

FALKIRK COUNCIL

Subject: GRANGEMOUTH ENERGY PROJECT: NEXT STEPS
Meeting: EXECUTIVE
Date: 15 MARCH 2016
Author: DIRECTOR OF DEVELOPMENT SERVICES

1.0 INTRODUCTION

1.1 The purpose of this report is to:

- update Members on the progress of an energy related project arising from work involving Falkirk Council, Scottish Government, Scottish Enterprise and local business in the Grangemouth and Falkirk area.
- convey the results of a comprehensive demand study and options appraisal for the delivery of new energy infrastructure centred on two key locations identified in the Council's new economic strategy; the Grangemouth Investment Zone and the Falkirk Gateway.
- outline the prospect for the Council to participate in a Northern Connections INTERREG project focussing on developing sustainable clusters and promoting regional innovation.
- identify the next steps for delivery of a Grangemouth energy project and seek approval to proceed

2.0 BACKGROUND

2.1 An introductory report was presented to the Executive on 13th January 2015 to advise Members of the progress on work which arose from the taskforce set up to address the potential closure of the INEOS plant in 2013. This work, which became the Grangemouth Energy Project, drew together the Council, businesses and other stakeholders to outline the options for a range of energy-related services to commercial, industrial and residential premises in Grangemouth and Falkirk.

2.2 The stated aim of the project was to 'determine if a more resource efficient, low carbon, low cost energy solution can be implemented - reducing the cost of energy to businesses and eventually homes in the Grangemouth area'. The outcomes of this were to:

- secure continued employment
- create new jobs
- improve energy security
- enhance the competitiveness of businesses located in the study area
- improve environmental protection
- enhance the area's international reputation

2.3 This work was primarily funded by Scottish Enterprise (SE) and tendered under an existing SE consultancy framework, alongside Falkirk Council as joint project leads. The outcome of the process was to appoint Mace Group Ltd who assembled a team involving sector specific expertise on renewable energy, district heating and the financial and legal aspects of energy networks. The primary management of the contract was carried out by Scottish Enterprise however the consultant team was based at Falkirk Stadium alongside the Council's Growth and Investment Unit staff to improve local engagement and create stronger links with the area. A fortnightly Grangemouth Energy Project update meeting took place amongst Falkirk Council, Scottish Enterprise, Scottish Government, Scottish Future's Trust and the consultant team to manage progress and direction.

3.0 GRANGEMOUTH ENERGY PROJECT: REPORT

3.1 The work was carried out in the following packages:

- Set out project scope area, required stakeholders and key contacts, communication methods and project timeframes.
- Carry out a comprehensive appraisal of heat and power demand profiles across the scope area.
- Stakeholder engagement workshops to assess relative priorities amongst public and private sector partners.
- Options appraisal for initial proposals
- Legal issues workshop and development of guidance with external counsel on Energy Services Company (ESCo) structure, opportunities and risks.
- Revised options appraisal incorporating workshop feedback
- Cost benefit analysis
- Consultative final recommendations and report publication.

3.2 An executive summary has been produced for wider dissemination and a copy of this document is appended to this report (Appendix 1).

3.3 The primary driver for this work was to address concerns of the energy cost burden to business in the Grangemouth industrial complex. However this report has identified that energy security and resilience are also significant concerns for local businesses and support agencies. The consultation highlighted interest in managing and reducing carbon emissions and the potential socio-economic benefits of developing heat and power networks to Falkirk residents, particularly those experiencing fuel poverty.

3.4 Through the development of the report, a wide range of energy generation options including several emerging renewable technologies have been identified as possible opportunities for Grangemouth. These include:

- Solar photovoltaic power
- Geothermal heat recovery
- Industrial heat recovery
- Biomass combined heat and power (CHP)
- Gas-fired combined heat and power

- Refuse derived fuel (RDF)-fired combined heat and power
 - Waste water heat recovery
 - Anaerobic digestion
 - Coal-fired combined heat and power with carbon capture and storage.
- 3.5 It is anticipated that any potential solution would draw on one or more of these technologies as the primary heat and power sources for a district network, with back-up provision across a distributed network. Several options were proposed and through a process of workshops and cost benefit analysis a final recommendation was reached.
- 3.6 The proposed solution is broken down in to three distinct district heating networks (DHNs), each based around an assessed demand profile and underpinned by a variety of balanced supply options, with particular focus on low carbon solutions and the re-use of waste heat. For clarity the three sections are designated the Eastern Network, the Western Network and the Northern Network – all three are within the original scope area as shown in the diagram at section 1.4 of Appendix 1.
- 3.7 The networks have been designed around the available heat demand and the main locations of heat and power generation. A key source of steady heat demand identified in this first phase relates to public sector buildings with a number of schools and Council buildings within the scope area. The report suggests that these can offer a useful anchor heat load to this type of project. Additionally the opportunity to connect to swimming pools within the scope area is significant due to the steady heat demand that they carry. The three highlighted networks were considered to each be at different levels of readiness for development of district heat networks.

4.0 NETWORK OPTIONS

Eastern Network

- 4.1 The Eastern Network has a total estimated heat demand of 66.2 Gigawatt hours(GWh) /year. This includes demand for hot water, steam and electricity to support operations at Grangemouth. Capital costs for the formation of a pipe network at this location are between £19m-£22m and this is identified as being a potentially viable project based upon existing demand and potential supply. The report shows several possible supply options with variable capital cost outlays of between £32-£40m, these involve:

- Industrial heat recovery from existing industry
- Supply from various private sector CHP facilities within the network area
- Heat supply from Avondale facility
- Development of solar PV energy generation at Kinneil Kerse Landfill
- Development of geothermal heat recovery in the Grangemouth basin.

In particular the Eastern DHN would appear economically favourable and affordable. There are two economically viable options, principally the utilisation of geothermal heat in conjunction with industrial heat recovery, and geothermal alone strengthened by the Renewable Heat Incentive (RHI) tariff that geothermal attracts at present. The option of using heat from the Avondale site has less economic benefit given the significant network pipe line lengths included, but is still affordable and will be investigated further as there is less technical risk associated with this than the geothermal option, which is relatively new

technology in Scotland. A separate study within this zone identified the potential for delivery of a residential scheme focusing on c300 properties. This could offer benefits of tackling local problems of fuel poverty and would involve an additional capital commitment of £4m.

The recommendation for this Eastern element of the network is to proceed to delivery of a full business case, with further consideration given to the potential delivery of the residential scheme.

Western Network

4.2 The Western Network has a current total estimated heat demand of 10.6 GWh/year, with capital costs for the formation of a pipe network of c£9m and options for heat supply involving capital costs of c£6m. The report acknowledges there is the potential for significant network development in conjunction with the proposed Forth Valley College and development work on the Falkirk Gateway sites (subject of a separate report to the Executive). The current report has focussed on existing demand and, as such, suggests that this project is not currently economically viable however the proposed project timeline to 2020 for the Western Network contains economic development and low carbon initiatives, including:

- the new Forth Valley College Campus and related accommodation,
- development of the Gateway sites, including hotel and leisure, new business and commercial property and housing developments
- Falkirk Community Stadium site
- upgrade of the Callendar Park CHP plant with the potential to link the Gateway, Callendar Business Park and education sites such as Graeme High.

Alongside the proposed Gateway scheme, it is suggested that affordable reliable heat and power could be delivered alongside improved access and high speed connectivity being delivered via the TIF initiative and that these would act as strong attractors to investment and provide a high quality environment for business and residents.

The recommendation is to proceed to delivery of a business case acknowledging the development opportunity at this location.

Northern Network

4.3 The Northern network has a current total estimated heat demand of 46.2 GWh/year, with capital costs for the formation of a network of c£17m and options for heat supply involving capital costs of c£33m-43m. The Northern network was deemed to not be currently viable based on the current demand profile.

The report recognises that support from the Department for Energy and Climate Change's Contracts for Difference subsidy scheme would significantly improve the financial case around the already consented biomass site at Forth Ports and that this may affect the economics of delivering this network. This area retains significant opportunities for heat distribution not least the 200MW biomass plant and other private sector generation schemes which are at various stages of progress. The report does not propose progressing this project to full business case at this stage as the priority is for the private sector interests to progress this work however on resolution of the position of adjacent networks and the current subsidy question, there will be an opportunity to revisit this option.

- 4.4 The report, summarised in Appendix 1, also provides commentary on the potential formation of an energy service company (ESCo). It identifies a number of options, risk and other factors to consider in the formation of such a body to assist delivery and management of a heat network. The report suggest that the design of this body would be finalised once more clarity is gained on the project to be delivered arising from the work on the business case.
- 4.5 In addition to recommending this work be taken forward, the report highlights the importance of introducing relevant planning policies which support district heating and sustainable energy developments to enable Falkirk's development to be protected against future energy uncertainty and can compete in new sectors to attract investment to Falkirk as highlighted in the recently adopted economic strategy.

5.0 **NEXT STEPS**

- 5.1 The development of this work has acted as a catalyst to draw together a cross-departmental group across the Council to develop a District Heating Strategy as designated by the Scottish Government's Heat Network Partnership. This document roots the Grangemouth work in a wider Falkirk context and a report on this work will be prepared for a future meeting of the Executive. Simultaneously Falkirk Council is investigating the opportunities around the development of a Sustainable Energy Action Plan (SEAP), which would provide the strategic context for the Council to enter into European funding programmes for the development of sustainable projects. From this work a bid is being developed to seek financial support from Scotland's Energy Efficiency Programme (SEEP), a Scottish Government programme with earmarked funding for energy efficiency developments.
- 5.2 Scottish Government, Scottish Enterprise and Scottish Futures Trust continue to support the development of the Grangemouth Energy Project. A bid for funding support was previously approved under the Scottish Government/EU funded Low Carbon Infrastructure Transition Programme (LCITP) and this bid has been revised and approved providing £120k to carry out the additional development work to deliver a business case, initially for the Eastern and Western networks. This work will be commissioned by the Scottish Government with assistance from the Council and other partners.
- 5.3 It is intended that the next stage of the business case will involve a particular focus on the technical, legal and financial elements of the project as well as expressing the benefits to be gained from this work. It is intended to deliver an investment grade business case which will convey to prospective investors the project's potential, technical details, the commercial, financial and the operational structures to support its delivery. Subject to appropriate procurement and state aid considerations, this could include potential Chinese investment partners e.g. Chinaway Energy (now Dragon Harvest Investments), with whom the Council and Scottish Enterprise signed a Memorandum of Understanding in 2014.
- 5.4 For the Council, the business case will further refine the role that it can play, and identify resource requirements, community benefits and income streams. It will also deliver the

next steps in the engagement strategy for business and the community which will be essential to ensure that the widest range of benefits are secured from these developments.

- 5.5 In seeking additional support for the development of the Grangemouth energy project and to reduce the financial cost to the Council of this work, Scottish Europa, the body responsible for promotion of economic links between Scotland and the EU has identified an EU supported 'INTERREG' project (a programme for the development of trans-national activity in economic development) where they aim to work with Scottish Enterprise, Falkirk Council and Edinburgh University in a project to cooperate with several other European municipalities in the development of heat networks in industrial locations. The majority of these partners are in Scandinavian countries where district heating is already developed and access to their expertise in this field is a significant opportunity. The focus of the project is on the creation of business support programmes to improve the development of sustainable economic clusters such as that proposed in the Grangemouth Investment Zone and to assist businesses in finding international partners for cooperation, knowledge-sharing and trade.
- 5.6 The project will run for around three years in parallel to the proposed development work on the Grangemouth energy project. In initial discussions with the lead partners we have proposed that Falkirk become a centre for the implementation of the development programmes which may lead to additional European funding opportunities. The total proposed budget for the project's Falkirk element is c£300,000 over three years. This would be funded by the Interreg programme with Falkirk's net contribution supplied through officer time.

6.0 IMPLICATIONS

Policy

- 6.1 The examination of a potential energy project at Grangemouth accords with the ambitions of the Strategic Community Plan, the Sustainable Development & Climate Change Strategy 2012 – 2017 and the new Economic Strategy for Falkirk – '*Growth: Investment: Inclusion*'.

Legal

- 6.2 The advice of colleagues from Governance Division and, where necessary any external legal advisors has been sought to date and will form a central part of the full business case. Pinsent Masons provided extensive legal opinion on the role of local authorities (and Falkirk in particular) in ESCo organisations and this will be developed further in the work on the business case to ensure a clear and specific advice on the role the Council could play and where any risks, liabilities and opportunities lie.

Financial

- 6.3 The advice of colleagues from Finance Services will be sought in the development of the project. External advice has been sought via Ernst & Young who have delivered a report on the development of a Falkirk Investment Fund which provides various mechanisms by which the Council can contract with investors and partners. At this outline stage the total capital requirement for the Eastern and Western networks is anticipated to be c£80m. These funds are anticipated to be sought from private investors and other external funding partners. We will continue to engage with UK and Scottish government around supporting funding streams such as LCITP and renewables subsidies.

Risk

6.4 The level of risk involved at this stage is limited by the level of funding being received from LCITP to carry out this work. The principal risk concern is around ensuring that the role of Falkirk Council in any future network is clearly defined, appropriate and beneficial both to the Council and the local community.

7. RECOMMENDATIONS

7.1 It is recommended that the Executive:-

- (i) Notes the terms of the above report on the progress of the energy project and the delivery of the Grangemouth Energy Project**
- (ii) Agrees the next steps in developing the project including the preparation of a business case for the Eastern and Western networks through seeking financial support from the Scottish Low Carbon Infrastructure Transition Programme.**
- (iii) Agrees to participate in the EU funded Interreg initiative for the promotion of local energy networks.**
- (iv) Requests officers to report back in due course, with the results of the business case and recommending the next steps.**

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Director of Development Services

Date: 15th March 2016

Contact Officer: Douglas Duff / Matthew Farrell Tel: 4952 / 0988

LIST OF BACKGROUND PAPERS

- 1. Grangemouth Energy Project Summary Report
- 2. Summary of LCITP bid

Anyone wishing to inspect the background papers listed above should telephone 01324 590988 and ask for Matthew Farrell.

Grangemouth Energy Project Summary Report



Scottish Enterprise
Grangemouth Energy Project
Date of issue: 17/12/2015
Revision: 3-0

Grangemouth Energy Project: Summary Report



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Accountability for this document

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Date:	20/11/2015

Version Control

All revision and amendments to this document are to be recorded in this section.

Ref	Date	Section	Page	Details	Authorised
0-1	05/10/15	All	All	<i>Draft report shell created</i>	
1-0	30/10/15			Draft report issued for comment	EH
2-0	20/11/15			Published report issued	EH
3-0	17/12/15			Final revisions by team	EH

Summary Report

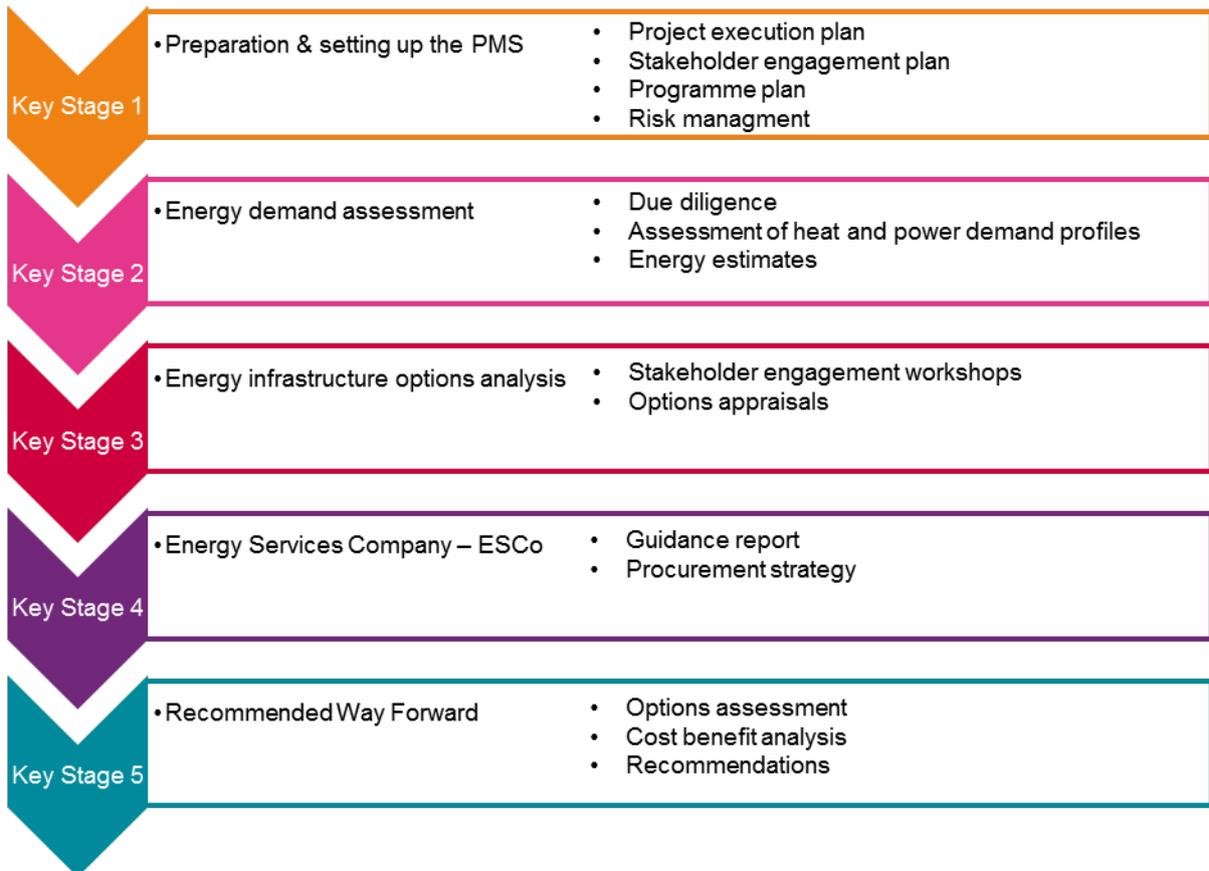
1. Executive summary

The Purpose of the Grangemouth Energy Project is summarised below:

“Determine if a more resource efficient, low carbon, low cost energy solution can be implemented - reducing the cost of energy to businesses and eventually homes in the Grangemouth area”

1.1. Reporting structure

In order to achieve this aim we adopted the following reporting structure:



A critical aspect of this study has been the level of support and engagement from businesses within the area and via Falkirk Council, Scottish Enterprise, The Scottish Government, Scottish Futures Trust, Scottish Power, Scottish Water and others. This support has allowed us to reflect a broad section of views and subject matter expertise. We were able to harness this engagement via our working groups and stakeholder workshops - guiding us through the vast number of available options, technologies and potential solutions.

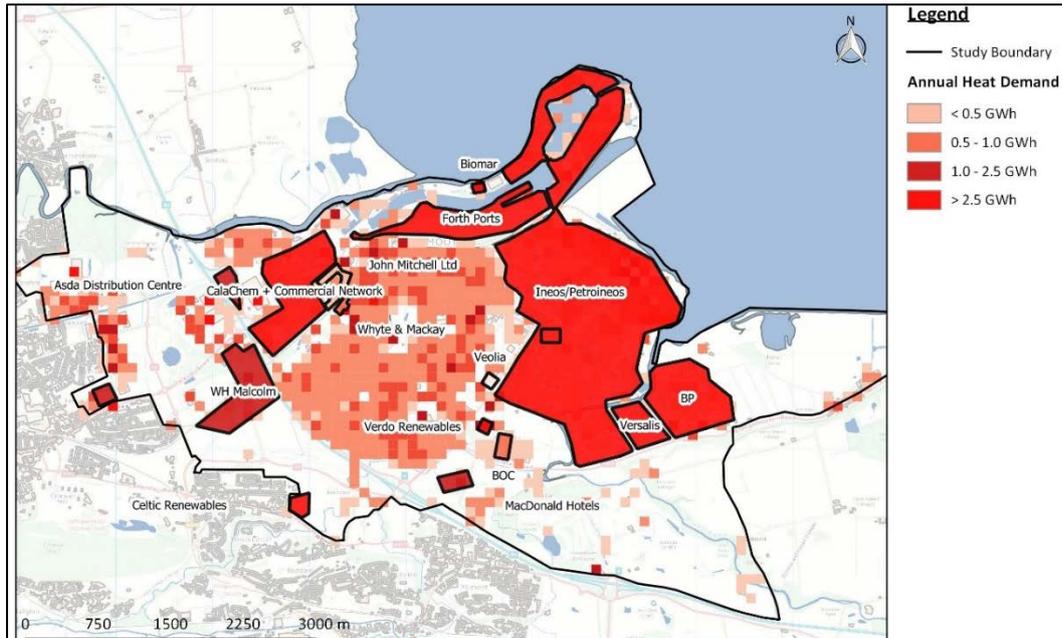
1.2. Energy Demand Assessment

Summarised below is the overall heat demand for the scope area, following an assessment of the area using a number of data sources and direct contact with stakeholders. The map illustrates the prevalence of commercial demand, along with the areas of domestic usage.

Grangemouth Energy Project: Summary Report



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Reference ## - Source 2015-07-24-SEGEP-KS2Output-0-2.pptx

The overall demand profile of the scope area was assessed as per the map above. Existing energy, heat and power generators within the scope area were similarly identified. A number of commercial organisations generate heat for their own use, primarily CalaChem and Ineos.

Based on the findings from these investigations, significant opportunities for balanced energy supply and demand were identified across the scope area.

The supply of power within the scope area significantly exceeds the demand profile. Based on the responses from industry, existing arrangements for the supply of power seemed adequate, however there may be an opportunity in the future to look at Private Wire arrangements, particularly from the Ineos site as they are net exporters to the grid.

1.3. Assessment of available solutions

In order to develop viable scenarios a full range of technically feasible options were assessed. The common feature for all was a District Heating Network as the infrastructure between the principal suppliers and our profiled demand. In conjunction with our wider stakeholder group this long list was distilled down to the five options outlined below.

- 1 Business as usual**

 - Business as usual, no heat network. This was used as a comparison for the costs, energy savings, and CO2 savings of the other scenarios
- 2 Biomass CHP**

 - Biomass CHP with single energy centre located at site of consented biomass plant at Port. This is divided into 2 further scenarios: (a) using the biomass plant of the size intended by the consented applicant at maximum electricity production; (b) using a biomass CHP of the minimum size to serve our proposed heat network. This scenario contains 1 heat network (Northern)
- 3 Integrated low carbon & industrial waste heat**

 - The main heat source for this scenario was industrial waste heat. Heat is taken from CalaChem (chemical plant), Ineos (refinery and chemicals plants) and Dalderse (STW). The 3 energy centres each have their own network
- 4 Gas CHP**

 - Multiple gas CHPs located on vacant land
- 5 Integrated low carbon**

 - Similar networks to Scenario 3 but only zero carbon heat production (solar thermal) and energy supplies which are intrinsic to the community i.e. waste (sewage and landfill) are included

Reference ## - Source GEP - supply and demand summary 151026 0-1.xlsx

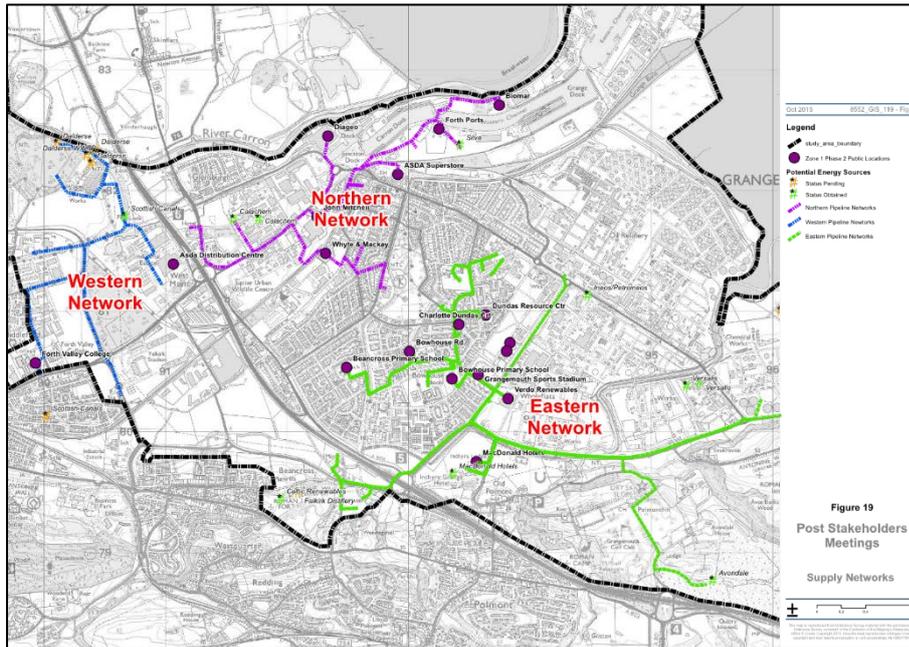
Workshops were held with a range of stakeholders to identify their ranking of priority allowing us to weight the categories, resilience and security of supply emerged as the highest priority. Each of the scenarios was assessed using the following criteria:

Category	Weighting	Details
Carbon impact	2	Quantitative assessment of the life-cycle emissions of CO2 from the technology, including any energy savings (e.g. from reduced cooling loads)
Resilience / security	3	Qualitative assessment covering: <ol style="list-style-type: none"> 1. Continuity / variability of supply 2. Vulnerability to external markets / prices 3. Resource self-sufficiency 4. Maturity / bankability of technology
Socio-economics	1	Qualitative assessment covering: <ol style="list-style-type: none"> 1. Fuel poverty 2. Local economic development
Energy costs	2	Quantitative assessment of total aggregated cost per kWh delivered energy over 25 years (indicative capital, operating and fuel costs are included)

Reference ## - Source 2015-09-21-Notes from workshop2.pdf

The outcome of this assessment was that Option 3, Integrated Low Carbon and Industrial Heat Waste, was taken forward as the preferred option for further assessment.

1.4. Our proposed solution – Grangemouth District Heating Network



Reference ## - Ironside Farrar GEP Network Drawings

Our proposed solution is broken down in to three distinct District Heating Networks, each based around an assessed demand profile and underpinned by a variety of balanced supply options, with particular focus on re-use of waste heat and low carbon solutions.

Each of the three options is at different levels of readiness for development of district heat networks.

1.5. Eastern Network

Based on information currently available, the strongest proposition is the Eastern Network.

The Eastern Network shows 3 possible supply points, these are Ineos, Avondale and Kinneil - there are several possible heat sources at Kinneil). A supply from Avondale would significantly increase the length of the pipe work without adding any demand points.

In particular the Eastern District Heating Network would appear economically favourable and affordable.

There are two economically viable options without the need for external funding for the capital costs, principally the utilisation of Geothermal in conjunction with BP, and Geothermal alone (as illustrated in the table below). At present Geothermal attracts an RHI tariff.

Primary supply	COMMERCIAL	
	IRR	Payback (yrs.)
Ineos	-11%	>30
Solar thermal + Avondale landfill gas / EFW	4%	23
Avondale landfill gas / EFW	5%	20
Kinneil AD (CHP) + WWHP	N/A	>30
Kinneil WWHP	N/A	>30
BP + Kinneil AD (CHP) + WWHP	N/A	>30
BP + Kinneil WWHP	N/A	>30
Geothermal	7%	13
BP + Geothermal	7%	13

Source GEP - supply and demand and pipe sizing, preferred option

The option of using heat from the Avondale site has less economic benefit, but is still affordable (all financing costs for the project capital expenditure can be paid from net

operational cash flows), and will be investigated further as there is less technical risk associated with this than the Geothermal option, which is relatively untried technology in Scotland.

1.6. Western Network

The Western scheme does not currently display sufficient demand levels to be economically viable based on stated cost assumptions however a development masterplan is being prepared for the Falkirk Gateway sites within the Western Network boundary which should introduce significant new activity and increase the heat demand to this network. Also, the opportunity to connect to the existing Council-owned Callendar Park CHP plant provides additional demand and resilience.

Although not immediately viable, the potential demand that can be delivered by the Gateway development requires further exploration.

The use of planning approvals for the development of District Heat networks in this area could leverage in private sector capital to finance the networks and this should be considered as a key part of the development plan for these sites.

1.7. Northern Network

The Northern Network will require significant grant support to progress and this will be impacted upon by the outcome of the DECC Contracts for Difference process in October 2016.

Some of these constraints may potentially be overcome by development of the consented Biomass plant planned for Grangemouth, which not only provides a vehicle for the provision of low cost heat, but also funds the costs required to develop the heat network. The consented operator has well-developed plans for the pipe network that requires just 9 MW of heat offtake to meet CHPQA requirements.

This scheme should be re-visited once the Eastern network is established and operational, as the incremental cost of expanding this network may overcome some of the current cost constraints on the network.

1.8. Wider Impacts

The development of a DHN within Grangemouth would result in reduced energy costs for a range of public sector buildings, as well as a number of SME Businesses and domestic users, a significant percentage of whom are deemed to be suffering from **fuel poverty**.

Depending on the delivery model adopted within the scope area, for example a council owned ESCo, there may be future opportunities to invest any profits from the operation of the DHN in to **community projects** and initiatives that support those most in need.

The proposed routing of the DHN, particularly the Eastern Network, would support Falkirk Council's strategic plan of developing an '**Investment Zone of National Significance**' as the proposed infrastructure could prove a stimulus for the location of future development in and around the current petrochemical site.

We have identified significant opportunities to utilise waste heat from a number of major businesses and the proposed DHN is a means to link supply and demand. There is significant potential for the re-use of industrial heat which far exceeds the demand for the full study area, particularly from the CalaChem and Ineos sites. It may prove difficult to unlock this potential in the short term, based on the current energy pricing policy and our assumed cost model.

With regards Ineos, although understanding the merits of the Grangemouth Energy Project and the ability to have heat supplied more cheaply to them, their key and overriding concern is internal resilience, with no reliance on external heat providers. Likewise for BP. Given that they both represent c.90% of the energy costs at Grangemouth, the project has been limited in its ability to reduce overall energy costs at Grangemouth. Additional businesses identified in Grangemouth incurred (along with the public sector and residential areas) the balancing 10% of energy costs, have been the main focus of this study. This includes a significant section of INEOS' estate which is not covered by their own networks and will be available for co-location and connection in to the Eastern Network.

If, however, a mechanism could be developed - for example RHI or other funding mechanism - to create market conditions at which this heat could be either supplied at a higher grade or at a lower price, there could be significant synergies between the supply and demand profiles in the area.

A further benefit of this approach would be the opportunity for organisations with surplus or waste heat to open up new income streams that could be used to offset their existing energy costs.

1.9. Next Steps

In order to progress our recommend option we suggest the following steps are developed in parallel.

Project ownership and leadership

Considerations should be made around who is going to take ownership and implement the next stage of this project, this approach should include but not be limited to, who is going to bear D&B risk, demand risk, secure supply and offtake agreements. Falkirk Council are well placed to lead with support but must define their role e.g. facilitator, network owner, off-taker etc.

1.9.1. Technical Solution Development

Off take and demand assessment

In order to develop a more robust feasibility study for the Eastern and Western Networks, further demand analysis and substantial engagement with potential off takers should be carried out. The output of this work will form the basis of any off take arrangements. The focus of this work should be on identifying interested parties from both the Public and Private Sector and carrying out detailed demand analysis, including peak usage times. Identifying long term plans and price sensitivities. It should be emphasised that the major off-takers are Verdo Renewable (49GWh/yr) and Falkirk Council (12GWh/yr) representing 60MWh/yr of the total 66GWh/yr demand.

Third Party energy providers at e.g. Avondale, Ineos, BP and CalaChem would also need to be further engaged to agree a mechanism whereby service agreements could be agreed.

Future work should aim to replace assumptions with data e.g.:

- Confirmation of interest from potential customers
- Estimation of annual heat demands (preferably by monthly meter readings)
 - assessment of existing equipment efficiencies (taking insulation / energy efficiency improvements and expected changes in demand into account)
 - peak heat demands (preferably from a knowledge of the installed boiler capacity and how these are operated in practice, benchmarks using floor areas and age of the building or from HH gas meter readings if available)

Full data would likely result in reductions in heat demand, energy centre and DHN capacities and hence, costs.

Development of engineering deliverables

In conjunction with the demand assessment, the commissioning of a detailed Engineering feasibility study is recommended to look in more detail at the proposed District Heating route and carry out site investigations and exploratory works. We would recommend developing a two stage Design & Build process with the detailed feasibility forming stage one and an option to extend this work in to a phase two detailed design.

The development of heat generation and capture activities potentially e.g. at the Avondale site, Ineos, BP, CalaChem and from Geothermal energy would also be subject to detailed feasibility work.

1.9.2. Commercial Delivery Structure

Alongside developing a technical solution, the commercial delivery structure will also need to be progressed.

Delivery Vehicle - ESCo

There are various delivery options that could be deployed to support the development of the proposed scenario. We would recommend carrying out the detailed demand and technical feasibility work in advance of selecting the appropriate delivery option. By carrying out that work and further refining the full scope, a best fit solution is more likely to emerge.

The key factors to consider when determining the appropriate choice of vehicle for both the ESCo and any project level entities will include:

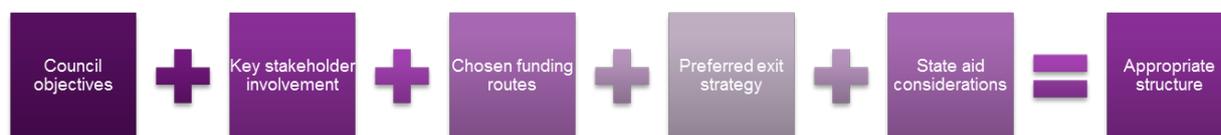
- Whether the entity is to make a profit or if it is to be a 'not for profit' entity
- Ownership/number of stakeholders
- Flexibility (aligned with ESCo objectives)
- Financing – certain types of vehicle are more suitable for financing than others
- Liability – what level of liability is to be assumed
- Exit planning - shares in a company (or its assets) may be sold without significant legal restriction. This is not the case for all other types of vehicle
- Tax treatment

The evidence of this report and experience of other areas will also help inform the decision making process as well as anticipated appetite for risk.

Further analysis requirements

There are various delivery options that could be deployed to support the development of the proposed solution.

The following information will need to be provided / confirmed:



- Confirmed set of objectives for the ESCo and whether it will be Council led or owned, a joint venture structure or a concession structure
- The level of involvement that the council and any other key stakeholders will have on the project e.g. the level of participation they wish to have
- Identification of key stakeholders and what their role will be in relation to the ESCo and/or specific projects (including any proposed community involvement)
- Where the financing is coming from and what are the terms of that financing e.g. is it coming from private investors or from the local authority or is it a mix, and if so what percentages are applicable. This can initially be at a high level, any key specific requirements that the funders may have that may affect the legal structure. It will also be important to know the level of liability that each party is willing to take on
- Where the resources are coming from to manage and lead the project i.e. in terms of personnel involved in the day to day running of the ESCo
- Any requirements that a party has for being able to exit the projects at any particular point in time
- State aid considerations
- Any structure will require a separate tax and accounting assessment

Once the information above has been confirmed it will become possible to fully tailor the legal structure to the preferred ESCo option selected.

Funding and procurement strategy

On completion of the previous two activities it will be possible to develop a funder-ready Economic model for the overall network. It would be then possible to identify potential Public, Private or potentially Third Sector funding routes or a mixture of all three. Potential funding routes include the District Heating Loan Fund, Renewable Energy Investment fund and European Infrastructure funds. Procurement would need to be subject to the proposed delivery vehicle constituted for the delivery of the programme and take in to account all consenting and potential planning restrictions arising within the proposed area.

All of the above will be incorporated into a full Business Case Report to allow participating parties to commit to investing in the preferred option, and allow it to be subsequently procured.