SUBMISSION FROM FORTH ENERGY

Key Messages

Forth Energy welcomes the opportunity to respond to the Committee’s call for evidence. Forth Energy believes that:

- Having set ambitious targets, there is an opportunity for Scotland to develop a leading position in growing a renewable heat industry, bringing economic growth and reducing carbon emissions.

- Meeting the renewable heat target is much more challenging than meeting the target for electricity and will require the leadership of the Scottish Government and commitment from a wide range of stakeholders.

- New CHP schemes require an underlying level of electricity generation to ensure their financial viability and to support the growth of heat networks for both industrial and community use.

- Larger-scale CHP plants, using imported, sustainably-sourced biomass can make a significant contribution to Scotland's carbon reduction and renewable energy targets.

- Government policy, the planning and consenting processes and renewable support mechanisms must be aligned to facilitate the delivery of infrastructure to meet the renewable energy targets.

The opportunity to develop a heat industry in Scotland

Forth Energy, a joint venture between Forth Ports Limited and SSE plc, plans to develop three high-efficiency, wood-fuelled Combined Heat and Power (CHP) plants in Scotland. The plants will be situated at the ports of Grangemouth, Dundee and Rosyth. Together they will have the capability to deliver 300 MW of reliable, flexible, renewable electricity to the national grid and 260 MW of renewable heat to both existing and new neighbouring industrial and commercial users, and to new local district heating networks. The proposed output can deliver around 30% of Scotland’s 2020 renewable heat target and approximately 6% of the electricity target.

Having set ambitious targets for renewable energy delivery, Scotland has opportunities to reduce the levels of carbon associated with the energy we use and create significant economic growth, through both electricity and heat generation. However, more progress has been made to date in delivering renewable electricity than renewable heat.

We believe that decarbonising our heat production requires collective focus and policy commitment if the energy sector is to deliver the Government’s target of 11% of heat demand from renewable sources by 2020. Government, developers, industry, businesses and local communities must work together to maximise the rate of delivery of renewable heat across multiple technologies and scales. An integrated
approach involving all stakeholders can stimulate the development of a heat industry, bringing economic growth through financial investment, research and development, manufacturing, sales and marketing, supply and installation, operation and maintenance.

The escalating cost of carbon is impacting on the business sector, making the supply of low-carbon heat an attractive proposition. A renewable heat industry will provide locally generated low-carbon energy to existing and new businesses and can enhance the proposed offshore renewables hubs identified in the National Renewables Infrastructure Plan\(^1\). It can also support the Scottish Government’s ‘Agenda for Cities’\(^2\) and the recently announced Enterprise Areas.

Forth Energy’s proposed CHP plants provide both a significant contribution to Scotland’s 2020 targets and also act as a catalyst for the development of a Scottish heat industry. Several organisations are in discussion with Forth Energy regarding the use of process heat from its plants. Forth Energy is committed to developing district heating networks and will work with key public and private stakeholders towards their delivery in the urban areas adjacent to the proposed plants.

**Scotland’s Renewable Energy Targets**

Forth Energy supports the use of long-term, non-technology specific targets to signal to developers and investors the Scottish Government’s continued support for increased growth in the provision and use of renewable energy.

The 2020 renewable electricity target, whilst challenging, appears to be achievable, provided that Electricity Market Reform (EMR) delivers both a stable regulatory regime and an appropriate support framework for renewable electricity through the transition from the Renewables Obligation (Scotland) (ROS). We await the outcome of the recent ROS consultation\(^3\), publication of the updated Electricity Generation Policy Statement and further details on EMR, which together will inform the debate and must assist delivery of the targets.

Although a recent Committee on Climate Change report indicates good progress towards the 2020 renewable heat target to 2010\(^4\), Forth Energy believes that sustaining the required level of growth to meet this target will be much more difficult than for electricity. Our response to the Committee’s call for evidence focuses predominantly on the challenges posed by the renewable heat target.

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\(^1\) Scottish Enterprise (2010), National Renewables Infrastructure Plan. Scottish Enterprise, Glasgow.  


\(^4\) Committee on Climate Change (Jan 2012), Reducing emissions in Scotland: 1st Progress Report. CCC, London.  
Challenges to meeting the 2020 renewable heat target

Forth Energy believes there are five key challenges to meeting the target of 11% of heat demand to come from renewable sources by 2020:

- Accelerating the growth of a renewable heat industry in Scotland and communicating the benefits of low-carbon heat;
- The absence of a distribution network and trading mechanism for heat;
- The limited scale of contribution anticipated from non-biomass renewable heat technologies;
- The financial viability of renewable heat projects; and,
- Scottish Government recognition of the contribution imported, sustainable biomass can make.

Accelerating the growth of a renewable heat industry in Scotland and communicating the benefits of low-carbon heat

To achieve its renewable heat targets and fully realise the benefits of a low-carbon society, Scotland must embrace the rapid growth of a renewable heat industry. To accelerate the pace of development this should involve a fully integrated approach, encompassing the entire supply chain. We must also learn from and draw on the experiences and best practices throughout Europe.

The Scottish Government must lead this initiative. Its policies, strategies, planning and consenting, financial support mechanisms and incentives must be aligned to facilitate the delivery and use of renewable heat. Many stakeholder groups have contributed to the renewable heat debate (for example Scottish Energy Advisory Board, Scottish Renewables, SCDI and Scottish Enterprise) and there have been a number of initiatives promoting renewable heat, but with limited success. The Government has a key role to play in coordinating organisations and initiatives to secure greatly increased renewable heat production, delivery and consumption.

Provided that the correct policies, strategies and support mechanisms are in place, we believe there is an opportunity for Scotland to develop a leading position in establishing renewable heat capacity and networks, serving industrial and commercial customers and local community needs.

The absence of a distribution network and trading mechanism for heat

Supplying heat to multiple customers is extremely challenging since, unlike electricity, there is no central distribution network or wholesale market for heat. As a consequence, acquiring heat customers depends on individually negotiated commercial arrangements and the construction of specific heat delivery networks. Unlike electricity, where the full output of a generating plant can be sold in the wholesale market and supplied to the national grid from the first day of commissioning, heat supply will generally grow over time as new industrial customers are attracted by the availability of renewable heat or as district heat
networks are expanded. This requires significant up-front investment to provide the capacity necessary to facilitate the future growth of heat demand.

This has particular implications for new CHP plants as there is a need for an underlying level of electricity generation from the start of operation to ensure financial viability and support the growth of heat networks. The consenting process and qualification criteria for CHP plants therefore need to be cognisant of the requirement to grow heat demand over time.

The Scottish Smart Cities network and the Government’s ‘Agenda for Cities’\(^5\) have identified a number of initiatives for areas of high population density which provide the greatest potential for competitive advantage and job creation in the low-carbon sector. These include the development of CHP energy systems, district heating networks and retrofitting existing building stock which together can deliver significant energy, carbon and cost savings.

*The limited scale of contribution anticipated from non-biomass renewable heat technologies*

A wide range of technologies exist which, taken together, could meet the Scottish Government’s electricity target. However, there are fewer proven technologies available to deliver the renewable heat target.

Heat currently constitutes around 50% of the total energy demand in Scotland\(^6\), with an estimated 2.8% of heat demand met from renewable sources in 2010. The combustion of biomass is the leading technology, providing 90% of the total renewable heat output in 2010\(^7\). The balance of output was supplied from waste treatment (4%), ground source heat pumps (4%), air source heat pumps (1%), solar (1%) and water source heat pumps (<<1%). Whilst we believe it is appropriate to have a diverse range of technologies and scales contributing to the supply of renewable heat, the pipeline of new non-biomass capacity currently under construction or in development is limited in extent.

We believe that biomass combustion has an essential role in delivering the necessary growth of renewable heat in Scotland. Unless the Scottish Government ensures appropriate support for the use of biomass within larger-scale CHP schemes under the ROS and EMR frameworks, it is unlikely to meet the 2020 heat target as other technologies will be unable to make up the shortfall.

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The financial viability of renewable heat projects

The financial support mechanism for renewable heat is the Renewable Heat Incentive (RHI), launched late 2011. However, there are two significant issues with the RHI which affect all developers of renewable heat projects: the limited annual budget and lack of any confirmed budget beyond 2015. As a consequence, the value of RHI financial support for new renewable heat projects is significantly undermined and is not bankable for the purposes of raising project finance.

There is a specific issue for heat produced from biomass in boilers rated over 1 MWth, where RHI support has been cut from a proposed level of £27/MWh (similar to the support currently available for CHP plants under the Renewables Obligation (Scotland) (ROS) for CHP uplift) to £10/MWh. Forth Energy’s calculations suggest this decrease in support will severely restrict the number of financially viable heat-only biomass projects above 1 MWth. Whilst support remains at an adequate level for sub 1 MWth biomass plants, these are considerably less-efficient than larger-scale boilers and an extremely large number would be needed to make any significant progress towards the renewable heat target. Their use is also generally inappropriate in urban areas.

Forth Energy has undertaken a financial assessment (verified by the Fraser of Allander Institute) of a typical biomass CHP plant supported under the RHI. We have found that the rate of return falls below the market threshold required by lenders for investment. To enable the development of the new renewable, larger-scale CHP plants which we believe are necessary to meet the 2020 heat target, Forth Energy has therefore proposed that the ROS CHP bands remain open to new accreditations beyond the currently proposed cut off date of 1 April 2015.

Scottish Government recognition of the contribution imported, sustainable biomass can make

Although the Scottish Government has a clear target for renewable heat, there needs to be a credible pathway to achieving it and policy to facilitate it. The combustion of biomass is the leading technology providing renewable heat energy in Scotland. Forth Energy expects biomass to play a major role in the expansion of renewable energy through to 2020 and beyond, if the heat and carbon reduction targets are to be met.

The Government has stated that it would prefer to see biomass deployed in heat-only or CHP schemes, off gas-grid, at a scale appropriate to make best use of both the available heat, and of local supply. However, in focusing on local supply, Scotland could miss out on the opportunity to utilise the growing global availability of

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8 Forth Energy (Jan 2012), Forth Energy’s response to the Scottish Government’s ‘Consultation on Review of ROC bands’. 
sustainable biomass which can be imported for use in the energy sector, as coal, oil and gas are currently. Forth Energy believes that the Scottish Government should explicitly recognise the substantial contribution larger-scale CHP plants using imported, sustainably-sourced biomass can make towards its carbon reduction and renewable heat targets. Such plants can co-exist with small-scale plants using locally available indigenous biomass, with both contributing to Scotland’s targets.

**Forth Energy's comments on the renewable heat target**

Forth Energy has commissioned the Fraser of Allander Institute at the University of Strathclyde to examine a range of scenarios for the growth of renewable heat in Scotland through to 2020 and beyond. The results of this work will be submitted to the Committee directly by the Fraser of Allander Institute as its response to the call for evidence.

The scenarios produced a range of potential renewable heat use by 2020 of between 4.6% (assuming low gas prices prevail) and, utilising a number of very challenging assumptions, 12.0% (assuming a trebling of available indigenous biomass, all of which is used solely for heat production in large-scale, high-efficiency boilers, along with high levels of heat pump deployment and the maximum use of municipal waste for heat). More plausible scenarios, which include the deployment of 3 or 5 larger-scale biomass energy plants using imported biomass, can deliver renewable heat use of between 8.5% and 11.0% by 2020.

In support of our earlier comments on the key challenges to delivering the renewables heat target, we highlight some of the main conclusions of the study below.

- In current circumstances it would appear very difficult for Scotland to achieve the 11% renewable heat target by 2020 using indigenous energy resources alone.
- Under most of the realistic scenarios assessed, Scotland would find it difficult to meet the 11% renewable heat target – and in those scenarios that do meet the renewable heat target, imported biomass would play a key role.
- Given current constraints Scotland is likely to find it very difficult to set and achieve post-2020 targets that go beyond 11% renewable heat without imported biomass.
- The renewable heat sector in Scotland in 2020 is expected to continue to be dominated by heat from biomass fuels.
- Large biomass energy facilities are expected to continue to provide the great majority of renewable heat in Scotland in 2020.
- Under current policy and financial constraints most new biomass energy facilities will need a significant proportion of electricity production to make them financially viable for commercial investors.
- Three biomass energy plants of the type proposed by Forth Energy could contribute around 30% of the renewable heat target, and in some scenarios energy facilities using imported biomass would contribute over 40% of renewable heat energy.
How Forth Energy's biomass CHP plants can help meet the renewable energy targets

Contribution to the renewable energy targets

Forth Energy's proposals for three biomass CHP plants could supply around 30% of Scotland’s 2020 renewable heat target and approximately 6% of the renewable electricity target.

Reducing CO₂ emissions

Biomass CHP plants can help reduce Scotland’s CO₂ emissions by displacing energy production from carbon intensive fossil fuels. Forth Energy has commissioned the Scottish Institute for Sustainable Technology (SISTech) to examine the long-term availability and carbon intensity of imported sustainable biomass.

SISTech’s work concludes that only a small proportion of the woody biomass that the studied countries have the capacity to produce sustainably, would be required to meet the projected increase in European biomass demand over the next two decades. Furthermore this is generally from regions which are already forested. In addition, our own discussions with credible fuel suppliers demonstrate that long-term supply agreements for imported, sustainably-produced biomass can be put in place for each plant’s projected needs.

SISTech’s lifecycle carbon footprint study modelled a range of feasible fuelling scenarios, taking account of all emissions, including those from land use change and transportation of the fuel. It calculated the predicted carbon intensity of Forth Energy’s plants at between 193 and 231 kgCO₂/MWh, well below the UK’s new sustainability criteria of 285 kgCO₂/MWh and equivalent to a carbon reduction of approximately 80% against coal and 45% against high-efficiency gas plant.

The study also examined the period within which carbon emitted from generation is taken up by new wood growth (the ‘carbon deficit’). It found that a biomass plant can deliver atmospheric CO₂ savings within two years compared to coal plants and within twelve years compared to gas CCGT plants. Over the lifetime of the three plants, the estimated atmospheric CO₂ reduction compared to the UK grid average is 8.7 Mt.

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Promoting economic growth

While small-scale CHP plants can, with an adequate support mechanism, make a contribution to renewable heat provision in rural or low density areas on an individual premises or residence basis, such plants are less compatible with urban communities where they can add to air quality challenges. Larger-scale CHP plants, fitted with high-quality air filtering systems, represent a viable source of renewable heat in urban markets where demand is high. They promote the use of heat created directly from the combustion of renewable fuels in large, efficient boilers and distributed to consumers via dedicated heat networks.

Our projects have the potential to attract new heat or cooling-intensive commercial and industrial customers to Scotland and initiate the development of some of the UK’s largest local district heating networks. Through the provision of locally generated low-carbon energy, they can also support plans to create renewable technology and manufacturing hubs at Scottish ports within the Renewables East Enterprise Area, attracting inward investment and promoting opportunities for local construction, development and employment.

Forth Energy’s plants represent a combined investment in renewable energy capacity in Scotland of £1.1 billion and are expected to bring economic growth to the regions in which they are located of around £80 million per annum (measured as Gross Value Added). They will create approximately 1000 construction jobs over 3 years and 210 permanent jobs throughout their operational life.

Improving security of supply

The use of biomass for generating electricity will diversify the generation fuel mix in Scotland, thereby increasing the security of supply. As there is limited potential for new biomass plant to be constructed under the current support framework, Scotland will not become overly-dependent on biomass as a fuel for electricity generation.

Biomass plants provide a controllable source of energy through their ability to vary output. Accordingly they complement intermittent or less controllable renewable generation technologies such as wind, marine, limited storage hydro and solar. The Scottish Government has identified a need for approximately 2.5 GW of new thermal generation capacity to be constructed in Scotland to ensure a secure electricity supply at time of low wind and hydro output\(^\text{13}\). New, flexible, low-carbon, biomass CHP plants, such as those planned by Forth Energy, can contribute to this requirement and reduce the need for back-up fossil-fuelled, carbon-intensive generation.


Conclusion

As set out in the document above, Forth Energy believes that:

- Having set ambitious targets, there is an opportunity for Scotland to develop a leading position in growing a renewable heat industry, bringing economic growth and reducing carbon emissions.

- Meeting the renewable heat target is much more challenging than meeting the target for electricity and will require the leadership of the Scottish Government and commitment from a wide range of stakeholders.

- New CHP schemes require an underlying level of electricity generation to ensure their financial viability and to support the growth of heat networks for both industrial and community use.

- Larger-scale CHP plants, using imported, sustainably-sourced biomass can make a significant contribution to Scotland’s carbon reduction and renewable energy targets.

- Government policy, the planning and consenting processes and renewable support mechanisms must be aligned to facilitate the delivery of infrastructure to meet the renewable energy targets.

Forth Energy remains committed to bringing reliable, responsible, renewable heat and electricity to Scotland, making a significant contribution to Scotland’s 2020 renewable energy and carbon reduction targets. We would be delighted to contribute further to the debate if this would be of assistance to the Committee.

Forth Energy
1 March 2012