

To realise our ambitions for offshore wind development in STW, the Scottish Government recently established a new FREDS sub-group, the Offshore Wind Industry Group (OWIG). Involving all of the developers of the 10 STW sites, the key public bodies (SG, SE, HIE, SDI and The Crown Estate) as well as academics, National Grid and the Scottish transmission companies, the purpose of the group is to identify and undertake the actions needed to establish a strong and competitive offshore wind industry in Scotland.

Given the exciting ambitions for offshore wind development in Scotland, the remit of the FREDS Marine Energy Spatial Planning Group (MESPG) extends to cover offshore wind responsibilities in addition to marine renewables. MESPG is taking forward a Strategic Environmental Assessment (SEA) for offshore wind in STW. The granting of The Crown Estate leases for the STW sites will be subject to the outcomes of the SEA which will be published in early 2010. In the meantime, MESPG and The Crown Estate are encouraging developers with interests in adjacent sites to take forward environmental studies in a collaborative manner.

Whilst a great deal of activity is happening within STW, there are also many opportunities outside of Scotland in terms of The Crown Estate's Round 3 process in UK waters and the large scale introduction of offshore wind across Europe. To ensure Scotland is at the heart of these wider opportunities, the Scottish Government is actively involved in a number of wider groups, ensuring that Scotland's offshore capabilities, experiences and skills are promoted.

At a UK level, the Scottish Government is working closely with the UK Government in coordinating the delivery of Round 3 and STW round. The Scottish Government is a member of DECC's Offshore Wind Delivery Group (OfWID) supporting the developing of offshore wind across the UK and the Electricity Networks Strategy Group (ENSG) responsible for strategically managing future investment in grid infrastructure to support the increase in renewable electricity generation.

Scotland is also making its mark in offshore wind policy across Europe as we promote our strengths. The Scottish European Green Energy Centre (SEGEC) will identify suitable EU funding, with a view to encouraging further investment in Scottish projects now and as Europe's offshore wind sector grows. The Scottish Government is also a strong advocate of the need for European Offshore Supergrids. As well as being actively involved in the EU's Offshore Grid Working Group, the Scottish Government is also a leading partner in the ISLES project alongside Ireland and Northern Ireland with a view to the future construction of an offshore grid in the Irish Sea.

Fuller details are available in the earlier **Infrastructure** section.

Burntisland Fabrications Ltd (BiFab) – Adapting to Changing Markets

BiFab is a highly successful Scottish company involved in large scale fabrication for the off-shore energy market. Set up in 2001 at its base in Burntisland, Fife following a management buy out, BiFab currently employs over 250 people at fabrication centres in Burntisland, Methil and Arnish on the Isle of Lewis.

The company's success has been built around the skills of the team that has produced major fabrications for the oil and gas sector since 1990. The company continues to focus on offshore energy, but the management team has realised that this sector is now changing and includes renewables markets such as offshore wind, wave and tidal power. This vision sees BiFab ideally placed to exploit these emerging opportunities. It had a key role in the development and construction of two support structures for the experimental Beatrice DOWNVInD project and in 2009 BiFab secured a £50 million contract from Ormonde Energy Limited to manufacture 30 offshore structures for a wind farm in Cumbria.

A positive example of the European opportunities available to Scottish companies is BiFab securing the contract to supply 6 off jacket sub-structures for the German test field project Alpha Ventus. These structures are on schedule for delivery August 2009.

Ambitions:

- to drive the success of the Scottish offshore wind industry, and facilitate the timely development and installation of offshore wind projects within Scottish Territorial Waters and Round 3 sites adjacent to Scottish Territorial Waters;
- to build Scotland's position as a key base for the offshore wind, innovation, manufacturing and installation, leveraging its oil and gas experience.

Opportunities:

- Scotland as a European leader in the offshore wind industry, enhancing our existing infrastructure, experience and skills;
- appropriate infrastructure, supply chain and grid capacity capable of supporting offshore wind development in Scotland and construction of infrastructure to service developments in the UK and Europe;

- skilled jobs for Scotland in research, development, construction, installation, operation and maintenance of wind turbines;
- Scotland as a hub for technology innovation for offshore wind through participation in offshore testing and demonstration programmes, such as DECC's ETF scheme and the Carbon Trust's Offshore Wind Accelerator programme;
- guidance for offshore wind development in Scotland following the completion of the offshore wind SEA. Geographical areas most suitable for offshore wind development will be highlighted as will areas where significant sensitivities and constraints exist;
- existence of a streamlined marine consenting regime for processing offshore wind applications swiftly, encouraging good quality offshore wind developments to take place in Scotland;
- supportive local authorities and communities benefitting directly from offshore wind developments in their area through supply chain opportunities, and well-sited developments working in harmony with their local environment.

Offshore wind Key Actions 2009-11

Area	Milestone/Event/tasks	Timescale	Resource implications
Making Scotland a leader in offshore wind development, building on its existing infrastructure, experience and skills	• Delivery and continual updating of the Offshore Wind Industry Group's Work plan.	• Ongoing	• Offshore Wind Industry Group
	• Commissioning of a Supply Chain study to identify industry requirements and match these to indigenous capabilities and highlight any gaps.	• Autumn 2009	• SEn and HIE led
	• In partnership with industry, hold a series of events to promote supply chain opportunities.	• Autumn 2009/ • Spring 2010	• SEn and HIE in partnership with The Crown Estate
	• Produce wind market forecast to highlight market opportunities to Scottish companies.	• Summer 2009	• SEn
	• Investigate what can be learnt from the oil and gas sector e.g. common codes for health, safety and environmental issues. Explore common supply chain competencies and offshore technology and subsea expertise. Hold workshop for offshore wind developers and oil and gas sector.	• 2010	• SEn and HIE led
	• Build on ongoing work identifying skill gaps to support the formation of a robust training system and to provide clear messages on the training needed for those entering Scotland's Offshore Wind Industry.	• Ongoing	• Scottish Renewable Energy Skills Group, with SRF and offshore wind developers

Further development of offshore wind technologies	• Identify innovation opportunities by collaborating with technology development and demonstration initiatives.	• Autumn 2009 onwards	• Offshore Wind Industry Group in collaboration with DECC, Carbon Trust, ETI and The Crown Estate
	• Champion and co-ordinate the delivery of appropriate Scottish regions as clusters for integrated innovation, manufacturing, port and grid infrastructure.	• Autumn 2009 onwards	• Developers in collaboration with BERR, DECC, Carbon Trust and The Crown Estate
	• Promote collaborations aimed at reducing the cost and improving competitiveness of offshore wind e.g. Offshore Wind Test Centre	• Autumn 2009	• SE/HIE/SDI
Planning and investing in the necessary grid infrastructure for connecting proposed offshore wind developments	• Consideration of strategic grid solutions for each zone of proposed offshore wind sites.	• Summer 2009 onwards	• National Grid led with input from developers and transmission companies
	• Creation of offshore grid sub-group for developers to investigate collaborative options for connecting offshore generation to shore. Identify economic opportunities in offshore cabling and transmission.	• Summer 2009 onwards	• SDI led with input from developers, SG grid team and The Crown Estate
Ensuring the development of offshore wind complements Scotland's marine environment	• Taking forward of the SEA for Offshore Wind in Scottish Territorial Waters.	• To complete early 2010	• MESPG led
	• Encourage co-ordinated regional approaches (based around offshore wind sites) to generic environmental scoping studies.	• 2010	• MESPG led with developers input
	• Aiming to ensure wider consistency in marine planning approaches for Scotland and with approaches in English and Irish seas.	• 2010	• SG led via participation in: ○ ISLES project ○ British Irish Council marine workstream • Marine Scotland will be responsible for marine planning under the current proposals in our Marine

			Bill.
Design of a streamlined marine consenting regime	• Establish group to design a marine consenting regime with appropriate structure and resources for handling of numerous offshore wind applications.	• Summer 2009-2010	• MESPG led
Ensuring appropriate financial incentives are available to ensure investment in proposed projects	• Direct engagement in DECC's consultation on proposal in Budget to raise ROC banding for offshore wind.	• Summer 2010	• SG Offshore renewables team dialogue with DECC

MARINE ENERGY

Vision:

- To create the world's leading marine energy industry that will provide a substantial contribution to the economy and environment of Scotland.

Overview:

With a significant wave and tidal stream resource estimated at around 21.5GW[7], The Scottish Government is proud of Scotland's position as a strong leader in marine energy renewables. With our impressive record of developing and exporting innovative wave and tidal stream renewable technologies, launching the £10 million Saltire Prize - the world's largest marine energy prize, to hosting the world's only accredited wave and tidal testing centre for marine renewables, the European Marine Energy Centre (EMEC), in Orkney, Scotland has a strong story to tell in the development of marine renewables.

However, we are well aware that other countries are putting a higher emphasis on marine renewables with the potential to challenge Scotland's leading status. For Scotland to retain its position as the world leader in the development of the sector, it is vital that Scotland's marine renewables industry continues to build upon its unique skills, experiences and expertise to date and that our infrastructure, supply chain and marine planning/consenting systems remain attractive to marine developers as the sector grows.

This route map for marine renewables focuses on wave and tidal stream devices, tidal barrage is not included. Development of tidal barrage technology is focused around the Severn currently. This route map builds on some of the key points that are currently being taken forward within the FREDS Marine Energy Group (MEG). The full details of MEG's work will be set out in its Marine Energy Road Map which will be published in the Summer.

MEG was reconvened in January 2009 to review its earlier Marine Renewables report of 2004. Consisting of Scotland's leading wave and tidal stream developers,

[7] Scotland's Renewable Resource, 2001

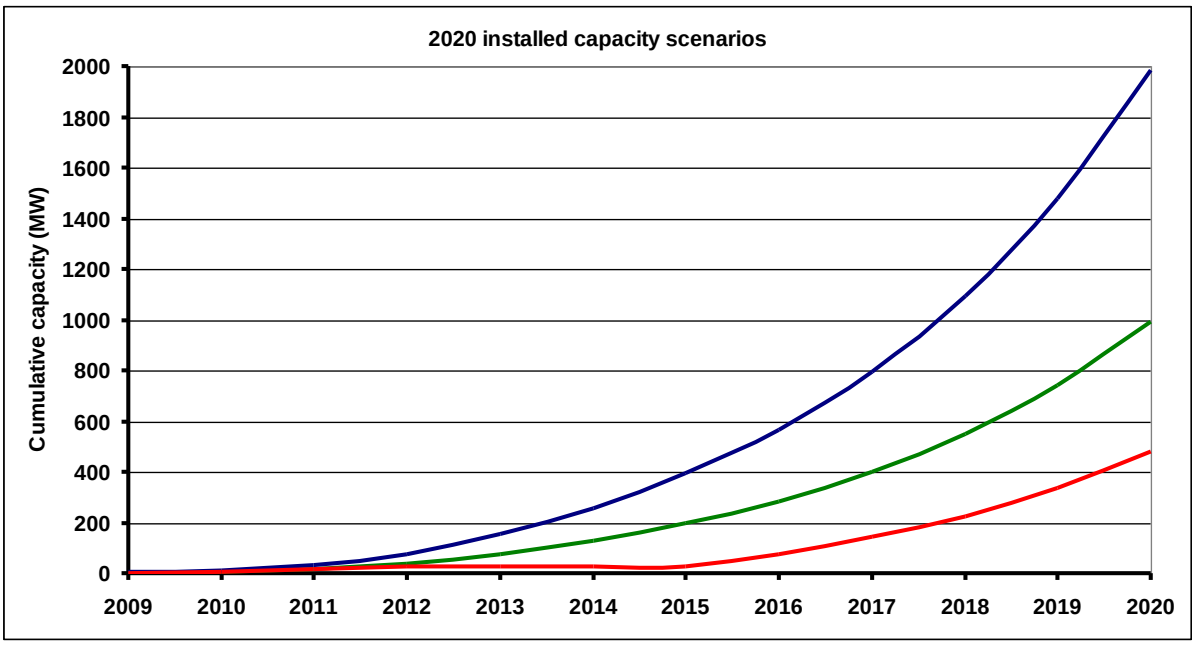
the key public bodies (SG, SE, HIE, SDI and The Crown Estate) as well as EMEC, academics, National Grid and Scotland's transmission companies, the purpose of this exercise was to provide an industry led up-to-date reassessment of Scotland's marine renewables sector. By mapping the actions necessary to realise the maximum contribution of wave and tidal stream generation to Scotland's renewable energy mix by 2020 (and beyond), we will continue to ensure Scotland's world leading status in the development of these technologies.

The Marine Energy Road Map when published will outline industry's view on the key issues to be addressed and the subsequent actions to be taken. MEG will then deliver on the Road Map with a two fold view: (i) to promote the market opportunity for marine energy generation in Scotland and, (ii) to ensure that Scottish companies are well placed to capture these opportunities.

The graph below demonstrates projections on possible patterns of deployment of installed marine energy capacity in Scotland. The factors modelled in the graph are as follows:

- Initial growth profile to 2012-13 (slow, medium, fast);
- Subsequent growth rate (e.g. 10% to 50% per annum);
- A variable capped annual capacity installation rate due to possible market constraints;
- A delay scenario due to market constraints or technology difficulties.

Figure 6: Possible Deployment of Installed Marine Capacity in Scotland



The graph sets out the following 3 scenarios[8]:

[8] Though these projected capacities are shown to be installed by 2020, the graph demonstrates growth of installed capacity after 2020. Past estimates demonstrate a Scottish marine energy resource much greater than 1-3GW, and it is expected that the sector will continue to make a

- ‘Low Scenario’ – 0.5GW installed by 2020;
- ‘Medium Scenario’ – at least 1 GW installed by 2020, with slower initial deployment and faster capacity building;
- ‘High Scenario’ – at least 2GW installed by 2020

The scenario reached at 2020 by Scotland’s marine renewables industry will be dependent on the extent to which the opportunities, ambitions and actions detailed further below are delivered upon.

FREDS Marine Energy Spatial Planning Group (MESPG) alongside MEG has a supportive role to play in facilitating the development of offshore renewables. Chaired by Marine Scotland, MESPG has agreed a project plan focussing on (i) marine planning, (ii) simplified consenting, (iii) environmental monitoring and research, and (iv) linking to/facilitating regional initiatives. Its priority task is to develop locational guidance for the marine renewable sector. This can include marine spatial planning, other marine planning approaches, strategic environmental assessment and the appropriate assessment elements where European designated areas or species may be affected by development plans. The immediate focus is around the Pentland Firth and Orkney Waters region to respond to The Crown Estate’s recent leasing round, however other areas such as the Western Isles and Solway Firth are beginning to emerge as potential regional initiatives under MESPG.

Interest in marine renewable activity in Scotland is at an all time high following this leasing round. Having received 42 applications for leases for wave and tidal stream deployment, with the potential for generating over 700MW of renewable power, The Crown Estate will award its commercial leases by the end of 2009. The realisation of this first round of marine renewable leases in Scotland, represents the first large scale co-ordinated deployment of marine devices on a commercial scale. The world’s industry will be watching with interest as developers embark on the challenges of manufacturing, deploying and operating their projects. The delivery of MEG’s Marine Energy Road Map and MESPG’s Project Plan will go some way to helping support this exciting first round of commercial deployments.

To support delivery of such wide scale deployment in Pentland Firth and Orkney Waters and in the future, elsewhere in Scotland, access to the relevant infrastructure and supply chain is needed. Appropriate port and harbour facilities, access to vessels, large scale manufacturing facilities and specialised local skills in developing, deploying and maintaining marine devices will all be needed in Scotland if it is to retain its position as leader in marine renewables. Very similar challenges exist for the offshore wind sector, therefore, the Scottish Government with the support of SE, HIE and SDI will take a co-ordinated approach to the development of Scotland’s infrastructure and supply chain capabilities addressing the needs of both sectors.

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significant contribution to the energy generation portfolio even after the 2020 renewables targets are met.

EMEC – A centre of excellence for marine renewables

The European Marine Energy Centre (EMEC) is the world's first grid-connected, independent, UKAS accredited test facility for wave and tidal power generation. Located in Orkney, the Centre is the result of investment from several public sector partners, including the Scottish and UK Governments, the Scottish enterprise networks and Orkney Island Council.

EMEC provides grid connected berths and a range of services for device developers, including independent assessment of devices' energy conversion capabilities, structural performance and survivability, as well as monitoring and assistance with consent and regulatory issues.

The Centre will host several of the wave and tidal prototypes being built with funding under the Scottish Government's Wave and Tidal Energy Scheme (WATES).

Its role extends beyond the provision of real-life testing conditions, and is leading the development of industry-wide standards for the marine energy sector.

EMEC is building up important skills and knowledge as it supports developers deploy and test their devices. This knowledge and skills base will be vital to the sector as developers now look to deploy their devices in the sea on a pre-commercial scale.

The continual development of existing and new wave and tidal technologies will be crucial to the long-term success of the sector. Scotland is leading the world in the development of these technologies and working with organisations such as the Carbon Trust, the Energy Technologies Institute (ETI) and Scotland's Energy Technology Partnerships (ETP), we're determined to retain our leading status. Developing technologies for the generation of renewable energy at home and securing strong export opportunities abroad.

The Carbon Trust – Supporting greater efficiency in marine energy extraction

The Carbon Trust is giving supporting to MacTaggart Scott to develop new hydraulic generator technology to increase the efficiency and cost-effectiveness of marine energy extraction.

The challenge:
Most Wave Energy Converters (WECs) use hydraulics for power take-off (PTO) systems. A concept called 'full reactive control' has been identified as one way of improving performance, but because it is complex and uses many moving parts it is susceptible to failure and requires further development. MacTaggart Scott wanted to develop a new PTO system with full reactive control but without the high price tag. They planned to reduce maintenance and life cycle costs by using fewer moving parts.

The company is experienced in building hydraulic motors for military and civil applications - from aircraft carriers to the lift gear on Tower Bridge. They plan to apply this expertise to the development of an efficient hydraulic generator system.

The approach:
The aim is to develop a key component of the power take-off system for Wave Energy Converters that is more efficient and more reliable than conventional systems. By using a reactive control system, it will be possible to 'tune' the hydraulics to capture power from waves more efficiently. A prototype will be developed and tested before further 'at sea' testing, to determine the likely performance and cost savings of the technology. The Carbon Trust is also helping MacTaggart Scott establish connections with wave technology developers to help scope the design parameters and assist at later development stages.

Whilst considerable progress is being made in Scotland, the Scottish Government is keen to develop the sector more widely, throughout the UK and Europe. It is doing so in a number of ways such as leading on the British Irish Council (BIC) Marine Energy workstream which is actively seeking collaborative opportunities with other BIC member administrations such as Ireland. The creation of the Scottish European Green Energy Centre (SEGEC) will make a strong contribution in promoting the sector's potential at the European level. Working closely with the European Ocean Energy Association (EU OEA) and the European Commission, SEGEC will actively pursue relevant EU funding opportunities for Scottish projects.

Ambitions:

- A world leading marine industry which:
    - Meets and exceeds 2020 targets
    - Brings strong economic benefits to Scotland's economy
    - Works in harmony with the marine environment
    - Exports innovative marine technologies across the world

Opportunities:

- Scotland as recognised global leader on marine renewables in terms of technology exporter, experience and expertise around deployment.

- Appropriate infrastructure, supply chain and grid capacity capable of supporting wave and tidal energy development in Scotland and construction of infrastructure to service developments in the UK and Europe.
- Encouraging the existing supply chain to prepare itself for the opportunity presented by the emerging marine renewables sector, and work with businesses interested in diversifying to service this expanding market
- Skilled jobs for Scotland in the development, construction, installation and operation of marine energy devices.
- A robust Marine Spatial Plan with a strong understanding of Scotland's marine users, uses, sensitivities and sectoral requirements, This will encourage developers to deploy marine renewable projects in the most suitable locations within Scotland's seas.
- Existence of a streamlined marine consenting regime for processing marine renewable applications swiftly, encouraging good quality marine renewable developments to take place in Scotland.
- Supportive local authorities and communities benefiting directly from the development of marine renewables in their area through supply chain opportunities and appropriately positioned developments working in harmony with their local environment.

Marine energy Key Actions 2009-11

Area	Milestone/Event/tasks	Timescale	Resource
Ensuring Scotland remains as the global lead in marine renewables, building on its existing infrastructure, experience and skills	• MEG to publish a Marine Energy Road Map and work towards delivering the key recommendations.	• Summer 2009	• MEG led
	• MEG commissioned study into investment necessary to (i) derisk technology and (ii) provide necessary supporting infrastructure.	• Study commissioned June 2009	• MEG led
	• MEG to use findings of its commissioned supply chain study and work of MEG finance sub-group to recommend financial solutions for de-risking technology.	• Summer – Autumn 2009	• SE and HIE led
	• Findings of commissioned supply chain study to be used to strategically plan the types (and locations) of infrastructure and supply chain needs necessary to manufacture, deploy and service devices.	• Summer – Autumn 2009	• SE, HIE and SDI led
	• Awareness raising events to be held for Scottish companies to promote the supply chain opportunities within the marine renewables industry.	• 2009/10	• SE and HIE led with support of The Crown Estate
	• To support the development of Scotland's supply chain, consideration of initiatives such as The Carbon Trust's Marine Energy Accelerator component technologies initiative.	• 2010	• SE, HIE, developers Carbon Trust
	• To identify the skills necessary to support the development of marine renewables and feed these into the Scottish Renewable Energy Skills Group.	• Autumn 2009-2010	• SEn, HIE, SG and marine developers
Planning and investing in the necessary grid infrastructure for connecting proposed marine renewable projects	• MEG Grid sub-group to identify grid reinforcements for accommodating rapid connections at specified locations within Pentland Firth/Orkney Waters and Western Isles. • Iteration to optimise locations and grid solutions.	• June 2009	• MEG Grid sub-group
	• MEG Grid sub-group to make a recommendation to HIE and SG on a short term national solution for applications seeking grid connection.	• June 2009	• MEG Grid sub-group
	• MEG to consider how it can work with Government to continue to make its case to OFGEM for changes to the existing charging regime.	• Summer-autumn 2009	• MEG input to SG Grid team
Improving knowledge and understanding of Scotland's seas to strategically manage the deployment of marine devices to	• MESPG commissioned a non-statutory Interim Marine Spatial Plan for Pentland Firth and Orkney Waters. Consultation later in 2009 with publication in 2010.	• Early 2009 – early 2010	• MESPG led
	• Undertaking of monitoring and research programmes to better understand the impact of marine technologies on the	• Autumn 2009 onwards	• MESPG led

minimise disruption	marine environment.		
Design of a streamlined offshore consenting regime	• Marine Scotland to establish a group to develop the marine consenting regime and compile guidance for developers.	• Summer 2009 - 2010	• MESPG led
Ensuring appropriate financial incentives are available to ensure investment in proposed projects	• To set out the key recommendations of the MEG finance sub-group within the Marine Energy Report.	• Summer 2009	• MEG led
	• To present options to Scottish and UK Ministers for addressing the identified gaps in marine funding: • appropriate support for encouraging continual technology development; • gap for pre-commercial/commercial demonstration projects.	• Autumn 2009-2010	• MEG led
Promoting Scotland's lead in marine renewables, engaging with and influencing key players in Europe and beyond	• For SEGEC to appoint a marine renewables desk officer capable of promoting the successes of Scotland's industry in Europe.	• Summer-Autumn 2009	• SEGEC
	• For SEGEC to develop a close relationship with the EU OEA and European Commission, aimed to drawing down appropriate European funding for Scottish marine projects.	• Ongoing	• SEGEC
	• To continue promoting the Saltire Prize at an international scale, encouraging new marine developers and innovators to deploy in Scottish waters.	• Ongoing	• SDI

SCOTTISH RENEWABLES ACTION PLAN

ANNEX B

ENERGY DEMAND AND TARGETS

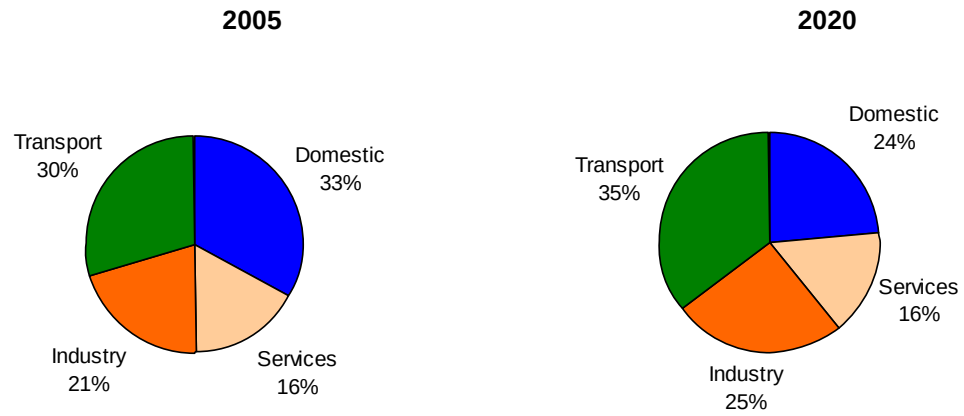
The table below reports forecasts of final energy demand in the period to 2020, and presents this data broken down by sector[9]. The trend is an overall reduction in energy demand between 2005 and 2020 of over 4%; this is driven by assumptions of existing measures to improve energy efficiency.

Table: Scottish Final Energy Consumption by Demand Sector

(TWh)	2002	2005	2010	2015	2020	% Change 2005-2020
Domestic	56.00	54.20	46.60	42.50	37.00	-31.7%
Services	25.80	26.80	25.30	24.60	24.50	-8.6%
Industry	36.30	34.50	35.10	36.80	39.60	14.8%
Transport	47.10	48.60	50.70	55.20	55.90	15.0%
Total	165.20	164.10	157.70	159.10	157.00	-4.3%

A comparison of final energy demand for the main sectors in 2005 and 2020 is illustrated by the following pie charts, which highlights the reduction expected in the domestic and services sectors in contrast to the increases in the transport and industry sectors.

Figure 7 Composition of Final Energy Demand by Sector (CC scenario)



Based on Scottish Energy Study: Volume 5, Table 11

Scotland's Targets

[9] Scottish Energy Study: Volume 5, Final Energy Consumption by Demand Sectors under the Central fuel price scenario.

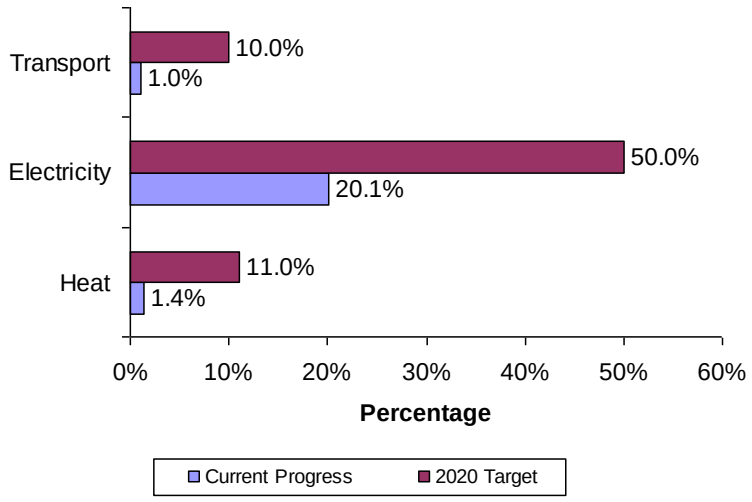
Scotland is currently committed to achieve a headline target of 20% of total Scottish energy use coming from renewables sources by 2020.

To achieve this energy target, individual targets on renewable electricity, heat and transport have been put in place:

- **Electricity** – Achieve 50% of gross electricity consumption from renewable sources by 2020, with an interim target of 31% by 2011.
- **Transport** – To achieve a 10% target for renewable transport by 2020. (In line with a mandatory 10% EU target set for each member state).
- **Heat** – Significant role for heat in overall energy targets (heat demand accounts for a large proportion of all energy use); target has been set at 11% of heat energy to be supplied from renewable sources by 2020.

The following chart provides some additional analysis to highlight how each of the above sectors are progressing towards their 2020 renewable targets[10].

Figure 8 Current Progress Towards 2020 Energy Targets



The Renewable Electricity Target

The target for renewable electricity generation is calculated as a percentage of Gross Electricity Consumption and was set at 50% of Gross Electricity Consumption by 2020. The table below reports the progression of renewable technologies over an 8 year period to 2007, year-to-year fluctuations can be observed in Gross Electricity Consumption however there has been little change over the period. However the target will be measured against the gross electricity consumption that occurs in the year 2020.

[10] Heat target progress – Sustainable Development Commission, Renewable Heat in Scotland, May 2009. Electricity target progress – Scottish Government Energy Statistics 2007. Transport target progress - The UK road transport biofuels market, http://www.berr.gov.uk/files/file43824.pdf

Table: Electricity Consumption Trends in Scotland					
Year	Total generated	Total consumed	Total transfers to rest of UK	Gross electricity consumption (total generated - exports + imports)	Renewables as % of gross electricity consumption
2000	50401	34740	9600	40801	12.2
2001	49140	34387	8694	40446	10.4
2002	49653	35360	8034	41619	12.3
2003	49415	35011	8177	41238	9.0
2004	49937	34842	8573	41364	14.1
2005	49237	35744	7315	41922	15.5
2006	52222	34354	10941	41281	16.9
2007	48217	34463	7362	40855	20.1

Renewable Transport Target

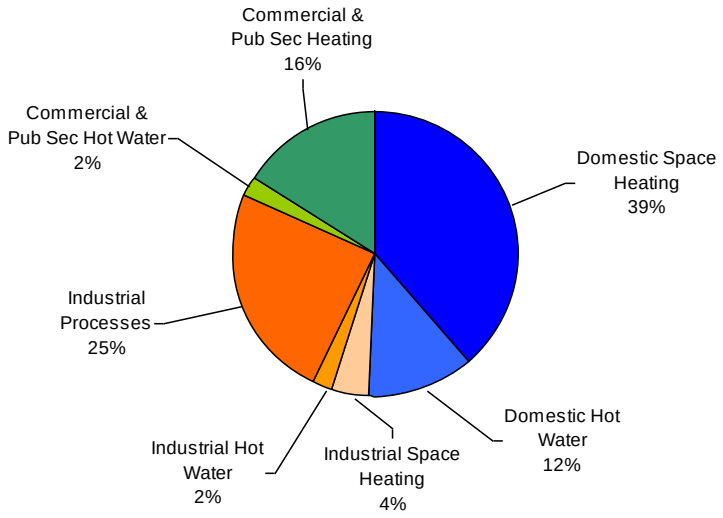
The European Council recognise that the starting point, the renewable energy potential and the energy mix of each Member State varies. It is therefore necessary to translate the Community 20% energy target into individual targets for each Member State. By contrast, it is appropriate for the 10% target for energy from renewable sources in transport to be set at the same level for each Member State in order to ensure consistency in transport fuel specifications and availability. In line with the European Directive[11], Scotland has set its renewable transport target at mandatory 10% minimum target for the share of biofuels in transport petrol and diesel consumption by 2020.

Renewable Heat Target

The renewable heat target was estimated *ex-post* and when setting the renewable heat target it was forecast that 32,061 GWh of renewable energy would be required to meet the 20% target in 2020. Making assumptions that renewable electricity and transport would provide 22,244 GWh and 3,397 GWh respectively, the remainder – 6,420 GWh – must come from heat. This level of output equated to a renewable heat target of c. 11% in 2020. Figure 3 below illustrates estimated shares of annual heat energy consumption; it demonstrates that over half of the heat usage currently is from the domestic sector.

[11] Directive 2009/28/Ec Of The European Parliament & Of The Council (23 April 2009)

Figure 9 Split of Scottish Heat Energy Demand



Forum for Renewable Energy Development in Scotland, Scotland's Renewable Heat Strategy, 2008

Energy Efficiency

Energy efficiency offers a way to resolve the apparent tension between the traditional goal of economic growth and environmental targets. DECC research has suggested energy efficiency and behavioural changes can have a significant impact in reducing energy demand[12]. This is supportive of European objectives to reduce projected energy consumption by 20% in 2020.

In terms of electricity targets, a reduction in domestic electricity usage (as a result of energy efficiency measures) will allow for more electricity to be exported rather than being consumed for domestic purposes. The definition of gross electricity consumption is total electricity generated minus exports plus imports. Increased implementation of energy efficiency measures therefore could reduce gross electricity consumption, which will make the renewable electricity target for 2020 easier to achieve. Improving energy efficiency is widely recognised as the easiest and most cost-effective means of reducing carbon dioxide emissions and needs to be pursued in parallel with measures to increase renewable energy use.

[12] DECC & Enviros Consulting (2008), The potential for behavioural and demand-side management measures to save electricity, Gas and carbon in the domestic sector, and resulting supply-side implications.

Glossary

AD – Anaerobic Digestion

AFRC – Advanced Forming Research Centre (University of Strathclyde)

ANSP – Air Navigation Service Providers

BERR – Business, Enterprise and Regulatory Reform

BIC – British Irish Council

BWEA – British Wind Energy Association

CAR – Water Environment (Controlled Activities) Scotland

CARES – Community and Renewable Energy Scheme

CCS – Carbon Capture Storage

CES – Community Energy Scotland

CHP – Combined Heat and Power

DECC – Department for Energy and Climate Change (UK Government)

DH – District Heating

DOWNVinD – Distant Offshore Wind No Visual Intrusion in Deepwater

EAB – Energy Advisory Board

EFT – Environmental Transformation Fund

EIA – Environmental Impact Assessment

EMEC – European Marine Energy Centre

ENSG – Electricity Networks Strategy Group

ESCO – Energy Service Company

ETI – Energy Technologies Institute

ETP – Energy Technology Partnership

EU OEA – European Ocean Energy Association

EfW – Energy from Waste

FCS – Forestry Commission Scotland

FREDS – Forum for Renewable Energy Development Scotland

HIE – Highlands and Islands Enterprise

ITI – Intermediary Technology Institutes

LCV – Low Carbon Vehicle

MEG – Marine Energy Group

MESPG – Marine Energy Spatial Planning Group

MSSF – Marine Strategic Studies Forum

NAREC – New and Renewable Energy Centre

NATS – National Air Traffic Services

NSAP – National Skills Academy for Power

OWID – Offshore Wind Industry Group

OfWID – Offshore Wind Delivery Group

Ofgem – Office for Gas and Electricity Markets

PAN – Planning Advice Note

PNDC – Power Networks Demonstration Centre

PSSSG – Power Sector Skills Strategy Group

RAP – Renewables Action Plan

RBAN – Regional Biomass Advice Network

RDD&D – Research, Development, Demonstration and Deployment

REF – Renewable Energy Framework

REPG – Renewable Energy Project Group

RESG – Renewable Energy Skills Group (UK Government)

RHAP – Renewable Heat Action Plan

RO – Renewables Obligation

RSPB – Royal Society for the Protection of Birds

SAMS – Scottish Association for Marine Science

SBHS – Scottish Biomass Heat Scheme

SCHRI – Scottish Community and Householders Renewables Initiative

SDC – Sustainable Development Commission

SDI – Scottish Development International

SDS – Skills Development Scotland

SE – Scottish Enterprise

SEA – Strategic Environmental Assessment

SEGEC – Scottish and European Green Energy Centre

SEPA – Scottish Environmental Protection Agency

SHFCRP – Scottish Hydrogen Fuel Cell Research Programme

SNH – Scottish Natural Heritage

SQA – Scottish Qualifications Authority

SRDP – Scottish Rural Development Programme

SSC – Sector Skills Council

STW – Scottish Territorial Waters

TAR – Transmission Access Review

WATES – Wave and Tidal Energy Support Scheme

WFD – Water Framework Directive

WRAP – Waste and Resources Action Programme