THE ECONOMICS AND FINANCING OF GLASGOW'S GREEN DEAL

Summary note for policymakers

Friday, 9 December 2022

Final Version

Pengwern Associates

1. Introduction

“The Glasgow Green Deal is a nine-year mission which will fundamentally reshape the city’s economy.”[1] In 2021, Glasgow launched its Green Deal – an ambitious plan to decarbonise the city and the wider city region and to build its climate resilience in the context of recovery from the COVID-19 pandemic. The Green Deal seeks to move away from the incremental approaches to climate action that have been typical of previous efforts to date, and move towards a systemic approach that aims to tackle the linkages between emissions and climate risk, poverty, health, equity and and justice.

To deliver on this agenda, policymakers, and wider stakeholders, must have confidence on why they should act. The commitments embedded in the Glasgow Green Deal are ambitious. To have the confidence to deliver on these goals, policymakers need to know whether it is likely that the benefits of taking action will exceed the costs, and whether the actions will provide jobs and economic security to the residents of Glasgow. They also need to appreciate where delivery risks are likely to be most pronounced and prepare in advance to reduce these risks wherever possible.

Policymakers also need to consider how to finance the necessary capital investment. Estimates suggest an investment need/opportunity associated with the Green Deal of £40bn over the next eight years. While some of this can and will be financed by the Council using conventional approaches, the scale of investment will require new financing models for raising. spending, and repaying capital. While some of these models will require changes to the way in which the Council works with partners, and the risk it is willing to take, a failure to explore these approaches will almost certainly lead to the ambitions of the Green Deal not being met.

This briefing note summarises the key findings from a 10-month scoping study undertaken by Pengwern Associates and partners for Glasgow City Council exploring the economics and financing of the Glasgow Green Deal. It answers three key questions:

- What are the potential economic benefits of the Glasgow Green Deal and are they likely to exceed the economic costs?
- What financing models can be used to facilitate the Glasgow Green Deal?
- How can the Council change its budgetary practices to support the Glasgow Green Deal?

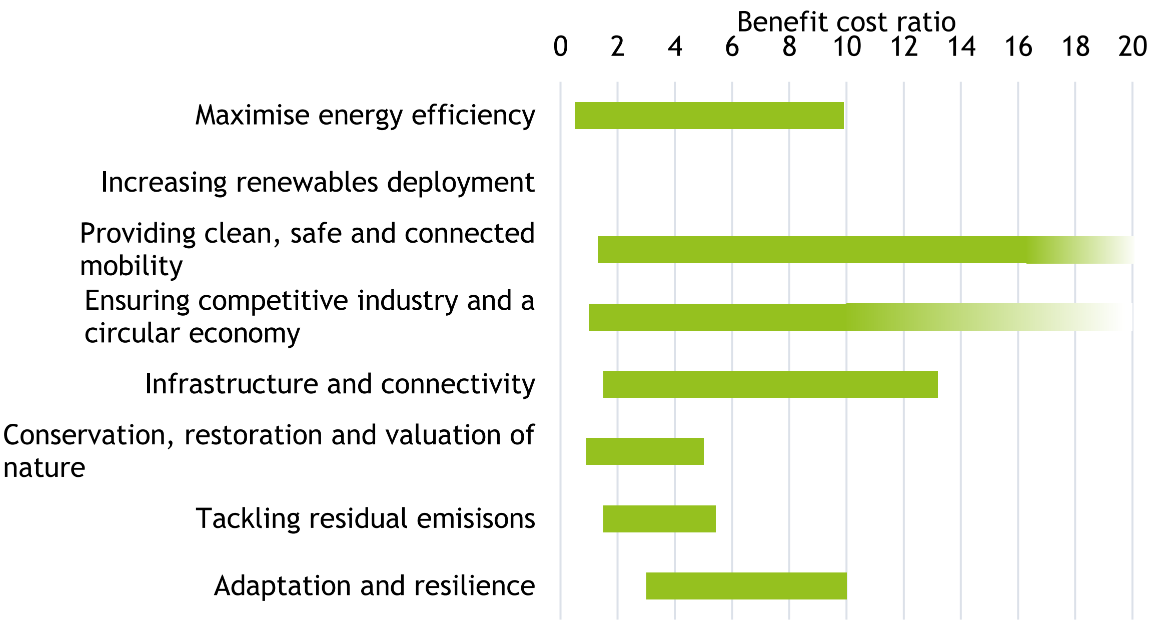
For each of the three questions above, Pengwern Associates produced separate detailed technical notes, this note summarises their key findings.

[1] Glasgow City Council (2021) Glasgow Green Deal: Our Roadmap and call for ideas

2. Economic benefits of the Glasgow Green Deal

There is strong evidence that interventions in all eight areas of focus of the Glasgow Green Deal will generate economic benefits substantially greater than their economic costs. The analysis for the eight areas is shown in Figure 1, which summarises the evidence on the benefit cost ratio (BCRs) of a wide range of policy appraisals and academic studies that examine the benefits and costs of activities in the different focus areas. The BCR measures the extent to which the discounted[2] social benefits of selected intervention exceed their discounted social costs i.e. a BCR of two would mean that the benefits are twice as high as the costs. Across all focus areas, the vast majority of evidence suggests that interventions will deliver benefits that are greater than their costs. Indeed, there is good evidence that the benefits could be three or four times greater than their costs, and in some instances could be ten times higher.

Figure 1 All eight areas of focus are associated with BCRs typically significantly above one



Notes: faded bars represent where there is evidence that some interventions will offer BCRs (much) higher than on the scale used for the chart. In addition, note that (1) evidence on the impacts of renewables investment are not typically expressed in terms of a BCR, but there is good evidence to show that these investment both reduce GHGs and electricity generation costs, implying a high BCR; (2 there is a) relatively small evidence based on BCRs for the circular economy and (3) the evidence on tackling residual emissions focuses on afforestation.

[2] Discounting refers to the practice of placing less weight on costs and benefits that arise in the future on account of the possibility that these costs and benefits may not arise, as well as underlying preferences for benefits today compared to in the future.

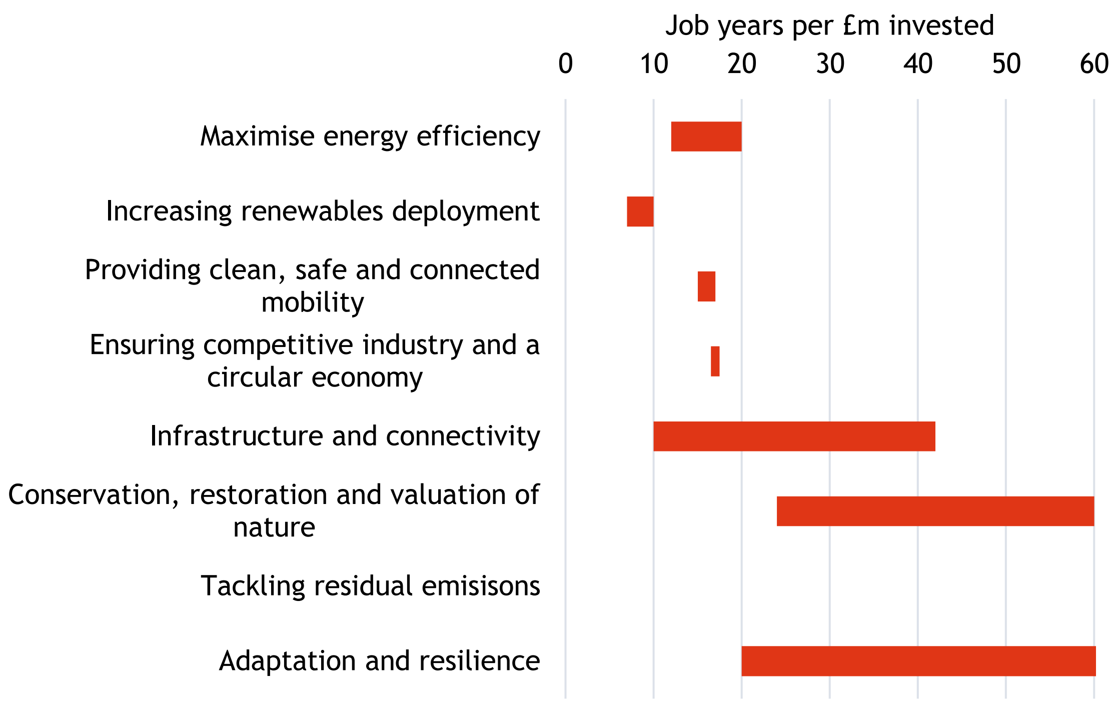
Many of these benefits will - or can be designed - to directly flow to the most deprived people and places in Glasgow. The high BCRs described above partly reflect the value that society places on reducing greenhouse gases so as to help avoid the worst impacts of climate change around the world. However, they also reflect that the Green Deal can bring a wide range of other local and tangible co-benefits, many of which will or can be concentrated on the most deprived in Glasgow, for example:

- Energy efficiency improvements can reduce fuel poverty and the poor health outcomes - including influenza, bronchial conditions and childhood asthma - associated with badly insulated properties, which is a disproportionately large problem in Glasgow, especially among its deprived populations.
- Greater penetration of renewable energy can help reduce electricity costs reducing fuel poverty.
- Transport interventions can reduce congestion, making it easier and cheaper for people to access employment opportunities, while active travel measures such as pedestrian walkways and cycle lanes will lead to better mental and physical health.
- Enhancing resource efficiency and moving to a circular economy can help firms enhance their productivity, supporting jobs growth, while helping households realise more from their spending. It will also lower the costs of waste treatment, and reduce pollution, improving the natural environment.
- Among other benefits, infrastructure and connectivity enhancements can make it cheaper for people to heat their homes and for firms and residents to take advantage of the digital economy.
- Conservation, restoration and valuation of nature will provide an improved local environment for people to live, work and play in, and which can help to reduce health inequalities.
- Afforestation to address residual emissions provides similar types of benefits to nature conservation and restoration, but can also provide an opportunity for Glasgow to develop a flourishing business in sustainably developed timber products.
- Adaptation and resilience measures can reduce the impact of climate damages in Glasgow, which would otherwise disproportionately affect the most vulnerable.

There is also strong evidence that the interventions in these focus areas can help support employment. It is more difficult to summarise the evidence on the employment benefits of the eight interventions because studies use different measures of employment and because there are differences of opinion on whether additional publicly-supported activity affects labour markets in the medium term. Nonetheless, Figure 2 summarises the available evidence and Table 1 identifies potential implications for the Glasgow City Region (GCR). These show that many interventions associated with Green Deal are labour intensive and hence provide the opportunity to help reduce regional unemployment.

The actual impact on local and regional unemployment is context specific. It will depend on the extent to which the supply chains associated with these focus areas are localised; the functioning of the local labour market; and the extent to which there is a skills match between the jobs associated with the Green Deal and the skills of those in the local labour force. The interplay of these factors may mean that in developing individual business cases, analysis may yield lower jobs estimates than presented here.

Figure 2 **Most of the areas of focus support more than 10 job-years for every £m invested**



Notes: Energy efficiency job estimates typically include direct and indirect jobs, adjust for displacement effects but are gross estimates. Renewable job estimates account for direct, indirect and induced effects and adjust for displacement effects but are gross estimates. Mobility job estimates are direct, indirect and induced but do not adjust for displacement effects and are gross estimates. Circular economy estimate comes from plastic recycling plant with point estimate of 17; this estimate includes direct and indirect jobs, excludes displacement and is a gross job estimate. The wide range for infrastructure and connectivity partly reflects the range of different activities but also reflects varying treatment on inclusion of indirect and induced jobs. Most studies for this area do not take account of the possibility of displacement. For nature, there is variation in whether studies include induced employment; most studies tend to not account for displacement. Tackling residual emissions in the main analysis are expressed per hectare so not included in the chart. Adaptation and resilience investment relate to job intensity associated with flood protection, and include indirect and induced effects. The economics technical report provides more detail on these estimates and associated terms.

Table 1 Evidence of employment impacts associated with Green Deal areas of focus

Area of focus	Potential implications for Glasgow
Maximise energy efficiency	• Potential to support 12,000 - 20,000 jobs for each year of the Housing Retrofit program, although some of these jobs may be outside the Glasgow City Region (GCR). • Further potential to be explored in rolling out a deep retrofit of Glasgow City Council estate, but not included here as at too early a stage of scoping to estimate the investment and employment potential.

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Increasing renewable deployment	• Potential for fostering deployment of residential and commercial rooftop solar to be determined. • Initial estimates of investment potential on GCC estate could support around 300 to 430 jobs over the lifetime of the investments. • There is no information available on investment and employment potential from households and businesses deploying rooftop solar.
Providing clean, safe and connected mobility	• Investment in Clyde Metro could support around 250,000 gross job years, although this includes all activities involved in the metro including upstream manufacturing, much of which is unlikely to take place in the GCR. • The investment and employment generation of active travel and vehicle electrification has not been estimated.
Ensuring competitive industry and a circular economy	• Construction of new material recycling facility could support around 340 job-years, direct and indirect jobs, although some jobs may be outside the GCR. • Simple downscaling of nationwide study suggests potential to support additional 6,000 direct and indirect jobs in GCR from shift to circular business models, after adjusting for displacement impacts.
Infrastructure and connectivity	• Heat network expansion might support around 120 jobs per year, or just under 600 job-years, although some jobs may be outside the GCR.
Conservation, restoration and valuation of nature	• Green infrastructure plans in Glasgow Green Deal could support 300-750 jobs in each year of spend, although some jobs may be outside the GCR.
Tackling residual emissions	• 250 temporary jobs could be supported in each year of planting plus 540 job years supported by maintenance activities, although some jobs may be outside the GCR.
Adaptation and resilience	• High jobs support potential, e.g. if all of the planned adaptation spend of £1bn was spent on flood protection over the period to 2030 could support 2,000 to 6,000 direct, indirect and induced jobs per year (assuming a 10 year implementation window).

Unlocking these large potential economic benefits will involve successfully overcoming several challenges. Numerous examples exist of interventions that initially look economically attractive but which fail to deliver the expected magnitude of net benefits. Some of the common reasons for this include:

- rushed design and implementation that fails to build awareness and/or readiness among target groups and leads to strategic goals being neglected;
- overly ambitious projections coupled with failures to develop adequate monitoring plans (with associated targets), making nimble course-correction challenging;
- inadequate cooperation across different public sector bodies;

- insufficient skilled personnel within public sector bodies;
- difficulties in convincing target groups that policies and incentives will be maintained into the medium-term; and
- a failure to design financing structures that mean that the personal financial incentives faced by firms and households are not aligned to the projected economy-wide benefits.

The Climate and Sustainability Board, supported by the Green Economy Unit and the Sustainability Team in Glasgow City Council can help mitigate these risks. This provides a strategic hub for Green Deal implementation and a nodal point to support co-operation across relevant public sector agencies within the City. It also provides a platform to further strengthen engagement with the private sector and to consider financing structures that provide appropriate incentives to the firms and households, as discussed further below. It can also help communicate the wider economic benefits associated with the implementation of the Green Deal, helping to demonstrate credibility and commitment.

At the same time, many of these challenges will need continued policy development and refinement from the Scottish and Westminster governments. This will need to be combined with funding arrangements across all tiers of government that provide for sufficient, but efficient, ‘on the ground’ implementation. Glasgow City Council will need to both advocate for relevant initiatives and policies and ensure that it has the capacity to determine which regional and national initiatives best align with its interests.

3. Financing options

Building on a review of national and international experience and taking into account the specific Glasgow Green Deal objectives and its context, the review identified seven financing options Glasgow City Council might prioritise. Figure 3 illustrates these and places them within the Council's wider financing landscape.

Some of these options relate to the ways in which the Council might raise additional capital, others relate to the way in which the Council might use its resources more effectively to leverage the capital of others. Some are more relevant and applicable for revenue generating activities, while others offer opportunities to move forward with investments that are not highly revenue generative. Some build on the existing practice of the Council, others would represent a more radical departure. These options are intended to complement, not replace, the need for individual projects to review and adopt their own business model, in a way that optimises the use of public capital.

Three options represent ways in which the Council might raise more capital to support its Green Deal objectives.

1. **Issue Community Municipal Investments (CMI).** They would be instruments issued and backed by GCC that can be purchased by local residents, through a crowdfunding platform, with the capital hypothecated to funding climate/green investments. Previous experience suggests that they are effective ways of both accessing low-cost capital and also increasing citizen engagement in local authority planning on climate change. In addition, some investors forgo returns and allow Local Authorities to use them to support further action. They can also build institutional knowledge within GCC on (small-scale) capital market instruments, and the needs/expectations of investors in these instruments. There is also a growing ecosystem of stakeholders and service providers with experience in these instruments, including the Green Finance Institute (GFI), and existing crowdfunding platform providers. As the CMIs would be backed by GCC as a whole, the funds raised from issuance could be used to help meet any GCC funding need related to the Green Deal, although the Council would face less risk if they were used to at least partly finance revenue generating activities. The product is likely to achieve greatest resonance with residents in relation to those activities that deliver appreciable local benefits and that can support socio-economic inclusion. This might include energy efficiency retrofits, small-scale renewable energy projects, local transport projects or nature and forestry projects.

2. **Engage with the UK Infrastructure Bank (UKIB) to explore lending and advisory opportunities.** The UKIB is a newly created public institution which intends to provide finance to local authorities and to the private sector. It aims to differentiate itself from other financing sources by offering more competitive terms (local authority lending will be priced at gilts + 60 basis points); being willing to take more risk in recognition of its strategic policy objectives; and exhibiting flexibility in designing bespoke financing arrangements that reflect the specifics of transactions. It has a particular focus on supporting net zero ambitions and regional economic growth. Given this, GCC should explore lending opportunities with the bank, especially in relation to energy efficiency, renewables, mobility, circular economy (waste) and infrastructure and connectivity. The UKIB is also developing an advisory function which will provide an important

opportunity to access expertise needed for project development (see option seven below).

3. **Develop value capture methods that both incentivise emissions and resilience outcomes and generate additional financial resources.** The value capture method that would be relatively easiest to implement would involve requiring developers to make a per tonne of CO_2 payment for the greenhouse gas (GHG) emissions associated with all new developments (potentially above a certain size threshold). This would both incentivise developers to explore low-carbon initiatives within new developments as well as generate additional resources that can be reinvested elsewhere in the City region to support low-carbon and/or climate resilience outcomes, including in activities that are not revenue generating. Such a levy would need to be set at a rate which balances the revenue raising with impact on appetite for development, and the Council would need to confirm it has powers to implement this approach. Similar schemes are already operating effectively in Milton Keynes and parts of London, although some political resistance may nonetheless be expected. The Council could also consider whether value capture methods could help with the financing of the Clyde Metro.

In terms of spending its resources to leverage investments by others, the analysis identifies a further three options:

4. **Develop one or more blended finance vehicle(s).** This/these vehicle(s) would combine both public and private sector resources in its/their capital structure, and provide capital, using a variety of different instruments (debt, equity, guarantees), to discrete projects that are able to generate some financial return but cannot finance themselves exclusively using private capital provided on fully commercial terms. These vehicles can help de-risk private investment. Examples developed elsewhere in the country – such as the Mayor of London's Energy Efficiency Fund (MEEF) - suggest that they can be an attractive way of leveraging large quantities of private sector capital towards Green Deal relevant investments. For example, MEEF combined ~£50m of public resources with ~£450m of private resources. The close relationship between the risk/return profile of the projects financed by such vehicles and the risk/return profile of the fund itself may mean that it is more efficient to create more than one fund so as to efficiently segment investors with different risk appetites or investment mandates.

5. **Continued exploration of strategic partnerships with the private sector** This could build on GCC's existing use of such partnerships – for example with the Glasgow Recycling and Renewable Energy Centre (GRREC). These models can provide an important way of delivering large scale capital investments related to the Green Deal. These may be particularly important in relation to waste infrastructure and recycling as well as the public electric vehicle (EV) charging network in the Glasgow City Region. However, bespoke assessments of value for money will be required. In addition to contract-based structures, GCC can also consider the use of lease and leaseback arrangements to support infrastructure upgrades, especially in relation to renewable energy. The Council can also explore some of more innovative partnership arrangements that other local authorities are using to pursue their climate strategies – such as the Joint Venture agreement Bristol City Council is pursuing in its City Leap project.

6. **Undertake 'Investor Collaboratives' to build a structured dialogue with, and involvement of, the private sector.** It is vital that GCC continues and strengthens its engagement with the private sector in relation to its Green Deal ambitions. This can

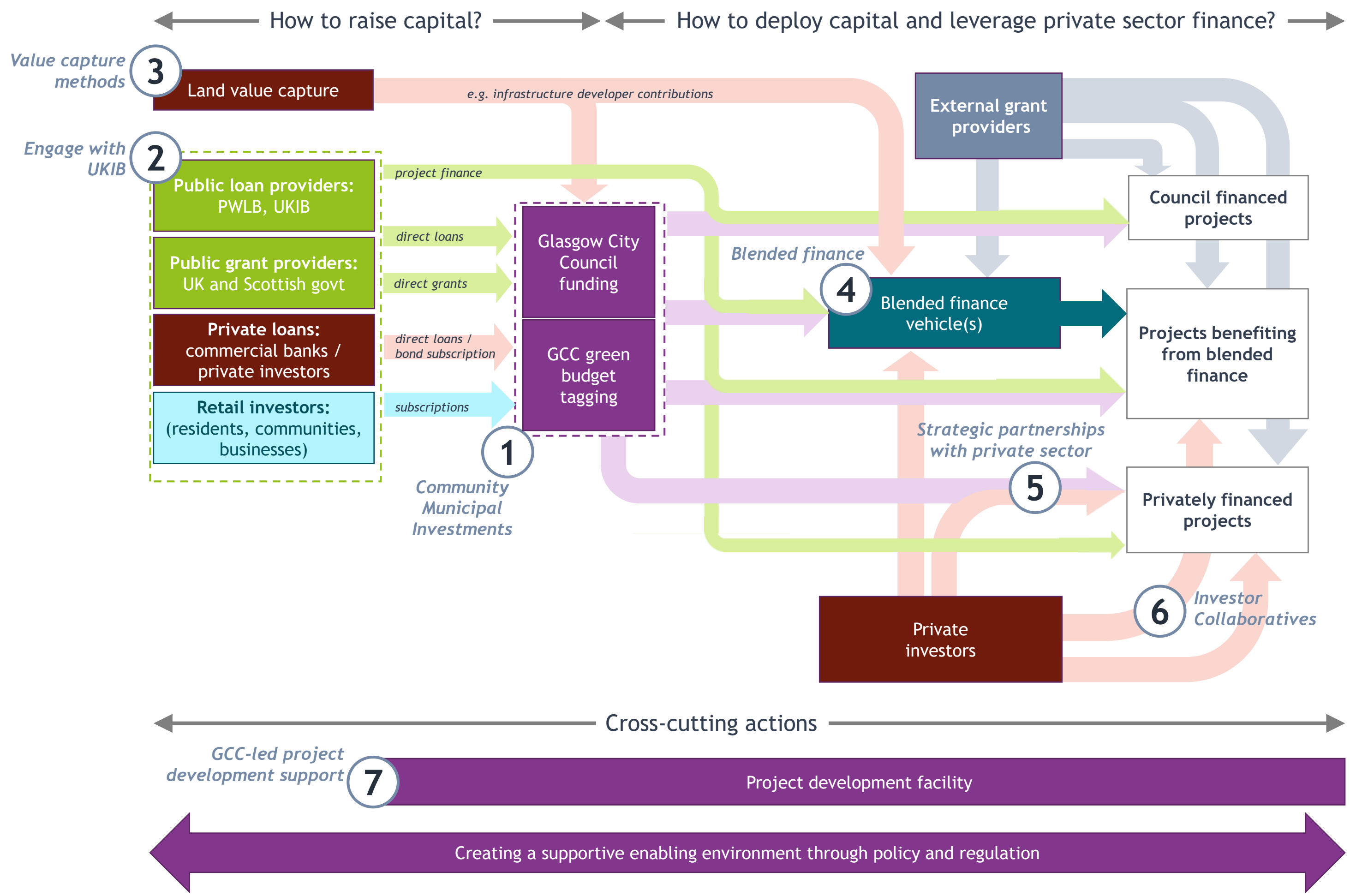
include networking, education, and capacity building sessions with investors and businesses. These engagements should cover both publicly sponsored investments for which the Council is seeking private partnerships as well as encouraging the private sector to orient its own investments and business models towards Green Deal consistent commercial opportunities. In relation to the former, the focus should be as transaction oriented as possible with the Council strengthening its capacity to handle early-stage relationships with investors including, for example, the development of capital arrangements, and signing Heads of Terms with specific parties. A strong dialogue between public and private sectors will help build trust and relationships, and also allow for private sector partners to make plans that will allow them to be responsive to the Council's requirements. Glasgow is a member of a number of platforms and initiatives, such as 3CI and the Horizon Europe mission on Climate Neutral and Smart Cities, that can be used to support this activity. It should seek to maintain access and make use of to the greatest extent possible. However, ultimately, the Council should adopt an engagement model that goes beyond those provided by external platforms and is both enduring and more comprehensive than these (in particular, also including adaptation and resilience).

There is one further cross cutting recommendation:

7. **Create a Citywide project development facility.** A critical challenge faced by many Councils is the transition from high-level statements of ambition to the development of a pipeline of investable projects that are technically sound and financially robust. In the short-term, this challenge can be overcome by exploiting the increasing number of external facilities that are intended to help Councils such as those that are or will be provided by the UK Infrastructure Bank, 3CI or the NetZeroCities platform. However, the most enduring solution will involve leveraging the expertise realised through participation in these initiatives to create sufficient permanent expertise within the Council, potentially through the establishment of a dedicated project development facility.

The implementation of these recommendations is predicated on a number of assumptions. These include that there will be sustained and deep political commitment to realising the Glasgow Green Deal with predictable resource flows to match. Fostering some or all of these models will also require the cultivation of the appropriate skills within the Council and its wider partners (related to, for instance, technical design, financial analysis and procurement of low-carbon and climate resilient investments). It will further require a willingness to work with a wide array of different partners, including a significant role for the private sector.

Figure 3 **The identified options cover the ecosystem of actors and flows that can link capital or projects**



4. Budgetary practices

The Council can complement its financing of the Green Deal by adopting green budgeting techniques. Green budgeting involves the use of the tools and systems of budgetary policy making to inform, assess and deliver green objectives. While the investment needs of the Glasgow Green Deal far exceed what the Council's budget can meet itself – leading to the financial model recommendations above – there are a number of reasons why green budgeting is valuable:

- it allows policymakers to use one of their most influential tools to deliver on their commitments;
- it increases political and public attention on green issues, demonstrating to the private sector and other governments that the Council is optimising its own resources to maximise climate and environmental outcomes, helping to catalyse further action by others; and
- it generates useful information that can be used for further purposes such as supporting green bond issuance

These benefits explain the growing trend towards green budgeting at national, regional and city level in both OECD countries and further afield.

A wide range of tools might be adopted within a green budgeting approach. Green budgeting is an umbrella term that covers a multitude of different tools. An OECD review of green budget identified at least 14 different tools that are consistent with the goals of green budgeting[3].

The analysis identifies 2 green budgeting tools that can be short-term priorities for the Council. These priorities take into account existing practice within the Council, its jurisdiction, the resources needed for implementation and consistency with political priorities:

- Green budget tagging (GBT): identifying (or 'marking') expenditures and/or revenues of a Glasgow City Council's budget against climate and/or environmental objectives, and subsequently, tracking these. Box 1 provide an example of how this has been undertaken by the government of France.
- Shadow carbon pricing: calculating and valuing the impact that policies, programmes and projects are expected to have on greenhouse gas (GHG) emissions, and incorporating this information within the economic appraisal of these activities.

The Council is now developing the internal processes to develop and pilot both of these tools.

[3] OECD (2021) Green Budgeting in OECD Countries

Box 1 **France's green budget tagging exercise**

The green budget tagging exercise in France rated expenditures, including tax expenditures, on a five point scale:

- Very favourable (3) – expenditure incurred for its environmental benefit
- Favourable (2) – an expenditure which did not have a primary environmental objective but which has a demonstrated indirect benefit
- Favourable but controversial (1) – an expenditure with a favourable impact but which could have contradictory effects, such as the risk of technological lock-in
- Neutral (0) – insufficient data to determine the environmental impact
- Negative (-1) – expenditures which have a direct negative impact on the environment or which encourages behaviours that harms the environment.

This assessment was made against six major environmental dimensions: (i) climate change mitigation; (ii) adaptation to climate change and prevention of natural disasters; (iii) the management of water resources; (iv) the circular economy, waste and the prevention of technological risks; (v) reducing pollution; and (vi) biodiversity, and protection of agricultural, forestry and other green areas. This analysis was undertaken for 475 separate line items.

In the subsequent reporting, these scores were further aggregated with expenditures reported as 'green' in cases where they had a positive impact (score of 1-3) on one environmental dimension without a score of -1 on any other dimension; 'mixed' where the expenditure had a score of 1-3 on one or more environmental dimensions but a score of -1 on another dimension; and 'brown' where there was at least one adverse impact on one dimension with no offsetting impacts on other dimensions.

The results for the 2020 budget found that out of a total of €574.2 billion in budgetary spending and tax expenditures, €52.8 billion had an impact on the environment:

- €38.1 billion was found to be green;
- €4.7 billion was found to be mixed. Much of this was spending on transport infrastructure, notably railways which was considered to have a positive impact on climate change mitigation but a negative impact on biodiversity.
- €10bn was found to be unfavourable, most of which related to tax expenditures that mitigated the impact of taxes on some energy consumers

About Us

Pengwern Associates is a UK-based consultancy specialising in the economics of climate change, the environment, international development and the linkages between them. Across these areas, it provides advice to support strategy development, decision-making and implementation, drawing on both quantitative and qualitative analysis.

Pengwern Associates was founded in 2018, as a lean and flexible consultancy to collaborate with others across the world to address some of today's most intractable environmental and social problems.

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