
Scottish Futures Trust

Public Sector Delivery Structures for Low Carbon Investment

Final Report

August 2013

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1. Executive Summary

Introduction

The Scottish Futures Trust (“SFT”), with the support of the Scottish Government, has been considering opportunities that would allow energy efficiency, small scale renewable and district heating schemes to be more quickly developed and rolled out across the whole of Scotland in order to accelerate the pace at which their benefits are captured and contribute towards Scotland’s 2020 emission targets.

SFT has commissioned PwC to analyse potential delivery structures for the public sector in particular, across three areas, being:-

- Non Domestic Energy Efficiency (NDEE) in the public sector estate.
- District Heating (DH), where the public sector is a developer, an enabler, or a purchaser of heat.
- Small scale renewable generation developed by the public sector or with direct public sector sponsorship.

The Scottish Government’s recent publication – *Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027 – The Draft Second Report on Proposals and Policies* (“RPP2”) – identifies the public sector’s share of Scotland’s 2010 greenhouse gas emissions as 0.9 million tonnes of CO₂ equivalent (MtCO₂e, a metric which captures information on CO₂ and the other five greenhouse gases), or 2% of total Scottish emissions. Almost all (98%) of these emissions are from public sector buildings with three quarters from local authorities and the NHS (62% and 13% respectively).

In addition to the regulatory context, the Scottish Government has established the transition to a low-carbon economy as a strategic priority in its Economic Strategy (as revised in 2011), and Scotland’s public sector has identified a range of related policy objectives including:-

- Reducing energy use in homes, schools, work places and public buildings.
- Reducing fuel poverty.
- Reducing reliance on fossil fuels.
- Increasing the value of Scotland’s low carbon services sector and the related job creation.
- Acting as an international role model.

The markets for NDEE, DH and Small Scale Renewables are still evolving. There are good exemplars of successfully developed projects in each of these areas but, in each, the consistency of project flow is variable and a series of workshops undertaken with relevant public sector bodies confirmed that the single biggest constraint is the development of viable projects through to deliverable business cases, rather than the structures which will enable strong business cases to be delivered.

As the flow of deliverable projects builds the availability of suitable delivery structures will become an increasingly important factor. Consequently, the objective of this study is to identify potential delivery structures which could be adopted by the public sector bodies in Scotland across each of the three sectors, addressing:-

- The rationale for the development of delivery structures.
- An appraisal of delivery options for individual projects within each sector.
- Appraisal of delivery models which could aggregate projects on an area basis or a sector basis.
- Consideration of wider, strategic approaches to aggregation.

Rationale for development of delivery structures

Currently, public sector organisations are making progress around low carbon investment. However typically this is on a project by project basis or through the development of a wider carbon vision, to be delivered under a variety of approaches. Implementation of the latter is more complex, and this approach is invariably taking longer than expected.

There is an overall need to accelerate this investment. A range of benefits can be achieved through effective delivery, including:-

- **Enhanced project development** through sharing capability, skills, examples and supporting strong business cases.
- **Better project delivery**, through consistent procurement and commercial approaches, through aggregating purchasing power and streamlining procurement; and
- **Improved project economics and financing** through harnessing revenue streams, addressing funders' requirements and improving value for money through portfolio risk benefits and economies of scale.

If these benefits are successfully harnessed, they can support Government in meeting its intended policy outcomes.

Appraisal of delivery options

We have undertaken an option appraisal approach to identifying and assessing the potential delivery options for each of the three sectors, considering the current delivery market in each sector and the challenges to large scale investment. We developed a list of potential delivery structures which was refined to a shortlist based on the specific needs of each sector.

With further analysis of risks and issues associated with each shortlisted option and the potential contracting approaches for each structure identified for each sector, further consideration was given to the potential opportunity for, and benefits associated with, aggregation of projects in each sector.

The initial long list of delivery vehicles covered seven potential models across a spectrum from wholly public sector projects which are wholly owned, funded and operated by the public sector to, at the opposite end of the spectrum, projects which are substantially privately owned with only limited involvement through public sector facilitation.

The results of the appraisal of delivery options for each of the sectors were as follows:-

Non-Domestic Energy Efficiency

Market and challenges

Low carbon retrofit for energy efficiency has not yet been widely adopted across the whole public sector estate albeit many strong examples exist and there is an established market of private sector providers. A combination of continuing growth in energy costs together with technological advancements has supported the development of increasingly strong business cases with improved benefits and shorter payback periods. This has also enabled the provider market to take additional risk including providing performance commitments through energy performance contracts. However challenges remain including:-

- Addressing the diverse base of energy consuming buildings and assets in the public sector
- Changes in the estate as assets are rationalised
- Establishing strong performance baselines against which to measure improvements
- Lack of awareness of energy efficiency opportunities

Potential Structures

Our analysis of potential structures recognised that these needed to take account of a range of factors including:-

- Sources of finance
- Performance risk
- The type and volume of proposed works
- External resources required to develop projects
- Procurement constraints
- Interfaces with existing facilities management arrangements

Our review led us to identify four potential delivery structures, together with the forms of contract which could be used to achieve their delivery:

Delivery structure option	Example contract structures	Description
1 Public sector led, use of single private sector contractor	Standard contract (design & build)	<ul style="list-style-type: none"> • Private sector contractor is engaged to undertake design and installation of discrete measures. Payment may be lump sum or time and materials.
	Service concession	<ul style="list-style-type: none"> • Private sector contractor is engaged to undertake design, installation and operation of building energy efficiency measures. Payment likely to be set periodic charge.
	Energy Performance Contract (EPC) (performance risk only)	<ul style="list-style-type: none"> • Private sector contractor is engaged to undertake design and installation of group of measures. Payment is fully or partly linked to energy consumption savings realised as a result of the scheme.
2 Public sector led, use of private sector contractor framework	Standard contract (design & build)	<ul style="list-style-type: none"> • Private sector contractors are engaged to undertake design and installation of discrete measures. Payment may be lump sum or time and materials.
	Service concession	<ul style="list-style-type: none"> • Private sector contractors are engaged to undertake design, installation and operation of building energy efficiency measures. Payment may be time and materials or set monthly charge.
	Energy Performance Contract (EPC) (performance risk only)	<ul style="list-style-type: none"> • Private sector contractor is engaged to undertake design and installation of group of measures. Payment is fully or partly linked to energy savings realised as a result of the scheme.
3 Joint venture with private sector partner	SPV and subcontracts	<ul style="list-style-type: none"> • Public sector forms special purpose vehicle with private sector entity for the design, installation and operation of the project. Performance and credit risk is shared between parties in accordance with shareholders agreement.
4 Private sector ownership with public sector facilitation	Energy Performance Contract (EPC) (credit and performance risk)	<ul style="list-style-type: none"> • Private sector contractor is engaged to finance, design and install a group of measures. Payment is fully or partly linked to energy savings realised as a result of the scheme.

We also considered the ways in which contracts could be aggregated either across organisations or, with sufficient project flow, on a geographic basis, to identify benefits such as:-

- Economies of scale
- Improve delivery market appetite
- Efficient procurement and contracting
- More successful project development
- Accelerated investment

We concluded that there are three main potential structures for the aggregation of NDEE projects as follows:-

Aggregation structure	Description	Key risks and issues	Key benefits
Single delivery partner	A single delivery partner is jointly procured (may be a consortium) to supply all NDEE projects across multiple public sector organisations.	<ul style="list-style-type: none"> • Potential limitation to volumes to be delivered from a single supplier. • Potential limitation to future innovation. • Single supplier may not be able to cover all technologies within sector. • Requires consistent programme specification and basis for pricing that can be applied consistently following initial competitive procurement. 	<ul style="list-style-type: none"> • Single supplier will have significant volume of work, enabling them to effectively negotiate with their supply chain. • Single supplier likely to invest in local supply chain as a result of known volumes. • Consistent approach across projects, enabling organisations to compare performance and ensure value for money. • Could be combined with project development function. • Finance options include both public and private. • Contract structures could include service concession, EPC or standard contract.
Framework of suppliers	A framework of suppliers is jointly procured (may be consortium). Organisations can undertake mini competitions within the framework for proposed projects.	<ul style="list-style-type: none"> • Requires higher volume to be attractive to suppliers as work levels are less certain. • Requires consistent programme specification and basis for pricing that can be applied consistently following initial competitive procurement. 	<ul style="list-style-type: none"> • Mini competition will encourage innovation and price competitiveness within framework. • Access to a wider range of technologies, suppliers and installers. • Could be combined with separate project development function, the cost of which could be allocated across delivered projects. • Financing options include both public and private. • Contract structures could include service concession, EPC or standard contract.
Single developer with supporting supply chain	A single development partner is jointly procured (may be a consortium) to supply all NDEE projects across multiple public sector organisations.	<ul style="list-style-type: none"> • Potential limitation to future innovation due to single developer. • Requires mechanism to achieve and demonstrate ongoing VfM. 	<ul style="list-style-type: none"> • Full risk transfer to private sector developer where private sector finance is used. • Allows more scope for supply chain transparency/price competition. • Standard contract can be established. • Makes fuller use of private sector development skills. • Project development undertaken by private sector reducing burden on public sector organisations.

Small scale renewables

Market and challenges

A recent report by the SCDI and AEA Technology shows that Scotland leads the UK in small scale renewable energy with capacity growing significantly over the past 12 months. This encompasses primarily hydro and wind power generation assets. There is an established and diverse market for the related technologies and the development and delivery of projects. Challenges in the market include:-

- Scalability, to overcome the relatively disproportionate development and transactional costs of case by case delivery
- The availability of finance, often due to lack of appetite for the associated risks
- The long term stability of market incentives

In considering the short listed delivery options we considered factors including:-

- Optimising funding potential
- The scope to reach appropriate risk allocation
- The need to establish secure independent generation sources
- The ability to create scale
- Effective control and governance
- Availability of development resources
- Availability of procurement resources

The majority of these factors will need to be incorporated in the detail of chosen delivery structures. We concluded that the five delivery structures appropriate for this sector would include:-

Delivery structure option	Example contract structures	Description
1 Public sector led, use of single private sector contractor	Standard contract (design & build)	<ul style="list-style-type: none"> • Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
2 Public sector led, use of private sector contractor framework	Standard contract (design & build)	<ul style="list-style-type: none"> • Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
3 Joint venture with private sector partner	SPV and subcontracts	<ul style="list-style-type: none"> • Public sector forms special purpose vehicle with private sector entity for the design, install and operation of the project. Performance and credit risk is shared between parties in accordance with shareholders agreement.
4 Private sector ownership with public sector commitment in element of the project	Power Purchase Agreement (PPA)	<ul style="list-style-type: none"> • Private sector contractor designs, builds, finances and operates the project with the public sector committing to purchase power.
5 Private sector ownership with public sector facilitation	Lease of land or right of access	<ul style="list-style-type: none"> • Private sector contractor designs, builds, finances and operates the project. The public sector body may provide a long term lease for land. Could be used in conjunction with PPA.

Potential for aggregation

Benefits of aggregation could include:-

- Economies of scale
- Improved market appetite
- More efficient procurement and contracting
- Concentration of project development resources
- Overall acceleration and investment

We identified the following potential aggregation options:

Aggregation structure	Description	Key risks and issues	Key benefits
Single delivery partner	A single delivery partner is jointly procured (may be a consortium) to supply all small scale renewables projects across multiple public sector organisations.	<ul style="list-style-type: none"> Likely to severely limit range of technologies and therefore projects that can be realised. Potential limitation to volumes to be delivered from a single supplier, or in market of suppliers to deliver at scale. Potential limitation to future innovation. Will need clear basis of pricing for incremental projects beyond initial procurement. 	<ul style="list-style-type: none"> Single supplier will have significant volume of work, enabling them to effectively negotiate with their supply chain. Single supplier likely to invest in local supply chain as a result of known volumes. Consistent approach across projects, enabling organisations to compare performance and ensure value for money. Could be combined with project development function. Finance options include both public and private.
Framework of suppliers	A framework of suppliers is jointly procured (may be consortium). Organisations can undertake mini competitions within the framework for proposed projects.	<ul style="list-style-type: none"> Option may be less attractive to suppliers as work levels are less certain. 	<ul style="list-style-type: none"> Mini competition will encourage innovation and price competitiveness within framework. Framework could cover a wider range of technologies than a single supplier. Access to a range of suppliers and installers which could cover a number of technologies and be combined with NDEE. Could be combined with separate project development function, the cost of which could be allocated across delivered projects. Financing options include both public and private.
Single developer with supporting supply chain	A single developer is procured to bring programme development/delivery skills and to establish and manage a cost-effective supply chain. Organisations engage with the entity to develop projects which are delivered by the supply chain.	<ul style="list-style-type: none"> Potential limitation to future innovation due to single developer. Would need a mechanism to be able to demonstrate value for money across a range of projects. 	<ul style="list-style-type: none"> Full risk transfer to private sector developer where private sector finance is used. Standard contract can be established although may need to be technology specific. Project development undertaken by private sector reducing burden on public sector organisations. Makes fuller use of private sector development skills.

District Heating

Market and challenges

District Heating projects have the potential to alleviate fuel poverty, de-carbonisation of a town or city's building stock, align with regeneration programmes and help create jobs.

District Heating is energy infrastructure, by nature carrying an expensive initial investment and an extended asset life across which the benefits are delivered. Consequently its funding, installation and operation requires a strategic and co-ordinated approach across a number of stakeholders. District Heating projects also require the incidence of one or more success factors including the minimum heat load density and the availability of low cost, low carbon heat to make them commercially viable.

Historically, District Heating is underdeveloped in the UK compared with many other European countries. The Scottish Government's Expert Commission on District Heating reported this year, recommending targets for the public sector to connect a proportion of its estate to District Heating networks and recognising the public sector's potential to provide anchor heat loads. The Scottish Government in response has renewed its commitment to District Heating and set out an action plan to address the Commission's recommendations. There is an active market of potential developers and specialist providers although the specialist supply chains supporting delivery are relatively undeveloped in the UK.

In considering shortlisted options, we considered factors including:-

- Barriers to accessing finance
- Control and governance arrangements
- Risk allocation, taking into account the specialist risks of generation and of heat off-take
- Potential exit strategy for public sector sponsors
- Availability of development resources
- Availability of procurement resources

Projects in this sector, particularly larger scale projects, are relatively more bespoke than in the other sectors and as a consequence we identified a wider potential range of six appropriate delivery structures including:-

	Delivery structure option	Example contract structures	Description
1	Public sector led, use of private sector contractors	Standard contract (design & build)	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
2	Private sector invests in some elements of the proposed activity	Standard contract (design, build & part-finance)	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
		Lease	Private or public sector may lease land or facilities for the project.
3	Joint venture with private sector partner	SPV and subcontracts	Public sector forms special purpose vehicle with private sector entity for the design, install and operation of the project. Performance and credit risk is shared between parties in accordance with shareholders agreement.
4	Public funding to incentivise private sector activity	Standard contract	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
5	Private sector ownership with public sector promise in element of the project	Power Purchase Agreement (PPA)	Private sector contractor designs, builds, finances and operates the project with the public sector committing to purchase power, which may be on a take or pay basis.
		Heat Take Off Agreement (HTOA)	Private sector contractor designs, builds, finances and operates the project with the public sector committing to purchase heat, which may be on a take or pay basis.
6	Private sector ownership with only involvement from public sector in facilitation role	Lease of land or right to use/access land	Private or public sector may lease land or facilities for the project.

Potential for aggregation

Aggregation in the case of District Heating is a more complex issue than in the other two sectors.

Aggregation of multiple heat off-take sources around a single generation source effectively involves the same structure issues as an individual project.

Equally, where projects involve a District Heating network with one or more energy centres providing heat and power to multiple buildings under ownership of different parties, the network is typically built over a number of phases based on the incremental economic case for each. Consequently a generic aggregation approach is generally not appropriate in the case of District Heating.

Strategic Aggregation

Our review of sectors addresses aggregation at a sector level, where the primary drivers for aggregation are economic efficiencies, improved market scale and more efficient procurement and delivery. We have also considered wider strategic approaches involving multiple public sector organisations working collaboratively across single or multiple technologies over several geographic areas. They can bring an aligned approach to delivery which simplifies project development and delivery for sponsors, and through scale and more consistent delivery approaches, be more attractive both to private sector delivery partners and, where appropriate, to external financing markets.

There are also potential benefits of delivery at scale of a more strategic nature, which can be accelerated by the delivery of aggregated programmes including achievement of wider objectives relating to:

- Economic development and job creation
- Inward investment
- Energy security
- Specific technological requirements
- Carbon reduction targets
- Asset management plans
- Regeneration programmes

We have identified and considered three different strategic aggregation approaches as follows.

Strategic Aggregator 1 – Local ESCO - a single organisation aggregating projects across a defined area

Under this structure, the sponsoring authority, often a local authority, would form an arm's length organisation typically referred to as an ESCO (Energy Service Company). This will be a single entity with strategic objectives around decarbonisation and potential to invest in and deliver projects directly or to invest in separate delivery vehicles created on a sector basis. It can also co-operatively deliver wider energy related services with community groups, businesses or other public sector bodies and can support other energy related activity including consultancy and project development, performance assessments and project management. The potential benefits of a local authority ESCO established as a separate legal entity with associated governance arrangements can include:-

- Clarity and focus around the development and delivery of energy related projects of differing types and size
- Development and investment of projects based on prioritised business cases
- Capture of revenue streams that can be channelled back into projects
- Ring-fencing of energy development risks within the ESCo structure
- Improved local energy security
- Contribution to addressing wider strategic objectives such as relief of fuel poverty
- A clear line of sight between energy projects and their economic impact

Strategic Aggregator 2 – Sectoral SPV - a single organisation aggregating projects across multiple areas

Some public sector organisations, with substantial established property portfolios, particularly the NHS, may require an aggregation approach specific to their own organisation that aligns with their strategic objectives at a countrywide level.

Use of an aggregation entity in these circumstances can include:-

- Support to accessing a range of financing sources across different project types
- Greater ability to understand underlying project dynamics and secure outcome based procurements with linkage of remuneration and benefits

- External funding needs and processes to secure committed project funding can be matched both to the needs of the overall programme and provide options to meet the specific requirements of the individual procuring entities, e.g. availability of capital resources.
- Establishment of contractor frameworks
- In circumstances where a separate entity can be created, risk can be ring-fenced to that entity

Strategic Aggregator 3 – Strategic Engagement - multiple organisations aggregating projects over a defined area or region

This approach would typically involve a citywide partnership seeking to develop a strategy and deliver a range of projects across a city using a range of specific delivery vehicles and contracting approaches as outlined in our sectoral conclusions.

It would involve a strategic partnership established between key stakeholder representatives who will set the strategic direction for the citywide sustainable energy strategy and will, where appropriate, procure delivery of partners for specific projects. The governance structure will typically involve private sector providers, with appropriate procurement safeguards where these providers are involved in project delivery. An aggregator structure of this type can bring benefits of:

- Creating a coherent focused approach to energy without duplication of effort across a city
- A stronger understanding of the current and future energy demands of a city with more potential to balance generation and consumption
- Drawing on the experience of a range of public and private sector organisations in relation to energy management and provision

Conclusions and Next Steps

There are clear objectives for reducing carbon emissions in Scotland and the public sector has control and governance across a number of areas where reductions can be made. However the rate of investment needs to increase.

Development of economically and practically delivered projects is an important area of focus and, at present, the principal area of constraint.

Given a pipeline of deliverable projects in the three markets on which this study has focused, there are important incremental benefits to be obtained for public sector sponsors for adopting effective delivery structures and through aggregating projects.

Aggregating projects on a strategic level is appropriate where there are clear, identifiable drivers to do so. Aggregation will also enable knowledge sharing and sector specific input on a project by project basis.

This report has identified a range of approaches to structuring and aggregating low carbon projects on either a technology basis or at a strategic level. We would recommend that SFT explores the most appropriate aggregation options with key stakeholders such as the Scottish Government, Local Authority representatives and other sector leaders within Central Government and the NHS.

2. Strategic Context

Background

Reducing carbon emissions across Scotland is a major political priority for Scottish Ministers. In addition to strong support for the delivery of commercial scale renewable power generation there is a desire to accelerate the pace at which organisations and individuals consider energy efficiency, district heating and micro renewable installations. It is only by combining a focus on both the supply side and demand side use of energy that Scottish Ministers will be able to meet their ambitious target of 42% reduction in carbon emissions by 2020.

Despite the increased profile and focus on the demand side measures for and methods of reducing energy demand it is estimated that demand for electricity in the UK may double by 2050. The move towards a low carbon economy means that electricity will be required to provide more of the energy needed for heating and transport needs. Examples such as the move to greater electrification of the railways, the increased adoption of electric vehicles and the provision of public transport by electric buses and trams will all lead to an increase in the demand for energy. Sustained technological developments further drive increased demand for energy.

In addition, by 2020 the UK needs to replace older fossil and nuclear generating capacity coming to its end of life equivalent to a quarter of the UK's existing power generating capacity. This means that an investment of around £200bn in generation, electricity networks and gas infrastructure will be needed. The scale of this investment and the underlying price of energy resources are likely to drive up energy bills, some estimates suggest by as much as 50%. Effective energy efficiency measures and the creation of local generation are therefore a crucial aspect of mitigating these potential increases, enhancing energy security and creating a balanced, sustainable energy solution for the future.

The advent of new support structures for energy efficiency investment such as the ECO and Green Deal models brings new and innovative opportunities for financing and structuring the risk profile of low carbon schemes.

Scottish Futures Trust (SFT) has been considering opportunities that would allow energy efficiency, micro renewable and district heating schemes to be quickly developed and rolled out across the whole of Scotland in order to accelerate the pace at which benefits are captured and contribute towards Scotland's 2020 emission targets. SFT has commissioned PwC to analyse potential delivery structures for the public sector in three areas with an aim to assist an increase in the rate of investment in delivering projects that will contribute to the delivery of Scottish Government's long-term carbon reduction targets. The three areas are:

- Non-domestic Energy Efficiency (NDEE) of the public sector estate
- Small-scale Renewables
- District Heating (DH) where the public sector are an enabler or purchaser of heat

These areas represent three quite different markets with different drivers and delivery solutions which we will explore further. Within the remainder of this section, we review the public sector drivers for low carbon investment and the public sector's role and activity to date.

Drivers of Public Sector Low Carbon Activity

Regulatory Context

The Climate Change (Scotland) Act 2009 set out targets for reducing Scotland's emissions of carbon dioxide and five other greenhouse gases covered by the Kyoto Protocol by 42% by 2020 (on 1990 levels for carbon dioxide), and by 80% by 2050.

The Scottish Government's recent publication – *Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027 – The Draft Second Report on Proposals and Policies* ("RPP2") – identifies the public sector's share of Scotland's 2010 greenhouse gas emissions as 0.9 million tonnes of CO₂ equivalent (MtCO_{2e}, a metric which captures information on CO₂ and the other five greenhouse gases), or 2% of total Scottish

emissions. Almost all (98%) of these emissions are from public sector buildings with three quarters from local authorities and the NHS (62% and 13% respectively).

RPP2 identifies goals for the public sector in helping to meet these low-carbon policy aims, in particular:

- The target of reducing energy consumption by at least 12% by 2020 ‘establishes a minimum level of ambition for all sectors, including the public sector’;
- By 2027 there will be a complete transformation in the way Scottish public bodies work and in how their estates are managed: achieved through implementing and going beyond existing carbon management plans, sustainable procurement processes and supporting governance arrangements;
- By 2050, direct emissions from the sector will be almost zero through reducing demand for energy and the use of low-carbon sources of electricity, heat and cooling.

Public Sector Policy Objectives

In addition to the regulatory context, the Scottish Government has established the transition to a low-carbon economy as a strategic priority in its Economic Strategy (as revised in 2011), and Scotland’s public sector has identified a range of related policy objectives including:

- Reducing the energy people need to use in homes, schools, workplaces and public buildings. The Energy Efficiency Action Plan states an aim to reduce energy consumption by 12% by 2020;
- Reducing fuel poverty, and eliminating it as far as practicably possible by 2016;
- Reducing future reliance on fossil fuels thereby reducing exposure to volatile energy prices and geo-political instability;
- Increasing the value of Scotland’s low-carbon services sector and creating 60,000 more green jobs (Low Carbon Economic Strategy for Scotland, 2010);
- Acting as a model for the international community in setting challenging emissions reduction targets; and
- Almost complete decarbonisation of road transport by 2050.

These aims are diverse with impacts across Scotland’s society and economy, on the domestic and public sectors and on business and industry.

Evolving industry sectors and public sector involvement

The markets for energy efficiency, district heating and small-scale renewables are not as developed as, for example, infrastructure construction although they can create projects which are sufficiently robust for investment. The evolving nature of these sectors needs to be considered when developing public sector delivery structures as outlined below for each sector.

Non-Domestic Energy Efficiency

The potential energy efficiency gains, and returns on investment, from building retrofit are considerable. The public sector faces the same issues as we see with the private sector – they are slow to progress otherwise strong economic cases for retrofit measures when faced with competing demands for scarce investment resources and other impediments such as the physical disruption involved. There is also an interface with continuing changes to the public sector estate and a need to establish which properties are sufficiently core to merit investment. The potential roles of new structures could include helping public sector organisations to identify and make compelling cases for investment, and finding ways to extend investment capacity. There will also be potential wins in aggregation from the perspective of getting the best out of the supply side market, both in project planning and implementation.

Small Scale Renewables

There have been relatively limited numbers of small public sector/community initiatives around wind turbines, small-scale hydro and biomass, even though encouraging community and locally-owned renewable energy projects are an important part of Scottish Government policy, with a target of 500MW of energy to be generated from such sources by 2020. Larger initiatives for small-scale renewables have been based around the extensive land holdings of The Forestry Commission and Scottish Water. These initiatives hold useful lessons but will be hard to replicate at programme level for those bodies that do not have an equivalent portfolio of suitable sites.

Assessment of the market and financing challenges in this sub-sector should focus on helping to identify investment strategies that can be deployed to enable communities (both geographic and communities of interest such as co-operatives) and public bodies, often working with communities, to create financeable projects. These strategies need to be both immediately applicable to pending projects and sufficiently flexible to account for a variety of delivery mechanisms and potential future changes in regulation and legislation for energy provision.

District Heating

Discrete district heating projects in urban Scotland have typically been based on gas CHP boilers while smaller scale rural projects have tended to be based on biomass generation. Whatever the generation technology, district heating projects can be challenging to finance, with significant upfront capital investment for the heat network typically required before heat users are secured on the long-term supply contracts that provide a steady revenue stream. Hence the potential role of the public sector as a purchaser or facilitator. This model has worked successfully in public bodies with sizeable property campuses such as universities and major hospitals, but has not typically extended into wider heat networks.

Where projects have been forthcoming they have often been financed by a combination of finance provided or obtained by a private sector partner and public sector grant funding. As public sector grant funding is now scarce, alternative approaches which can demonstrate their financial viability, and can support commercial financing models, are required. The ability to invest in a more consistent flow of projects together with additional biomass pathfinder projects supported through the Renewable Heat Incentive could significantly increase the number of renewable district heating projects in Scotland.

Hierarchy of Interventions

Public bodies seeking to reduce their carbon impact can adopt a portfolio of approaches. In seeking to achieve the maximum impact from limited resources both in skills and finance – it is important to prioritise the application of these resources.

The Institute of Mechanical Engineers has prepared an energy hierarchy to help bodies seeking to reduce carbon emissions to reduce carbon emissions to prioritise these actions, for example by seeking to reduce energy use before meeting remaining demand by the cleanest means possible. These priorities are considered from the perspective of an entire national or supra-national energy sourcing perspective. Clearly, only certain aspects are relevant to public sector organisations in the context of achieving their decarbonisation goals. Adapting this approach to reflect the options available to the Scottish public sector leaves the following three priorities.

Priority 1 – Energy conservation. The reduction or elimination of unnecessary energy use. Conservation is often achieved through behavioural changes such as switching appliances off when they are not being used. Technology solutions for energy monitoring and control will have an increasingly important role to play here, whether through intelligent use of smart meter systems in buildings or sophisticated control systems to manage street lighting energy use.

Priority 2 – Energy efficiency. Efficiency improvements which either reduce the rate of consumption by energy-using assets in meeting their purpose, e.g. LED lighting systems, or which make energy available in a more efficient manner, such as combined heat and power systems, fall into this category.

Priority 3 – **Exploitation of renewable, sustainable energy resources.** As well as resource availability, effective and sustainable energy provision must also embrace wider issues such as affordability, societal acceptability and environmental impact.

While the focus of this study is not the public sector’s overall strategy and priority for meeting its decarbonisation goals, these priorities form part of the framework and context for delivery structures.

Objective of this study

The objective of this study is to identify potential delivery structures which could be adopted by public bodies in Scotland to deliver programmes of investment across each of the three sectors:- NDEE, district heating and small-scale renewable. This report therefore provides:

- the rationale for the development of delivery structures;
- appraisal of delivery options at the project level within each of the three sectors;
- appraisal of delivery models which could strategically aggregate projects on either an area basis or a sector basis; and
- conclusions and next steps.

3. Rationale for development of delivery structures

Introduction

In the strategic context section we considered why investment in low carbon projects is a priority for the Scottish public sector motivated by a diverse range of issues such as cost avoidance/savings; carbon targets; economic development and addressing fuel poverty.

Currently, public sector organisations are generally making progress around low-carbon investment. However, it either tends to be on a project by project basis (due to funding constraints or capital investment prioritised to other operational areas) or through the development of a wider carbon vision under a variety of approaches. Implementation of the latter invariably takes longer than expected for a number of reasons such as timescales to develop projects, identification of priority projects; funding and procurement.

There is a need to accelerate this investment in the areas of NDEE, small scale renewables and district heating across the different public sector bodies. This can be undertaken through delivery structures which address the different stages of project development, identify where assistance is needed to accelerate investment, and consider how aggregation of projects may deliver improved value for money (for example, through economies of scale and standard approaches and documentation.)

The ultimate objective of SFT's wider activity and of this report is to identify what services need to be provided in which type of delivery structure to facilitate the investment need.

Rationale for Delivery Structures

There are a number of potential benefits of effective delivery vehicles which are identified in the Table below. These benefits have been identified through discussions with SFT, Scottish Government, Scottish Local Authorities and the NHS in Scotland. In turn, these benefits should result in improved policy outcomes which match the public sector policy drivers identified earlier within the report.

Table 3.1 – Benefits of delivery structures

Benefits of delivery structure	Enhanced policy outcomes
<p>Project Development</p> <ul style="list-style-type: none"> Enhanced project development capability Sharing strong exemplars Identifying strong business cases Building/sharing government skills Enabling innovative technologies <p>Project Delivery</p> <ul style="list-style-type: none"> Consistent commercial approaches Consistent / efficient procurement approaches Harnessing private sector skills Aggregating purchasing power Pipelines visible / attractive to developers Streamlined procurements Accelerating developments and roll out <p>Project Economics & Financing</p> <ul style="list-style-type: none"> Capturing revenue streams Recognition of funders' requirements (internal or external) Securing economies of scale Improved value for money Portfolio risk benefits 	<ul style="list-style-type: none"> Improved carbon savings Cost savings Revenue enhancement Community engagement Improved social outcomes e.g. Reducing fuel poverty Economic outcomes e.g. Developing SMEs in the local supply chain

It is recognised that a major factor in public bodies' success in addressing Scottish Ministers' objectives is the need to develop approaches that facilitate the development of viable projects and that a lack of awareness of the market, the opportunities and the benefits is delaying the identification and development of viable projects.

Work is on-going in parallel to this study to overcome these barriers. Therefore, this report focuses only on the delivery stage of projects with the intention to develop thinking around the delivery structures. As a consequence, when a pipeline of projects is developed, there is a structure in place that could deliver a number in aggregate at a suitable scale and speed.

Efficient delivery structures may require engagement with projects during the development stage e.g. long-term partnerships or JVs, and continue through the delivery stage as far as operation and maintenance.

Delivery structures need to help unlock the barriers that are preventing projects moving forward. Beyond the project level, a need exists for aggregation of identified projects in order to accelerate investment in carbon emission reductions and create a more efficient process for delivering a pipeline of suitable projects. The table below provides a summary of the different stages of project and programme development and the aspects which require to be considered in designing delivery structures and approaches to aggregation. At a project level, consistent delivery structures can help support effective project development and delivery and open up potential for delivering aggregation benefits through collaboration across projects. At a programme level, aggregation will be directed at programme synergies and optimisation of benefits.

Table 3.2 – Project Considerations

Rationale for Consistent Delivery Structures and Aggregation		
	Project Considerations	Programme Considerations
Project Scope and Definition	<p>At a project level considerations will focus upon supporting effective development of the individual project:</p> <ul style="list-style-type: none"> identifying the opportunities; agreeing the scope; proving the concept; and developing the proposition. 	<p>At a programme level considerations will include:</p> <ul style="list-style-type: none"> Will aggregation of a number of projects deliver benefits such as enhanced value for money or faster implementation? <p>At a programme level, are services required to:</p> <ul style="list-style-type: none"> develop area or technology based low-carbon investment strategies identify which low carbon business cases are implemented first; identify how different projects may fit together to deliver wider synergies; develop a funding and financing strategy for the delivery of the low carbon investment. <p>To be successful the services provided at programme level will be defined through an iterative learning loop with the individual projects.</p>
Approach to Implementation	<p>At a project level the considerations will focus on how the project will be procured including:</p> <ul style="list-style-type: none"> What roles does the public sector wish to deliver internally, i.e. design, build, finance and /or maintain? Where is private sector expertise needed? How best can private sector expertise be accessed i.e. standard contracts for consultancy or design and build on an individual project basis, strategic partnerships, joint ventures or public private partnerships? 	<p>At a programme level considerations will include:</p> <ul style="list-style-type: none"> What are the benefits of aggregating projects either on an area basis or a technology basis? Will the services benefit from a national approach to procurement – for example, lower procurement costs, economies of scale, knowledge sharing.
Delivery Structure	<p>This is the mechanism to be used to enable the project to be delivered, i.e. who will deliver the works and any on-going operation and maintenance services. At a project level the considerations will include the role of existing delivery structures, i.e. who does what? For example, do we have an existing body who manages our district heating operations or will the private sector do this?</p>	<p>At a programme level, delivery structures can be organised or procured on an area or sector basis. Their scope and structure will be influenced by the characteristics of the projects to be delivered through them.</p>
Funding & Financing	<p>At a project level this will focus upon how the procuring Authority wants to finance the project, i.e. by accessing private finance or by using its own resources.</p>	<p>At a programme level, consideration will focus upon the benefits of aggregating projects to access finance and how different financing approaches may tie into different delivery structures. For example, some delivery structures will facilitate both private finance and public finance (from capital budgets or borrowing).</p>

All these aspects of project development and delivery need to be examined to evaluate the benefits of applying consistent structures or aggregating these to deliver them at scale.

For example, the London RE:FIT model has established a Programme Delivery Unit to develop projects and also to bundle these where appropriate. Contractors are then selected to deliver the projects through the use of mini-competitions using the RE:FIT framework. The aggregation of a number of projects has allowed marginal projects which may not be attractive to the market in themselves (either due to size or the technology) to be delivered. The RE:FIT projects are also able to access the specific low carbon finance sources if private finance is required. This approach to aggregation has delivered a streamlined service from project development to delivery, allowing the benefits of economies of scale, standard approaches to documentation and lower transaction costs realised by London based Procuring Authorities (with the Framework itself and the related benefits being available to a wider range of UK public sector bodies).

Summary

Through considering these aspects of low-carbon investment, it is possible to draw conclusions on what would be the most appropriate delivery structure and what services it is required to provide.

This report outlines the different delivery structures which are available to accelerate investment within the three sectors to help inform the approach to be adopted within Scotland. However, in order to do this cognisance needs to be given to the nature of the projects in the three different sectors – Non-domestic energy efficiency, small scale renewables and district heating – and the evolving markets in the sectors.

Section 4 of this report therefore:

- Provides for each sector a brief overview of the market; the challenges of delivering public sector projects in these sectors; a long -list of approaches; an analysis of the potential benefits and the risks and issues of a number of short-listed approaches; a decision tree which indicates which approach is likely to be favoured for any given constraint and then discusses the nature of the contract structures which are available in each sector.
- Explores the opportunity to aggregate projects in a delivery structure on a sector based approach. These options draw on the analysis of project characteristics and approaches to implementing individual projects whilst benefiting from economies of scale; maximising market attractiveness and minimising procurement costs through using standard approaches.

Section 5 reviews approaches to the Strategic Aggregation of projects on an area basis or within specific organisations.

4. Appraisal of delivery options

Introduction

The aim of the options appraisal process, outlined below, was to identify and assess the potential delivery structure options for the three key technologies: Non Domestic Energy Efficiency Retrofit (NDEE), small scale renewables and district heating.


The analysis of each sector includes an overview of the current market and the challenges to large scale investment in the sector. A long-list of delivery vehicle structures was identified and refined to a short-list based on rationale specific to the needs of each sector. Further analysis of the risks and issues associated with each of the short-listed options was then undertaken and the associated contract structures identified. Finally, consideration was given to the potential opportunity for, and benefits associated with, aggregation in each sector.

The identification of the delivery structure options and associated contract structures was the result of the consideration of a number of contributing factors rather than a single discrete metric and is based on a combination of the outcome of the stakeholder consultations, input from the project team and experience of the existing markets.

Delivery Structures

The long list of delivery structures noted in Table 4.1 represents a spectrum of delivery structures which have been identified for each sector and is based on a number of potential options ranging from fully public sector led to fully private sector led. We have used the relative level of public and private sector involvement as the primary basis for defining points along this long list spectrum. Clearly there are many different dimensions of project delivery though development, design, funding, procurement and implementation. These cannot all be represented in the long list but are picked up more specifically as we look at each sector.

Table 4.1 Range of delivery structure options



Option	Description	Risk allocation	Example
1	Entirely public sector funded, operated and owned	Public sector retains all risk	Purchase contracts for equipment only
2	Public sector led and funded, use of private sector contractors	Private sector assumes construction and possibly operation risk	Purchase turnkey asset delivery contract, possibly with maintenance and/or operation
3	Private sector invests/takes risk in some elements of the proposed activity	Private sector takes risks for discrete elements	As 2 with increased private sector operational risk, and payment or investment at risk
4	Joint venture, equal share in project with a private sector partner	Most risks are shared	Joint Venture – both parties investing and taking risk
5	Targeted public funding to incentivise private sector activity	Public sector support only to economically unviable elements	Feed-in tariffs or Power Purchase Agreement
6	Private sector ownership with public sector commitment in element of the project	Public sector underpins key risks	Public sector guarantees demand or credit risk
7	Private sector ownership with only involvement from public sector in facilitation role	Private sector risk beyond early stages development	Public sector makes suitable site available and grants lease/licence/royalty arrangement
8	Total private sector owner project	Private sector carries all risks	No or minimal public sector role

For the purpose of the analysis carried out for each sector it is assumed that:

1. An initial project has been identified and that the services procured will include the delivery of the initial project with the opportunity to develop and deliver future projects adopting a similar approach.
2. The delivery structure will address delivery of all aspects of the project for each technology although the respective roles of the public sector and private sector within that will vary.
3. The funding / financing requirement of the project will be dependent on the commercial viability of both the initial phases of work and the overall project; in reality this would need to be considered on a project by project basis but will become easier to establish as models are followed consistently.

The following sections consider a long-list of delivery options for each sector in the context of the sector's market for project delivery and the specific challenges faced in project delivery. The long-list has been selected on the basis of the public sector drivers for the implementation of the particular technologies, the risk-reward profile of the technology being considered and the type of procuring public sector organisation. The list represents a number of discrete points on a continuum of public-private sector involvement. We do not give further consideration to projects in which there is no public sector involvement (Option 8 above).

Non Domestic Energy Efficiency Retrofit (NDEE)

Non domestic buildings account for a significant proportion of carbon emissions in many public sector organisations. However, it is the continued increases in energy prices that has raised the profile of NDEE retrofit as an invest-to-save initiative.

Market insight

Energy efficiency retrofits represent a rapidly growing market that will benefit the environment, building owners, tenants and communities alike. Pike Research's report, 'Energy Efficiency Retrofits for Commercial and Public Buildings' examines the global market landscape for energy efficiency retrofits in commercial and public buildings. According to the report the global market for energy efficiency will expand from \$80 billion in 2011 to \$152 billion by 2020. Western Europe will remain the largest market for energy efficiency retrofits in commercial and public buildings, but its share of world revenues will drop from 41 percent in 2011 to 37 percent in 2020. As part of the RPP2 process, the Scottish Government commissioned the Carbon Trust to estimate the carbon abatement potential of the Scottish public sector. The report found that realising deep, long-term carbon abatement potential in the public sector is challenging but possible.

Key market players in the UK include:

1. Utility companies, e.g. Eon, EDF Energy Ltd, SSE and Npower.
2. Technology companies, e.g. Honeywell, Siemens, Johnson Controls, Vital Energi, Mitie and Dalkia.
3. Construction companies, e.g. Balfour Beatty, Skanska, Willmott Dixon.

Low carbon retrofit has not been widely adopted so far on the public estate in the UK. This is a result of the challenges outlined below. However, the appetite of public sector organisations is beginning to change. A combination of continuing rises in energy costs together with technological advancements has enabled stronger business cases to be developed with increased benefits and shorter payback periods. As a result a number of entities are offering a range of contracting structures including Energy Performance Contracts (EPC). There are a number of variations offered in the market but the basic premise is that some or all of the performance risk associated with the energy efficiency measures are transferred to a private sector body with all or a proportion of the payments linked to the savings realised from the lower consumption of energy.

Challenges

Increased pressure on revenue budgets and resources mean that many public sector bodies are seeking to secure a reduction in revenue expenditure through capital investment in their assets, however a number of key additional challenges remain:

1. The diversity of public sector assets – typically the energy efficiency issues across the estate of a public sector organisation can vary significantly and specific engagement is required on a project-by-project basis to understand the scale and scope of potential works and the associated energy efficiency payback.
2. Asset rationalisation – many public sector organisations are undertaking significant asset rationalisation; understanding the stock that will be retained in the medium to long term is critical to developing an energy efficiency based investment plan.
3. Baselining performance – developing a design solution is dependent on accessing current and robust data sets, including current, seasonal and historic energy consumption data, site maps and technical drawings, asset registers, operational hours and occupancy levels, details of previous energy saving measures, maintenance schedules, building management systems etc. Together with field surveys and testing these are used to determine baseline calculations for assets. The baseline is critical to establishing a robust business case for the retrofit, contract negotiation and implementation.
4. Lack of awareness – in some cases organisations are not aware of the potential opportunity from energy efficiency retrofit, including the benefits of adopting a whole building approach which integrates multiple measures.
5. Technologies are evolving – consequently it can be difficult to identify the optimum mix of solutions, whether balancing ‘quick wins’ with longer term measures or considering longer term programmes during which technologies may develop further.
6. Identifying ‘quick win’ interventions which may already have been completed, limiting the opportunities to use these to fund additional measures.

Assuming these challenges can be overcome, access to low-cost finance, relatively short payback periods (which can be as low as 3-7 years) and a responsive market mean that there is an opportunity for public sector organisations to reduce energy expenditure and associated carbon emissions through NDEE retrofit. In order to benefit from this opportunity public sector organisations should be aware of the potential delivery structures available and the risk-reward profile associated with each approach.

Long list of delivery structures

Table 4.2 below sets out the generic long-list of delivery structures and the rationale for the short-list to those applicable for NDEE retrofit.

Table 4.2 Analysis of generic delivery structure options for NDEE

Delivery structure option	Include in shortlist?	Rationale for short-listing
1 Entirely public sector funded, operated and owned	No	It is unlikely in the vast majority of current opportunities that an individual public sector organisation would have the required specialist skills and experience to undertake a full energy performance assessment, monitoring and verification work in house.
2 Public sector led, use of private sector contractors	Yes	The specialist nature of NDEE retrofit has resulted in an established market of private sector contractors. Key to achieving value will be leveraging the potential scale of the suitable public sector estate and setting principles for contracting, particularly in relation to credit and performance risk.
3 Private sector invests in some elements of the proposed activity	No	NDEE requires a whole building approach as the performance of an individual measure may be dependent on the other measures installed.
4 Joint venture, equal share in project with a private sector partner	Yes	A key factor in realising the benefits from a whole building retrofit will be a single owner approach ensuring the corresponding behavioural change by the building occupants.
5 Public funding to incentivise private sector activity	No	The relatively short payback period for NDEE retrofits has resulted in a number of financing offers in the market. As a result public sector financing support is generally considered unnecessary.
6 Private sector ownership with public sector promise in an element of the project	No	The relatively short payback period for most NDEE retrofit has resulted in a number of financing offers in the market. As a result public sector promise is considered unnecessary.
7 Private sector ownership with only involvement from public sector in facilitation role	Yes	The commercial attributes of NDEE retrofit have resulted in a number of turnkey offers in the market.

Analysis of short listed options

There are a number of factors associated with the delivery of NDEE which will influence a public sector organisation's preferred delivery structure, including but not limited to their approach to:

1. Provision of finance – some public sector organisations have access to low-cost finance, such as public works loan board (PWLB) finance, which could be used on an invest-to-save basis to retrofit their own assets. The low cost of PWLB could help to significantly reduce the payback period of a project, but may also impact the borrowing capacity of the organisation. Its use must be balanced against other demands on capital funding as well as the potential risk exposure of the public sector body.
2. Performance risk – the use of Energy Performance Contracts (EPCs) is becoming increasingly widespread and enables the procuring body to transfer some of the performance risk associated with the energy efficiency measures to a private sector body. In general an EPC is an arrangement by which all or a proportion of the payments to the private sector delivery partner are linked to the savings realised from the lower consumption of energy.
3. The nature of works – this can vary from simple provision of insulation in existing building voids to complex, disruptive works involving a range of specialised contractors.
4. Volume of proposed work – due to ongoing asset rationalisation work, and the resulting uncertainty, many public sector organisations are unable to commit to a programme of NDEE retrofit across their estate. As a result organisations may be limited to seeking to undertake retrofits on single buildings as and when funding becomes available.
5. Development resources – public sector organisations are subject to budget constraints and as such there is a limited internal resource for the development of projects, particularly where specialist knowledge or skills are required. The ability to develop projects to sufficient maturity to take to market can be a significant hurdle in NDEE retrofit.

6. Procurement considerations – the public sector is subject to strict procurement rules and regulations, these can lead to time-intensive and costly procurements. The complexity of the chosen delivery structure for NDEE retrofit should therefore be proportional to the proposed project to mitigate excessive associated procurement costs.
7. Existing FM and LCM Arrangements – the arrangements for facilities management and lifecycle- may limit the immediate options to address non-domestic energy efficiency. Each public body should carefully consider how energy efficiency services are incorporated within any FM arrangements.

Table 4.3 below sets out in further detail the qualitative analysis of the short-listed options for NDEE retrofit together with the potential benefits, risks and issues associated with each of the factors set out above. Note that at this stage option 2 has been split into two sub-options: 2(a) single contract and 2(b) framework.

Table 4.3 Qualitative analysis of short-listed delivery structure options for NDEE

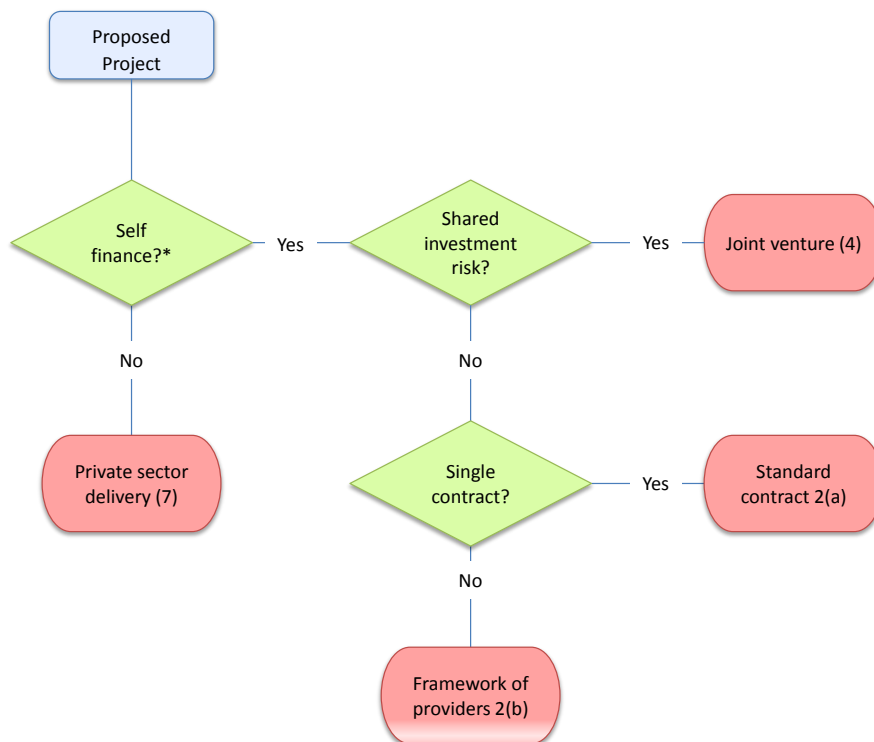
	Delivery structure option	Potential benefits	Risks and issues
2(a)	Public sector led, use of single private sector contractor. The private sector contractor undertakes the install and maintenance elements of the project. <i>Example: Building retrofit installation & maintenance contract</i>	<ul style="list-style-type: none"> • Relatively low development and procurement resource requirement. • Potential to transfer a proportion of credit and/or performance risk to private sector entity, depending on financing solution. • Solution bespoke to individual asset or project. • Ability to access a range of low-cost financing options including Salix finance and prudential borrowing. • Increased private sector interest for clear committed single project scope. • Contract could be procured to deliver initial project and include future development and delivery. 	<ul style="list-style-type: none"> • Initial project specification to be developed by public sector organisation. • Public sector likely to retain investment risks and a proportion of performance risk. • Structuring, procurement and demonstrating best value.
2(b)	Public sector led, use of private sector contractor framework. The private sector contractor may undertake design, install and maintenance elements of the project. <i>Example: Framework contract covering a range of retrofit works of one or more types</i>	<ul style="list-style-type: none"> • Relatively low development resource requirement. • Moderate procurement resource requirements to establish framework of providers and call-off arrangements. • Potential to transfer a proportion of credit and/or performance risk to private sector entity. • Potential to leverage greater value through use of framework for multiple projects, including use of mini competitions to drive out further value as market continues to develop. • Framework could be created to include future development work. • Ability to access a range of low-cost financing options including Salix finance and prudential borrowing. 	<ul style="list-style-type: none"> • Initial project specification to be developed by public sector organisation. • Private sector may react less favourably to framework compared to clear, committed single project scope if it does not have guaranteed volume of work under future call-offs. • To maximise value from framework and attract private sector it would need to deliver an increased volume over a short term – the NDEE market is dynamic and the public sector may wish to reflect changes in commercial terms. • Increased procurement complexity compared with single contract.
4	Joint venture with private sector partner. All elements of the projects are shared across both parties. <i>Example: Co-investment in a JV entity to deliver a programme of works, which could be procured by JV or all/part delivered by JV partner</i>	<ul style="list-style-type: none"> • Establishes a transparent structure for joint delivery of NDEE measures. • Public sector organisation shares directly in any increase in realised benefits. • Private sector partner will gain comfort from public sector involvement. • Potential to secure finance from a range of public or private sector sources – private sector partner may also have established financing proposal. • Joint venture could be responsible for both the development and delivery of projects. 	<ul style="list-style-type: none"> • Complex procurement as typically a Special Purpose Vehicle (SPV) is created to deliver works. • Transaction costs may be disproportionate to value of works –likely to only be feasible for a large programme of NDEE projects. • Partner will require return on capital committed.

Delivery structure option	Potential benefits	Risks and issues
<p>7 Private sector ownership with public sector facilitation. The private sector undertakes the design, financing, installation and maintenance elements of the function, with the public sector providing support in the form of access to information or land or similar.</p> <p><i>Example; grant of NDEE scheme development rights coupled with performance obligations to generate savings</i></p>	<ul style="list-style-type: none"> • Low development resource requirement. • Moderate procurement resource requirement. • Private sector financed therefore no impact on public sector organisation's borrowing limits where applicable. • Full transfer of investment and performance risk to the private sector. • No limitation to volume as the private sector partner seeks to drive scalability. 	<ul style="list-style-type: none"> • Potential limitations to finance due to non bankable nature of energy efficiency saving as a result of reduced consumption. • Private sector finance likely to be more expensive than public sector borrowing.

Decision tree

Figure 1 summarises the decision making process of a public sector organisation in relation to NDEE retrofit and how this impacts the delivery structure choice as described in table 3. The decision tree below is based on the assumption that there are no existing suitable frameworks for the works. The decision tree provides a general guide to a public sector organisation, whereas in reality the delivery structure will need to be refined to fit the requirements of an individual organisation.

Figure 1 NDEE delivery structure decision tree



* e.g. are capital budgets or prudential borrowing capacity available?

Contract Structures

Each of the delivery options identified in the section above could be executed through a range of contractual structures as set out in Table 4.4. The contractual structure selected, and the detail within each type of contract, will be dependent on the risk-reward profile of the project, availability of finance and scalability of the project.

Table 4.4 NDEE example contract structures

	Delivery structure option	Example contract structures	Description
2(a)	Public sector led, use of single private sector contractor	Standard contract (design & build)	Private sector contractor is engaged to undertake design and installation of discrete measures. Payment may be lump sum or time and materials.
		Service concession	Private sector contractor is engaged to undertake design, installation and operation of building energy efficiency measures. Payment likely to be set periodic charge.
		Energy Performance Contract (EPC) (performance risk only)	Private sector contractor is engaged to undertake design and installation of group of measures. Payment is fully or partly linked to energy consumption savings realised as a result of the scheme.
2(b)	Public sector led, use of private sector contractor framework	Standard contract (design & build)	Private sector contractors are engaged to undertake design and installation of discrete measures. Payment may be lump sum or time and materials.
		Service concession	Private sector contractors are engaged to undertake design, installation and operation of building energy efficiency measures. Payment may be time and materials or set monthly charge.
		Energy Performance Contract (EPC) (performance risk only)	Private sector contractor is engaged to undertake design and installation of group of measures. Payment is fully or partly linked to energy savings realised as a result of the scheme.
4	Joint venture with private sector partner	SPV	Public sector forms special purpose vehicle with private sector entity for the design, install and operation of the project. Performance and credit risk is shared between parties in accordance with shareholders agreement.
7	Private sector ownership with public sector facilitation	Energy Performance Contract (EPC) (credit and performance risk)	Private sector contractor is engaged to finance, design and install a group of measures. Payment is fully or partly linked to energy savings realised as a result of the scheme.

Aggregation

In the analysis undertaken above it was assumed that the public sector organisation would undertake a single project or potentially a series of small-scale projects within NDEE. Aggregation at this scale has the potential to deliver some benefits to the individual organisation such as increased economies of scale, however experience would suggest that there will be a limited number of single organisations who are able to generate sufficient scale to justify a framework arrangement of their own. This challenge could be overcome by bringing multiple organisations together across the public sector.

Benefits

Aggregation of projects from multiple organisations within the NDEE sector has the potential to quickly generate scale and deliver a number of benefits to the public sector including:

1. Improved economies of scale – bringing projects together has the potential to create improved buying power for products and services in the market. The NDEE market includes a range of technologies and measures that can be retrofitted to existing buildings. Many of the measures are relatively low value and therefore suppliers and installers rely on securing high volumes of work. Creating a framework with the opportunity for entities to supply and install significant volumes of work over a given period will enable those entities to develop a work plan and provide greater value than would be the case in a reactive, project by project approach.
2. Increased market appetite – private sector entities often require a minimum level of scale to make projects commercially viable. Aggregated projects may enable previously uneconomic projects to be undertaken as part of a wider programme. A greater scale of engagement would also increase the number of entities who wish to engage and create an incentive to invest and develop the local supply chain (including SMEs) to support installation.

3. Efficient procurement and contracting – public procurement can be resource intensive and cost can be disproportionate to project scale. Collective procurement of goods or services across multiple organisations can help reduce the cost to individual public sector entities.
4. Project development - a key barrier to developing NDEE projects for many public sector organisations is the availability of resources with the required skills to develop ‘market ready’ propositions. Subject to scale, aggregation has the potential to create sufficient scale to support a separate project development function.
5. Accelerated investment – aggregation of projects has the potential to increase focus on the NDEE sector, increase market interest including financing options therefore accelerating investment in the sector.

Scope of aggregation

As set out above there are a number of factors restricting the number of NDEE projects being undertaken in Scotland. Aggregation of projects across multiple organisations has the potential to extend beyond supply and installation to also cover project development. Roles supported by an aggregation structure could include:

1. Strategic support /needs assessment
2. Specification of projects
3. Advice and support in packaging projects
4. Procurement support
5. Delivery of project (including detailed design, and construction)
6. Finance
7. Operation and maintenance and monitoring
8. Behavioural change support

Aggregation options

There are three main structures for the aggregation of NDEE project across multiple organisations. Each can potentially be applied across different contexts of aggregation, e.g. in applying a common technology, such as low energy street lighting, or across portfolios of buildings requiring energy efficient retrofit. These options are described in further detail in Table 4.5 together with key risks, issues and benefits. A diagram representing each of the structures is included in Appendix 1.

Table 4.5 NDEE aggregation structure options

Aggregation structure	Description	Key risks and issues	Key benefits
Single delivery partner	A single delivery partner is jointly procured (may be a consortium) to supply all NDEE projects across multiple public sector organisations	<ul style="list-style-type: none"> • Potential limitation to volumes to be delivered from a single supplier • Potential limitation to future innovation • Single supplier may not be able to cover all technologies within sector. • Requires consistent programme specification and basis for pricing that can be applied consistently following initial competitive procurement 	<ul style="list-style-type: none"> • Single supplier will have significant volume of work, enabling them to effectively negotiate with its supply chain. • Single supplier likely to invest in local supply chain as a result of known volumes. • Consistent approach across projects, enabling organisations to compare performance and ensure value for money. • Could be combined with project development function. • Finance options include both public and private. • Contract structures could include service concession, EPC or standard contract.
Framework of suppliers <i>Could be a structure akin to LONDON RE:FIT</i>	A framework of suppliers is jointly procured (may be consortium). Organisations can undertake mini competitions within the framework for proposed projects.	<ul style="list-style-type: none"> • Requires higher volume to be attractive to suppliers as work levels are less certain. • Requires consistent programme specification and basis for pricing that can be applied consistently following initial competitive procurement 	<ul style="list-style-type: none"> • Mini competition will encourage innovation and price competitiveness within framework. • Access to a wider range of technologies, suppliers and installers. • Could be combined with separate project development function, the cost of which could be allocated across delivered projects. • Financing options include both public and private. • Contract structures could include service concession, EPC or standard contract.
Single developer with supporting supply chain <i>Could be a structure akin to hub</i>	A single developer is procured to bring programme development/delivery skills and to establish and manage a cost-effective supply chain. Organisations engage with the entity to develop projects which are delivered by the supply chain.	<ul style="list-style-type: none"> • Potential limitation to future innovation due to single developer. • Would need a mechanism to be able to demonstrate value for money across a range of projects 	<ul style="list-style-type: none"> • Full risk transfer to private sector developer where private sector finance is used. • Allows more scope for supply chain transparency/price competition • Standard contract can be established. • Makes fuller use of private sector development skills. • Project development undertaken by private sector reducing burden on public sector organisations.

Market activity

An example of a framework aggregation approach in NDEE is the London RE:FIT framework. The original framework was established in January 2010 for 3 years and was available to all public sector organisations in the UK. The aim of the framework was to streamline the procurement process for energy services, including but not limited to energy efficiency, by providing pre-negotiated EU regulation compliant contracts that can be used with a group of pre-qualified Energy Service Companies for the design and implementation of energy conservation measures.

The Greater London Authority (GLA) has since procured a new RE:FIT Framework for a further 4 years which builds on previous experience. The new framework:

- Enables a range of financing options for energy/carbon reduction projects.
- Provides simplified tendering options that reduce tendering process costs for buyers and suppliers thereby making smaller value projects more viable.
- Provides clearer pricing and contractual powers to help further improve value for money across the lifetime of a project.

- Provides the opportunity for greater client-specific requirements and contractual terms to be incorporated into RE:FIT contracts.

The RE:FIT programme established in 2008 has enabled energy bill savings of £2.1 million per annum and typically delivers energy and carbon savings of 28% per annum with payback periods of 7 years or less. In addition the programme provides support to public sector organisations to develop projects at no cost (for London based organisations) through a programme delivery unit.

Small scale renewables

Over recent years public sector organisations have been actively developing and procuring small-scale renewable energy projects in an effort to reduce carbon emissions and improve energy security. The Sale of Electricity by Local Authorities (Scotland) Regulations 2010 permit local authorities in Scotland to sell electricity generated from specific renewable sources. Previously local authorities could only sell electricity generated from waste or in association with heat. As a result of the change in legislation, together with attractive market incentives for small-scale generation such as the Feed in Tariff (FiT) and Renewable Obligation Certificates (ROCs), many local authorities have sought to develop projects which will provide a non-ring-fenced stable revenue stream. Other drivers for local authorities include tackling fuel poverty and promoting energy efficiency.

Market insight

A recent report by the Scottish Council for Development and Industry (SCDI) and AEA Technology shows that Scotland leads the UK in small-scale renewable energy, with capacity growing significantly over the last 12 months. The AEA Scottish Microgeneration Index details progress made across the country, and in each local authority area, one year on from the launch of the Feed-in Tariff (FIT) scheme, which was designed to encourage uptake of small-scale renewable electricity generation.

The Index found Scotland to have a disproportionately high installed capacity (by population) with 20% of UK installed capacity. It also found that 75% of the UK's hydro capacity is in Scotland, in addition to 63% of the total wind capacity.

Aberdeenshire shows the highest installed capacity in the UK, while Dumfries & Galloway has the largest number of installations amongst Scottish local authorities. Some rural areas (Aberdeenshire - 5.6 MWe, Perth & Kinross - 3.84 MWe, Argyll & Bute - 1.75 MWe and Orkney Islands - 2.1 MWe) have significant hydro and wind power generation compared to the rest of the UK.

The report identified significant potential for growth in renewable energy generation in many parts of Scotland where the natural environment is suitable. It also identified potential in the built environment, where local authorities in particular can capitalise on their assets to use these technologies to reduce their energy bills and carbon footprint. The report suggested two routes to accelerate growth of the small-scale renewable energy market in Scotland:

1. do more of what is already a success - wind and hydro at community and commercial scale.
2. do more of what is working in the rest of the UK - solar PV for homes through aggregation of projects.

Key market players in the UK include:

- Utility companies, e.g. Eon, EDF Energy Ltd, SSE and Npower.
- Technology companies, e.g. Honeywell, Siemens, Johnsons Controls, Vital Energi, Mitie and Dalkia.
- Construction companies, e.g. Balfour Beatty, Skanska, Willmott Dixon
- Specialist companies, e.g. solar century, evoenergy

Challenges

There are a number of widely publicised challenges associated with the development and implementation of small-scale renewables, including:

1. Scalability – typically small-scale renewable projects developed by public sector organisations are reactive and as a result small individual projects are implemented on a case by case basis. This often results in disproportionate development and transaction costs.
2. Availability of finance – renewable energy projects are still perceived as high risk by many traditional investors. As a result the market is served by a limited number of specialist banks and finance institutions.
3. Stability of market incentives – multiple reviews of FiTs applicable to solar and anaerobic digestion projects has resulted in uncertainty in the market. The subsequent implementation of the reviews led to a number of mature projects becoming uneconomic, with entities experiencing significant losses as a result and reducing confidence in the market.

Despite these challenges the benefits of small-scale renewables mean that public sector organisations remain committed to implementing projects across their estate either on a standalone basis or as part of a wider energy efficiency programme. The following sections set out the potential delivery structures available and associated risk-reward profiles. The analysis is based on the assumption that the renewables projects are delivered on a standalone basis rather than combined as part of a wider NDEE retrofit programme and includes the following technologies:

- Small-scale wind
- Solar photovoltaic
- Anaerobic digestion
- Hydro generation

Long list of delivery structures

Table 4.6 sets out the generic long-list of delivery structures and the rationale for the choice of short-list applicable for small-scale renewable generation.

Table 4.6 Analysis of generic delivery structure options for small-scale renewable projects

	Delivery Structure Option	Include in Shortlist?	Rationale
1	Entirely public sector funded, operated and owned	Yes	The ability of a public sector organisation to undertake the full project lifecycle for a small scale renewables project is dependent on the internal skills and resources of the organisation as well as the underlying technology. A number of organisations have successfully undertaken photovoltaic projects in-house.
2	Public sector led, use of private sector contractors	Yes	The introduction of market incentives has resulted in an established market of private sector contractors for small-scale renewables projects.
3	Private sector invests in some elements of the proposed activity	No	The small scale of projects would suggest that investment in some elements would be undesirable.
4	Joint venture, equal share in project with a private sector partner	Yes	The combined experience of the private sector in the development, implementation and operation of the project together with use of public sector estate and energy demands has the potential to create an opportunity for partnership working.
5	Public funding to incentivise private sector activity	No	The public sector drivers for small-scale renewables together with existing market incentives would indicate that, for the public sector, further incentivisation is unlikely to be desirable.
6	Private sector ownership with public sector promise in element of the project	Yes	Private sector delivery with a long-term power purchase agreement with a public sector body could create an attractive investment opportunity while delivering a range of strategic benefits.
7	Private sector ownership with only involvement from public sector in facilitation role	Yes	The market incentives for small-scale renewables have resulted in a number of turnkey offers in the market.

Analysis of short listed options

The following list sets out the key factors associated with the development and delivery of small-scale renewables projects which may influence a public sector organisation's preferred delivery structure.

1. Funding potential – accessing finance for small-scale renewables project can be challenging for the following reasons:
 - a. they often carry high upfront costs and lower operational costs,
 - b. transaction costs can be disproportionate due to the limited scale of the project,
 - c. the risks can be difficult to assess or manage, and
 - d. many financiers have difficulty understanding both the risks and returns.
 - e. Whether large or small scale, revenue risks around energy production, contracting and pricing, and regulatory issues will need to be considered.

There are a number of finance options available, including:

- a. Private sector corporate finance – potentially provided by a private sector partner, requires a decision by the corporate sponsor to accept the risks and potential rewards of the project in their entirety and can only be used by sponsors with a significant base of assets, debt capacity and internal cash flow.
 - b. Private project finance – generally involves the use of a special purpose vehicle to fund a specific generation project.
 - c. Public sector funding (PWLB) – local authority access to low-cost finance is likely to be advantageous for marginally commercial projects.
 - d. European Structural funds – potential sources include debt financing from EIB loans, structural funds and programmes. The majority require a minimum scale of investment and match funding.
 - e. Green Investment Bank (GIB) - the GIB have allocated funds to two fund managers to invest in commercial terms in non-domestic energy retrofit and small-scale renewables projects.
 - f. REIF - The Renewable Energy Investment Fund (REIF) helps promote the use of energy from renewable sources and drive further investment into key areas of Scotland's renewables industry by investing or lending on commercial terms.
2. Risk allocation
 - a. Planning – securing planning permission in a timely manner will be important to the success of any proposed small-scale renewables projects. Although planning decisions are independently made by the planning authority, an understanding of the process will be valuable in developing the project and the public sector will have a key role in managing this risk.
 - b. Power purchase agreements – establishing secure revenue streams for small-scale renewable projects will be critical in securing finance for the project. The public sector has the potential, subject to appropriate vires and value-for-money checks, to sign up to long-term power purchase agreements, thereby securing a baseline revenue stream for the project while establishing a secure energy supply for the relevant organisation(s).
 - c. Delivery responsibility – the roles and responsibilities of the public sector organisation throughout the project will differ depending on the technology being implemented, scale of project, and chosen delivery structure.
 - d. Securing feedstock (where applicable) – the success of biomass and energy-from-waste projects will be dependent on the ability to secure a demonstrably stable feedstock supply at an appropriate price for the project.
 3. Energy security – a key driver for the implementation of small-scale energy efficiency projects in the public sector is the ability to establish secure, independent energy generation sources.
 4. Scale – small-scale renewable projects are often reactive and developed on a case by case basis. The ability to create scale will be critical in securing private sector interest in delivery and investment.

5. Control and governance – the ability to influence the development of the project including the power price will impact on the public sector organisation’s ability to meet wider strategic objectives such as fuel poverty.
6. Development resources – public sector organisations are subject to budget constraints and as such there is a limited internal resource for the development of projects, particularly where specialist knowledge or skills are required. The ability to develop projects to sufficient maturity to take to market can be a significant hurdle in small-scale renewable projects.
7. Procurement resources – the public sector is subject to strict procurement rules and regulations, which can lead to time intensive and costly procurements. The complexity of the chosen delivery structure for a small-scale renewable project should therefore be proportional to the proposed project to mitigate excessive associated procurement costs.

Table 4.7 sets out in further detail the qualitative analysis of the short-listed options for small-scale renewable projects together with the potential benefits and risks and issues associated with each of the factors set out above. Note that at this stage option 2 has been split into two sub options: 2(a) single contract and 2(b) framework.

Table 4.7 Qualitative analysis of short-listed delivery structure options for small-scale renewables

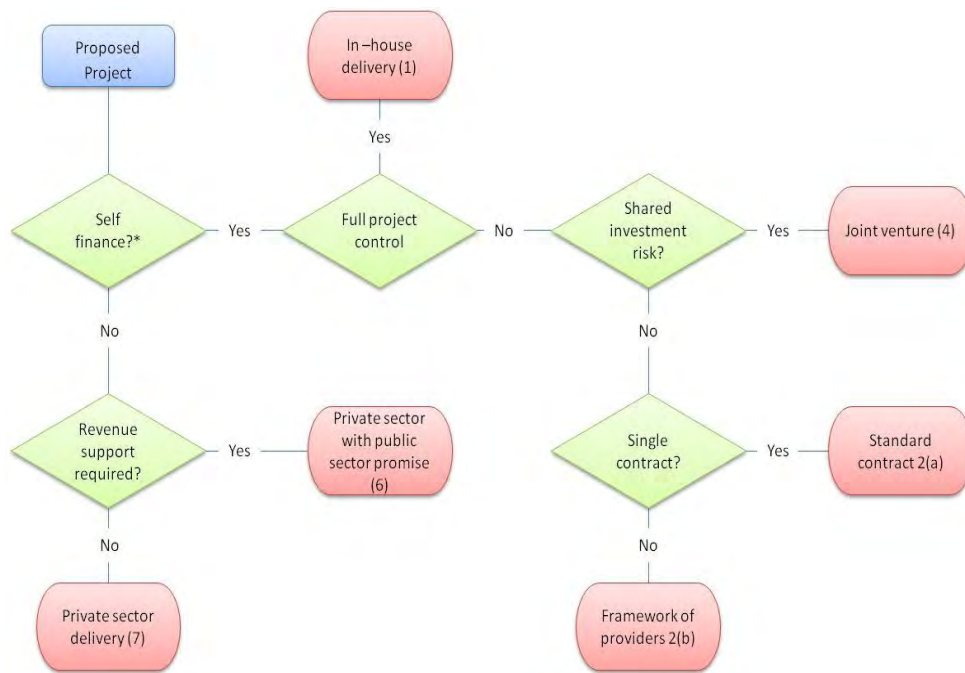
Delivery Structure Option	Potential Benefits	Risks and Issues
1 Entirely public sector funded, operated and owned <i>Example Contract for purchase/installation of wind turbine</i>	<ul style="list-style-type: none"> • Low development and procurement resource requirement. • Potential financial benefits from the project retained by the public sector. • Full control and governance over the project development. • Will result in secure energy supply to public sector organisation. 	<ul style="list-style-type: none"> • Public sector organisation retains full development, delivery and financial risk of the project. • Ability to scale up limited compared to private sector organisation. • Will require public sector funding and potentially impact on public sector borrowing limits.
2(a) Public sector led, use of single private sector contractor <i>Example: Contract for design, installation and maintenance of generation plant</i>	<ul style="list-style-type: none"> • Relatively low development and procurement resource requirement. • Potential to transfer a proportion of delivery risk to private sector. • High level of control and governance over project development and implementation. • Leverages private sector expertise. • Ability to access a range of low-cost financing options including Salix finance and prudential borrowing. • Increased private sector interest for clear, committed contract scope. • Contract could be procured to deliver initial project and include future development and delivery. 	<ul style="list-style-type: none"> • Initial project specification to be developed by public sector organisation. • Public sector likely to retain investment risks and a proportion of delivery risk.
2(b) Public sector led, use of private sector contractor framework <i>Example: Framework contract with call-off arrangement for design, installation and maintenance of a programme of generation plant</i>	<ul style="list-style-type: none"> • Relatively low development resource requirement. • Moderate procurement resources to establish framework of providers and call-off arrangements. • High level of control and governance over project development and implementation. • Potential to transfer a proportion of delivery risk to private sector. • Potential to leverage greater value through use of framework for multiple projects, including use of mini competitions to drive out further value as market continues to develop. • Framework could include private sector entities to deliver a range of technologies. 	<ul style="list-style-type: none"> • Initial project specification to be developed by public sector organisation. • Private sector may react less favourably to framework compared to clear, committed contract scope unless there is a visible pipeline of work. • Increased procurement complexity compared with single contract.
4 Joint venture with	<ul style="list-style-type: none"> • Establishes a transparent structure for joint 	<ul style="list-style-type: none"> • More complex procurement as

Delivery Structure Option	Potential Benefits	Risks and Issues
private sector partner <i>Example: Parties contribute investment/ development rights/ know-how and share risks, eg Glasgow CC and SSE Cathkin Braes wind farm</i>	<ul style="list-style-type: none"> delivery of project. Subject to scale could potentially secure project finance. Risks ring-fenced to joint venture vehicle. Public sector organisation shares directly in any increase in actual benefits. Private sector partner will gain comfort from public sector involvement. Joint venture could be responsible for both the development and delivery of projects. 	<ul style="list-style-type: none"> typically a Special Purpose Vehicle (SPV) is created to deliver works. Transaction costs may be disproportionate to value of works – likely to only be feasible for a programme of projects.
6 Private sector ownership with public sector promise in element of the project <i>Example: Public sector offers asset development opportunity combined with Power Purchase Agreement</i>	<ul style="list-style-type: none"> Lower development resource requirement. Moderate procurement resource requirement. Private sector financed therefore no impact on public sector organisation's borrowing limits where applicable. Full transfer of delivery risk to the private sector. No limitation to volume as the private sector partner seeks to drive scalability. Public sector takes long-term power purchase agreement therefore creating a stable baseline of revenue against which finance can be raised. 	<ul style="list-style-type: none"> Private sector finance likely to be more expensive than public sector borrowing. Only commercially viable projects will be taken forward, marginal projects unattractive for private sector finance.
7 Private sector ownership with public sector facilitation <i>Example; lease or licence to develop generation assets on public sector sites, Analogous to approach taken by Forestry Commission Scotland</i>	<ul style="list-style-type: none"> Low development resource requirement. Moderate procurement resource requirement. Private sector financed therefore no impact on public sector organisation's borrowing limits where applicable. Full transfer of investment and performance risk to the private sector. No limitation to volume as the private sector partner seeks to drive scalability. 	<ul style="list-style-type: none"> Potential limitations to finance depending on scale of proposed project. Only commercially viable project will be taken forward, marginal projects unattractive for private sector finance. Private sector finance likely to be more expensive than public sector borrowing.

Decision tree

Figure 2 summarises the decision making process of a public sector organisation in relation to small-scale renewable projects and how this impacts the delivery structure choice as described in table 5. The decision tree below is based on the assumption that there are no existing suitable frameworks for the works. The decision tree provides a general guide to a public sector organisation based on the key influencing decisions. In reality the delivery structure will need to be refined to fit the requirements of an individual organisation.

Figure 2 Small-Scale Renewables delivery structure decision tree



* e.g. are capital budgets or prudential borrowing capacity available?

Contract Structures

Each of the delivery options identified in the section above could be executed through a range of contractual structures as set out in Table 4.8. The contractual structure selected, and the detail within the contract, will be dependent on the risk-reward profile of the project, availability of finance and scalability of the project.

Table 4.8 Small-scale renewables example contract structures

	Delivery structure option	Example contract structures	Description
2(a)	Public sector led, use of single private sector contractor	Standard contract (design & build)	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
2(b)	Public sector led, use of private sector contractor framework	Standard contract (design & build)	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
4	Joint venture with private sector partner	SPV	Public sector forms special purpose vehicle with private sector entity for the design, install and operation of the project. Performance and credit risk is shared between parties in accordance with shareholders agreement.
6	Private sector ownership with public sector promise in element of the project	Power Purchase Agreement (PPA)	Private sector contractor designs, builds, finances and operates the project with the public sector committing to purchase power.
7	Private sector ownership with public sector facilitation	Lease of land/right of access to land	Private sector contractor designs, builds, finances and operates the project. The public sector body may provide a long-term lease for land. Could be used in conjunction with PPA.

Aggregation

The case for aggregation in the small-scale renewables sector is similar to that in the NDEE sector, i.e. while aggregation by a single entity can deliver some benefits, aggregation across multiple organisations has the potential to quickly generate scale.

It should, however, be noted that the drivers for the development of small-scale renewables are different from those in the NDEE sector. While the NDEE sector has been largely reactive and linked to the availability of small pots of funding often associated with asset management plans, the small-scale renewables sector activity has in recent years been linked directly to the availability and level of market support mechanisms such as the Feed in Tariff (FiT) or Renewable Obligations Certificates (ROCs). As a result any aggregation approach would need to be flexible to take into account any further changes to the market incentives, e.g. changes to FiT support for solar photovoltaics.

The aggregation approach should also take into account the fact that small-scale renewables projects are often a 'bolt on' option to a NDEE retrofit. For example, a public sector building may receive a package of measures including insulation, energy management systems and localised generation such as solar photovoltaics. In addition if aggregation were expanded to include low carbon generation when associated with building retrofit any potential structure could also include building-specific combined heat and power solutions. This concept is explored further in the chapter on District Heating.

Benefits

The benefits that could be delivered are similar to those in the NDEE sector:

1. Improved economies of scale – bringing together small-scale renewables has the potential to create improved buying power for products and services in the market. The degree to which this can be realised will be dependent on creating a framework for small-scale renewables that incorporates the various technologies at sufficient scale.
2. Increased market appetite – private sector entities often require a minimum level of scale to make project commercially viable. Aggregating projects may enable previously uneconomic projects to be undertaken as part of wider programme. A greater scale of engagement would also increase the number of entities who wish to engage and create an incentive to invest and develop the local supply chain (including SMEs) to support installation.
3. Efficient procurement and contracting – public procurement can be resource intensive and cost can be disproportionate. Collective procurement of goods or services across multiple organisations can help reduce the cost to individual public sector entities.
4. Project development- accessing the resources with the required skills to develop 'market ready' propositions for small-scale renewables is generally only an issue for marginal projects or where the public sector organisations wish to retain a high level of control over the project. For example a self-financed solar photovoltaic project with an install and maintain contract would require significant input, however the same project could potentially be developed and delivered by the private sector.
5. Accelerated investment - aggregation of projects has the potential to increase focus on the sector. This may lead to increased market interest, expansion in financing options therefore accelerating investment in the sector.

Scope of aggregation

Similarly to the NDEE sector the scope of aggregation for small-scale renewables could extend beyond supply and installation to also cover project development. Roles could include:

1. Strategic support / needs assessment
2. Managing OFGEM interaction
3. Specification of projects
4. Procurement support
5. Delivery of project (including detailed design, and construction)
6. Finance

7. Operation and maintenance

Aggregation options

There are three main structures for the aggregation of small-scale renewables projects across multiple organisations. These options are described in further detail in Table 4.5 together with key risks, issues and benefits.

Table 4.9 Small-scale renewables aggregation structure options

Aggregation structure	Description	Key risks and issues	Key benefits
Single delivery partner	A single delivery partner is jointly procured (may be a consortium) to supply all small-scale renewables projects across multiple public sector organisations	<ul style="list-style-type: none"> • Likely to severely limit range of technologies and therefore projects that can be realised. • Potential limitation to volumes to be delivered from a single supplier, or in market of suppliers to deliver at scale. • Potential limitation to future innovation. • Will need clear basis of pricing for incremental projects beyond initial procurement. 	<ul style="list-style-type: none"> • Single supplier will have significant volume of work, enabling them to effectively negotiate with their supply chain. • Single supplier likely to invest in local supply chain as a result of known volumes. • Consistent approach across projects, enabling organisations to compare performance and ensure value for money. • Could be combined with project development function. • Finance options include both public and private.
Framework of suppliers	A framework of suppliers is jointly procured (may be consortium). Organisations can undertake mini competitions within the framework for proposed projects.	<ul style="list-style-type: none"> • Option may be less attractive to suppliers as work levels are less certain. 	<ul style="list-style-type: none"> • Mini competition will encourage innovation and price competitiveness within framework. • Framework could cover a wider range of technologies than a single supplier. • Access to a range of suppliers and installers which could cover a number of technologies and also combined with NDEE. • Could be combined with separate project development function, the cost of which could be allocated across delivered projects. • Financing options include both public and private.
Single developer with supporting supply chain	A single developer is procured to bring programme development/delivery skills and to establish and manage a cost-effective supply chain. Organisations engage with the entity to develop projects which are delivered by the supply chain.	<ul style="list-style-type: none"> • Potential limitation to future innovation due to single developer. • Would need a mechanism to be able to demonstrate value for money across a range of projects • 	<ul style="list-style-type: none"> • Full risk transfer to private sector developer where private sector finance is used. • Standard contract can be established although may need to be technology specific. • Project development undertaken by private sector reducing burden on public sector organisations.

Market activity

Aggregation of small-scale renewables projects has generally been limited to technology-specific activity; the following examples currently exist in the market:

1. A number of local authorities in the UK have established framework agreements for solar photovoltaics on both social housing and public sector buildings.
2. The London RE:FIT framework includes suppliers who develop and deliver combined heat and power projects and small-scale building specific renewables.

3. Birmingham City Council has recently procured a Green Deal delivery partner to undertake Green Deal projects for a range of organisations. The scope also included building-specific renewables for non-domestic buildings.
4. Newcastle City Council has procured a delivery partner to undertake Green Deal for six partner authorities including small-scale renewables on both domestic and non-domestic buildings.

District heating

District heating projects have the potential to alleviate fuel poverty, catalyse decarbonisation of a town or city's building stock, align with regeneration programmes and help create jobs and economic growth over the short, medium and long term.

The key drivers for public sector organisations developing district heating networks include:

- Improving energy security -the development of a district heating system, with the potential for further / alternative generators of heat to be added in the future, will provide increased generation and supply capacity which in turn will provide increased and improved security of heat supply.
- Invest to save - users of the network will secure savings on operation and maintenance costs compared with more traditional systems for heat generation currently in use or available for inclusion within new builds. Eligible businesses will also benefit from financial savings and a reduction in their obligations under the Carbon Reduction Commitment.
- Potential for income generation through the sale of energy – public sector organisations are facing increasingly difficult financial positions. Investment in district heating projects has the potential to generate additional revenue from the sale of heat and either the sale of the electricity generated or obtaining value through establishing “netting off arrangements” for electricity generation.
- Reducing carbon emissions - projected users of heat supplied from a district heating network are likely to secure a reduction in their carbon emissions compared with current heat generation arrangements. As a key user of heat from the network, securing these reductions will assist the public sector organisation in addressing its emission reduction targets.
- Safeguarding existing and creating new jobs (Local Authorities) - The introduction of a heat network has the potential to assist developments in meeting the sustainability requirements of planning regulations, such as the criteria for EcoHomes or the Code for Sustainable Homes. District heating projects also have the potential to support a ‘green’ local supply chain, through the creation of jobs during the construction and operational phases of a network.
- Tackling fuel poverty (Local authorities) – subject to the level of control and governance retained, the local authority may have the opportunity to provide low or zero cost heat to local residents in fuel poverty.

District heating is energy infrastructure. By its nature infrastructure is expensive in initial cost terms and delivers benefits over an extended asset life (typically +50 years). As infrastructure, its funding, installation and operation requires a strategic and coordinated approach across a number of stakeholders. District heating projects generally require the incidence of one or more success factors, such as minimum heat load density and availability of low cost, low carbon heat, to make them commercially viable. Typical success factors are shown in Figure 3.

Figure 3 District heating network typical success factors.



1. **Regeneration** – The advent of new development in an area can catalyse the construction of a district heating network. Property developers will increasingly look to use connection to or establishment of a district heating network as a route to planning compliance and to deliver properties meeting sustainability standards, e.g. EcoHomes or the Code for Sustainable Homes and Code for Sustainable Buildings.
2. **Fuel poverty relief** – Rising energy prices and, in some areas, inefficient homes will see increasing numbers of residents fall into fuel poverty. District heating networks supplying low-cost heat have proved to be an effective means of delivering affordable warmth and reducing fuel poverty and improving the health and wellbeing of residents.
3. **CO₂ reduction** – District heating networks have a key role to play in helping public sector organisations achieve their CO₂ emission reduction targets and therefore an organisation’s climate change strategy.
4. **Local objectives** – Public sector organisations generally have a range of strategic objectives such as economic development and inward investment. District heating has the potential to play a key role in achieving these objectives.
5. **Heat load density** – The higher the heat load density the more cost-effective the district heating network; an important early step in the development of any district heating project is to map heat load across the city.
6. **Surplus heat** – Economic operation of a district heating network requires a source of low-cost heat; so identifying locations with reject/surplus heat from industrial processes or power generation will be an important part of any initiative.

Market insight

District heating is used extensively across the world; there are notable examples in New York (serving 100,000 commercial and residential properties) and Paris (serving 5,774 buildings). In Northern Europe, particularly

Denmark, Sweden, Finland and Germany, district heating has a very strong presence, from small community to city-wide schemes.

Historically, district energy in the UK has had a bad reputation due to poor materials and issues with installation and operation. These issues have now been resolved and a new breed of schemes is leading the way since the 1980s. There are, however, still only a small number of large-scale schemes in the UK; less than 2% of heat is supplied from district heating in the UK.

It is estimated that there is a 'pipeline' of district heating projects which could result in investment in community energy infrastructure of more than £300 million in the UK, and it is predicted that the UK could be Europe's fastest growing district heating market within the next few years. The recent publication of the Heat Strategy for England and Wales is set to establish district heating as a core strand of the UK's future heat policy. The Scottish Government's Expert Commission on District Heating recommends setting targets for the public sector to connect a proportion of its estate to district heating networks, especially as heat anchor loads exist in bodies such as NHS and universities. The Scottish Government has renewed its commitment to district heating in its response to the Commission's report and has set out an action plan to address its recommendations. In Scotland new funds have been made available and district heating is being increasingly integrated across policy. Currently there are a number of small schemes, including:

1. The Shetland District Heating scheme. This serves Lerwick, taking heat from an energy-from-waste boiler. Demand has grown, leading to investment in the heat source to supply further customers.
2. The Aberdeen Heat and Power schemes. Three projects using gas fired CHP systems to supply tenants in social housing. Expansion plans include development of the Seaton scheme to serve properties in the city centre.

Key markets players in the UK for district heating include:

1. Utility companies, e.g. Eon, Scottish Power, SSE.
2. Specialist district heating companies, e.g. Cofely/ GDF Suez, Mitie, Dalkia, Vital Energi, Clarke Energy, Contour Global, etc.

The creation of district heating networks can form part of a wider energy solution. They have the potential to address some of the key energy challenges that the UK currently faces in relation to the health agenda and deprivation; providing residents with cost-effective forms of heating for their homes have been proven to improve health and wellbeing.

Long list of delivery structures

Table 4.10 sets out the generic long-list of delivery structures and the rationale for the short-list to those applicable for district heating networks.

For the purpose of identifying and evaluating the long-list of delivery options it is assumed that:

1. The delivery model would encompass all parts of the delivery chain for a district heating project, which can be broadly summarised as:
 - a. Generation – including the development, construction and operational requirements of the energy centre and associated costs.
 - b. Transmission – including the development, installation and operation of the main connecting pipeline for the scheme.
 - c. Management – including the construction, installation and operation of the distribution pipework, customer contract management and metering.
2. The delivery structure may include the following aspects of project implementation:
 - a. Development – typically large scale district heating projects are successful where a phased approach to implementation is adopted. It is therefore anticipated that where procurement is

undertaken it will include the delivery of a small number of initial phases with the opportunity to develop and deliver future phases.

- b. Delivery – in this context delivery refers to the overall responsibility for the implementation of the delivery chain as set out above.
- c. Financing / Funding- the funding and financing requirement for the project will be dependent on the commercial viability of both the initial phases of work and the overall project.

Table 4.10 Analysis of generic delivery structure options for district heating networks

Delivery Vehicle Option	Include in Shortlist?	Rationale
1 Entirely public sector funded, operated and owned. The public sector organisation undertakes design, finance, build and operate elements of the project utilising internal resources.	No	It is considered unlikely that an individual public sector organisation would have the required skills and experience to develop, design, construct and operate a full scale district heating project in-house.
2 Public sector led, use of private sector contractors. The public sector undertakes the design and finance elements of the project and contracts the build and operate elements of the project to a private sector contractor.	Yes	There is an established market of private sector contractors focused of the delivery and operation of district heating networks in the UK.
3 Private sector invests in some elements of the proposed activity. For example the private sector may invest in the generation element of the project, with the public sector undertaking the transmission and distribution elements of the project.	Yes	The complex nature of a district heating project may require a combination of public and private sector delivery for different elements of the project.
4 Joint venture, equal share in project with a private sector partner. All elements of the project are split across the public and private sector entities.	Yes	The combined experience of the private sector in the development, implementation and operation of the project together with use of public sector estate and energy demands has the potential to create an opportunity for partnership working.
5 Public funding to incentivise private sector activity. The public sector provides initial funding for the elements of the project which may be marginal (subject to state aid approval).	Yes	Private sector may consider investment where only the profitable elements of the district heating system are included, thereby negating the ability of the Council to meet key project objectives such as fuel poverty and economic regeneration.
6 Private sector ownership with public sector promise in element of the project. The public sector commits to long-term heat and/or power off-take agreements or could provide access and land for pipeline wayleaves and energy centre.	Yes	During the initial development and implementation phases of a district heating network it can be difficult to raise finance due to the lack of secure supporting revenue streams. As a key user the public sector can help overcome this issue by signing up to long-term heat off-take agreements (subject to the appropriate value-for-money tests).
7 Private sector ownership with only involvement from public sector in facilitation role. The project is private sector designed, financed, built and operated, with the public sector providing access to information such as heat mapping.	Yes	An established market exists for private sector delivery of district heating networks where commercial returns can be realised.

Analysis of short-listed options

The following list sets out the key factors associated with the development and delivery of district heating networks which will influence a public sector organisation's preferred delivery structure.

1. Funding potential – accessing finance for district heating networks can be challenging for the following reasons:
 - a. high upfront capital costs;
 - b. operation in an unregulated market making revenue streams difficult to secure;
 - c. project returns are often marginal with frequent conflict between meeting strategic aims of a proposed project and creating a commercial market offering;
 - d. project development and transaction costs can be significant;
 - e. project build-out can be over the long term (40-50 years);
 - f. the risks can be difficult to assess or manage; and
 - g. many financiers have difficulty understanding both the risks and returns.

There are a number of finance options available, including:

- a. Private sector corporate finance – potentially provided by a private sector partner, which requires a decision by the corporate sponsor to accept the risks and potential rewards of the project in their entirety, and can only be used by sponsors with a significant base of assets, debt capacity and internal cash flow.
 - b. Private project finance – generally involves the use of a special purpose vehicle to fund a specific project.
 - c. Public Works Loan Board funding (PWLB) – low cost of finance for local authorities which is likely to be advantageous for marginally commercial projects.
 - d. European Structural funds – potential sources include debt funding from EIB loans, structural funds and programmes. The majority require a minimum scale of investment and match funding.
 - e. GIB - the Green Investment Bank are engaging directly with local authorities who are currently considering large-scale district heating networks in the UK.
 - f. REIF - The Renewable Energy Investment Fund (REIF) helps promote the use of energy from renewable sources and drive further investment into key areas of Scotland's renewables industry.
2. Control and governance -the ability to influence the development of the project, including the power price, will impact on the public sector organisation's ability to meet wider strategic objectives such as:
- a. Supporting economic development and inward investment.
 - b. Alleviation of fuel poverty.
 - c. Supporting carbon emission reductions.
3. Risk allocation
- a. Planning and routing – the pipeline will require planning permission and access to undertake street works. Ensuring timely access to the pipeline route in order to meet demand from new developments will be important to the success of the project. Although planning decisions are made on an independent basis, understanding of the processes will be valuable in developing the project. Local authorities have a key role in managing this risk.
 - b. Power Purchase Agreements (PPA) – establishing secure revenue streams for district heating projects will be critical in securing finance. The public sector has the potential, subject to appropriate vires and value-for-money checks, to sign up to long-term PPAs, thereby securing a baseline revenue stream for the project while establishing a secure energy supply for the public sector organisation.
 - c. Heat Load – establishing and retaining domestic and commercial customers to the network is a key risk as it will directly impact the revenues for the project. The public sector has a key role in creating anchor loads for a district heating network which will provide revenue certainty. The public sector organisation would remain a key customer irrespective of the business model chosen, and any partner would be heavily reliant on the public sector.
 - d. Interface risk – the management of the construction of the energy centre and the laying of pipes are key risks for successful delivery of a district heating network. There are many interface risks between these elements of a project and consideration needs to be given to how these are managed.
 - e. Default risk – the sale of heat to customers will require a billing and collection facility. The entity providing this may also take either all or some of the customer credit risk, although this is more likely to sit with the financial investor for a project
 - f. Design risk - although the design risk will sit with the investing organisation it is anticipated that this will be allocated to a suitably qualified and experienced supplier either through a consortium or suitable subcontractor agreement.
 - g. Operation and maintenance – it is anticipated that O&M contracts can be established with a suitably qualified and experienced supplier either through a consortium or suitable subcontractor agreement. The contract should seek to ensure that any outages of the network are minimised.
 - h. Performance risk – who will be responsible for the performance of the plant delivering the level of electricity and heat that it is designed and built for? In addition, how can the project be structured to ensure each party is appropriately incentivised to meet its obligations?

4. Exit Strategy – a key consideration for any public sector organisation considering district heating will be the ability to exit at a future point in time. In broad terms there are three potential economic scenarios under which a public sector organisation may wish to consider any investment it has made. These are:
 - a. The project has demonstrated commercial returns through the development / build-out of the network and the connection of a strong customer base. In this scenario the project has achieved business stability generating financial returns potentially at the level required to attract interest from third-party buyers.
 - b. The project has reached a point at which it is capable of self-financing its operations but it is not generating returns at the level required to attract interest from private sector investors.
 - c. The project has failed to achieve financial independence and is unable to maintain solvency without on-going financial support.
5. Development resources – public sector organisations are subject to budget constraints and as such there is a limited internal resource for the development of projects, particularly where specialist knowledge or skills are required. The ability to develop projects to sufficient maturity to take to market can be a significant hurdle in district heating projects.
6. Procurement resources – the public sector is subject to strict procurement rules and regulations, which can lead to time-intensive and costly procurements. The complexity of the chosen delivery structure for the district heating project should therefore be proportional to the proposed project to mitigate excessive associated procurement costs.

Table 4.11 sets out in further detail the qualitative analysis of the short-listed options for district heating networks together with the potential benefits, risks and issues associated with each of the factors set out above.

Table 4.11 Qualitative analysis of short-listed delivery structure options for district heating networks

Delivery Structure Option	Potential Benefits	Risks and Issues
2 Public sector led, use of private sector contractors <i>Example: Public sector specifies and procures CHP plant and heat distribution system assets, possibly with operation/maintenance obligations</i>	<ul style="list-style-type: none"> • Public sector retains 100% control and governance of the project. • Potential to utilise existing resources within the public sector organisation to deliver services. • Public sector continues to source gas and electricity through the existing electricity purchase agreement, thereby maximising the potential to establish and maintain a netting off agreement¹ with the energy supplier. • Public sector has more flexibility on the project return relative to the private sector, which enables the public sector to align the project with its socio-environmental objectives. • Public sector branded delivery structure likely to be trusted within the community, which may assist in ability to secure long-term heat contracts with customers and therefore secure revenue streams. • Potential to leverage private sector expertise in future expansion and development of the project, subject to appropriate procurement. 	<ul style="list-style-type: none"> • Use of internal resources may limit available skills and impact on quality of delivery. • Reduce any ability to transfer risks; the public sector retains demand risk for the scheme. • Limited opportunity to leverage private sector expertise in the development and delivery of the project.
3 Private sector invests in some elements of the proposed activity	<ul style="list-style-type: none"> • Relatively small development / set up costs • Public sector retains control and governance of elements of the project. 	<ul style="list-style-type: none"> • Use of internal resources may limit available skills and impact on quality of delivery.

¹ A 'netting off agreement' allows the public sector party to net off from its power purchasing arrangement any electricity it generates and exports to the grid, so it only pays for the balance of electricity consumed.

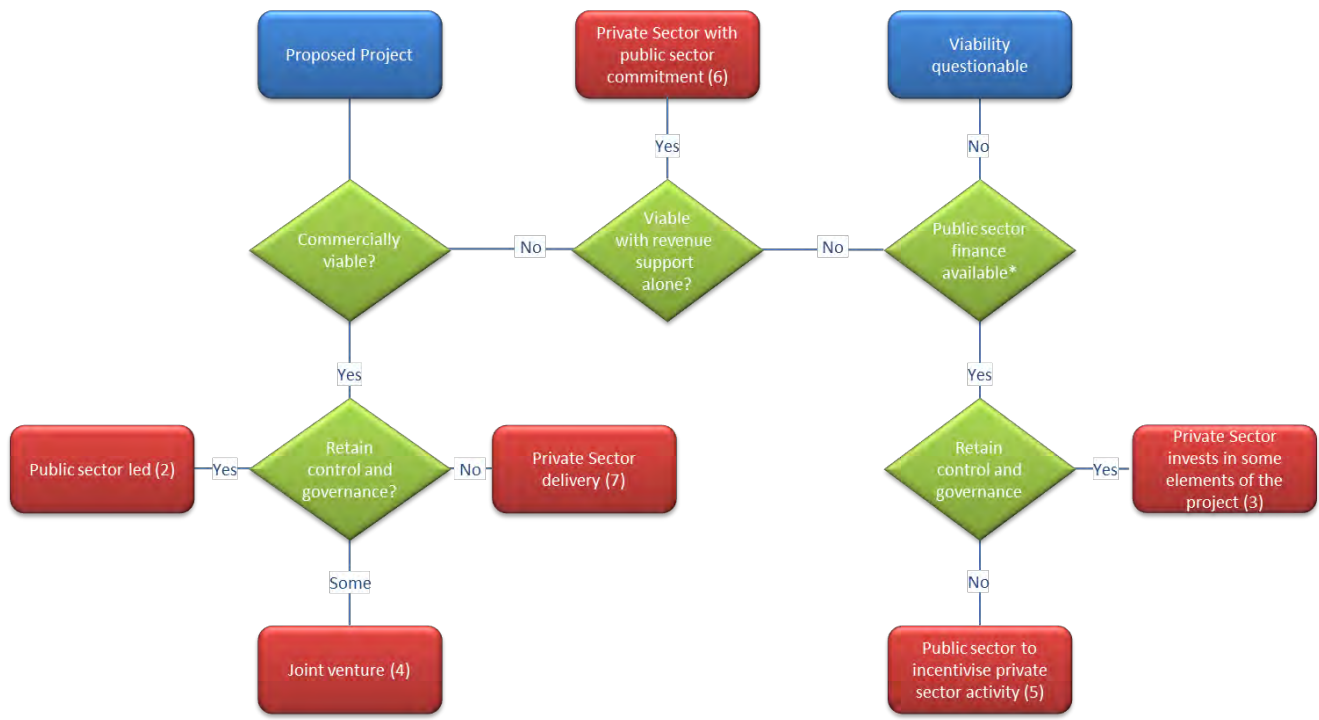
Delivery Structure Option	Potential Benefits	Risks and Issues
<p><i>Example: Public sector specifies and procures heat distribution system with the private sector investing in the energy generation plant.</i></p>	<ul style="list-style-type: none"> • Potential to utilise existing resources within the public sector organisation to deliver services. • Public sector continues to source gas and electricity through the existing electricity purchase agreement, thereby maximising the potential to establish and maintain a netting off agreement with the energy supplier. 	<ul style="list-style-type: none"> • Limited ability to transfer risks; the public sector retains demand risk for the scheme. • Limited opportunity to leverage private sector expertise in the development and delivery of the project.
<p>4 Joint venture, equal share in project with a private sector partner <i>Example: Public and private sector parties contribute investment, development and share risks. E.g. Birmingham City Council and Utilicom (GDF Suez) scheme.</i></p>	<ul style="list-style-type: none"> • Moderate development / set up costs. • Opportunity to leverage private sector expertise through use of a partnership. • Potential to transfer some risks to a private sector partner. The risk should sit with the party best able to manage it. • Project part-funded by the private sector. • High level of transparency on project performance. • Potential for the public sector to dispose of interest in delivery structure at a future point in time. • The creation of a partnership would enable the public sector to procure a single partner (which may be a consortium) to provide all construction, operation and maintenance support required for the project. • The public sector organisation continues to source gas and electricity through the existing agreements, thereby maximising the potential to establish and maintain a netting off agreement with the energy supplier. 	<ul style="list-style-type: none"> • Ability to secure private sector partner is dependent on project risks and returns. • Loss of some control; private sector involved in decision making. • Public sector in partnership with the private sector may impact on market interest if the public sector organisation's exit strategy is unclear. • Certain risks, for example, credit risk in residential district heating may not be attractive to private sector and may need to be retained by public sector.
<p>5 Public funding to incentivise private sector activity <i>Example: Public sector party funds over-sizing of plant and equipment to enable future connections from planned developments.</i></p>	<ul style="list-style-type: none"> • Minimal resources required from the public sector. • Enables delivery risk to be transferred to private sector, while retaining the opportunity to secure revenue income from the project and to divest interest at a future point in time. • Public sector finance support could be in the form of a guarantee to support future proofing of the project. • Moderate development / set up costs. • Opportunity to leverage private sector expertise through use of a partnership. • Would enable the public sector to procure a single partner (which may be a consortium) to provide all construction, operation and maintenance support required for the project. 	<ul style="list-style-type: none"> • Reduced control over the future development of the project. • Private sector may consider investment where only the profitable elements of the district heating system are included, thereby negating the ability of the public sector to meet key project objectives such as relief of fuel poverty and economic regeneration.
<p>6 Private sector ownership with public sector promise in element of the project, e.g. long term heat off-take agreement or underwriting consumer payment risks. <i>Example: Public sector party signs up to a long term heat off-take agreement on a take or pay basis to provide a stable revenue stream to private sector operator.</i></p>	<ul style="list-style-type: none"> • Minimal resources required from the public sector. • Moderate development / set up costs. • Opportunity to leverage private sector expertise through use of a partnership. • Potential to transfer delivery risks to a private sector partner. • No requirement for public sector funding • Would enable the public sector to procure a single partner (which may be a consortium) to provide all construction, operation and maintenance support required for the project. • Ability to secure additional forms of finance (e.g. project finance) through secure revenue stream provided by public sector organisation. 	<ul style="list-style-type: none"> • Very limited control retained by the public sector organisation. • Very limited opportunity for future revenue income. • Private sector may consider investment where only the profitable elements of the district heating system are included, thereby negating the ability of the public sector to meet key project objectives such as relief of fuel poverty and economic regeneration. • Private sector unable to utilise existing public sector agreements for electricity and gas and therefore potentially establish and maintain a

Delivery Structure Option	Potential Benefits	Risks and Issues
7 Private sector ownership with only involvement from public sector in facilitation role <i>Example: Public sector organisation provides heat mapping data and supports stakeholder engagement to enable private sector to develop a scheme.</i>	<ul style="list-style-type: none"> Moderate development / set up costs. Minimal resource requirement from the public sector. Enables 100% transfer of risk to the private sector. No financial investment would be required from the public sector. Would enable the public sector organisation to procure a single partner (which may be a consortium) to provide all construction, operation and maintenance support required for the Project. 	<p>netting off agreement for the electricity produced from the project, therefore potentially impacting the financial viability of the project.</p> <ul style="list-style-type: none"> Very limited potential for any control by the public sector organisation. Private sector may consider investment where only the profitable elements of the district heating system are included, thereby negating the ability of the public sector to meet key project objectives such as relief of fuel poverty and economic regeneration. Private sector unable to utilise existing public sector agreements for electricity and gas and therefore potentially establish and maintain a netting off agreement for the electricity produced from the project, therefore potentially impacting the financial viability of the project.

Decision tree

Figure 4 below provides an example of a decision making process a public sector organisation may follow in relation to a proposed district heating network, and how this impacts the delivery structure choice as described in table 11. The decision tree is based on the assumption that the public sector organisation is procuring a single district heating network which may be delivered in a number of phases. The decision tree provides a general guide to the preferred delivery structure options. However, district heating networks can be large and commercially complex, requiring bespoke delivery vehicles and associated contracts. For example, a public sector organisation may establish a delivery structure for the implementation of the transmission network, including an element of future-proofing, while the remaining elements, generation and distribution, are delivered by private sector partners.

Figure 4 District heating delivery structure decision tree



* e.g. are capital budgets or prudential borrowing capacity available?

Contract Structures

As with the previous technologies, the exact nature of the contract will be dependent on the risk-reward profile, availability of finance and scalability of the project; however there are a number of additional considerations for district heating such as:

1. Generation source – the use of surplus heat from existing generation sources, as opposed to a new generation facility, would result in a separate agreement for the provision of heat either in the form of a rental agreement for the use of pipework to supply customers or a heat purchase agreement between the pipeline operator and generator.
2. Future proofing – the contract structure would need to take into account any requirement to oversize or ‘future proof’ the network to take account of future planned developments or regeneration plans.

Such factors can result in the creation of separate contracts for the generation, transmission and distribution of the project. As a result the contractual structure for district heating projects can be complex, with multiple stakeholders undertaking different elements of the project. For simplicity Table 4.12 considers the contract structure for the project as a whole.

Table 4.12 District Heating example contract structures

	Delivery structure option	Example contract structures	Description
2	Public sector led, use of private sector contractors	Standard contract (design & build)	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
3	Private sector invests in some elements of the proposed activity	Standard contract (design, build & finance)	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
		Lease	Private or public sector may lease land or facilities for the project.

	Delivery structure option	Example contract structures	Description
4	Joint venture with private sector partner	SPV ²	Public sector forms special purpose vehicle with private sector entity for the design, install and operation of the project. Project risks are shared between parties in accordance with shareholders agreement.
5	Public funding to incentivise private sector activity	Standard contract	Private sector contractor is engaged to undertake design and install of project. Payment may be lump sum or time and materials.
6	Private sector ownership with public sector promise in element of the project	Power Purchase Agreement (PPA)	Private sector contractor designs, builds, finances and operates the project with the public sector committing to purchase power, which may be on a take or pay basis.
		Heat Take Off Agreement (HTOA)	Private sector contractor designs, builds, finances and operates the project with the public sector committing to purchase heat, which may be on a take or pay basis.
7	Private sector ownership with only involvement from public sector in facilitation role	Lease	Private or public sector may lease land or facilities for the project.

Aggregation

Aggregation in the case of District Heating is a more complex issue than under NDEE or small-scale renewables. To simplify the analysis district heating has been considered as two separate categories:

1. Single combined heat and power energy centre supplying a single building or a small number of buildings under the ownership of the same entity.
2. A district heating network with one or more energy centres providing heat and power to multiple buildings under ownership of multiple entities.

Single project aggregation

The case for aggregation in the first category is similar to that of small-scale renewables or NDEE and all three could be included under a single low-carbon framework. This would enable public sector organisations to consider energy generation in conjunction with a wider energy management plan and ensure that the hierarchy of energy management interventions is respected. The benefits, scope and options for aggregation in this category are very similar to small-scale renewables and therefore have not been repeated in this section.

District heating network aggregation

The development of district heating networks is generally driven by a strategic need for a specific city or area. District heating networks have been successful where a lead entity has developed a long-term vision (40+ years) for a city or area. The network is built over a number of phases based on the economic case of each; continued refinement of the phases as new heat loads are realised enables the network to respond and grow organically³.

As a result a generic aggregation approach is generally not appropriate as aggregation takes place naturally at the project level.

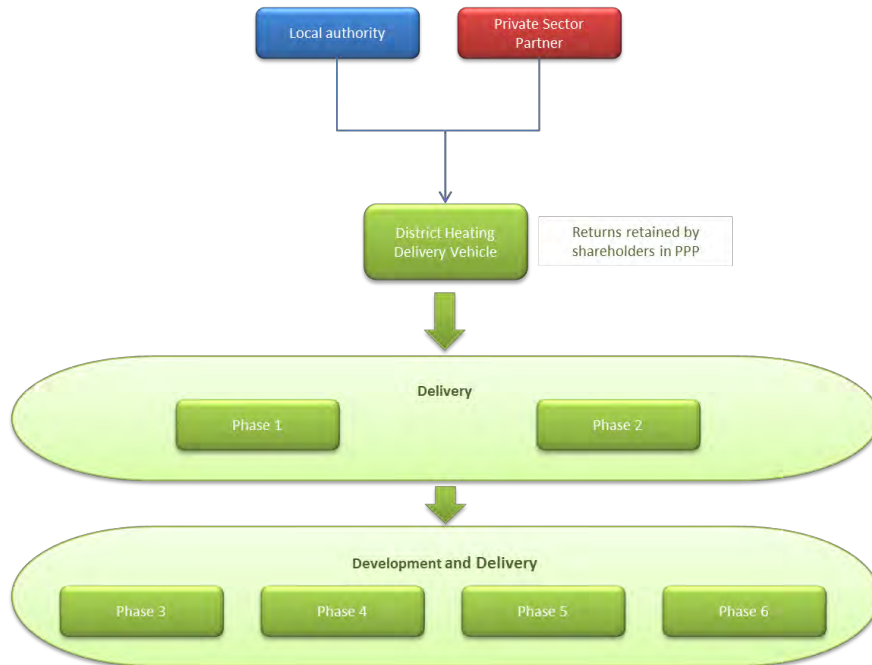
Figure 5 shows a potential delivery structure for the implementation of a district heating network. Under this structure the public sector entity (ies) (often led by a local authority) creates a delivery structure, potentially in conjunction with a private sector delivery partner, to facilitate the phased implementation of a district heating

² Joint ventures also include purely contractual arrangements as well as special purpose vehicles.

³ Potential future expansion of the scheme should be contemplated from the outset – including technical compatibility / standards to allow future phases / connections - and also from a commercial perspective.

network across the area. Any revenue returns generated by the works are either invested into future development and delivery of works or retained by the shareholder(s) of the delivery vehicle, the basis of which would be set out in the shareholders agreement. The delivery entity would be responsible for all elements of development and delivery.

Figure 5 District heating network delivery structure



Market activity

There are a number of existing district heating networks across the UK. Many of these have evolved significantly over a long period of time. For example, Nottingham City’s network was originally developed by British Coal, but is now owned by the City Council and incorporates several energy centres and multiple heat loads. There are, however, a number of ‘recent’ district heating networks such as that developed in Birmingham or in Lerwick in the Shetland Islands:

Birmingham City Council has a long-held vision to develop large-scale sustainable energy supplies across the City and took the first steps to developing a heat network in 2003. Two initial schemes were identified, which were procured in 2005/2006. Utilicom were selected as the preferred bidder and formed a wholly owned subsidiary as the delivery vehicle for the project. They signed the first 25-year agreement in 2006 and a further agreement in 2008. The team is currently identifying other areas across the City to grow the network further and ultimately interconnect each of the phases currently being developed.

The Lerwick district heating scheme has been financed by the Shetland Islands Council Charitable Trust (and European Regional Development and EU Thermie funding). Shetland Heat Energy and Power Ltd was set up to run the scheme.

The scheme commenced operation in November 1998 using backup oil-fired boilers. In November 1999, the 7 MW waste-to-energy plant run by Shetland Islands Council became operational, leaving the oil boiler plant as standby and to meet peak loads. A 15 MWh hot water thermal storage tank was constructed in 2006 at the peak load boiler station to reduce the use of the peak load boilers by storing up heat at night and using it at peak times when the load outstrips the surplus heat output from the waste-to-energy plant.

Additional boiler capacity has been added to provide capacity of 15MWh. The scheme currently has about 30 km of mains and serves at least 1110 properties including a sports centre with swimming pool, 3 schools, the largest pelagic fish factory in Europe, a dairy (using heat for pasteurisation), residential care centres, a library, the main hospital, offices, retail premises, a museum, hotels and guest houses, public buildings, council and private housing, amongst others.

Further extensions are planned including expansion through greater use of stored wind-powered energy including excess energy used to run the thermal storage, completely removing the need to burn oil at peak times.

5. Strategic Aggregation

Previous sections have considered approaches to delivering individual projects in each sector. This is important as it highlights the contractual mechanisms and approaches which are possible. Aggregation at a sector level has also been addressed within each sector section. At this level the primary drivers for aggregation are economic, to cost effectively develop, procure and deliver projects across multiple organisations with similar aims and objectives. This section considers the wider strategic approaches to aggregation and associated structures.

Aggregation drivers

Multiple public sector organisations working collaboratively across single or similar multiple technologies over several geographical areas have the potential to create significant economies of scale and efficiencies in delivery. They can bring an aligned approach to delivery which simplifies project development and delivery for sponsors, and through scale and more consistent delivery approaches, be more attractive both to private sector delivery partners and, where appropriate, to external financing markets.

There are also potential benefits of delivery at scale of a more strategic nature, which can be accelerated by the delivery of aggregated programmes including achievement of wider objectives relating to:

1. Economic development and job creation
2. Inward investment to a specific area
3. Energy security
4. Sector specific technological requirements
5. Carbon reduction targets

In addition, the longer, more visible development pipelines of aggregated programmes can be more easily integrated into wider asset management plans and regeneration programmes.

The exact nature of these drivers as well as the differing objectives and budget requirements of various public sector organisations mean that a 'one size fits all' strategic integration structure may be difficult to achieve for one or multiple technologies. As a result three different strategic aggregation approaches have been identified:

Strategic aggregator 1. Local ESCo – A single organisation aggregating projects across a single defined area.

Strategic aggregator 2. Sectoral SPV – A single organisation aggregating projects across multiple areas.

Strategic aggregator 3. Strategic engagement – Multiple organisations aggregating projects over a defined area or region.

The outline concept and structure of each of the aggregation approaches are explored in further detail in the remainder of this section. They have been illustrated by reference to specific sectors for example, Local Authorities or the NHS, and can be based upon specific technologies but the broad concepts of the approach will be applicable across a number of sectors and technologies.

However each type of public sector organisation has its own issues of governance, financial resources and budgetary allocation and specific powers of implementation. Consequently within this report the aggregation structures are illustrative. Each implementation opportunity of these aggregation approaches will need to be developed further in accordance with the governance, powers, procurement regulations and resource constraints of the sponsoring bodies.

Strategic aggregator 1 – Local ESCo

Public sector organisations and local authorities in particular are undergoing changes as spending capacity reduces. Future changes to resourcing and funding mechanisms will require new, cooperative approaches to service delivery, particularly for large-scale infrastructure. Many local authorities are cognisant of this need.

They have a good understanding of their energy strategy and the types of investment which will drive its achievement and wish to establish structures which have the flexibility to deliver a wide range of energy related initiatives. This may include, but is not limited to, energy efficiency retrofit, energy generation, collective energy purchase, energy consultancy, and energy performance assessment. In addition they need to ensure that any proposed approach is able to complement existing initiatives. Therefore what they need is an effective, “galvanising” structure to bring together and implement their overall strategy and act as a focal point for development and implementation of investment opportunities.

This example sets out a potential aggregation approach which enables the focused delivery of a specific technology or group of technologies while retaining the desired flexibility. The example below is based on a local authority seeking to develop an initial district heating network while retaining the flexibility to deliver multiple technologies; however, the starting technology could vary depending on need. In each case the delivery structure and contracting approach would follow the options appraisal process as set out for each technology within Section 4.

Structure

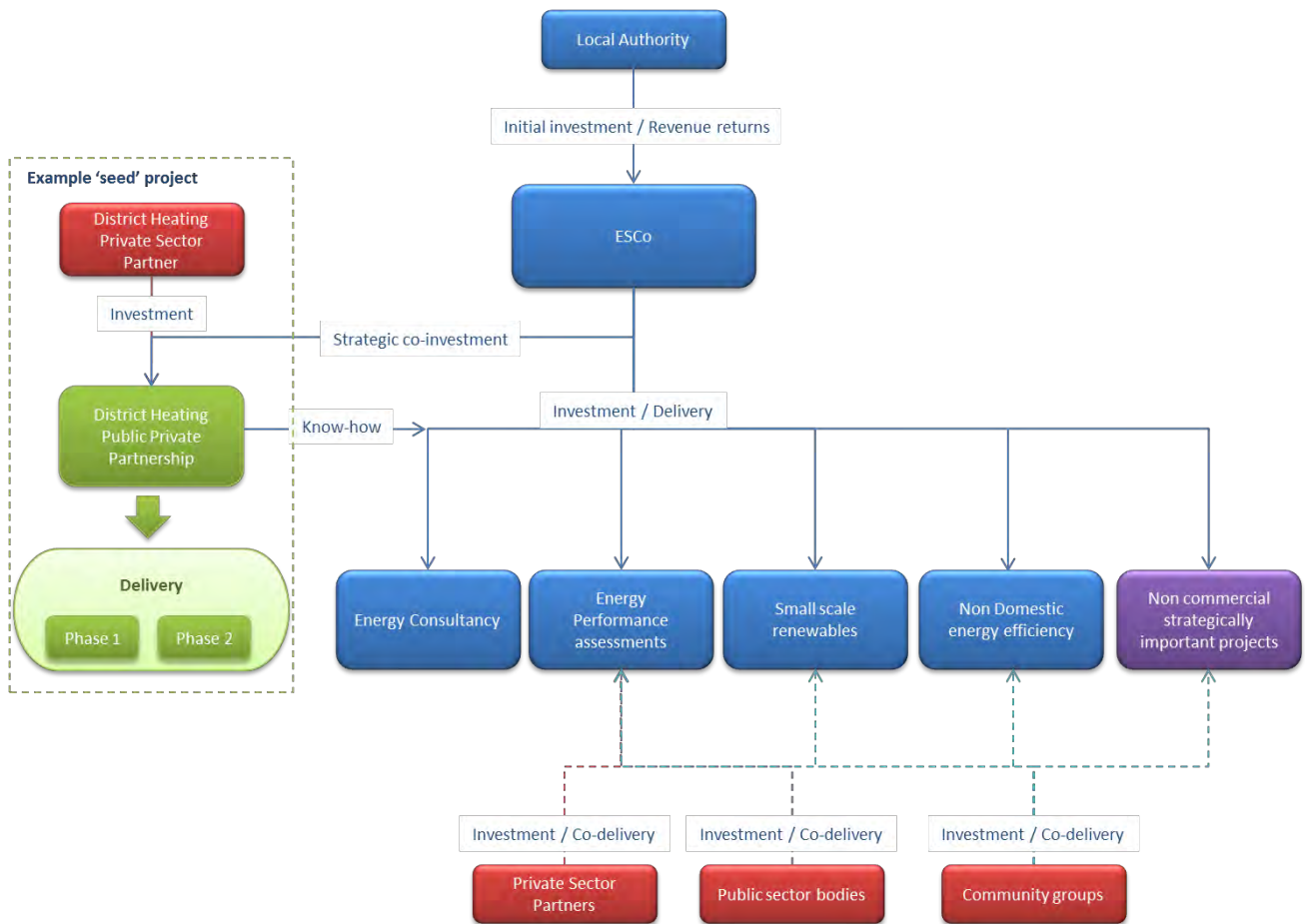
Under the proposed structure the local authority would form an arm’s length organisation typically referred to as an ESCo. Historically ESCos or Energy Service Companies have been defined as businesses that develop, install and finance projects designed to improve energy efficiency often featuring sustainable energy sources. Different applications of the ESCo concept include:

- Public sector led (with or without private sector partners) to deliver an individual project or a programme, e.g. Aberdeen Heat and Power Co Ltd, an arm’s length not for profit company limited by guarantee but embedded within the Council;
- 100% private sector entities which design, build, operate and manage an individual facility, e.g. many combined heat and power networks in the healthcare industry; and
- An entity which provides services to another entity and guarantees savings or emissions reductions, e.g. Honeywell Energy Services, Vital Energy etc.

In summary an ESCo is a broad term used to describe a number of potential delivery options for energy efficiency or alternative energy interventions with the common theme of creating an entity that takes responsibility for delivery. For the purposes of this report the term ESCo refers to a public authority (usually local authority) wholly owned delivery vehicle for the investment and/or delivery of energy services. We describe the structure below from a local authority perspective.

The local authority ESCo (“LA ESCo”) is a single strategic entity with the potential to invest in and deliver projects directly; invest in separate delivery vehicles created on a sector basis; or, cooperatively deliver wider energy related services with community groups, businesses or other public sector bodies as shown in Figure 6.

Figure 6 Strategic aggregator 1 structure



In its simplest form the LA ESCo, an arm's length wholly Council owned entity, could be set up around a specific project to give it an initial focus and momentum. It could procure and work in partnership with a private sector entity to deliver the early phases of a district heating network. It could then seek to develop and deliver further phases over an extended time period. While the lives of the assets developed could potentially be up to (or in the case of district heating pipework in excess of) 40 years, the partnership agreement would likely be for shorter periods of time with opportunities to either extend or terminate at discrete points in time.

The role of the LA ESCo could be further extended to incorporate other energy related activity focused on enabling the future pipeline of projects, including:

1. Energy consultancy – the local authority's energy team could consider providing energy advice and support to other public sector bodies such as has been adopted by Northampton City Council.
2. Energy performance assessments – similarly to point 1, the local authority could consider delivering a range of services related to energy efficiency retrofit.
3. Small-scale renewable projects- the local authority may wish to develop and deliver additional small scale energy projects, subject to market conditions.
4. Strategically important projects – in order to meet its strategic objectives the local authority may wish to implement additional projects potentially in cooperation with communities or other public sector bodies. The LA ESCo could provide a vehicle for the development and delivery of such projects and could ultimately channel returns from projects with faster payback into more marginal projects.

Benefits

Establishing the LA ESCo as a separate legal entity with the associated governance arrangements can generate a number of benefits, including:

- Clarity and focus around the development and delivery of large and small scale energy related projects.
- Development and investment in projects and initiatives based on sound business cases.
- Generation of transparent revenue streams that could be ring-fenced for investment in future energy related projects or returned to central funds.
- Ring-fencing of energy development risks within the ESCo structure
- Increased energy security for the area.
- Potential to address wider strategic objectives such as relief of fuel poverty.
- Clear line of sight between energy projects and economic development, including jobs safeguarded or created as a result.

This combination of improved strategic focus, enhanced development support and skills, creation of a more consistent pipeline of delivery and clearer revenue streams creates a stronger platform for engaging with private sector delivery partners and potentially creates a more attractive market opportunity which can support better commercial terms.

Market examples

A number of local authorities have created ESCos to address energy provision and/or management; these include Peterborough, Birmingham, Coventry, Nottingham, Woking, Sheffield, Southampton and Kirklees. Of these the majority have been developed to deliver district heating networks, with the exception of Peterborough who have developed an ESCo to provide a range of services and deliver projects across the Peterborough area and beyond. Peterborough City Council has established a wholly owned ESCo, Blue Sky Peterborough. The ESCo has procured, or is in the process of procuring, a range of energy related projects including solar PV and energy performance contracting. The aim is to expand upon the range of measures that can be delivered, with the overall vision for Peterborough to become a net exporter of energy.

Strategic aggregator 2 – Sectoral SPV

Some public sector organisations operate across a number of areas across the country such as NHS Scotland or the Scottish Prison Service. The specific drivers for such organisations may require an organisation-specific aggregation approach that aligns with their strategic objectives at a national level and provides an effective delivery mechanism that provides a national, harmonised approach that facilitates an effective flow of investments from business case through development and financing through to delivery.

This section sets out a potential aggregation approach for a single organisation across multiple sites / areas. The example is based conceptually on NHS Scotland (which leads coordination of its energy efficiency activity through NHS Health Facilities Scotland⁴ (“HFS”)) seeking to develop an approach which provides a range of funding sources to support everything from small-scale projects through to large-scale infrastructure. However within the scope of this report we have not examined the governance, powers, and constraints specific to its further implementation in NHS Scotland. In each case the delivery vehicle and contracting approach would follow the options appraisal process as set out for each technology within Section 4.

⁴ NHS Scotland is divided into boards, 14 of which are territorial and 8 special (covering a mix of clinical and support functions). The NHS Health Facilities Scotland sits between the boards and the Scottish Government advising on policies and their impact on the NHS.

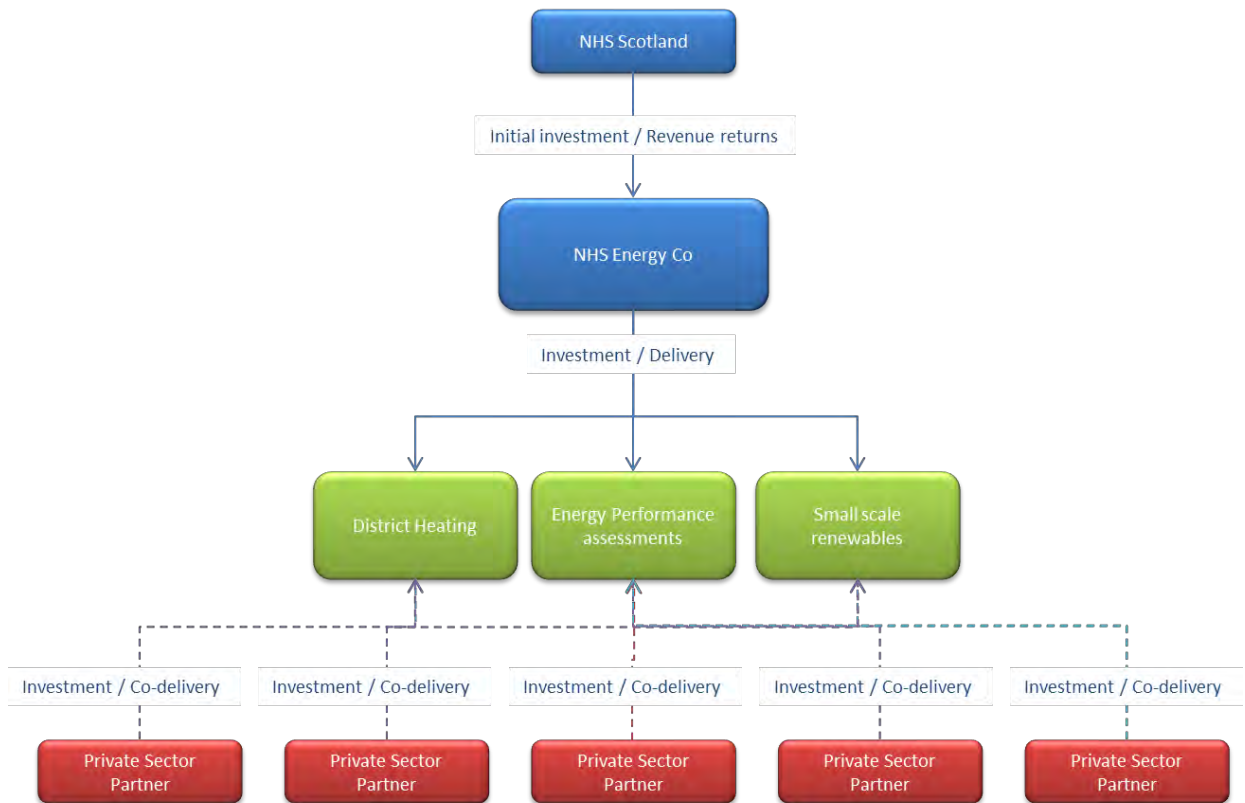
Structure

Under the proposed structure an SPV would be created which would be wholly owned and controlled by NHS Scotland (in this case presumably through HFS) as it manages access to funding. Key attributes of the SPV would be:

1. Arranging access to a range of finance sources to support a range of project types from 'quick wins' to large scale investments such as site-specific CHP.
2. Ability to secure outcome based procurements with remuneration linked to the benefits realised.
3. Procure a framework of private sector contractors which would cover a range of technologies and include the facility to support project development.
4. Risks would be ring- fenced to the SPV.

The structure of the SPV could take a variety of potential forms, depending on the needs and constraints of the sponsoring body.

Figure 7 Strategic aggregator 2 structure



The powers of the NHS in Scotland to participate in companies and joint ventures are governed by the Functions of Health Boards (Scotland) Order 2006. The form of entity and investment in the SPV would need to be considered against this legislation.

Benefits

Establishing a separate SPV with the associated governance has the potential to generate a number of benefits to NHS Scotland, including:

- Scope to procure a framework of providers who can meet the specific technologies and technical requirements of the NHS, e.g. ventilations specifications.
- Investment and funding can be aligned to NHS budgets.
- External funding needs and processes to secure committed project funding can be matched both to the needs of the overall programme and provide options to meet the specific requirements of the individual procuring entities, e.g. availability of capital resources.
- Support in and focus on the development of projects and knowledge sharing facilitation.
- Ability to adhere to hierarchy of energy management interventions therefore maximising benefits realised in terms of energy consumption savings.

HFS could also consider a joint venture approach, which might involve one or more providers of finance and/or development capability to extend the financing and project development outcomes that can be achieved through this approach.

Market examples

The NHS (across the UK) currently runs an initiative called the Carbon and Energy Fund which is designed to make it easier for Trusts and Boards to implement energy infrastructure upgrades, repaid through guaranteed savings. The CEF brings together the specialist expertise in and around the NHS and consolidates the procurement of advisors and contractors. It operates as Carbon Energy Fund Scotland within Scotland.

Strategic aggregator 3 – Strategic engagement

One of the key factors in successfully addressing energy efficiency and ultimately addressing the challenges of climate change will be the ability of both public and private sector organisations to work collaboratively within a defined area to deliver an overall strategy.

Collaboration at a project level can be relatively easily articulated, for example a large-scale district heating project may have multiple stakeholders with different project interests such as heat load, provision of an energy centre or wayleaves for the pipeline route. Strategic Integrator 1, the local ESCo, is focused on providing delivery momentum to a technology, or identified group of technologies, within a defined area. It can develop to a point where it contributes to strategy development as it matures but that is not its starting point.

Where the starting point is developing an overall low carbon strategy for a specific geography, for example a city or city region, and developing a plan to maximise achievement of a ranges of strategic objectives with limited resources a more collaborative approach is required. Collaboration at a strategic level for a specific area is less easily defined however it can be best understood as a strategic partnership of a range of entities with an interest in the energy provision in an area or city.

This section sets out a potential aggregation approach for multiple organisations over a defined area, which initially focuses on drawing together. The example is based on a city-wide partnership seeking to develop a strategy and deliver projects across the city. Again, in this example the delivery vehicle and contracting approach would follow the options appraisal process as set out for each technology in the preceding chapters.

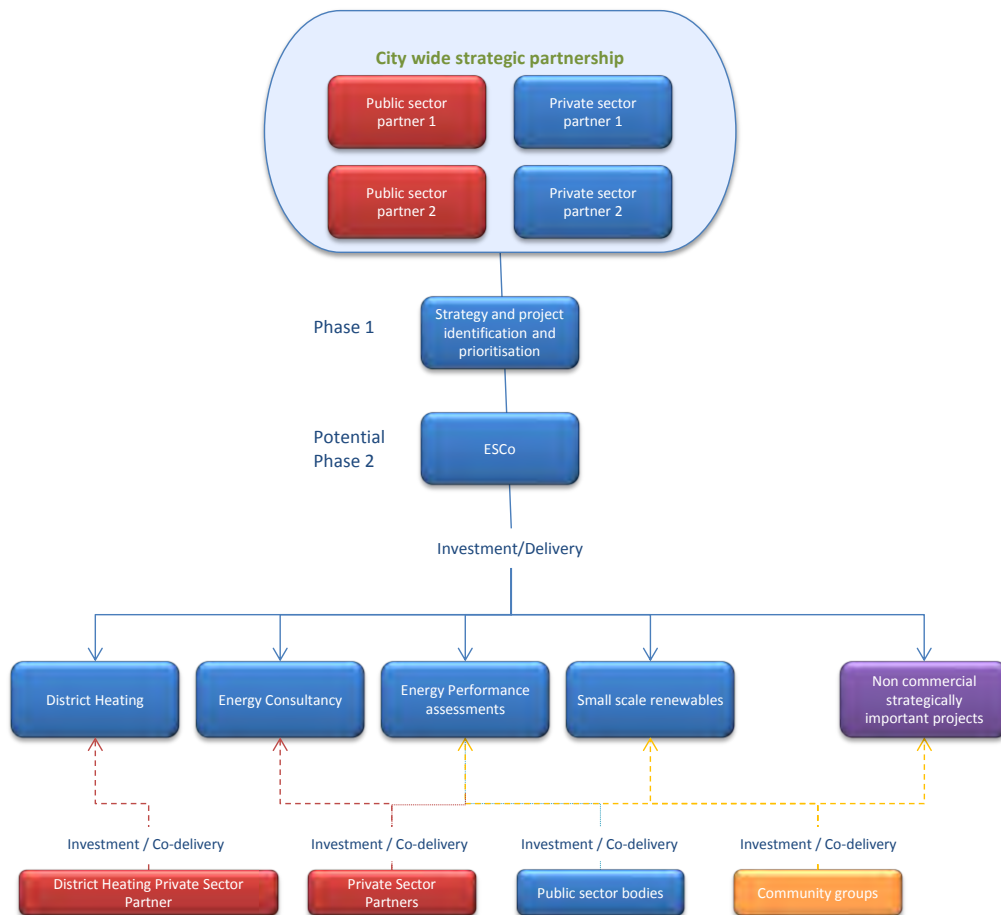
Structure

Under the proposed approach a strategic partnership would be established with key stakeholder representatives from public and private organisations. The private sector partners could include local stakeholders who can act as partners in creating and delivering the strategy but also companies bringing low carbon know-how to help inform strategic decisions. The partnership would seek to set the strategic direction for energy across the city and where appropriate procure delivery partners for specific projects. A key consideration in determining the

governance arrangements for the strategic partnership will be the ability to remain independent during any procurement, as there is a high probability that some stakeholders represented will also seek to deliver future schemes.

It should be noted that services required by the Strategic Partnership will need to be procured unless the Strategic Partners were procured to deliver a range of services including the role of a Strategic Partner. Once priorities and initial delivery plans are identified this may develop into one or more ESCo structures. To progress these into delivery phases.

Figure 8 Strategic aggregator 3 structure



Benefits

There are a number of benefits that can be realised through establishing a strategic partnership for a specific area, including:

- Ability to draw on the experience of a range of public and private sector organisations in relation to energy management and provision.
- Ability to understand the current and future energy demands of the city.
- Linkage to the city’s wider strategic development plans.
- Potential to create a coherent and focused approach to energy, without duplication of effort across the city.
- Potential to balance generation and consumption of energy across the city.

Market examples

Sustainable Glasgow is a city-wide partnership formed to help Glasgow become one of the most sustainable cities in Europe. It brings together partners from higher education, the public and private sectors to work with local people, communities and businesses. It aims to help the city reduce its carbon emissions by 30 per cent within 10 years and build a greener and more sustainable future for Glaswegians. It is estimated that green energy initiatives will bring £1.5 billion of new investment into Glasgow during the decade. Sustainable Glasgow is identifying opportunities for a range of city-wide projects that will:

- Deliver major investment
- Create long-term jobs
- Develop the clean energy supply chain in Glasgow
- Help tackle fuel poverty
- Create new revenue streams for the public sector and communities
- Improve air quality
- Help regenerate communities
- Improve the appearance of the city
- Make Glasgow a leader in sustainable urban living
- Help transform Glasgow's image on the world stage.

Legal structures for aggregation

This section provides a high-level overview of the potential legal structures that public sector organisations could use for the aggregation structure and the key considerations in determining the most appropriate legal structure. The table below sets out the key UK legal structures that may be appropriate for the delivery of NDEE, small scale renewables, district heating and ESCo projects. It should be noted that the legal structures set out below are not the starting point for establishing the most appropriate delivery structure for a project, but follow the risk–reward analysis as set out in the previous sections.

Table 13 UK legal structures

Legal Structure	Description / Commentary
Company limited by guarantee ("CLG")	Primarily used for non-profit organisations, does not usually have share capital or shareholders but members who act as guarantors. CLGs are commonly used in the public sector. A CLG is more suitable to a body that is not designed to be a wealth creator for the members, but rather a vehicle to manage specific activity. A CLG would not facilitate any future disposal of a public sector body's interests to the private sector. A CLG is liable to pay tax. Should the CLG be dissolved any surplus could be distributed to the members in proportion to their interests.
Company limited by shares (CLS")	A private company limited by shares has shareholders with limited liability. CLSs are easily understood structures and regulated by the Companies Act 2006. A CLS can trade, raise finance and invest in or be sold to third-party investors. A CLS is liable to taxation and should the CLS be dissolved any surplus would be distributed to the shareholders in proportion to their interests.
Limited Partnership ("LP")	A form of partnership in which in addition to one or more general partners, there are one or more limited partners. Only one partner is required to be a general partner. Limited Partners have limited liability, meaning they are liable only for debts incurred by the partnership to the extent of their registered investment and have no management authority. They are paid a return on their investment (as defined in the partnership agreement).
Limited Liability Partnership (LLP")	A partnership in which all partners have limited liability. Tax transparency of the LLP (with each partner being taxed on its interest in the LLP rather than the LLP being taxed in its own right). This is generally advantageous to public sector partners who are not subject to corporation tax. On dissolution of the LLP any surplus would be distributed to the partners in proportion with their interests. LLPs are a relatively new legal form and their suitability as a vehicle able to facilitate a transfer of ownership from the public to the private sectors has not been fully tested in the market.
Community Interest Company ("CIC")	Introduced in 2005, designed for social enterprises to use their profits and assets for the public good. Includes provisions such as an asset lock which would mitigate against any future disposal to the private sector and consequent realisation of the public sector's investment.

Mutual	<p>The term “mutual” is used as an umbrella term for several different ownership models. The distinguishing characteristic of a mutual is that the organisation is owned by, and run for, the benefit of its members, who are actively and directly involved in the business – whether its employees, suppliers, or the community or consumers it serves, rather than being owned and controlled by outside investors.</p> <p>Mutuals can be based on a variety of different legal structures; however, there is also an incorporated legal structure which is specifically mutual: the industrial and provident society. There are two types of these: Co-operative Societies and Community Benefit Societies (BenComms).</p> <p>Co-operative Societies operate for the benefit of their members, and distribute any surplus not reinvested in the business to those members. BenComms conduct business for the benefit of their community. Any profits are not distributed among members, but returned to the community. They therefore provide a legal structure designed for social enterprise. Industrial and provident societies always have a mutual ownership structure. The term “Co-operatives” describes a wider movement of mutual enterprises, which includes all Co-operative Societies and Community Benefits Societies. However, not all co-operatives use these legal structures – many are in fact limited companies. The Government is working to support and enable mutuals, social enterprises and charities to have much greater involvement in the running of public services. There are plans to give public sector workers the right to form employee-owned co-operatives and bid to take over the services they deliver. The intention is to harness the benefits of the mutual model to empower staff to innovate and to improve public service delivery.</p>
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There are a number of key areas that public sector bodies should consider when identifying the most appropriate legal structure for their chosen delivery structure. These are detailed below.

Table 14 Key considerations when identifying the legal structure for the proposed project.

Key considerations	Comment
Commerciality	Will the proposed project operate as a commercial entity with appropriate returns on investment or would a not-for-profit organisation be more appropriate?
Exit strategy	Would the public sector organisation seek to divest from the project at a future point in time? A CIC, for example, includes provisions such as an asset lock which would mitigate against any future disposal and realisation of the public sector’s investment.
Limitation of liability	Where the public sector organisation is an investor into a project consideration should be given to the ability to limit the liability associated with the investment.
Stakeholder management	There are a number of stakeholders associated with the project and the delivery vehicle will need to operate effectively with customers, contractors, energy suppliers etc.
Funding and financing	The delivery vehicle will need to support the proposed financing arrangements for the project; particular consideration should be given to this where a joint financing arrangement is proposed.
Project returns	Would the public sector organisation seek a return from an investment made? Would any surpluses be reinvested into the project or retained by the public sector organisation for other services?
Tax position	Consideration should be given to the tax position of the public sector organisation, including: direct tax, capital allowances, finance costs, stamp duty, stamp duty land tax and VAT.
Accounting treatment	Consideration should be given to the accounting treatment of the proposed delivery vehicle. Particular consideration should be given to the case where a project is initially owned by a public sector organisation and subsequently incorporates private sector investors.
Procurement	Both in relation to the anticipated extent of public and private sector participation in the proposed delivery vehicle and in relation to any intended contracts to be awarded by it.
State Aid	The structure and related contractual documentation should be compliant with relevant State Aid legislation.
Vires	The public sector organisations would need to refer to the relevant regulations governing their ability to receive an income as a result of investment in such a project and ensure that the proposed approach is not ultra vires and that the appropriate permissions have been secured. Likewise, public sector organisations would need to ensure that any intended governance arrangements for the delivery vehicle do not contravene relevant regulations and governance requirements.
Best Value	The option which provides the most advantageous solution based upon both financial and qualitative parameters.

At this stage it is not possible to narrow down the options for the legal structure. Further analysis should be undertaken on a project by project basis to understand the priorities of the public sector organisation(s) concerned.

6. Conclusions and next steps

Conclusions

1. There are clear objectives for reducing carbon emissions in Scotland and the public sector has control and governance over a number of areas where reductions can be made. While progress is being made, the rate of investment needs to increase. Markets in the three focus areas, while small, are developed and development of economically and practically deliverable projects for delivery is an important area of focus and, at present, the principal area of constraint.
2. Given a pipeline of deliverable projects in the three focus areas, there are incremental benefits to be obtained for public sector sponsors from adopting appropriately developed delivery structures and from aggregation of projects, whether across a geographic area or by bringing together similar projects. In general, the potential benefits increase with greater levels of aggregation, though realisation of benefits becomes more complex.
3. Aggregating projects on a strategic level is appropriate when there are clear, identifiable drivers to do so. For example, a clear decision by a local authority to utilise the energy sector to address a range of strategic objectives.
4. The different drivers of different public sector organisations suggest that a single strategic aggregator is unlikely to be successful.
5. The creation of strategic aggregation structures is not mutually exclusive from the aggregation of projects at a sector level. Combining strategic aggregation with sector based aggregation will enable economies of scale to be realised at a project level while ensuring clear direction and adherence to the hierarchy of energy interventions on an area or organisational basis.
6. Aggregation at both levels will enable knowledge sharing and sector specific input on a project by project basis. Consideration should be given to development units to support the development of projects at a sector level.
7. Sector specific aggregation could be combined for the following technology areas:
 - a. NDEE Retrofit
 - b. Building specific small scale renewables
 - c. Building specific single user combined heat and power (including non-renewable energy sources)
8. Aggregation at a sector level is not appropriate for larger-scale district heating networks with multiple stakeholders due to their size and complexity. A bespoke project by project approach is required, although a central support unit to assist in the identification and phasing of projects could be established to accelerate development.

Next steps

This report has identified a range of approaches to aggregation of low carbon projects on either a technology basis (i.e. non-domestic energy efficiency, small-scale renewables or district heating) or as a strategic aggregation (i.e. on an area basis, for example, a city region, or on a sector basis, for example, the NHS). We would recommend that SFT explores the most appropriate aggregation options with key stakeholders such as the Scottish Government, Local Authority representatives and other sector leaders within central government and the NHS.

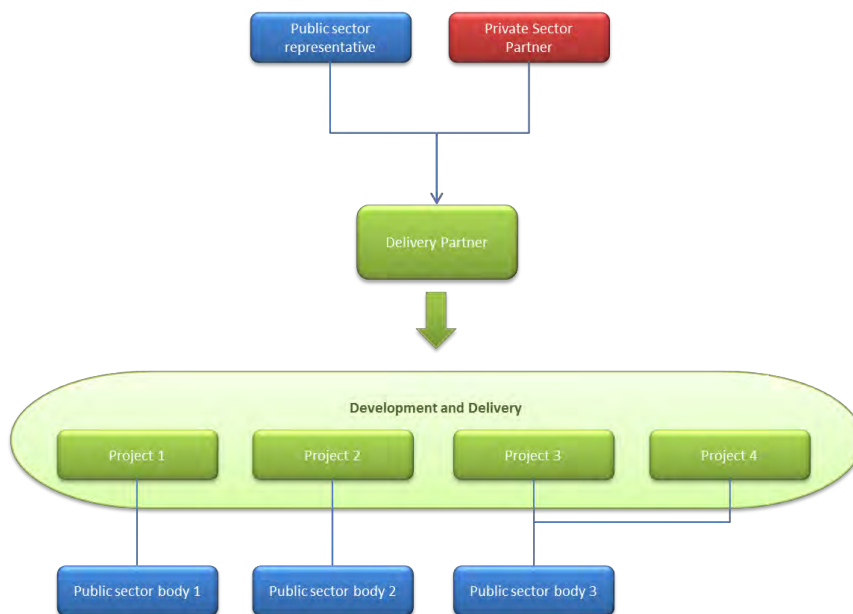
Appendix 1

Single delivery partner

An individual public sector body or a group of public sector bodies procure a single delivery partner for the delivery of a specific technology or multiple technologies on behalf of all participants.

The role of the delivery partner will be to deliver works rather than to develop projects. These works could be on single projects or a range of projects within the same broad sector. It is likely that a number of delivery partners would be needed to deliver non-domestic energy efficiency works, small scale renewables and district heating due to the very different skills sets in each of these areas.

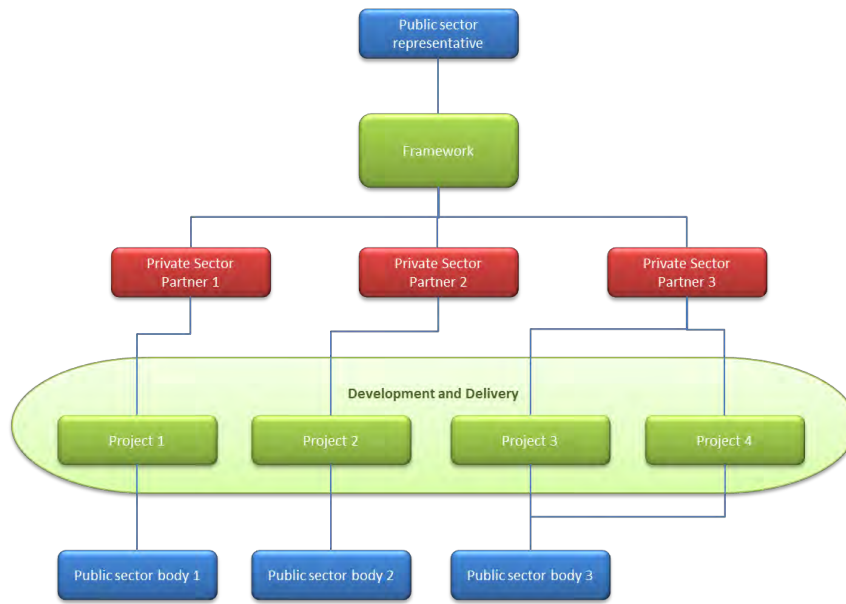
It would be an appropriate approach when there was a large number of similar projects which would benefit from a streamlined approach to procurement, a consistent approach to delivery and could generate economies of scale. Figure 9 Single delivery partner



Framework

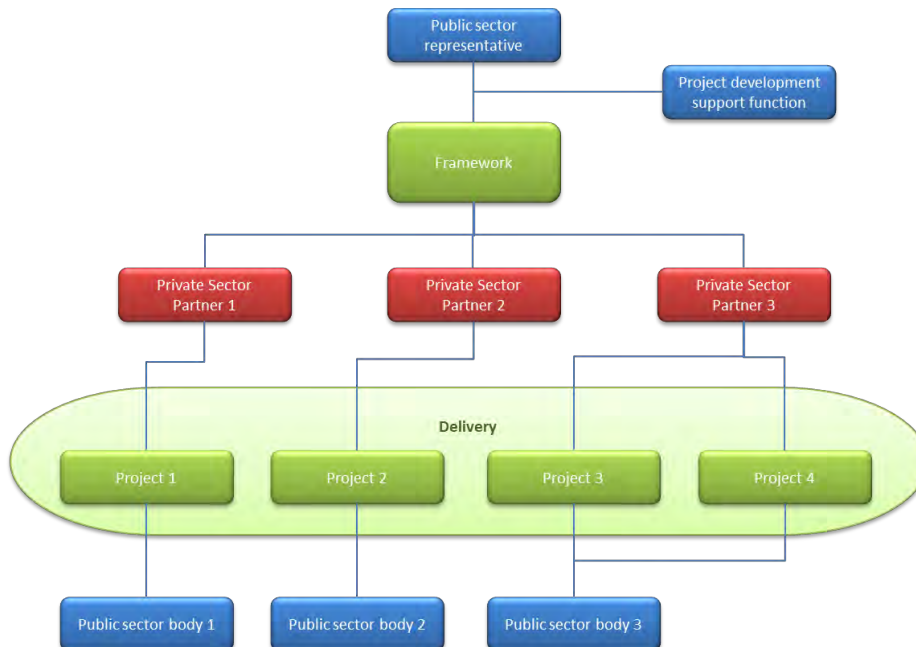
Framework structure – a representative body of the public sector procures a framework of suppliers for a single technology or multiple technologies as set out in Figure 10:

Figure 10 Framework



A number of framework approaches exist within the UK for example, LONDON RE:FIT. The framework can be established with a separate project development function. In this instance a representative body of the public sector procures a framework of suppliers for a single technology or multiple technologies as set out in 11. The framework is supported by a separate project development support function which could be provided by an existing public sector organisation or outsourced to a private sector entity. The function would support public bodies wishing to use the framework in creating ‘shovel ready’ projects and could potentially provide finance support or access to finance.

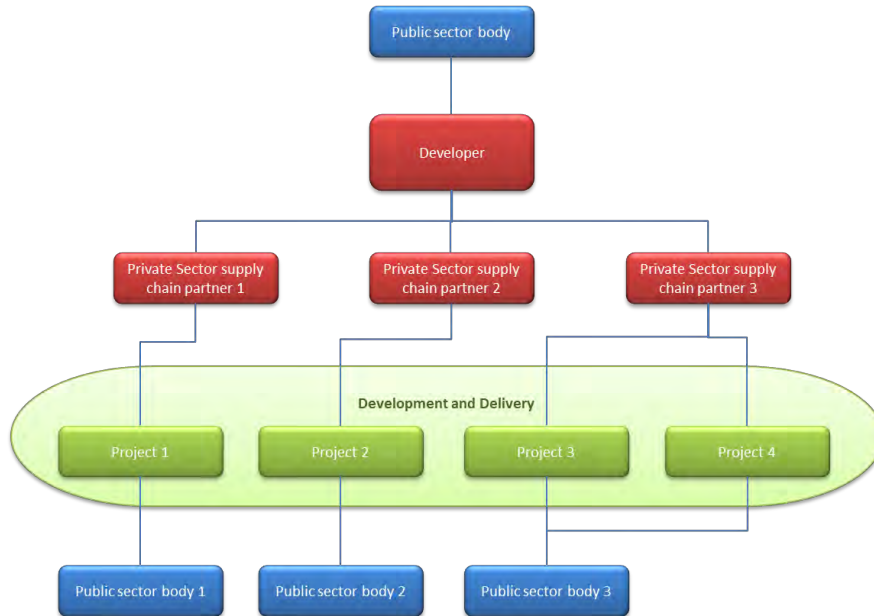
Figure 11 Framework with project development support function



Single developer

A representative body of the public sector procures a development partner with an established private sector supply chain to deliver a specific technology or multiple technologies on behalf of all participants. Under this approach the Single Developer will develop as well as deliver individual projects. This approach is similar to the approach adopted by Peterborough City Council. The Single Developer will have access to a supply chain which potentially straddles a wide range of technologies.

Figure 12 Single developer





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