SCOTLAND EUROPA

GREEN PAPER "A 2030 FRAMEWORK FOR CLIMATE AND ENERGY POLICIES": SCOTLAND EUROPA COMMENTS IN THE CONTEXT OF THE STAKEHOLDER CONSULTATION

Scotland Europa *is part of Scottish Enterprise, Scotland's main economic development agency, and is also a membership-based organisation that promotes Scotland's interests across the institutions of the European Union and to the representatives of Europe's regions and Member States. Our membership brings together a wide range of Scottish organisations from the public, private and education sectors. The comments in this response reflect the views of a cross-section of Scottish stakeholder organisations among Scotland Europa's membership.*

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- **TARGETS AND POLICY MEASURES**

General comments

The EU's current climate and energy package can be regarded as a major success of recent years of EU policy and the EU should maintain its ambition for a longer term common framework aiming towards decarbonisation of the economy.

We must recognise, however, that we have not yet reached 2020 or the achievement of targets set for this timeframe. There is a mixed picture of progress across the EU Member States and between the different areas of action. It is therefore necessary to face up to some policy failures or inadequacies if we are to avoid constrained budgets and limited access to finance from derailing progress.

The definition of a new framework for the 2030 horizon offers the opportunity for fresh thinking, rather than limited only to amendment of the current approach and existing suite of measures.

In general, the future framework should be better informed by data and analysis although there is a need to balance evidence gathering and assessment with prompt definition of a framework which corresponds to the timeframes of investment decisions.

In the current context, there is a particular need for more robust evidence that the proposed package makes economic sense. Policy should be shaped also by the economic opportunity and potential for job creation. Analysis should look at whole life cycle impacts and should take into account the full innovation chain and the opportunities presented to maximise economic benefit.

Socio-economic benefits should play an important role in informing policy direction. Scotland recognises the value of the regeneration opportunities, not least in coastal and port locations where investments will be necessary to tap offshore and marine renewable resource. There is a unique opportunity for economic development and job creation in those areas of deployment, which face challenges due to their remote nature.

Examples in Scotland include the source of new jobs and investments in infrastructure and the supply chain brought to the island of Orkney with the establishment of the European Marine Energy Centre, a first-of-a-kind testing centre for marine renewable energy devices.

An Environmental Impact Assessment commissioned by economic development body Highlands and Islands Enterprise showed that since EMEC was established in 2003, the marine industry has created around 250 jobs and has added £30m of earning and £57m of GVA to the Orkney economy. These impacts are predicted to increase four-fold by 2020 as test activity accelerates further and the roll-out of the planned Pentland Firth and Orkney Waters leasing round sites begins in earnest.

The Scottish Government has committed to its own ambitious targets for 2020 and beyond[1], which aim to balance the three objectives of a fair cost to consumer, security of supply and reduction in carbon emissions. Scotland's 100% renewables target is the most ambitious in the European Union. Meeting 100% of our electricity consumption from renewables in 2020 will mean that, together with the 11% renewable heat and 10% renewable transport targets, Scotland's overall share of renewable energy will be at least 30% by 2020.

According to the findings of a recent inquiry by the Scottish Parliament's Economy, Energy and Tourism Committee, the Scottish Government targets are achievable[2]. Moreover, the inquiry finds a potential strong economic impact that achieving these targets can have on the Scottish economy.

However, the effort required for the achievement of Scotland's targets will be affected by the longer term framework in place at EU level for emissions, renewable energy and energy savings. Scotland's targets were informed and based, in part, on the proposed increase of the EU green house gas emissions reduction target from 20% by 2020 to 30%. Without this increase there is a risk that Scotland will be unable to meet its targets over the next 7 years.

The future EU framework for climate and energy policy must acknowledge the central role of local authorities in achieving potential new targets. A multi-level approach to climate change mitigation that involves all levels of government and reaches out to communities is essential to achieving the current EU and Scottish targets.

Scottish Councils undertake positive work with their local partners as demonstrated by individual Carbon Management Plans and their annual reporting in the framework of Scotland's Climate Change Declaration, which was signed by each of Scotland's 32 local authorities. Under the Declaration, Councils have set their own emissions targets for 2020 within the Scottish policy framework. These include a target of 42% set by Aberdeen City, which the city is well on track towards meeting.

Local authorities, their policies and services have an important role in strengthening an integrated approach to energy efficiency and carbon emission reduction strategies which includes all relevant sectors. Aberdeen City Council has gained cross party political support for efforts to develop the local low carbon economy. One of the key aspects of this has been the role of the Council in developing partnerships between the public and private sector to ensure effective and timely delivery of these projects. Local authority leadership was central to securing private sector investment. Replicating this approach across the EU could have great impact towards achievement of existing and future targets.

[1] A greenhouse gas emissions reduction of 42% by 2020 and 80% by 2050; 100% gross annual electricity demand from renewables by 2020; at least 11% renewable heat; and 10% in the transport sector by 2020.
[2] EET Committee report on the achievability of the Scottish Government's renewable energy targets (2012)

Structure

A clear policy framework is crucial to providing business and investor certainty for the development of low carbon technologies and the supply chain. However, there is scope in the current review for a 2030 strategy to reconsider the structure of this framework. Questions could include whether targets are best based on consumption or production; whether 2030 is the appropriate deadline for achievement of new interim goals; if a CO2 target might be broken down into ETS and non-ETS sectors; and the likely need for a further EU-level energy reduction target.

In defining a future set of targets, it is imperative to fully consider their interaction with other policy measures which will be included in the overall climate and energy framework. In particular, the impacts of a reformed Emissions Trading System need to be closely considered. While efforts to address ETS failings are underway, the decision-making and implementation processes mean that impacts cannot be assumed to show effect in the medium term. This puts into serious question the adequacy of a single CO2 target to ensure medium-term continuation of decarbonisation pathway to 2050.

There should be an emphasis on securing multiple benefits from climate change and energy policies to set Europe on a more sustainable path; recognising the opportunities to secure environmental, economic, community and health benefits. Ambitious climate and energy targets can deliver multiple benefits for the wider environment, society and for the economy; however, the choices made to reach future targets will likely influence the extent to which multiple benefits are realised.

For instance, climate and energy measures, if optimised for air quality, could help protect human health and ecosystems from the harmful effects of air pollutants. Failure to consider the potential wider impacts of measures could lead to unintended trade-offs. While diesel vehicle and domestic biomass burning incentives may support climate change objectives, but may also contribute to poor local air quality in urban centres, with consequences for human health. Working towards an appropriate level of policy integration will realise multiple benefits and should help avoid, or at least better identify and manage, potential trade-offs or unintended consequences.

It must further be recognised that while targets can drive technology development, they don't address other necessary parts of the low carbon equation. Behavioural or organisational changes are key examples. Both of these are particularly important in the case of transport. While targets have driven progress in reducing vehicle emissions, solutions in better space management and reducing travel need further attention.

A second Scottish Government report on meeting Scotland's emission reduction targets 2013-2027 (RPP2[3]) identified major cross sector areas where there is a need to focus ambitions and additional measures: considering potential different futures that might come to pass; making the transition to a low carbon economy; getting our funding and financing mechanisms right; understanding and influencing behaviours; and the role of our spatial planning system.

[3] Draft Second Climate Change Report on Proposals and Policies (June 2013)

Renewable energy

There is wide consensus among stakeholders that the current Scottish target framework has had a positive impact in Scotland where they have been a call to action for industry, giving a signal of high level political commitment. As an example, energy firm SSE cites policy as the key driver of innovation in its NINES (Northern Isles New Energy Solutions) smart grid demonstrator project on better distribution management. While the economic crisis has changed the context in some parts of the EU, from a Scottish industry perspective the case for investment in renewables is still strong.

Targets have also been of benefit to secure an increased number of cooperation agreements with international partners focused on renewable energies, such as a recent Memorandum of Understanding with South Korea to foster the sharing of knowledge, ideas and technology for the development of marine energy industries.

They have further spurred the establishment of new organisational structures and implementing bodies such as the International Renewable Energy Technology Zone hub in Glasgow; the Energy Technology Centre facility in East Kilbride for developing, testing and demonstrating small-scale renewable and sustainable energy systems; and the business-focused Edinburgh Centre for Carbon Innovation hub for the knowledge, innovation and skills required to create a low carbon economy.

European projects have supported Scotland's response to ensuring appropriate steering structures are in place to meet targets. These include a current proposal from 16 partners from nine member states to establish an Ocean Energy ERA-NET, which will provide a framework for transnational joint activities. The ENSEA (European North Sea Energy Alliance) further creates a forum bringing together regional stakeholders across government bodies, higher education institutes and SMEs in the common aim of commercialising innovation in the integration of renewables into energy systems.

The 2020 Renewables Routemap[4] for Scotland sets out the context for the Scottish Government's action alongside industry. According to the Routemap over the next decade to 2020, renewables in Scotland could provide:

- Up to 40,000 jobs and £30bn investment to the Scottish economy;
- significant displacement and reduction in carbon emissions;
- A strengthening of future energy security through the harnessing of sustainable indigenous resources;
- And a transformational opportunity for local ownership and benefits.

Scotland's main economic development agency Scottish Enterprise has looked at the impact of investment in renewables relative to investment in other parts of the economy, in the context of the Scottish Parliament inquiry into Scotland's renewable energy targets mentioned above. Current appraisal evidence for renewables projects involving Scottish Enterprise's support shows a forecast GVA return on investment of over £10 for every £1 over a 10 year period. Looking at all Scottish Enterprise's activities across sectors (not just renewables), evidence suggests that, on average over ten years, we can expect £5-£8 net GVA return for every £1 invested.

[4] Update to Renewable Energy Routemap (October 2012)

Other sectors/ sub-sectors

Additional sector specific targets – such as those in place in Scotland for renewable heat and transport – are generally useful to steer away from all efforts being focused on electricity, where easier solutions are available. Sectoral targets should, however, be designed to avoid perverse outcomes such as those observed with biofuels.

More consideration should be given to the treatment of land-use/forestry/agriculture in the climate and energy policy framework, ideally linked to Common Agricultural Policy reform. There has been good progress on the part of the Scottish Government on reducing emissions from Scottish agriculture through the 'Farming for a Better Climate' programme. Incentives to encourage better quantification of the emission reductions would be likely to enhance outcomes.

It should not, however, be forgotten that targets and obligations on some sub-sectors are already included in the current overall EU framework – for example in the Energy Efficiency and Performance of Buildings Directives – so we should first take better stock of the impact these have had and will have on longer term progress.

RDD & technology

EU technology strategy to implement political targets needs to focus on scaling up to deliver larger outcomes and improve competitiveness. Generally, a longer term approach should be taken to innovation as longer term support is the way to effectively bring down costs. However, this should be in addition to (rather than replace) support for basic and applied research.

A sound approach should not only include the most advanced technologies, but also those expected to make a contribution and drive further transformational change in the medium to long-term. Technology strategy needs to consider the interaction with the wider policy framework and especially the potential long-term impact of a renewable energy target in creating a situation of domination of more mature technologies such as onshore wind.

In addition to low emission generating technologies, the EU strategy should show awareness of the enabling key technological improvements, devices and components relating to cost reduction, reliability and operability.

Economic development considerations may also have an impact on the prioritisation of different technologies: for Scotland, offshore wind, ocean renewable energy and Smart Grids (including Energy Storage) provide the greatest potential economic benefits but there are also potentially significant opportunities from biofuels.

Key technology priorities for the 2030 timeframe include:

Offshore wind

Offshore Wind will play a critical role in supporting Scotland's transition to a low carbon economy within the broader context of taking bold and early action to address the global issue of climate change. It also has the potential to add significant value to the Scottish economy in terms of creation of GVA and jobs. Scottish experience in the sector can

contribute to coordinated European efforts. The analysis[5] that underpins the Scottish Government's 2020 Renewables Routemap[6] estimates the potential benefits of the offshore wind sector alone:

- Up to £1.3 billion in GVA in 2020 and £7.1 billion in total this decade, with an additional £6 billion of GVA from wider supply chain and employee spending.
- The potential to create 28,000 full-time equivalent jobs in the sector, supporting an additional 20,000 jobs in the wider Scottish economy by 2020.

Key issues which should be the focus on continuing R&D are the challenges associated with deployment in deeper waters and the need to reduce costs to make Offshore Wind competitive with other forms of energy. The UK Offshore Wind Cost Reduction Task Force recently published its findings and sets out a specific roadmap for how the offshore wind industry can reduce the cost of generation to £100/MWh in the next 7 years.

Ocean renewables

Marine tidal and wave technologies have a potentially very significant economic impact. Worldwide, there is the potential to develop 748GW of ocean energy by 2050. By 2030, ocean energy could create 160,000 direct jobs[7].

Scotland is currently the global leader in marine energy, with more wave and tidal stream devices installed than the rest of the world combined, making Scotland well placed to capture a significant share of the emerging global market, forecast to be worth £50 billion ($76 billion) by 2050 according to trade association, RenewableUK. Achieving 1GW of marine renewable energy could provide 2,600 direct Scottish jobs with 5,000 jobs overall in the EU. These figures are based primarily on capital expenditure. When research and development activity or operations and maintenance are included, 1GW could see approximately 12,500 gross jobs provided, when indirect and induced jobs are taken into account[8].

Significant public support is required to leverage private investment at this crucial point in the sector's development where progress must continue from proving and demonstrating individual devices through to the deployment of the first pre-commercial arrays during 2014-17, with installation and operation of major arrays from 2017 onwards. Ocean renewable technologies are deployed in harsh environments, which create unique challenges including relatively high capital costs in comparison with other renewable energy sectors.

Scotland has pioneered marine energy investment with the world's first round of commercial wave and tidal lease sites. The Crown Estate has granted over 1.6GW of wave and tidal sites in Scottish waters with the majority of sites in and around the Pentland Firth and Orkney Islands. These projects are being taken forward by international utilities, including Scottish Power, Scottish & Southern Energy and RWE and device developers. A further Scottish Leasing Round has opened up the rest of Scotland's territorial waters for projects of up to 30MW aimed at companies who wish to compete in the Scottish Government's £10 million Saltire Prize for marine energy.

[5] Offshore Valuation Study (May 2010)
[6] Update to Renewable Energy Routemap (October 2012)
[7] An International Vision for Ocean Energy, Ocean Energy Systems (2011)
[8] Marine Energy Road Map, Scottish Government (2009)

Key projects in Scotland include;

- Sound of Islay Tidal Array –ScottishPower Renewables will build a 10MW array of tidal turbines supplied by Andritz Hydro Hammerfest. Consisting of 10 x 1MW machines which will be manufactured and assembled in Scotland. The project was awarded EU funding under the NER 300 mechanism.
- Kyle Rhea Tidal Array – an array of 4 tidal machines by UK based Marine Current Turbines with a total installed capacity of 8MW by 2015. The project was also selected under the EU NER 300 scheme.
- Mull of Kintyre Tidal Array – an array of up to 6 Nautricity 500kw tidal turbines will be deployed by Argyll Tidal by 2015.
- Islay Tidal Park – Irish developer DP Marine Energy are developing a 30MW tidal array project 6km of the coast of Islay.

In addition major industrial players like Voith Hydro and Alstom have engaged in device testing at the European Marine Energy Centre in Orkney, Scotland.

Smart grids and energy storage

The Scottish Smart Grid Sector Strategy[9] recognises the importance of smart grids in realising the low carbon transition and Scotland's strengths in this area, including significant company and academic capabilities. Building on research by Scottish Enterprise, it creates a Smart Grid vision for Scotland for 2020 as an examplar of Smart Grid adoption and a leading international provider of Smart Grid technologies and know-how. The ambition is to create up to 12,000 new jobs in Smart Grids. The Strategy highlights the challenges Scotland faces, the actions which will be required to realise the vision and the business opportunities for companies with Smart Grid capabilities.

Energy Storage is also a key area of opportunity given issues around integrating renewable energy into the grid. In this context we include a wide variety of technologies: mechanical, electrical, chemical, biological and thermal and support for all of these are essential to enable the ambitions for development of renewable energy.

EU support should focus on implementing large scale demonstration of smart grids and investment in innovation for manufacturing of key technologies such as High Voltage DC. EU-level support for the Smart Grid and for energy storage could in particular contribute to:

- Enabling greater input from SMEs in developing RD&D strategy, which is presently dominated by major organisations
- Increasing support for projects specifically addressing regulatory barriers to network management solutions, such as innovative ESCOs, islanding and energy storage
- Enabling wider participation in, and more targeted dissemination from, the EERA Joint Programmes

Support for demonstrator projects will build on a current initiative by Scottish Enterprise, University of Strathclyde, Scottish Power and SSE around the Power Network Demonstration Centre (PNDC), which is a world class facility to support the development and validation of future electrical power distribution technologies. It is expected to play a central role in accelerating the deployment of emerging technologies by demonstrating their functionality within a realistic, controllable grid environment.

[9] Scottish Smart Grid Sector Strategy (2012) Scottish Enterprise

The ENSEA (European North Sea Energy Alliance) project will focus on the theme of integrating high levels of renewables into energy systems, looking in particular at the challenge of intermittency of supply.

CCS

Development of CCS is a key priority for the Scottish Government and Scottish Enterprise, based on the conviction that without CCS, carbon reduction targets will not be met. Scotland has significant strengths: the North Sea offers huge capacity as natural and effective storage facilities for CO2 in depleted hydrocarbon reservoirs and saline aquifers (as outlined in a recent report by Scottish Enterprise on a Central North Sea CO2 Storage Hub[10]); the presence of the 40 year old oil & gas industry with relevant skills and expertise, including companies such as Doosan Power Systems, Wood Group and Mott MacDonald with expertise in this area; world leading industrial research and academic institutions; and support from government and agencies.

The economic opportunities from the development of CCS are considerable – it is estimated that the CCS market could generate more than £2bn in GVA and create more than 13,000 jobs in Scotland by 2025. Scotland has 2 full chain CCS proposals which are through to the final round of the UK Government CCS Commercialisation Programme.

Scotland is engaged in the demonstration of full chain CCS at scale, including on an existing gas power station at Peterhead, Aberdeen. This project was ranked in the Reserve List in the first round of calls for the European Commission's NER 300 mechanism. The Captain Clean project in Grangemouth pursues full chain, commercial demonstration on a coal-fired plant.

While the EU Energy Roadmap 2050 recognised the need to develop CCS on gas technology, current initiatives at the centre of the EU's energy strategy – notably the NER 300 financing mechanism and the Energy Infrastructure package – discriminate against CCS on gas in their design, which is focused on coal plants. A specific support mechanism for CCS on gas should be considered to take account of the expected greater role gas will play in the EU energy system and avoid jeopardising progress towards emissions targets.

Enhanced Oil Recovery must also be considered as an option for reducing the cost of CCS. In Scotland alone the value of EOR is put at £2.7bn GVA resulting in 5300 person years project employment and is based on 0.8GT of CO2 being injected into wells to produce another 2.5Bn barrels of oil.

It is essential that the required infrastructure for CO2 transport and storage is developed alongside the capture technology. We therefore commend the inclusion of a transport and storage network for CO2 in the EU's trans-European energy network Guidelines.

Renewable heat

Scottish Enterprise sits on the UK Low Carbon Innovation Co-ordination Group (LCICG) which brings together the major public sector backed organisations that are supporting low carbon innovation in the UK. The LCICG have published a series of TINAs (Technology Innovation Needs Assessments) which aim to identify and value the key innovation needs of specific low carbon technology families to inform the prioritisation of public sector investment in low carbon innovation.

[10] Central North Sea CCS Storage Hub Report (2012)

The Heat TINA[11] focuses on heat pumps, heat networks and heat storage as three key heat technologies that could play a key role in meeting UK and global heat demand in an emissions constrained future. Innovation in these technologies could reduce UK energy system costs by £14-66bn to 2050, with heat storage also offering additional value by enabling other system adjustments. Innovation can also help create a UK industry with the potential to contribute further economic value of £2-12bn to 2050. Significant private sector investment in innovation, catalysed by public sector support where there are market failures, can deliver the bulk of these benefits with strong value for money.

A recent report[12] by Dutch consultancy DNV KEMA Energy & Sustainability looked at the potential impact of the new smart electric thermal storage (SETS) technology "Quantum," brought to market by SSE and Glen Dimplex, on the energy system as a whole and also on the consumer. SETS can reduce heating energy consumption by up to 20%, compared to traditional night storage heaters resulting in annual energy savings of 1.600 kWh per household, equating to 600 kg CO2 per year. SETS also allows a larger penetration of renewable electricity in a distribution grid, by offering a source of flexibility and grid balancing.

Early results from a Scottish Universities-led research programme[13] examining the development of sustainable, low carbon heating in urban areas recognise multiple benefits of district heating and combined heat and power schemes, including an impact on local economic regeneration. The research programme recognises the scale of projects can be a barrier for local actors and that measures to reduce investment risk are necessary

2nd generation biofuels & biomass

Solid biomass represents a significant market opportunity as wood products (processed and waste) offer a feasible method of meeting renewable heat obligations and the running of buildings accounts for around 40% of Scotland's energy use. Scotland could become a supplier of feedstock and has well developed strengths in crop research/plant science (SAC, Glasgow University), genetic engineering (SCRI, Roslin Institute) and combustion systems (Doosan Babcock). Scotland also has well established forestry and arable farming sectors.

A study by the Scottish Government[14] has estimated that by 2020 the biomass sector could be employing 1350 direct jobs with more in the biomass supply chain (3,500 jobs including indirect), and be worth £85m in GVA. However, growth depends on the implementation of appropriate and robust support mechanisms.

Scotland could manufacture somewhere around 10% of its liquid fuel requirement in the form of biofuels from its indigenous feedstocks, a significant contribution. However at present due to Renewable Obligation Certificate policy, it is generally considered more financially attractive to produce electricity rather than liquid fuel from AD produced biomethane.

In Scotland Argent Energy has invested heavily in a 50 million litre per annum biodiesel production capability, producing liquid fuel to EN 14214 2008 (the European standard for biodiesel as an automotive fuel). Argent Energy has the only plant in the UK to use

[11] Technology Innovation Needs Assessment: Heat (September 2012)
[12] Potential for Smart Electric Thermal Storage -Contributing to a low carbon energy system (February 2013)
[13] "Heat and the City": Year one findings (September 2011)
[14] "2020 Routemap for Renewable Energy in Scotland", The Scottish Government, 2011

distillation technology, which ensures that their fuel is a homogenous, clear and very clean biodiesel.

Celtic Renewables is a start-up company formed to commercialise a process for producing butanol, a superior next generation biofuel, and other high value sustainable products from the by-products of biological industries. This innovative technology was developed by the Biofuel Research Centre at Edinburgh Napier University.

Biotechnology companies such as Ingenza have developed technology in Scotland which has been successfully exploited overseas to improve biofuel fermentation efficiencies. With appropriate public support, these existing commercial opportunities offer the possibility of expansion into other territories, replicating facilities and business models developed in Scotland.

Biofuel costs are predicted to be largely comparable to petrol and diesel production prices at around £20/GJ, based on a prediction of $150/barrel oil prices in 2020 and using the median costs predicted for various biofuels. In the worst case for biofuel competitiveness of both the most expensive biofuel cost predictions and a low oil price (of $100/barrel, perhaps due to significant shale gas penetration of the market), then biofuel costs are predicted to be around double the cost of fossil fuel equivalents in 2020. In the UK, around 80 pence of the £1.40 sale price per litre of fuel is duty and VAT, which provides the option of regulatory levers to accommodate the predicted biofuel costs with no impact on the consumer.

Looking beyond existing feedstocks in Scotland, the development of energy rich algal strains suitable for growing in closed containers using artificial lighting and waste heat and CO2 could provide an economic breakthrough in biofuel production. Targeted support in these sectors should be considered.

The UK launched the Renewable Heat Incentive (RHI) in November 2011 with a scheme for the non-domestic sector that provides payments to industry, businesses and public sector organisations which generate and use renewable energy to heat their buildings – this can include burning biomass. The RHI will be expanded from summer 2013 to support bioliquids used for Combined Heat and Power (CHP), and remove the capacity limit for biogas.

The use of biofuels in the transport sector is mandated under the Renewable Transport Fuels Obligation (RTFO), which requires transport fuel suppliers to ensure that 5% of all road vehicle fuel supplied (by volume) is from sustainable renewable sources in 2013/14. At present biofuels production costs are generally higher than conventional fossil fuels, and their use in the transport sector is supported by Renewable Transport Fuel Certificates, which are required by fuel suppliers to demonstrate their compliance with RTFO obligations.

- **FINANCE & FUNDING**

Securing investment

A crucial requirement for the success of any finance or support schemes, regardless of the scale and design, is that they are stable in the timeframes for their implementation. Changes to subsidy schemes at EU or national levels have a significant impact on the sector as a whole.

Across the board, investments should be driven by economic development considerations as well as technological considerations of the contribution to long term emissions goals and diversity of energy supply.

In designing schemes, there is a need for instruments to reflect the different needs of subsectors; the intensity of coordination and support measures should vary depending on the sector and the particular market failure to be addressed. R&D should not be the only focus, but non-technological and market opening measures also need support.

Experience in Scotland has shown that it is important to provide support at all stages of development of a technology to realise the full benefits e.g. support for R&D, for prototype development, for test and demonstration and for manufacture at scale.

For ocean renewable energies, for example, there is a need for public support for scale testing & demonstration in real conditions; in addition to continuing research into reduced cost devices. Cost reduction activities need to cover not only devices but also vessels and supporting infrastructure. A comprehensive EU strategy also needs to support the development and availability of competitive test and demonstration facilities (for offshore wind as well as ocean renewables).

Tools for horizontal issues – not just technology subsectors – should be available. An example could be a programme on skills for the low carbon economy, including for climate adaptation. Scotland's skills, particularly in the offshore energy sector, have historically played a key role in attracting investment.

Specific national schemes are useful to best match local conditions and avoid concentration of production in the areas where it is cheapest outright, rather than necessarily those where it is most sustainable or cost-effective. However, the level of investment required necessitates coordination and schemes designed at all levels which are mutually complementary to allow smart use of multiple funding sources in single, large scale projects.

The ERA-NET scheme is a welcome and positive approach to provide impetus and new models for coordination and concentration of national resources around strategic priorities of significance for the EU as a whole. Scottish Enterprise is further leading a bid from 16 partners from nine member states, who have proposed to establish an Ocean Energy ERA-NET, which will provide a framework for transnational joint activities and will cooperate with the EERA Ocean Energy JP; other relevant European projects and industry stakeholders. The proposal sets out the execution of the project from networking and information sharing to

the launch of, at least one, transnational joint call. In doing so the partners will develop a shared vision for the sector, an action plan for delivery and a toolkit for call administration.

The instruments available from the European Investment Bank should be a clear component of the overall EU portfolio of support tools. Achieving this will require making some instruments more accessible to smaller scale projects, particularly in the case of energy efficiency where the nature of investments required tends to mean these are small. Instruments could perhaps be made available to stakeholders via intermediary bodies such as local economic development agencies.

A number of the EU countries with particularly high natural renewable energy resource potential are also among those worst affected by the debt crisis. As well as securing investment of the required scale in this current difficult economic climate, other barriers include finding a workable balance of risk between developers, financiers and supply chain; and securing finance at construction phase (for example, with offshore wind) before debt markets will come in.

Scotland has developed and implemented a range of innovative financing mechanisms to support the renewable energy industry. These include the Saltire Prize and WATERS for ocean renewables; the Scottish Innovative Foundation Technologies Fund (SIFT) for Offshore Wind foundation structures; the POWERS fund which supports the development of prototype Offshore Wind turbines; and the National Renewables Infrastructure fund (NRIF) also for Offshore Wind. NRIF and POWERS have been critical to Scotland progressing much more quickly than originally conceived with regard to inward investment prospects.

Scotland has also recently established the Renewable Energy Investment Fund (REIF). REIF has been designed to complement existing public and private sector finance schemes currently available in Scotland and has £103 million available to provide loans, equity investments and guarantees (but not grant funding) for projects that will either:

- accelerate the growth of the marine renewable energy sector in Scotland;
- increase community ownership of renewable energy projects in Scotland;
- or provide for district heating networks that utilise renewable heat technologies like heat pumps, biomass boilers and solar thermal panels and other renewable energy projects.

REIF will also consider projects in other areas that support the delivery of energy from a renewable source or are an innovative renewable energy technology.

In addition, the UK Government has created the Green Investment Bank which will be based in Scotland and has £3bn of funding to invest in sustainable projects.

Overall, recognising the different stage of development to technologies in renewable energy as highlighted in previous sections, it is important that there is a range of funding mechanisms available including grants, loans, equity investment and subsidies to reflect the different types of support required from initial R&D, through prototyping, test and demonstration, scale up and full scale manufacture.

Some disconnect has been apparent to stakeholders between the allocation of support in the current EU climate and energy policy framework and its technology arm in the Strategic Energy Technology Plan. Stakeholder engagement in the SET Plan initiatives and related, voluntary schemes like the Covenant of Mayors is affected by the lack of a clear or dedicated funding source to support their implementation. The SET Plan also foresaw little

engagement of supply chain actors and SMEs, although the EU has stated as a goal of its funding programmes to increase their participation.

EU Programmes

It is welcome that the future Horizon 2020 programme is proposed to include a clear focus on private sector engagement. The programme should aim toward effective innovation which brings technologies and solutions to maturity and to the market.

We welcome the requirement that a minimum of 20% of established EU funding programmes is to support work on climate change in the 2014-2020 financial framework. This should cover both efforts to mitigate and adapt to changing climatic conditions. However verifying that the stated climate change outcomes are effectively realised will require;

- Clear assessment criteria for evaluating such proposals;
- Supporting guidance; and
- Robust monitoring and evaluation of such proposals.

New instruments such as the NER 300 mechanism have had positive impact in scaling up demonstration in Scotland, with the first Award Decision including the planned world's largest tidal demonstration array at the Sound of Islay and the Kyle Rhea tidal stream array project.

However, if the scheme is to be extended in the new EU programming period there is a need to address the discrimination in its current rules against projects on CCS on gas.