

INFRASTRUCTURE INVESTMENT BOARD

Funding and Financing of Scottish Infrastructure

1 Purpose

- To review the current challenges, relative costs and opportunity costs to Scottish Government of infrastructure funding and financing levers, building on the Board's consideration of the issues in 2018 (Sections 3, 4 and 5);
- To invite IIB to consider their role in the decision-making framework for infrastructure investment (Sections 6 and 7), developing a common approach for portfolios to assess the conditions and readiness to enable new models of infrastructure investment.

2 Context

- 2.1 In October, the IIB considered the commitments set out in the Capital Spending Review and the Infrastructure Investment Plan (published February 2021) as well as the additional priorities agreed through the Cooperation Agreement (with the Scottish Greens Party) and the Programme for Government.
- 2.2 These commitments were set against a backdrop of a revised capital funding position and the need to consider a prioritisation approach to maximise the impact of Scottish Government's own capital investment sources taking cognisance of the investment hierarchy and the potential to leverage these resources to deliver outcomes for Scotland.
- 2.3 Early in the last decade when the UK was coming out of a financial crisis, significant public sector capital budget reductions then led to the introduction of alternative funding structures to deliver much needed construction sector activity and infrastructure investment in public sector owned road and social infrastructure. These funding approaches brought in private finance upfront and a commitment to repay with government resource budget over time. Investment in economic infrastructure such as energy, water and telecoms during this period continued using the existing market and regulatory regimes in place which sufficiently incentivised the private sector to invest and the bill payer to fund during that period.
- 2.4 In the planning phase of the National Infrastructure Mission in 2018, IIB considered a tool for matching funding and financing levers at its disposal to projects. This approach envisaged enabling the Scottish Government to maximise investment overall by drawing on those funding methods which offer lowest cost of funds or lowest opportunity cost. This tool was shared with spending portfolios to guide them in their decision making processes and encouraged them to explore alternative options. It was also published in the 2019 Medium Term Financial Strategy alongside details of each of the funding and financing mechanisms. Section 4 includes an update of this guide and Sections 5 to 9 will cover some of the wider issues for consideration alongside such a tool.

3 Current Infrastructure Challenges

3.1 Scotland continues to face significant challenges to its funding such that the investment 'toolbox' requires expansion. The challenges are grouped under the following 4 headings:

Complex infrastructure for climate change

- The scale of investment is so significant and will have intergenerational impact. The direct costs cannot all be borne by government upfront and therefore private investment is needed alongside government resources.
- Any additional investment from the private sector requires an income stream to repay it – either through government subsidy, regulatory tools, increased bills or raising revenue through general taxation beyond the current levels.
- Scale of societal change will influence the speed and development of the new infrastructure eg switching to zero emissions heating in our homes, our workplaces and in our communities, decarbonising our industries and transport. These require coherence and coordination from diverse portfolios and to align with consumer engagement.
- The long-term horizon between infrastructure needs identification, development and delivery means investing in generation and network infrastructure in advance of need.

Technological changes and digital

- Infrastructure in all sectors is increasingly reliant on data and analytics as well as the associated data storage which relies on strong underpinning connectivity networks.
- Market mechanisms have incentivised the private sector to increase connectivity across Scotland however the market will not go to the hardest to reach places under the current market regime and the technology is still developing.

Legal

- New investment is needed where many of the regulatory and legislative powers are reserved eg energy and telecoms.
- Planning and consenting for the new infrastructure assets across all geographies and communities is complex and still in development for some areas
- Understanding of the classification rules (assets must be privately classified for additionality to capital budgets) as well as Subsidy control rules, working across regulated and reserved areas such as the Climate Change Act, Fuel Poverty Act

Fiscal

- Existing capital budgets and resource budgets remain constrained.

- Timeframes to develop and deliver infrastructure and behavioural change to meet the 2030 and 2045 statutory commitments are challenging and ahead of commitments across RUK
- Infrastructure assets need to deliver beyond their primary purpose or function to enable economic growth

Public Sector Central Government e.g. roads, rail, digital projects, prisons, colleges, health.	Public Sector Local Government e.g. schools, housing and local economic development projects.	Notes Table reflects “Increasing cost of capital” to SG
	Tax Increment Finance (TIF)	Council finances (PWLB) incentivised by extra tax revenues. TIF cost-neutral to SG if Non-Domestic Rates ‘displacement’ is accurate.
Capital Grant	Capital Grant	CDEL available from SG or HMT directly (eg through City Deals, Levelling Up although these are not infrastructure specific)
		CDEL is also used to provide budget cover for public financing of projects in the private sector such as financial transactions, investments made via the Scottish National Investment Bank and Scottish Enterprise.
Capital borrowing	Capital borrowing	Capital borrowing distributed as capital grant to public bodies and borrowing costs associated with the borrowing sit with SG.
	UK Infrastructure Bank	Newly established and anticipates lending to private sector and local government (£12bn investment, £10 bn guarantees). Strategy due June 2022.
	Growth Accelerator (GA) Green Growth Accelerator (GGA) Learning Estate Investment Programme	These are forms of outcomes based funding where the funding is from SG resource budget. Local Authority uses reserves or borrows from PWLB to deliver outcomes. Impacted by Council Prudential Borrowing and SG affordability/ RDEL limits.
Mutual Investment Model (MIM)		Financed Cost (including maintenance) estimated at 2.6-3.3x capital value or cost of asset. Resource budget has matched this level.

4 Refreshing the 2018 guidance

4.1 Cost of Capital to Scottish Government of Funding and Financing levers

Notes:

SG has self-imposed limit that revenue funded investments do not exceed of 5% of resource budget (excluding social security).

The table is calibrated on affordability and does not consider wider filters for applicability of the levers to infrastructure such as deliverability, technology, legal, classification and risk considerations.

The recently published Infrastructure Investment Plan also introduced the investment hierarchy which prioritises enhancing and maintaining assets over new build and this also needs to be factored in when using such a guide.

Annex A has a list of the detail relating to taxpayer funded mechanisms which the levers described above.


Case studies on tax payer funded methods of funding and financing infrastructure that accompanied the IIB October 2018 paper on funding and financing infrastructure have also been updated and are available should members wish to receive this additional information.

Whilst some of the current funding models are specific to certain sectors e.g. Green Growth Accelerator applies to low carbon investment, there is potential for methodologies to be developed further to apply to other sectors. For example, in theory, outcomes based funding could be considered for natural capital investment models should these be taxpayer pays infrastructure and should government wish to use resource budget to support them.

Audit Scotland' published a report in 2020 on privately financed infrastructure investment¹ for tax payer pays infrastructure with a number of recommendations in relation to the decision making on the potential use of private finance and the general mix of infrastructure investment models. This included recommendations that Scottish Government should 'better communicate the rationale of project financing and funding decisions to public sector organisations and Parliament.' This will be an ongoing area for consideration where a range of capital and resource funded options are used.

¹ [Privately financed infrastructure investment: The Non-Profit Distributing \(NPD\) and hub models \(audit-scotland.gov.uk\)](https://www.audit-scotland.gov.uk) published by Audit Scotland in January 2020

4.2 Opportunity cost to Scottish Government of Infrastructure Funding and Financing Levers



Private Sector: Universities, Utilities, SMEs, individuals..	Notes: “Increasing opportunity cost of capital” illustrates the cost to Scottish Government, where choices are available
Regulated Asset Base	Private companies (utilities sector) own, invest in and operate infra assets and charges customers and/or receives subsidy. Economic regulator provides efficiency incentives, caps prices, revenue or investment return. It assumed no direct SG risk therefore low cost of capital, however any decision for further Scottish infrastructure investment requirement would indicate need for further consideration of the RAB approach.
UK Government mechanisms	There are potential mechanisms that are developed and introduced by UKG that could be applicable to infrastructure investment in Scotland. Examples include the Contract for Differences regime that has been utilised in the energy sector.
Commercial bank funding	Where financing is directly available to a private entity investing in infrastructure on a commercial basis. It is assumed no SG risk and therefore lowest opportunity cost of capital.
UK Infrastructure Bank (including UK Guarantee Scheme, loans and equity)	Where financing for infrastructure is directly available to a private entity on a commercial basis, it is assumed no SG risk and therefore lowest opportunity cost of capital. Limited information available on the UKIB. The first Strategic Plan is anticipated in June 2022.
Scottish National Investment Bank (“the Bank”)	The Bank provides investment to the private sector and is funded through FTs and therefore it is assumed to have a similar opportunity cost of capital to FTs. Not targeted at infrastructure per se but could support companies in the infrastructure market where the activity relates to the Bank’s missions. Parts of the enterprise bodies operate in a similar way.
Financial Transactions (FTs)	Can only be used for private sector loans or equity investments. SG is allocated FT limit by HMT. SG must repay HMT (at 80% to date), and any bad debts beyond that need to be met from SG CDEL.
Scottish Guarantees	Scottish Government can issue it’s own guarantees similar to UKGS. Any guarantee over £1m must be approved by Finance Committee. Cost of call on guarantee is met by SG CDEL therefore risk and potential call
CDEL	CDEL should be prioritised for tax payer funded infrastructure however noting potential value to pump prime to attract or crowd in investment.
Capital borrowing	Capital borrowing places a future resource budget cost on the Scottish Government through interest repayments. Capital borrowing should be prioritised for tax payer funded infrastructure
Fiscal levers	For completeness, alongside these financial levers sit a wider range of fiscal levers such as tax relief or direct grant support to private companies or individuals connected to infrastructure investment where the opportunity costs will be dependent on the design and application of the lever.

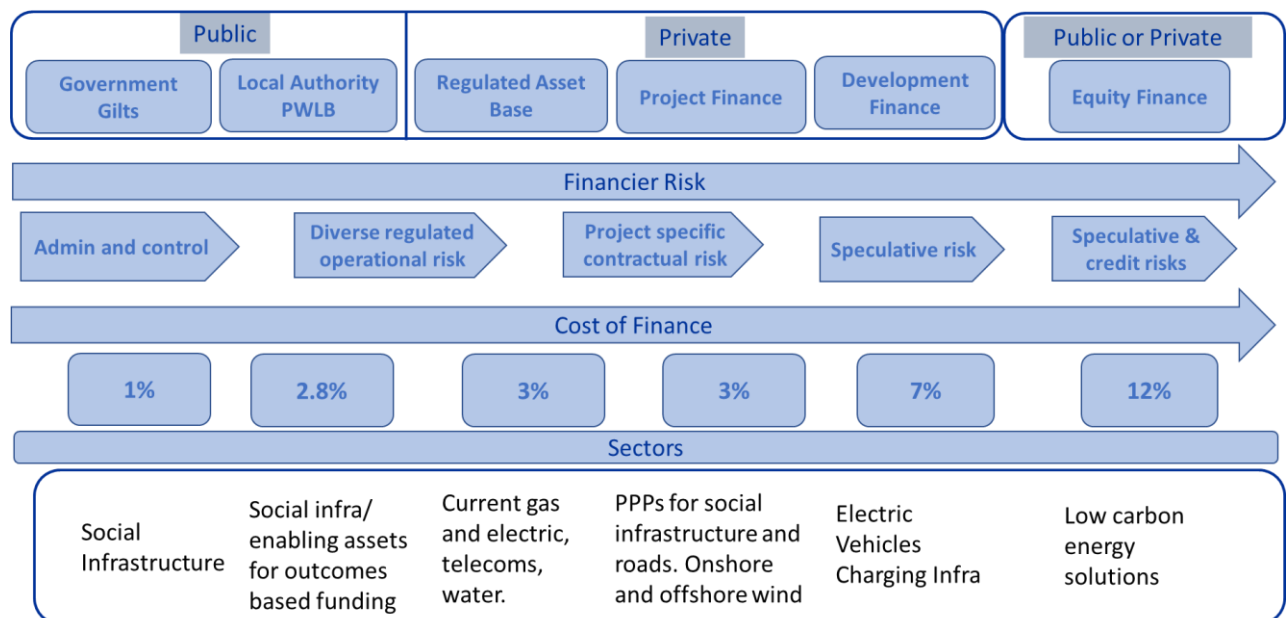
Notes:

The table in 4.2 is calibrated on opportunity cost from an affordability perspective and does not consider wider filters for applicability of the lever to infrastructure such as deliverability, technology, legal and regulatory, and broader commercial considerations. These need to be considered as well as the context of the IIP hierarchy.

5 Relative costs of accessing public and private sources of finance

5.1 The table below sets out the relative costs over underlying interest rates of the financing levers set out in the tables in Section 4 and aligns where these are currently available to infrastructure sectors.

5.2 Costs of Finance and matching to current infrastructure sectors



5.3 On the left hand side where there is least risk around repayment and most confidence around the income stream, the cost of finance is at its lowest. As financier risk increases so too does the cost of finance.

5.4 The bottom box sets out where some of the infrastructure sectors are in relation to financier risk. Heat networks could also start to feature on the right hand side as the Heat Network Act comes into play. Notably a number of the new energy infrastructure classes such as hydrogen and Carbon Capture and Storage (CCS) do not currently feature as the approaches to supporting investment are currently in development at a UK wide level. Scottish Government can provide capital payments, but the ongoing support that is needed for investor certainty will come through the development of business models, which is currently reserved. The proposed “industrial carbon capture” and “dispatchable power agreement” business models support

the demand for CCS infrastructure by incentivising power and industrial customers (respectively) to install CCS, but these are about a year away from being operational. Moreover the business model to support CCS infrastructure itself is still being consulted on. It is likely to be based on a Regulated Asset Base (RAB) model with regulated fees and cash injections initially to protect the Transport & Storage provider (T&SCo) from the small number of users in the short-term, overcoming initial offtake risk. However information has not yet been shared on how the T&SCo business model will overcome potential stranded asset risk.

- 5.6 Whilst most government finance is towards the low cost end, the public sector may also provide development or equity finance to institutions or projects through bodies such as Scottish Enterprise and Scottish National Investment Bank, and now the UK Infrastructure Bank with the aim of levering or crowding in other private finance. Creating the conditions to lower the cost of finance is a key factor in delivering best value from available budgets, however, another fundamental consideration that requiring constant re-evaluation is whether the assets should be funded by taxpayers or consumers in the first place.

6 Tax payer or consumer payer funded infrastructure

- 6.1 The core policy decision in infrastructure funding and financing is which infrastructure assets are going to be funded by taxpayers and therefore government capital or revenue budgets, and which are going to be funded by consumers (individuals, businesses). These decisions often require reserved regulatory levers, but there are significant elements where Scottish Government has a role, including its financial levers such as capital and revenue resource.
- 6.2 Across the asset classes, where the taxpayer is funding through Government budgets, generally Government is able to exert more control over the investment, including prioritising it, delivering programmes and delivering co-benefits such as fair work through delivery programmes. It is also more easily possible to influence fairness of the cost burden through the progressive tax system. However, delivering significant new investment needs through taxpayer funding requires de-prioritisation of existing infrastructure investment or tax increases (either through new tax structures or increases to existing tax structures).
- 6.3 Under consumer payment models, there can still be significant Government influence on the policy outcomes through regulation, but asset delivery is controlled by delivery organisations, or by individuals. It is harder to deal with issues around natural monopolies and more difficult to influence fairness of the cost burden and universality of provision in particular in less densely populated areas, though all of these can be address through carefully designed regulatory regimes, for example accompanying a regulatory regime with financial support for those less able to pay eg. Support to older people and disabled homeowners in installing smoke detectors <https://www.gov.scot/news/changes-to-fire-safety-laws/>.
- 6.4 In general it may be easier to impose charges on businesses or individuals than to raise taxes. An example of this is the WICS determination of Scottish Water charges which was that Scottish Water can levy charges on customers at a maximum of 2% above inflation on average over the six-year period 2021-27. <https://wics.scot/latest/wics-publishes-final-determination>.

- 6.5 Government roles can also include subsidy through the regulated asset base model often used for utilities, conditional grants directly to projects (Low Carbon Infrastructure Transition Programme), financial guarantees, rates relief or grants to individuals (eg electric car charging grants and home charge points) and many other routes.
- 6.6 Any new intervention to increase investment through consumer charges should be considered in aggregate across portfolios and infrastructure asset classes to maximise coherence and ensure that the burden on consumers, especially from lower income groups is considered in the round. IIB may wish to consider its role in this macro decision making framework for infrastructure investment. Consideration is also required as to whether any new user charge is being considered as a replacement for an existing tax (e.g. fuel duty) or an additional charge to consumers outwith general taxation; and the extent to which those matters are devolved and/or reserved.

7 Establishing new infrastructure investment approaches

- 7.1 The key elements which require to be in place to draw in private investment for new infrastructure investment approaches, in addition to the general conditions for investment of a well-functioning economy and stable legal regime are:
- Clarity of the ultimate funding source (either that it is government policy that taxpayer pays, government regulation, government incentivisation through co-funding the asset or financial support to individuals OR market conditions where the consumer chooses to pay);
 - Available technology to deliver the infrastructure service that is required;
 - Resources to deploy the technology;
 - Competitive conditions to deploy in Scotland rather than elsewhere.
- 7.2 Work to develop these conditions, and the signalling and transparency of that work to investors and the financial intermediary marketplace, along with more detailed structuring of individual investment opportunities when identified to make them market-ready, and fit with the generic investment criteria of scale investors will maximise private capital investment into consumer funded infrastructure in Scotland.
- 7.3 An analysis of the infrastructure sectors requiring significant investment in the coming years and an assessment of their current funding sources is set out in [Annex B](#). [Annex C](#) also takes a more detailed look at one of the largest programmes of investment required to deliver decarbonisation of heat. The analysis sets out some considerations both for the current approaches and points to areas for potential discussion for the new or extended infrastructure classes.
- 7.3 There may be benefit, in addition to sharing the updated summary of funding and financing levers (Section 4), in developing a Scottish Government approach for portfolios to provide a strategic assessment of the existing and required conditions (based around the list in 7.1 above) to enable new infrastructure investment approaches for consumer pay models to be developed in their area. The Board may wish to consider how closely this analysis should be

linked to the ongoing work for the Resource Spending Review and consideration of new or different funding mechanisms and revenue raising opportunities.

- 7.4 This approach could both guide portfolios by setting out a series of areas for consideration and the financial and non financial levers but also enable additional data to be collated by Scottish Government to continue to build a picture of the new infrastructure investment requirement for Scotland and the types of government financial and non-financial levers that are under consideration by each portfolio. Data collated through the strategic assessments could also help identify where the dependencies for the infrastructure investment lie both with other parts of Scottish Government and with UK government and regulatory bodies.
- 7.5 IIB may wish to consider whether such an assessment could support them in their current remit to maximise synergies and opportunities across infrastructure investment approaches. This approach goes beyond the direct remit of the Board and therefore consideration should be given during the discussion on how best to take forward the approach – either to consider one or two specific opportunities as highlighted in Annexes B and C that most closely align with IIB Remit, or for Board members to champion the use of high-level decision framework (based on section 4) in their respective areas and roles on other Boards and Groups.

Discussion:

- The Board is invited to consider the range of challenges facing the funding of infrastructure and the opportunities to explore new approaches presented in Annex B.
- The Board is invited to discuss and agree their role towards the new approaches as discussed in section 7.

Annex A

Taxpayer funded infrastructure

Current methods available to Scottish Government to fund and finance 'tax payer' funded infrastructure include:

1. **Issue of capital grants or capital from capital borrowing** – In the year 2022/23 the capital budget (excluding Financial Transactions) is £5.3bn. Historically, a large proportion of this budget (c90% in 20/21) is spent on infrastructure. In addition to the capital block grant, the Scottish Government can increase capital expenditure through borrowing up to £450m per year up to a maximum limit of £3bn. Capital borrowing places a future resource budget constraint on the Scottish Government to pay back.
2. **Outcomes funding mechanisms** where Scottish Government releases annual revenue funding once the assets are built and specified outcomes such as economic indicators, emissions reductions, good maintenance/condition regimes are achieved. These include:
 - **Growth Accelerator** – The key objective of the Growth Accelerator funding mechanism is the delivery of public sector enabling infrastructure which stimulates private sector investment and the wider economy. The model establishes a payment-by-outcomes approach based on achieving key measures relating to economic, financial and social impacts which are determined on a project-by-project basis.
 - **Green Growth Accelerator** – this is new and starting to focus on infrastructure projects to support Scotland's transition to an inclusive, net-zero emissions economy. The model will establish a payment-by-outcomes approach based on local government achieving key carbon emission reductions and low carbon economy measures which are determined on a project-by-project basis.
 - **Learning Estate Investment Programme** – this is an outcomes-based funding method used to deliver high quality, well maintained, digitally-enabled learning environments that achieve ambitious energy targets.

These outcomes based funding mechanisms are typically for local government delivered projects. Local government invests (often using its borrowing powers) to enable the outcomes. As noted in the Infrastructure Assets table in the Annex, where capital is available to deliver similar outcomes, local government (and central public bodies) will typically default to application for capital funding programmes. Capital is less complicated and expensive and does not have the long term risk associated with the outcomes based mechanisms.

Where Scottish Government consider that a mix of capital and resource funding is required to deliver the Infrastructure Investment Plan, public bodies may require some direction on which infrastructure investment approach to use.

3. Tax Incremental Funding – this model sees local authorities borrow up front to pay for enabling infrastructure that will catalyse private sector development and unlock additional future business

rates. Those business rates are then ring-fenced over a 25-year period and used to repay the initial borrowing. Local authorities therefore accept the risk of private sector development occurring.

4. Mutual Investment Model - this is a profit sharing form of public private revenue finance. Under MIM, a delivery company is established to undertake specific infrastructure investment. The delivery company finances infrastructure investment through a mixture of bank debt, bonds and risk capital from the public and private sector. To pay for the cost of the infrastructure investment, the delivery company receives a unitary charge from the Scottish Government (typically over a 25-year period).

5. Loans and Equity – This is usually provided via Financial Transactions provided by UK Government can be used by Scottish Government to make investments in private sector entities. These need to be repaid to Scottish Government for onward repayment to HMT.

6. Guarantees - these can be provided by Scottish Government or UK Government whereby an agreement is made to fund the gap between expected and actual income.

Annex B

Scotland's Infrastructure sectors

The analysis sets out some considerations both for the current approaches and points to areas for potential discussion for the new or extended infrastructure classes. Housing has not been included in the scope but would also merit a review of current and future approaches.

IIB may wish to consider their role in the decision-making framework in determining any change to the current funding and financing approaches and in relation to the development of funding and financing of future infrastructure investment across these sectors in Scotland.

Current and future approaches to consider	
<p>Social Infrastructure Learning estate, Health, Culture, Justice, Offices</p> <ul style="list-style-type: none"> • Public sector ownership of assets • Funded by the taxpayer - either from capital (CDEL) budget as the asset is built or funded using resource (RDEL) budget (where public or private finance (PPP) is used) upfront. 	<p>Approaches are well developed. CDEL or RDEL (PPP, public borrowing, outcomes based funding ie LEIP, Green Growth Accelerator, Growth Accelerator, Tax Incremental Finance)</p> <p>To consider – prioritisation across portfolios, who directs on capital v's revenue delivery model? (default portfolio choice is capital), what direction on funding new asset v's refurbished assets?</p>
<p>Digital Infrastructure Fibre, mobile and international connectivity</p> <ul style="list-style-type: none"> • Private sector owned assets • Funded by the bill payer • Taxpayer funding has also been used to extend connectivity reach eg R100, Scottish 4G Infill programme 	<p>Private sector invests and income stream to repay comes from the bill payer. Regulated market. Government has invested CDEL to extend investment where the market will not go (ie where income stream insufficient for private investment).</p> <p>To consider – What new delivery approach for the remaining areas in Scotland where current regulatory market will not deliver - income stream is insufficient. after current investment rounds?</p>
<p>Transport Roads, EV infrastructure, [rail, aviation, maritime]</p> <ul style="list-style-type: none"> • Roads are public owned, funded by tax • EV infrastructure is a new asset class, to date part tax funded, some bill payer (user) funding • Rail, Aviation, Maritime not covered in this paper 	<p>[redacted under s29(1)(a)]</p>
<p>Energy Generation, grid infra, energy storage assets, heat</p> <ul style="list-style-type: none"> • Private sector owned assets • Funded by bill payer in regulated markets • Reserved area, although delivery of heat systems and energy efficiency is devolved • Often subsidies for early technologies eg RHI • Proposed funding/delivery models for hydrogen or carbon capture utilisation & storage (CCUS) still in development 	<p>To consider - Current infrastructure will not be sufficient for NZ ambition. New consumer funded models are required. At the early stages this is likely to require a variety of levers such as public grants in tandem with the development of new regulatory regimes to help prove and implement technologies eg hydrogen, CCUS. Different approaches could be deployed for heat networks where technology is further developed but income stream not sufficiently visible/viable to be near 'at scale' delivery.</p> <p>The development of energy infrastructure investment approaches across government ie the 'who pays' question has dependencies across the majority of infrastructure asset classes.</p>

Natural Infrastructure

Water, Flood management, Natural capital

- Public sector ownership of water (public owned regulated asset base) funded by bill payer
- Flood defences are public owned, funded by taxpayer
- Natural capital – mix of public private owners

[redacted under s29(1)(a)]

Waste Management

- Mostly Local Authority owned assets, funded by block grant and Council tax with some assets delivered through PPP mechanisms.
- Some private 'merchant' infrastructure have been developed in geographic areas where there is greater certainty of income streams e.g. charging for commercial waste disposal and financial institutions such as the Green Investment Bank have helped crowd in finance.
- Consumer charges have been introduced to fund some services e.g. garden waste.

Development of infrastructure encouraged through regulatory levers. This has encouraged some development, but recycling rates are still below target as the case for investment is more difficult to make in some geographic areas and where income streams are insufficient for private investment. Grant funding to develop projects is available to Local Authorities and to the private sector through the Circular Economy Investment fund.

To consider – What approach can be taken to co-ordinate development of infrastructure for areas where development is still required.

Annex C

Case Study: New infrastructure required to decarbonise heat in our homes and non-domestic properties

Using the headings set out in Section 9, the case study below is an example of how the Heat in Buildings division in the Energy and Climate Change Directorate is considering heat decarbonisation. The table captures a snapshot of the complex mix of policy development, regulation and legislative development alongside the use of capital and revenue funding to support heat decarbonisation including incentivising the private sector to invest in the supporting infrastructure.

The use of a blend of capital and revenue funding levers now represents a transition phase during which regulations and legislation is being developed and introduced which will ultimately create the conditions to clarify where the infrastructure funding will come from which in turn enables the flow of private investment.

There are significant links and dependencies to other parts of government such as planning and consenting and to where mechanisms are to be developed to support a Just Transition. Notably, this is only one area in the climate change agenda where new infrastructure assets are required and the ability to coordinate and link to other areas where private sector investment is sought for new infrastructure assets will be important.

The Heat in Buildings Division has also set up its overarching governance to support strategic oversight and coherence and is considering how a National Public Energy Agency might be established to support the coordination and delivery of the Heat in Buildings Strategy which was published in October 2021. This might also be an additional category to add to a Scottish Government assessment approach (Section 9.1) to understand the governance, programme and project management principles being applied to design and deliver new infrastructure.

<p>Drivers for new infrastructure</p>	<p>By 2045 virtually all heating of homes and businesses will have been decarbonised. Interim targets for 2030 (75% reduction) mean that SG have set an ambition that 1 million on gas grid homes and most of the 170,000 off gas grid homes are decarbonised by this date. The equivalent of 50,000 non-domestic buildings are to be converted to zero emissions heat. A large majority of buildings require to achieve a good level of energy efficiency.</p> <p>Published estimates suggest > £33 billion to decarbonise heat in buildings. These costs exclude the infrastructure required to deliver the new heating systems such as the heat network pipes and heat pumps and any related expansion to the electricity grid infrastructure.</p>
<p>Funding source</p> <p>Developing a package of measures using funding and financing levers</p>	<p>Anticipated to be consumer pays (but with regard to a Just Transition) there is a significant package of support from government including:</p> <ul style="list-style-type: none"> • Government regulation such as the Heat Networks Act to incentivise private sectors investors (to date small scale developments) • Framework of regulations relating to property standards

	<ul style="list-style-type: none"> • Use of Local Heat and Energy Efficiency strategies to inform planning • Phasing out of fossil fuel heating systems • Co-funding of infrastructure assets such as through the successor to the Low Carbon Infrastructure Transition programme • Design of financing models to support domestic decarbonisation via the Green Heat Finance Taskforce • Design of funding support measures for the bill payer
Technology	A combination of technologies will be required to deliver heat decarbonisation including heat pumps, heat networks and hydrogen. All are at different stages of development and require significant investment to enable at scale roll out.
Resources	<ul style="list-style-type: none"> • Will require significant investment in electricity generation and transmission infrastructure to enable supply of renewable electricity. • Will require Investment in a skilled workforce and developing supply chains; • Will require buildings to manufacture / deliver systems from; and, • Wayleaves, planning, other consents required to connect the assets.
Competitive conditions to deploy in Scotland	<ul style="list-style-type: none"> • Will require proximity to consumers; • Will require proximity to key supply chain members and a well-developed cluster ecosystem; • Will require a supportive general business and tax environment.