

Business Case

Summary Sheet

Title: Sustainable Infrastructure Programme (SIP) Latin America		
Project Purpose: To accelerate the implementation of the NDCs of key countries by catalysing and mobilizing strategic private sector investments in sustainable infrastructure, starting in Latin America.		
Programme Value: £177.5m		Region: Latin America, focusing on Mexico, Colombia, Brazil and Peru.
Senior Responsible Owner: Pete Betts		
Project Code:	Start Date: December 2017	End Date: December 2022 (Investment Period)
Quest Number:		

Intervention Summary

What support will the UK provide?

- 1 Approval is sought to invest in the 'Sustainable Infrastructure Programme' (SIP) to support countries in 'greening' their national infrastructure plans in line with their Nationally Determined Contributions (NDCs) under the Paris Agreement. It will be managed by the Inter-American Development Bank (IDB) and provide concessional capital funding with embedded technical assistance to help selected countries attract private investment into new sustainable infrastructure projects.
- 2 BEIS would provide up to **£175m of official development assistance (ODA) funding** from our International Climate Finance (ICF) budget over an **initial investment period of 5 years** to focus on a Sustainable Infrastructure Programme in Latin America, specifically Mexico, Brazil, Colombia and Peru. BEIS would not expect reflows from the investment, but returns would be reinvested into new projects. Any returns that cannot be re-invested would be returned to BEIS during the winding-up of the programme.
- 3 In addition, BEIS would allocate an additional **£2.5m** to procure third party advisors to conduct **additional sector-specific research to help with the implementation and a mid-term and impact evaluation** of the programme. Given the innovative nature of the programme, and the potential for future replication, it is vital that we have the tools available to guide the programme's priorities and make up-to-date and informed decisions during implementation, as well as gather the learning from SIP to assess whether deployment of UK climate finance was effective and transformative. Each output would be procured separately and research would be subject to approval from BEIS research and evidence committee.

Why is UK support required?

- 4 Climate change is one of the biggest threats to our national and economic security and we need to act now in order to avoid more detrimental and costly effects in the future. According to the World Bank, 100 million people are at risk of being pushed into extreme poverty by rising temperatures and increasing floods by 2030¹, with associated political instability and migration.
- 5 In Paris, the UK - alongside 195 other countries - committed to act together to keep a global temperature rise to well below 2 degrees. Developed countries confirmed a collective commitment to mobilise \$100bn of climate finance a year by 2020 from public and private sources to help developing countries mitigate and adapt to climate change. Through the ICF, the UK demonstrates that we are delivering against that goal.
- 6 The International Climate Fund was set-up in 2011 to administer the UK's international climate finance, its aim is to help developing countries access support to tackle climate change and move to a pathway of sustainable economic growth. Since then the ICF has evolved and grown, most recently the Prime Minister committed to provide 'at least' £5.8bn of climate finance to developing countries between 2016 and 2020.
- 7 Sustainable infrastructure² has been identified as a key priority to live up to the ambition of the Paris Agreement to keep temperature increase well below 2 degrees, and is one of the key focuses of the ICF in BEIS for the period up to 2020/21.
- 8 **This thinking was driven by a growing body of evidence that the next big climate challenge will be to bridge the existing gap in infrastructure funding globally in a sustainable and 2 degree compatible manner.** In developing countries, the infrastructure investment gap is estimated to be around \$4 trillion a year over the

¹ *Shock Waves: Managing the Impacts of Climate Change on Poverty*, World Bank Group, 2015. At: <https://openknowledge.worldbank.org/bitstream/handle/10986/22787/9781464806735.pdf>

² More information on what we mean by 'Sustainable Infrastructure' can be found in the Strategic Case under 'Targeting the interventions – identifying sectors that need support'.

next 15 years, according to the 2016 New Climate Economy (NCE) report.³ The report points out that unless all new infrastructure is green and sustainable, we will not be able to meet the objectives of the Paris Agreement.

- 9 McKinsey has estimated that making this infrastructure sustainable will likely increase up-front capital costs by 6 percent (2016).⁴ These costs are often returned over the life of the project due to lower operating costs and greater resilience, but the increased financing requirements up-front are hard to meet, and the majority of this will need to come from the private sector.
- 10 **Public finance will be necessary to help bring in private investment at scale.** Although some of this public funding will come from developing countries' own budgets, there will be limits to what national governments can do to mobilise private investment. The constraints vary; one key factor is the lack of strong credit rating of countries themselves leading to a higher cost of capital. Other factors include currency exchange risks that limit international investments, but also the lack of stable regulatory frameworks. In some countries, the lack of expertise to build public-private partnerships is a major constraint.
- 11 **The UK has a lot to offer in this space** as London is a global financial centre and low-carbon has been identified as a unique selling point by the Foreign Office (FCO) and the Department for Trade (DIT) especially around financial services such as legal advice and consultancy on the design of green projects.
- 12 We have therefore been designing the Sustainable Infrastructure Programme to primarily address emission reductions and poverty reduction, in line with ODA guidelines and the International Development Act, while also thinking more widely about the secondary commercial benefits for the UK and increasing the UK's soft power shaping and influencing institutions in other countries.
- 13 **We have researched the wide ranging initiatives going on in this space.** Given the recent nature of the commitments under Paris, none of the initiatives in the research specifically made the link between the infrastructure investment gap and the host countries' ambition to reduce emissions and mobilising private finance into their national infrastructure plans and NDCs. This has been confirmed through conversations with experts such as Rachel Kyte and Nick Stern. More information on programmes operating in each country and the landscape can be found at Annex A and D. We therefore believe that a programme that links infrastructure investments to NDCs would add value to the existing landscape of initiatives.
- 14 In Annex C we outlined the options available for a Sustainable Infrastructure Programme. On balance we have proposed the following approach:
 - a. **Take a portfolio approach to a Sustainable Infrastructure Programme, starting with the Latin American window** and subsequently focusing on South East Asia, and then potentially Africa, while keeping the specific activities within each window flexible and responsive to country needs.
 - b. **Develop the business case for the first Latin American window with the Inter-American Development Bank (IDB) as the primary delivery partner.**
- 15 Research will be undertaken for a Sustainable Infrastructure Programme in Asia and Africa, using the budget from the research element of this programme. This will inform the development of subsequent programmes in each continent, if demand is identified and also rationale for any increase to the Latin America window. New programmes will then be developed on a longer time frame, will require additional budget and therefore will be presented in separate business cases to the Projects and Investment Committee. Any future programme in new geographies will be based on learning from the Latin America programme design and will work interactively with this programme to share learning, and possibly account for efficiencies.

What are the main programme activities?

³ The Sustainable Infrastructure Imperative (2016) – available at <http://newclimateeconomy.report/2016/misc/downloads/>

⁴ Financing change: How to mobilize private-sector financing for sustainable infrastructure (January, 2016) Available at - http://www.mckinsey.com/~media/mckinsey/industries/capital%20projects%20and%20infrastructure/our%20insights/the%20next%20generation%20of%20infrastructure/financing_change_how_to_mobilize_private-sector_financing_for_sustainable-_infrastructure.ashx

- 16 **The programme will aim at deploying up to £175million on a combination of technical assistance and concessional capital investment.** A key principle will be flexibility to enable us to respond to the country's needs, adapt to specific domestic circumstances and adapt the financial instrument we use (e.g. guarantees, loans, grants, equity, etc.) as we go.
- 17 **The objective will be to use countries' emission reduction plans as a starting point for identifying opportunities for mobilising private sector investment into sustainable infrastructure.** In doing so, a key challenge will be to link the work of finance, planning and transport ministries, who are in charge of infrastructure planning, with the work of environment ministries, who are in charge of emission reduction plans.
- 18 To generate the most transformational impact, we will focus on three types of interventions for each sector:
- Technical assistance to Governments to build the right regulatory framework.** For example, this could include legal advice to standardise Power Purchase Agreements, or assistance to design and implement feed-in tariffs or auctions for renewables;
 - Investment in targeted projects to demonstrate commercial viability.** Private investors are often cautious when investing in sectors and technologies where the track record is weak or non-existent. Our money will help the IDB invest in challenging projects, reduce risks and 'crowd-in' private sector investors;
 - Work with local financial institutions to unlock domestic capital markets.** For example providing technical support to increase local banks' capacity to do the appropriate due diligence and lend to 'green' projects.
- 19 A budget of £175m has been generated using estimated project costs from the IDB. Early models have assessed that this would allow for £150m (CDEL) to be invested in targeted projects, around £35m-£40m (which would be 3 medium size projects) per country. These estimates are for the concessional tranche of a total project cost. The additional £25m would be allocated to the technical assistance strand (RDEL) of the programme, which would allow the IDB to provide capacity building support in two sectors per country.
- 20 Having a combination of technical assistance combined with a portfolio of projects in each country is assessed as creating the greatest opportunity for transformation and tackling a range of barriers to investment. If this model is successful there is a possibility that it could be used for further ICF funding in the future, however and additional funding allocations would be subject to a new business case and relevant approvals.

Principles for the design of the Sustainable Infrastructure Programme

- 21 **To combine technical assistance with capital investment.** There are usually a range of barriers to investment, from regulatory uncertainty to the risk-adjusted returns required to invest in emerging markets. By deploying capacity to address technical barriers (e.g. regulatory) together with some risk capital invested directly in projects, we are more likely to address barriers across the sector and unlock greater private investment.
- 22 **To ensure the programme is demand-led.** Local buy-in is crucial for the success and sustainability of the intervention. The IDB intends to establish a high-level dialogue with the partner country to ensure that the programme supports the national plans.
- 23 **To target specific sectors.** £175million is a significant sum of public finance but limited compared to the investment need. So we will have to think carefully about where and how we can have the most impact. Our suggestion is therefore to focus on specific sectors in each country. For example, we have identified renewable energy in Colombia or securitisation of small scale solar or energy efficiency projects in Mexico as possible sectors. Similarly, second generation biofuels could be a sector in Brazil. These examples are for illustrative purposes and following project approval, we will commission further evidence on the investment gaps and where UK International Climate Finance would be truly additional and generate real impact. IDB expertise will also be invaluable.

24 **To build-in flexibility.** With elections in three of the four target countries in the next 12 months and a rapidly changing investment environment for clean technology the programme needs to be flexible. This will allow the UK and IDB to together decide the current strategic priorities each year and allow for the sector decisions and high-level dialogue with the partner Governments to be more meaningful. We will also be able to work closely with the Department for Trade and Foreign Office to ensure the programme compliments their work in the respective countries.

Why Latin America first?

- 25 A country prioritisation exercise conducted earlier this year looked at three criteria: 1. Climate priority (including emission reduction potential); 2. Wider foreign policy priorities; 3. Commercial opportunities. It concluded that in Latin America, Mexico, Colombia, Brazil and Peru are where the greatest potential is.
- 26 The identified Latin American countries present a number of advantages from a BEIS perspective:
- a. Countries like Mexico and Brazil have more advanced economies and the size and state of their capital markets means that we can focus on more innovative interventions to attract private investors. There is also greater potential that successes could filter down to other countries in the region.
 - b. As a result, these markets could be where as a co-benefit we could create the most opportunities for UK companies in the low-carbon sector. We are talking about a multitude of small companies (legal firms, consultancy, investment advisers, etc.) but it will be quite difficult to measure the impact of our actions, even though in aggregate, it could equate to large benefits.
 - c. DFID and the CDC Group are not present in Latin America, which will reduce the risk of unhelpful overlap. The FCO however is very much present in these countries and we have working closely with the Prosperity Fund, as our money could be very complementary to some of their work.
 - d. Latin America's perceived infrastructure quality is lagging well behind advanced economies and high growth Asian economies, and advantages over sub-Saharan Africa are reducing.⁵
 - e. Finally, some Latin American countries have adopted very ambitious commitments under the Paris Agreement, including the focus countries, but are at risk of missing their targets without international assistance. This would send a negative signal internationally and could undermine further future ambition, especially given the current US context. We need more success stories about growth and opportunities created by low carbon investments.

Why the Inter-American Development Bank (IDB) as the primary delivery partner?

- 27 The UK has been working closely with the IDB for a few years, through DFID and DEFRA, and our experience has been very positive. Our approach to the implementation of countries' commitments under the Paris Agreement and the link to sustainable infrastructure has been very much aligned with the IDB's strategy. We have also had very positive feedback from Canada and DEFRA who both have funds managed by the IDB. Our programme would be separate to other UK funds to allow for a different focus and governance mechanism.
- 28 The great advantage of working with the IDB is their reputation locally, connections to partner Government, and that their core activities are closely joined up with their private finance arm. Our programme will therefore aim to draw on the expertise that exists on both sides of the 'IDB house', while building on the effective network and relationships that the IDB has developed over the years in the region.

How does the project fit with the country priorities (such as Nationally Determined Contributions – NDCs) or the department's strategic objectives?

- 29 As outlined above, this approach has been developed specifically to respond to countries' NDC priorities through a climate partnership approach. Working with a regional development bank will allow us to offer a wide range of technical assistance and private finance approaches, in response to the countries' needs.

⁵ <https://publications.iadb.org/bitstream/handle/11319/7315/Infrastructure%20Financing.%20Definitivo.pdf?sequence=1>

- 30 The SIP will ensure complementarity with other ICF programmes, particularly the new Transformational Technical Assistance programme. We will ensure this through the sector prioritisation exercise in each country as well as including relevant parties in the high-level dialogue for each country.
- 31 The UK may benefit from increased economic and business opportunities, including through increased productivity of enterprises in the region and competitiveness. The UK should benefit from visibility and recognition of its catalytic role and expertise in sustainable infrastructure. We also intend to design the programme so that we can improve awareness of opportunities for UK firms to become involved.

What are the key risks to the success of the programme?

- 32 This is a difficult approach to implement and has risks. It will take time, relies on political engagement (which needs FCO support) and there is a risk that UK visibility is diluted through IDB involvement, unless the overarching UK partnership is strong.
- a. **Speed.** We are aiming to announce the programme by the COP 23 in Bonn in November. That requires significant resource within BEIS, IDB and no delays.
 - b. **UK visibility.** Working with a development bank, like IDB, means they will also be associated with the funding. As above, IDB have been really positive about working with us proactively. We will aim to develop a communication strategy at implementation stage.
 - c. **Bilateral relations.** We will use learnings from previous bilateral programmes to manage risks e.g. through country diversification and working through an established partner instead of bilaterally.
 - d. **Political risk.** In Brazil, Mexico and Colombia where there are elections in 2018 and political support for both NDC implementation and private sector participation in infrastructure could change. We are working closely with the embassy and IDB to work out the best timing to engage each country.
 - e. **Project risk.** The programme will leverage IDB pipeline of opportunities during the investment period. Our focus on promoting private investment means we are reliant on sufficient private sector projects being developed and crowding-in private sector investment alongside BEIS and IDB for each project. Before the technical assistance has been implemented we will be relying on the IDB pipeline (which is well developed) but there is a risk that in the short term the projects are less aligned to the technical assistance. BEIS and IDB will appoint two professional full time contractors to monitor the program implementation, evaluate potential projects and oversee the credit analysis conducted by IDB.
 - f. **Scale.** As the scale of the challenge and the financing needs are vast there will be limitations around what is possible to achieve with our intervention. This is exaggerated given the size of the countries we are operating in; therefore our suggestion is to focus on specific sectors in each country.
 - g. **Defining emissions reductions.** Given the potential for sustainable infrastructure to reduce emissions for the long term, we are keen to explore infrastructure approaches. But identifying/ quantifying the potential for emissions reduction in infrastructure projects (e.g. how do we capture the emissions reductions from transport projects or transmission) and developing innovative approaches to financing sustainability improvements within hard infrastructure programmes may take some time.
 - h. **Delivery partner.** For the IDB the innovative aspect of this programme will be combining both the technical assistance side of the bank with the investment cooperation. It will require careful management to ensure we maximise the capacity on both sides of the bank to achieve the full potential of the programme. Therefore we will hire two independent contractors to oversee this cooperation.

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Chapter 1: Strategic Case

Context - The global challenge

Investing in sustainable infrastructure is key to tackling three simultaneous challenges: reigniting global growth, delivering on the Sustainable Development Goals (SDGs), and reducing climate risk (NCE, 2016:8).

- 1.1 The 21st United Nations Conference of Parties (COP) in Paris was a landmark moment where almost 190 countries submitted a voluntary plan to move to a lower-carbon economy (Intended Nationally Determined Contributions, INDCs). However, we are currently not on track to avoid dangerous climate change and keep the world on the 1.5-2 degree pathway outlined in the Paris Agreement so there is an urgent need to scale-up low-carbon investment.
- 1.2 At the same time global demand for new infrastructure is rapidly increasing. To meet countries' NDCs, how this new infrastructure is built is crucial. Infrastructure assets are typically long-lasting and can influence firms and households' investments choices - choices that are difficult to reverse, creating lock-ins (Fay et al, 2011).⁶
- 1.3 The New Climate Economy has calculated that from 2016-2030 the demand for new infrastructure will be around \$90 trillion – this is more than the current global stock (estimated at \$50 trillion) due to the requirement for both replacement of out-of-date infrastructure as well as new projects. Of this, about two-thirds of the demand will be in the global south (c\$4 trillion per year) (NCE, 2016).
- 1.4 Right now decisions are being made whether to build this new infrastructure in a 'climate-smart' way or continue with business-as-usual and lock-in a high-carbon future. The main challenge is that climate-smart infrastructure can be more expensive especially upfront despite long term benefits. McKinsey's 2016 report 'Financing change' estimated that making projects sustainable will likely increase up-front capital costs by 6 percent. These costs are often returned over the life of the project due to lower operating cost and greater resilience, but the increased financing requirement is hard to meet. This cost disparity can create a vicious cycle as this financial barrier can impede the quantity and quality of infrastructure investment (Bhattacharya et al., 2016).⁷
- 1.5 While the public sector will remain a key source of infrastructure investment (in developing economies about 60-65% of the cost of infrastructure is financed by public sources), there is a need to scale-up private financing to address the significant financing gap (NCE 2016). Therefore, it is vital that we use the available public resources to help address these barriers, crowd-in private finance, and demonstrate to the private sector that low carbon investment can be sustainable and profitable.
- 1.6 The International Climate Finance and fund was set up in 2011 in recognition of the growing importance and urgency of tackling climate change that poorest countries are often hit hardest and are least able to deal with the changes and their impact on growth and poverty reduction. One of the principle aims of the ICF is to demonstrate that the low carbon transition is possible, replicable at scale and commercially viable whilst simultaneously contributing to economic growth.
- 1.7 Focusing on the Latin American region presents a number of advantages for BEIS:
 - a. Emissions in the region are growing fast due to rapid urbanisation and growing industrial activity and there is a need to demonstrate that growth can be effectively decoupled from emissions.
 - b. As middle income countries these are 'easier' countries to target with more difficult and complex interventions. If successful, projects (for example in Mexico) can be used as a blueprint and replicated across the region, and potentially in other emerging markets.

⁶ Fay, M., M. Toman, D. Benitez and S. Csordas (2011). "Infrastructure and Sustainable Development" in S. Fardoust, Y.-B. Kim, C. Sepúlveda (eds.), Postcrisis Growth and Development: a Development Agenda for the G-20. Washinton, D.C.: World Bank .

⁷ Bhattacharya et al., 2016. Delivering on Sustainable Infrastructure for Better Development and Better Climate.

- c. Latin America has good complementarity with the rest of the UK ODA portfolio as DFID and CDC are not present in Latin America. The Prosperity Fund (through the Foreign Office) has programmes in each of the target countries, however none of these target sustainable infrastructure. We are working closely with the Foreign Office to link the relevant embassy into the delivery of the programme.
- d. BEIS is looking to deepen relationships with some of the more ambitious countries on climate action under 'climate partnerships'. The first of these is likely to be in Latin America and the SIP will reinforce the UK commitment with tangible activities and demonstrate flows of climate finance.

Targeting the interventions – identifying markets that need and can support them

- 1.8 Emerging markets are rapidly developing, with growing populations and increasing urbanisation. This burgeoning urban population is creating a growing need for new infrastructure to respond to pressures from urbanisation (Bhattacharya et al., 2012:8).⁸ There is already an infrastructure deficit in emerging markets which is impeding economic growth, and failure to address this will only continue to hamper both development and growth.
- 1.9 In Latin America the level and quality of infrastructure is inadequate and identified as one of the principal barriers to growth and development (IMF, 2016). To close this 'infrastructure gap', the region will need to raise its investment levels in this area to at least 5% of its GDP, which equates to additional infrastructure investment of about 2-2.5% of GDP annually, or around US\$ 120–150 billion a year over an extended period (IDB, 2015). Private-sector funding mobilization will be fundamental to this given that countries in Latin America have limited fiscal space to cover such a significant investment gap. Given limited fiscal resources and the potentially higher upfront costs of sustainable infrastructure, it is also important to ensure that private and public sector funding is spent on infrastructure is sustainable.

Country selection

- 1.10 The decision to focus on Latin America is not exclusive and additional Sustainable Infrastructure Programmes are being scoped for Asia and Africa, therefore the country selection is focusing on the most appropriate countries for this programme in Latin America.
- 1.11 **Given the scope of the challenge in Latin America and the limited available funding we recommend focusing on 4 countries: Mexico, Colombia, Brazil and Peru.** These countries were selected through the ICF country prioritisation exercise in December, 2016, which assessed countries against three parameters: A. Climate priority; B. Wider foreign policy priorities; and C. Commercial opportunity. This analysis has subsequently been reinforced by the Inter-American Development Bank's assessment of suitability of Latin American countries for a Sustainable Infrastructure Programme.
- 1.12 **The countries selected are of a high climate priority.** Of the countries identified, Brazil and Mexico represent some of the biggest emitters globally of carbon dioxide (ranked 7th and 11th in the world respectively); yet they have relatively low emissions on a per capita basis indicating that the potential emissions could grow to be significantly higher. In this regard, per capita emissions for the OECD as a whole are 11.6 tCO₂ per capita, and are 3.8 for Colombia, 5.2 for Peru, 6.0 for Mexico, and 6.4 for Brazil.
- 1.13 Table 1 shows that absolute emissions are much higher in Brazil and Mexico, reflecting population differences. Once land-use sectors are excluded (which are not included in this programme), there is a consistent pattern of strong growth in emissions since 2000, also demonstrating the importance of targeted action in these sectors.

Table 1: Overall emissions in 2013, by country (MtCO₂e)

⁸ Bhattacharya, A. , M. Romani and N. Stern (2012). "Infrastructure for development: meeting the challenge", Policy Paper, June. Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment in collaboration with G-24.

		Brazil	Colombia	Mexico	Peru
GHG emissions	MtCo2	1,317	178	742	158
	% of world Total	2.7%	0.4%	1.5%	0.3%
	World rank	7	45	11	47
	Growth versus 2000	-18%	-37%	22%	53%
GHG (excl. LUCF and agriculture)	MtCo2	581	107	649	63
	Growth versus 2000	53%	35%	29%	62%

- 1.14 **Politically, analysis has indicated that the countries selected have adopted ambitious NDCs but are at risk of missing their NDCs because of lack of capacity**, which could in turn make promoting greater ambition a very difficult politically message to sell. The Grantham Institute’s analysis on G20 countries indicated that Mexico has an ambitious and well considered NDC, suggesting political appetite for high ambition, yet it is the capacity and capability to implement these plans that is not yet clear (Averchenkova and Matikainen, 2016).⁹
- 1.15 Furthermore, some countries have effectively signalled their ambition to work with international partners to meet more ambitious GHG reduction trajectories through making conditional targets that depend on international support. For example, Mexico has a conditional target of a 36% reduction against the baseline by 2030 compared to a 22% unconditional target. Similarly, Colombia has similarly stated 20% unconditional versus 30% conditional target. Countries such as Colombia are actively recruiting donor support to meet its NDC commitments, for example through a central climate financing agency (where Germany has assisted) and establishment of Nationally Appropriate Mitigation Actions (NAMAs) in key sectors such as transport.
- 1.16 **Finally, in order to get the private finance to flow at scale we arguably should focus on challenging interventions** where the opportunity and potential to leverage in significant public and private investment appears to be greater and local buy-in will increase the possibility of success. The countries identified are emerging markets, and have more conducive macro-economic conditions for attracting domestic and foreign investment, yet it isn’t flowing at the scale or in the sectors needed to meet their low-carbon ambition. For example, the WRI (2014) illustrate that where government commitment to the development of the wind industry in Mexico existed (together with the use of policy levers and concessional capital) it helped leverage in significant amounts of private sector capital, with over 95% of wind capacity additions over the last ten years coming from the private sector.¹⁰

Targeting the interventions – identifying sectors that need support

- 1.17 The New Climate Economy define ‘sustainability’, in the context of sustainable infrastructure, as “ensuring that the infrastructure we build is compatible with social and environmental goals, for instance by limiting air and water pollution, promoting resource efficiency and integrated urban development and ensuring access to zero- or low-carbon energy and mobility services for all” (NCE,2016:10). For the purpose of this business case the term ‘sustainable infrastructure’ includes the following sectors, as these are the most prominent sectors in our selected countries both in terms of existing and future GHG emissions, as shown in Figure 1 below:
- a. Renewable Energy (excluding large hydro);
 - b. Transmission and distribution networks for renewable energy;
 - c. Lower-Carbon and Efficient Energy Generation [excluding Power Thermal power plant retrofit to fuel switch from a more GHG-intensive fuel to a different and less GHG-intensive fuel type];
 - d. Energy Efficiency (excluding for high carbon industries);
 - e. Non-Energy GHG Reductions (Industrial processes);
 - f. Waste and Wastewater; and
 - g. Transport.

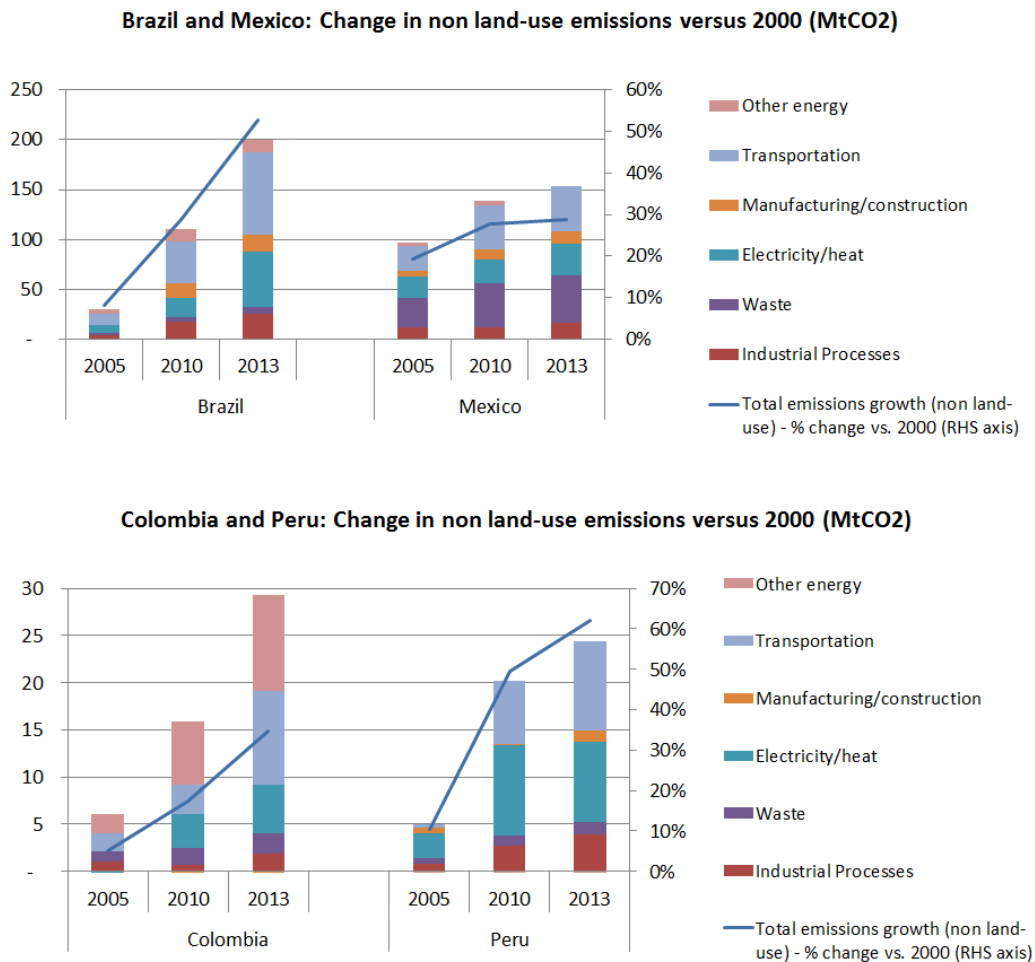
⁹ Accessible at: <http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2016/11/Averchenkova-and-Matikainen-2016.pdf>

¹⁰ WRI (2014) Mobilizing Climate Investment, http://www.wri.org/sites/default/files/pdf/mobilizing_climate_investment.pdf

1.18 Given the scale of the markets we have proposed to operate in, we need to ensure the ICF support is targeted to maximise impact. Therefore we will only intervene in a limited set of sectors, most likely two sectors per country. Whilst these will be decided during the implementation phase in consultation with the IDB and informed through the external research we intend to undertake in the first year, and once we've engaged with the recipient country in more detail, some early analysis can indicate where the opportunities and the needs are.

1.19 The sources of increases in greenhouse gas emissions (GHG) vary country-by-country. The following figures show a sector breakdown of the contribution to growth between 2000 and 2005, 2010 and 2013 for GHG emission by country. This shows the strong growth in transport emissions in all countries, representing 30-40% of the growth in emissions in all countries; growth in emissions from the electricity sector has been more important in Brazil and Peru, but still accounts for a relatively large proportion of the increase in Mexico and Colombia; emissions from other energy sub-sectors are also important in all countries meaning that the energy sector accounts for over 75% of emission increases in all countries except Mexico (55%); and emissions from the waste sector have grown strongly in Mexico

Figure 1: Change in emission for Mexico, Colombia, Brazil and Peru (excluding land-use)



Source of data: World Resource Institute

1.20 As is the case for total emissions, per capita emissions in non-land-use sectors and at the sectoral level also indicate large potential for growth in emissions. Total non-land use emissions are 11.0tCO2 per capita in the OECD as a whole, but are 2.8tCO2 per capita in Brazil, 5.2 in Mexico, 2.3 in Colombia, and 2.1 in Peru. There will be a need to disconnect economic growth from emissions growth in these countries.

- 1.21 The land-use and agriculture sectors will be excluded from the scope of this programme as we already have programmes targeting these sectors in the countries identified. It is also clear that given non land-use sectors are growing strongly, there is a strong case for tackling emissions in these sectors as well.
- 1.22 See Annex A for a more detailed account of the case for investment in sustainable infrastructure in Mexico, Brazil, Colombia and Peru.

Why there is a gap – the barriers to investment

- 1.23 The New Climate Economy highlight that neither capital nor projects are lacking, instead there is a “**lack of ‘bankable’ projects**” (NCE, 2016:34). Projects that are not ‘bankable’ are defined by McKinsey as projects that “do not appear to be likely to deliver high enough risk adjusted returns to attract private-sector equity or debt. Or costs and risks may not appear to be allocated appropriately” (McKinsey, 2016: 30).
- 1.24 Additionally infrastructure projects are exposed to external risks, including poor policies, institutional failures and lack of investor familiarity with green technologies (McKinsey, 2016:3). These challenges are inherent to infrastructure with the scale of the projects, as well as the public good element, making them particularly sensitive to local politics. This can cause even greater challenges in developing countries where there is often political instability and weaker regulatory environments.
- 1.25 The sector-specific barriers vary country-by-country but there are some overarching issues which are well documented (NCE, 2016; McKinsey, 2016) and impact on infrastructure more broadly. It is these barriers which we will be focusing on with the overall design of the sustainable infrastructure programme, and then the additional research (included in the budget of this business case) will focus on the sector/country specific barriers once the target sectors have been identified. Project identification and approval will also focus on addressing specific barriers to investment.
- 1.26 Below is a summary of the research on barriers to investment in the NCE and McKinsey 2016 report on sustainable infrastructure. These are reinforced by the barriers that the IDB has also identified in the selected countries (as noted below):
- a. **Unfavourable and uncertain regulations and policies:** For example, uncertainty over tax treatment, regulation on investment limits, regulations on banks limiting long-term funding and lack of long term commitments or financial stability to support long term projects. There can also be a lack of defined standards over what is needed to make infrastructure sustainable.
 - i. For example in Brazil, perceived risks in regulatory governance deter investment.
 - ii. For example in Peru, inefficiencies and duplication between government agencies; and a lack of standardization in permits and tariffs.
 - b. **Lack of transparent and “bankable” project pipelines:** While there may be sufficient capital and potential projects, these are often not developed enough to encourage investor confidence, documentation is lacking, or they don’t deliver the returns required by potential investors. Government long-term plans or their communication may also be lacking. There is also a lack of capacity on the investor side to properly evaluate projects.
 - c. **Inadequate risk-adjusted returns:** Where the risk of the projects is deemed to be higher (or perceived to be higher, for example, given it is for a new type of technology or it carries a higher upfront cost) investors may expect greater returns. These are often greater than what standard infrastructure projects can offer. If an investor cannot mitigate additional risks or share costs they may remain an unattractive project. The IDB notes:
 - i. For Brazil, low infrastructure returns due to high and risky opportunity costs for business.
 - ii. For Colombia, when clients seek financing, local banks perceive high risk in the technology and offer high interest rates, high collateral requirements and short-term financing.
 - iii. For Mexico, the real or perceived performance risk, technical risk and uncertainty around the possible returns or such projects.
 - iv. For Peru, high opportunity costs for private sector investment and PPPs.

- d. **Lack of viable funding and business models:** If sectors are heavily subsidised or the tariffs are universal then the income from a project may not have the potential to meet the costs, reducing incentives to invest. Capturing the benefits of investment may also be a problem for investors, for example recovering the higher upfront costs of energy efficient investments that will accrue to an owner or operator. The IDB notes:
 - i. For Brazil, private banks are oriented to short term investments and the securities markets are relatively small; and that there are scarce domestic public or private sources of funding.
 - ii. For Colombia, there is a lack of incentives to overcome the upfront cost of capital and risks; and lack of adequate long-term financing coupled with lack of suitable long-term contracts.
 - iii. For Mexico, the lack of adequate commercial bank financing available on a non-recourse or limited-recourse basis.
- e. **High development and transaction costs:** The capital cost of developing an infrastructure project can vary depending on the local context and requirements. Where the standards are less familiar (for example there may be a limited track record for particular types of project that helps investors consider risk and performance) or agreements are negotiated on a case-by-case basis this can be much more costly. Transaction costs may also be higher if an intervention involves investment in small scale assets, where transaction costs may represent a higher percentage of the overall project. The IDB notes:
 - i. For Brazil, there is a high cost of bond issuance to support sustainable infrastructure-backed assets.
 - ii. For Colombia and Mexico there is a relatively limited track record and thereby investor's exposure to sustainable infrastructure projects.

1.27 Another cross-cutting concern is that sustainable infrastructure may sometimes have intrinsic differences to traditional infrastructure as it sometimes means working with a more distributed set of smaller projects and owners. For example, renewable energy or energy efficiency proposals can be more distributed, and developing a proposal will involve working with a large range of actors (who may also be considered less creditworthy). Solutions could include, aggregation of renewable energy or energy efficiency projects into a securitisation vehicle to attract higher leverage and more competitive funding sources.

1.28 Barriers to project investment in Latin America span the above barriers to investment, but there are also more specific general barriers and market failures related to the above which we will consider. For example, the World Bank (2017)¹¹ notes specific market failures in the financial market in Latin America including:

- a. a lack of expertise within the financial sector for project finance structures that can result in poor credit risk assessments or relying on additional guarantees that may not actually be required; and
- b. there are limited examples in the LAC region where the financial sector is sufficiently developed to finance projects with long-tenors that may often be required for infrastructure projects.

1.29 Annex A expands on these challenges and lists some further barriers to investment in the financial sector for specific countries and the appraisal case (as well as Annex B) show some illustrative projects that could address these barriers through the SIP.

1.30 In originating projects, we will ensure that the justification of any project is grounded in addressing market failures, ensuring that our funding is additional. Until this occurs it is not really possible to identify what exact market failures will be addressed through this programme, SIP will address a selection of the above barriers through improving the pipeline of bankable projects (for example, through technical assistance) and increasing private sector participation (though de-risking projects via a range of financial instruments to be deployed by the IDB). The case studies in the Annex illustrate how this may occur in practice for a possible intervention in Mexico.

The proposed intervention

¹¹ <https://openknowledge.worldbank.org/bitstream/handle/10986/26406/114418-WP-LACRegionalInfrastructureFinanceReportFINALFINAL-PUBLIC.pdf>

- 1.31 The main objective of the Sustainable Infrastructure Programme is to **accelerate and enable the implementation of the NDCs by catalysing strategic public and private sector investments in sustainable infrastructure**. The programme will use three tools to achieve this:
- High level in-country engagement;
 - Quality Technical Assistance;
 - Blended Finance (reimbursable funding). This means BEIS will provide first loss tranches (equity, guarantees, sub-debt) combined with senior debt provided by IDB and private sector lenders for various individual projects and securitisation vehicles.
- 1.32 These three components will seek to achieve a transformational change in the market, while strengthening the country dialogue between those countries, the IDB and the UK on NDCs and sustainable infrastructure.
- 1.33 The Sustainable Infrastructure Programme will follow a sequential approach: firstly using the partnerships with each country to identify sectors that have significant barriers to investment and need technical support; secondly by deploying the targeted technical assistance both with governments and with local financial institutions; and thirdly strategically investing concessional finance to de-risk and attract private investment into novel projects. Each element of the programme will be country specific but have a common overarching approach.
- 1.34 **High level in-country engagement:** this first component is vital to ensure that the intervention is driven by the demand in the recipient country. We have learnt that in-country ownership is fundamental to achieving long-term change and transformational goals of any programme. This will begin with the engagement of key stakeholders and the organisation of ‘High-Level Dialogues’. These dialogues will start the development of plans for sustainable infrastructure investments in each country and aim to identify the sectors which need the greatest support – this will help inform the sector choices for the SIP to focus on and allocate resources most efficiently. It will also help with donor coordination to avoid duplication of support. This high level engagement can also feed into wider plans to build Climate Partnerships with specific countries.
- 1.35 **Embedded technical assistance:** once the sectors are identified, the SIP will establish a toolkit of support to overcome ‘soft’ market barriers. There are likely to be barriers to investment that the capital component (below) cannot overcome. Following analysis of these market barriers to investment, the SIP will design specific technical assistance via a financial advisor, to unlock private investment into infrastructure projects. This may include regulatory reform, support for local banks or advisory services for local developers to boost the pipeline of bankable projects to mitigate a number of risks mentioned in paragraph 25. This technical assistance will be embedded in the SIP and delivered through the IDB to address barriers to private investment in the project pipeline. This aspect of the program will be flexible and work closely with other programmes administering technical assistance in other sectors in the region to ensure it is complementary.
- 1.36 **Capital investment (blended finance):** for de-risking projects to accelerate the mobilisation of private investments. We estimate that this tranche will reflect the majority of the funding. It will be used to ‘de-risk’ major green infrastructure investments and therefore crowd-in private investment. The instruments used to de-risk investments will vary and we will need to remain flexible to make sure we are fit for purpose. We will work with IDB so that funding or assistance will be for genuine additional projects that assist in the delivery of NDCs.
- 1.37 Annex B includes a case study demonstrating how these interventions could interact in practice and what interventions the programme could target. The case study is hypothetical as the high-level dialogues have not yet happened (i.e. stage 1) but use real examples of where gaps have been identified.

Delivery partner – who is best placed to deliver the programme?

- 1.38 We have identified a partnership with the IDB in Latin America as an opportunity for us to learn about Latin America with a partner whose thinking on the interventions needed for NDC implementation are very much in line with our thinking. The IDB have demonstrated expertise in both working with governments in the region to deliver technical assistance, and investing in project to crowd-in private finance (through their

investment arm, the Inter-American Investment Cooperation “IIC”). The IDB and the IIC arms have demonstrated that they work effectively with each other, which is a key success factor to the programme. They are also cited as one of the most ambitious MDBs on the climate agenda with a clear strategy and defined targets.

- 1.39 Political engagement is fundamental to the success of the programme given the demand-led approach of the programme. The IDB have been identified as uniquely placed to achieve this, having strong existing relationships with the countries identified and the necessary political influence in the region. Following the elections in each country, the IDB will develop a new country strategy and relationship with the incoming Government to ensure the engagement is continued and relevant, this has recently been undertaken in Peru, and will happen again next year in Mexico and Colombia.
- 1.40 Operationally, the IDB have indicated that they can create a new single donor fund for the UK, which could be opened over time to other donors if there is appetite from the UK. They have signalled appetite to create a flexible governance structure which would meet our requirements for oversight over how our funding is invested and collaboration with partner governments for greater visibility over UK climate finance.
- 1.41 The proposed governance arrangements for the programme are outlined in the management case and respond to the lessons learned from programmes under management. In summary, we have proposed that there are two full-time independent contractors hired into the IDB to represent BEIS’s interest in the grant and blended finance operations, and ensure the appropriate use of our funding. Additionally, we will have early sight of all projects that would receive UK funding so that we could express any concerns. Finally, the UK is a shareholder of the IDB and has a representative on the Board. The UK representative has been engaged with the design of the programme from the outset to create a common understanding of the goals of the programme and ensure our interests are represented at the Board.
- 1.42 We have tested IDB’s ability to deliver with several other donors including DEFRA, DFID, and the Canadian Government. All partners remarked on the flexibility of the IDB and the strong client focused approach of the bank. IDB scored ‘good’ (2nd highest out of 4) for both alignment with UK priorities and organisational strengths in the latest DFID Multilateral Development Review.

Alignment with UK Government’s climate finance strategy

- 1.43 The International Climate Fund was set-up in 2011 to administer the UK’s climate finance, its aim is to help developing countries access support to tackle climate change and move to a pathway of sustainable economic growth. Since then the ICF has evolved and grown, most recently the Prime Minister committed to provide ‘at least’ £5.8bn of climate finance to developing countries between 2016 and 2020. The ICF is governed by a cross-Whitehall Strategy Board which meets quarterly and includes all relevant departments (DFID, DEFRA, FCO, HMT, DIT and BEIS).
- 1.44 The ICF aims for a 50:50 split between mitigation and adaptation with BEIS prioritising large-scale mitigation and private sector projects in countries with large or rapidly growing emissions. This complements DFID’s focus on adaptation and building climate resilience in the poorest countries (ICF Governance Principles).
- 1.45 Since the latest spending review the ICF team in BEIS has reviewed the investment strategy and made some notable changes. There will be a relative shift in our delivery model to reflect Ministerial concerns that there has been insufficient visibility of UK climate finance as a result of delivering mainly through large multilateral funds. In particular, there is strong ministerial appetite to:
 - a. Explore the development of high-level political partnerships on climate, starting with 2 key countries where the UK could make a demonstrable difference by 2020, building on the work of the SIP where possible. This would include working closely and at ministerial levels with a small number of developing country governments with high climate ambition and has the potential to achieve greater climate impacts. Please see Annex H for more information on the role of climate partnerships and link to the SIP.

- b. Create a more developed offer on technical assistance to strengthen capacity and capabilities in developing countries through a ‘Transformational Technical Assistance’ Programme. This would complement the technical assistance provided under the SIP by sharing UK skills directly with host governments.
- c. Design more focused and flexible capital finance programmes to support sustainable infrastructure and/or reduce deforestation in order to make the results more visible.
- d. Explore the scope to get secondary UK commercial benefits, including by maximising synergies with the UK Industrial Strategy and focussing efforts on where the UK has competitive strengths.

1.46 As part of the updated strategy the BEIS ICF team have designed ‘guiding principles’ to describe how we will pursue transformational change within each of these broad thematic areas.

- a. **Innovate** to overcome critical barriers in the market: Take financial and technological innovation to developing country markets and test approaches tailored to their unique contexts.
- b. **Invest with Impact** by mobilising private capital at scale: Embed private finance and technical assistance across the portfolio to enhance the impacts and success of our projects.
- c. **Inspire** by sharing UK skills to raise ambition: Harness UK strengths and leadership in key countries, sharing evidence and expertise to build confidence and capabilities

1.47 The Sustainable Infrastructure Programme has been designed to learn lessons from the previous 7 years of the ICF as well as focusing on the new priorities and guiding principles (which are in part a reflection of the lessons).

- a. The programme has selected the focus countries in tandem with the country prioritisation exercise conducted to identify potential climate partnerships. This will ensure that the SIP will be operating in ‘easier’ countries to implement more difficult interventions focusing on the mobilisation of private investments.
- b. The design has combined technical assistance with investment capital in order to create ‘demonstration project’ and build an integrated approach for each sector and accelerate mobilisation of private investments. This should help increase buy-in and sustainability for the programme, as well as having a potentially significant low-cost transformational impact.
- c. The programme will seek more visibility for the UK through a communication strategy discussed with the IDB from the outset. The countries selected within the SIP will also be considered for wider ‘climate partnerships’ and be part of a more comprehensive ‘UK offer’.
- d. Finally, there has been significant communication with other UK departments such as the Department for International Trade and the Infrastructure Projects Authority to establish a plan for securing secondary benefits for UK companies. More information on this can be found in the section below on UK commercial opportunities.

1.48 **Coordination:** As part of the development of the programme the team has worked closely with the embassies in each of the relevant countries (through our climate attaché network) to ensure that the programme supports the UK priorities in the country and is complementary to the prosperity fund programmes under operation. The embassy will be involved in the operations of the programme.

Transformational Impact of the Intervention – The Theory of Change

1.49 The overall ‘transformational’ objectives we are seeking to achieve through the design of the Sustainable Infrastructure Programme are:

- a. Private investment is unlocked at scale for sustainable infrastructure in the target sectors including through effective regulatory reform;
- b. Partner governments are bought into sustainable growth paths and not only bring their national infrastructure plans in line with their NDCs but look to increase ambition in 2020; and
- c. UK climate finance is positively recognised by partner governments, in turn encouraging increase in ambition of others and visibility of UK climate finance.

1.50 These goals are ambitious given the scale of the finance available and can only be achieved by selecting the right interventions. We need to carefully consider the risks that could limit the scale and the impact, and be able to adjust the model to respond to changing conditions in country. The consideration of how our

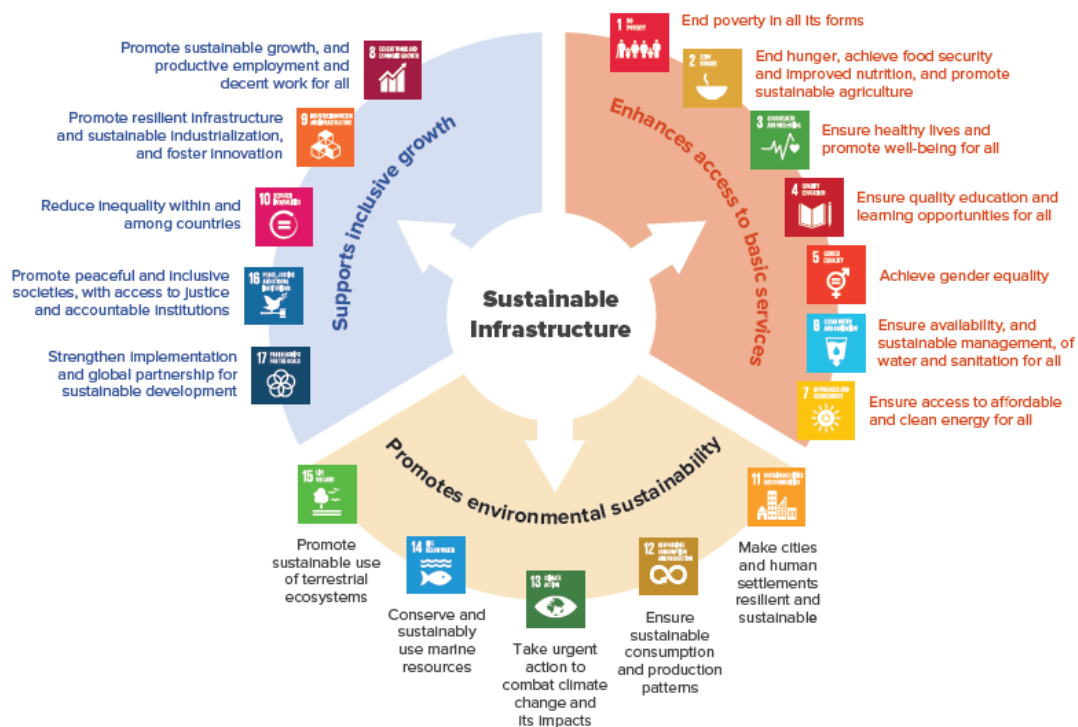
intervention could achieve the overall goals and the assumptions that could impact on this flow is illustrated in the ‘theory of change’ which can be found in Annex E.

International Development Act 2002

- 1.51 The International Development Act 2002 enables the Secretary of State (SoS) for the Department of Business, Energy and Industrial Strategy (BEIS) to provide any person or body with development assistance if they are satisfied that the provision of the assistance is likely to contribute to a reduction in poverty. “Development assistance” means assistance provided for the purpose of (a) furthering sustainable development in one or more countries outside the United Kingdom, or (b) improving the welfare of the population of one or more such countries. “Assistance” includes financial assistance. “Sustainable development” includes “any development that is, in the opinion of the Secretary of State, prudent having regard to the likelihood of its generating lasting benefits for the population of the country or countries in relation to which it is provided”. The International Development Act 2002 provides that the SoS may contribute to a fund that it is intended to be used for these purposes.

Source: Bhattacharya et al., 2016 in NCE, 2016

Sustainable infrastructure supports many of the Sustainable Development Goals



- 1.52 These interventions meet the requirements of the International Development Act 2002. At a global scale, ending poverty and addressing climate change, two of the most defining challenges of our times cannot be considered in isolation. The poor stand to be the most affected by climate change as without action, climate change can threaten food security and thereby raise prices of agricultural products beyond the sustenance of the poor.¹² These also form many of the Sustainable Development Goals as demonstrated in the diagram¹³ (above).
- 1.53 At a national level, infrastructure underpins core economic activity and is an essential foundation for achieving inclusive sustainable growth. It is indispensable for development and poverty elimination, as it

¹² Shock Waves – Managing the Impacts of Climate Change on Poverty (World Bank, 2016)

¹³ Source: Bhattacharya et al., 2016. Delivering on Sustainable Infrastructure for Better Development and Better Climate.

enhances access to basic services, education and work opportunities, and can boost human capital and quality of life.¹⁴

- 1.54 Latin America has a sizeable gap in infrastructure funding, requiring the region to raise its investment levels to at least 5% of its GDP. A key tenet of this programme is *transformational change*, which will promote sustainable and inclusive growth while accelerating the implementation of NDCs in its priority countries.
- 1.55 The SIP will be using both technical assistance and capital investment, to unlock private capital for sustainable infrastructure and increase the quality and quantity of new and sustainable infrastructure in Mexico, Colombia, Brazil and Peru. Some of the expected outcomes, and key performance indicators to measure the success of the programme, will be reduced carbon emissions which will help the countries achieve their NDC targets, and poverty alleviation through expanding basic services, such as access to electricity and water. In addition there will be jobs created in these sectors increasing the availability of both skilled and un-skilled employment locally.
- 1.56 The focus of SIP on innovative interventions in Latin America, coupled with the potential for replication of SIP projects by the private sector provide long-term solutions to the challenge of expanding basic services to these areas, and in extension reducing poverty. Workforce requirements to develop sustainable infrastructure would also lead to growth in local employment opportunities.

Gender Equality

- 1.57 To meet the requirements of the gender equality provisions that have been added to the International Development Act 2002 (that the SoS have regard “to the desirability of providing development assistance that is likely to contribute to reducing poverty in a way which is likely to contribute to reducing inequality between persons of different gender”), we have considered the possible gender impact of the project. In tandem with this consideration has also been given to the Public Sector Equality Duty, in particular the impact of the programme of women and girls.
- 1.58 Evidence suggests that fairly small investments in infrastructure services (among others) – especially water and electricity – can disproportionately benefit women who are often in charge of domestic and care work. This can lead to increased opportunities for employment for women as well as noticeable impacts on leisure time, which can also improve welfare.¹⁵
- 1.59 In this regard, SIP will look for additional opportunities to promote the interests of women and girls in the development of both interventions. This could include, for example, quotas on female representation on projects or the establishment of apprenticeships for women. Additionally, we could leverage existing programmes that link sustainability with gender equality. For example, in Colombia, women living in or near high climate risk zones are trained to be *Guardianes de Ladera* (Guardians of the slope).

Conclusions

- 1.60 In light of the scale of the challenge, the barriers identified and the ICF strategy, this business case considers the case for establishing a Sustainable Infrastructure Programme with the Inter-American Development Bank that would deliver:
 - a. Targeted interventions in four countries in Latin America to unlock market barriers and leverage private investment into sustainable infrastructure projects;
 - b. Alignment of NDCs and national infrastructure plans within the target countries, to increase the likelihood that the NDCs can be met, with the potential to increase ambition in 2020;

¹⁴ The Sustainable Infrastructure Imperative (NCE, 2015)

¹⁵ Gender Equality and Development (World Bank, 2012)

- c. Increased visibility of UK climate finance – particularly in potential ‘Climate Partnership’ countries - to leverage soft power, increase the 2020 ambition and improve communications around ODA spend in-country;
- d. Reduced social inequality and poverty reduction from higher quality and resilient infrastructure as well as the reduced potential impact of dangerous climate change; and
- e. Increased awareness of the secondary benefits for UK companies of the opening up of sectors where there is relative UK expertise in emerging markets.
- f. A pilot programme that could potentially be replicated in other markets.

Chapter 2: Appraisal Case

- 2.1 The Appraisal Case covers the options that were considered to address the barriers identified above in the Strategic Case. It also includes an assessment of the value for money of the preferred option, setting out how the design provides economy, efficiency and effectiveness in utilising donor funds to have a transformational impact on renewable energy deployment.

Options analysis - What are the feasible options that address the needs set out in the Strategic Case?

Option 1:	Do Nothing. BEIS would not establish a new vehicle targeting sustainable infrastructure, or make any further contribution to another facility with an infrastructure focus.
Option 2:	Put money into (replenish) existing multi-donor fund. BEIS would invest in or replenish an existing multi-donor fund that contributes to sustainable infrastructure in Latin America. Whilst there is no specific fund that would provide technical and financial support in just these countries some global funds do make investments there, such as the Clean Technology Fund.
Option 3:	Create a global fund with a global development bank or private sector organisation. BEIS would establish a vehicle with a global focus rather than targeting just four countries in one continent. This could be procured and delivered by a private sector partner, or could be delivered through a global development bank, such as the World Bank.
Option 4:	Create a regional fund with a regional development bank. BEIS would establish a new vehicle with a regional focus targeting barriers to sustainable infrastructure in specific countries, working with a local development bank. Given the strategic case we are assessing a Latin American fund with the Inter-American Development Bank.
Option 5:	Create a regional fund with a private sector partner. BEIS would establish a new vehicle with a regional focus (Latin America) targeting barriers to sustainable infrastructure and run a procurement exercise to find a private sector organisation that could deliver the programme.

Critical Success Criteria Assessment

- 2.2 A number of Critical Success Criteria (CSC) have been applied to each of these options to inform the selection of a preferred option for the delivery of this initiative. They are described in qualitative terms.

Estimated ability to mobilise private sector partners	Intervention will be able to mobilise private sector investment at scale.
Scale and Sustainability	Sufficient programmes delivered to generate enough momentum to demonstrate change and change perceptions of risk and viability. Once ICF financing has ended, investment beneficiaries will continue to deliver.
Ability to deliver technical assistance component	The intervention combines technical support with the investments to increase capacity and capability in the partner countries, specifically Governments, local financial institutions and project developer.
Ability to manage risk in structure:	The intervention presents a low risk in terms of their ability to deliver and meet the fiduciary requirements of BEIS. The intervention is eligible to administer UK Aid. Specifically: Government control and assurance; ODA eligibility; Ensuring project is in scope of usual spending powers; Financial and accounting; Procurement and legal risk; and State Aid.
Development benefits	The intervention has a positive developmental impact in host countries.
UK visibility	Intervention is visible and attributable to the UK's Climate Finance.
Timing	We want to see initial impact ahead of 2020.

- 2.3 The full options assessment is contained in Annex C, and Table 2 summarises the results. For each option the level of CSC was considered on a range between Low and High, as there is insufficient evidence to be able to

accurately numerically rank them. A range from ‘Low’ to ‘High’ is used to classify options relative to each other, there is no objective definition for the ratings, although justification for why the chosen scores have been assigned is given in Annex C.

Table 2: Options assessment against critical success criteria

CSC	Option 1 Do Nothing	Option 2 Existing multi-donor fund	Option 3 Global fund	Option 4 Regional fund with development bank	Option 5 Regional fund with private sector
Estimated ability to mobilise private sector partners	Low	Medium	Medium - High	High	High
Scale and Sustainability	Low	Medium	High	High	Medium
Ability to deliver technical assistance component	Low	Low	Low	High	Low
Ability to mitigate risk in structure:	N/A	High	Medium	High	Low
Development benefits	Low	Medium-High	Medium-High	High	Medium
UK visibility	Low	Low	High	High	High
Timing	N/A	High	Low	Medium/High	Low
Summary	Low	Medium	Medium-High	High	Medium

- 2.4 **Table 2 shows that based on the critical success criteria Option 4 is the preferred option.** Option 1 scored Low on the majority of criteria; as if the UK were to do nothing then none of the objectives in the strategic case would be met. Option 2 scored Medium, as an existing fund would be less tailored to the specific aims of our challenge and therefore less likely to have the targeted impact we are looking to achieve. The only CSC that scores ‘high’ for Option 2 is timing and risk mitigation and this is because this would be an established mechanism with clear delivery routes that delivers UK Aid.
- 2.5 Option 3 scores Medium-High. It scores High on scale as it would have the ability to operate globally so could have the potential to disburse larger sums of funding and create momentum in a range of geographies. It would have the potential to achieve one of the core objectives, mobilising private finance. However, given the funding suggested in this business case it would be hard to have a significant impact in such a range of geographies. The delivery route is also less clear as there aren’t any private sector organisations or even development banks that have deep relationships with governments in all potential target countries, given this, it would also take longer to deliver impact.
- 2.6 Option 5 has been assessed as having a ‘medium’ fit with the strategic aims. Procuring a private sector partner would have its merits regarding mobilisation of private investors and potential UK visibility (depending on the partner). However, it would be much more challenging to have deep relationships with partner governments and undertake embedded technical support. It would also take much longer to establish reducing our likelihood of having early impact by 2020.
- 2.7 **Option 4 has been scored as having a strong fit with our critical success criteria.** The IDB has a strong reputation in the region and relationship with partner governments. Their experience shows that they have delivered both technical support and investments at scale. IDB has a mandate to consider both climate and poverty alleviation, with particular regard to gender equality, giving us confidence that development benefits would be a core priority. Overall this option has the strongest fit to our transformational objectives and meets all critical success criteria.

Value For Money appraisal (VFM)

- 2.8 The approach used to assess value for money is in line with DFID's 3E's approach which looks at economy, efficiency, effectiveness and cost-effectiveness.
- **Economy:** Are we or our agents buying inputs of the appropriate quality at the right price?
 - **Efficiency:** How well do we or our agents convert inputs into outputs?
 - **Effectiveness:** How well are the outputs from an intervention achieving the desired outcomes?
 - **Cost-effectiveness:** How much impact does an intervention achieve relative to the inputs that we or our agents invest in it?

Economy

- 2.9 As noted in the strategic case, UK support will fund:
- a. Concessional finance (CDEL) of £150 million, expected to fund £35-40m per country on average.
 - b. Technical assistance and administration costs, including fees (RDEL) of around £25 million to allow the IDB to provide capacity building support and meet its administration costs in two sectors per country (on average).¹⁶
 - c. An additional £2.5m to procure third party advisors to conduct additional sector-specific research to help with the implementation and evaluation of the programme
- 2.10 While the details of the specific interventions to be undertaken are not yet known, the IDB have provided a preliminary budget for the use of the first two funding streams above.
- 2.11 Disbursements made under both the TA and investment facilities will also be pursuant to IIC policies and procedures, including the IDB procurement policy which is reviewed in the management case.
- 2.12 The delivery route for the additional sector-specific research and evaluation (the proposed £2.5m), is likely to be partly procured by BEIS and partly by the IDB. It will be subject to respective organisations' procurement policies to ensure value for money. We will consult with the IDB on these activities to avoid duplication of efforts, and harness any evidence that they will also have collated. These activities are also expected to provide lessons for the wider proposed SIP programme beyond Latin America.

Efficiency

Barriers to investment

- 2.13 The strategic case highlighted several key barriers to investment in sustainable infrastructure in Latin America. Whilst the programme is yet to identify the sectors it will operate in the IDB has provided a case study in order to illustrate better the types of activities the SIP could perform (see Annex B). The case study uses an example of how SIP could attract institutional investors' capital for sustainable infrastructure in Mexico via aggregation of a pool of underlying green assets (funded and brought together in a warehousing facility) and the issuance of these asset based securities as a green bond. This approach addresses several identified market failures identified in the strategic case, including:
- a. Lack of commercial bank activity to fund smaller scale low-carbon and climate-resilient assets.
 - b. Lack of financial sector expertise in understanding the risk profile of sustainable infrastructure investments, including due to a lack of a track record.
 - c. In terms of structured finance, the IDB have also identified the lack of historical data on the credit performance of securitised assets, and the related difficulty in obtaining credit agency ratings; and

¹⁶ Technical assistance is expected to include a range of activities, including country partnership activities, strategy and policy development, institutional capacity building, project feasibility and design, project acceleration and structuring support.

- d. The lack of clear standards, best practices and clear documentation for originating and structuring the asset classes or green bonds as a risk to lenders and investors.

- 2.14 One of the main objectives of the SIP programme is for technical assistance to support (1) project feasibility and design and (2) project acceleration/structuring (i.e. accelerating the development of a pipeline through improving the bankability and attractiveness of proposed projects). The IDB draft budget referred to in the economy section foresees the IDB supporting 26 projects in the feasibility and design stage and 7 projects in the acceleration/support stage¹⁷.
- 2.15 It is expected that the majority of these technical assistance interventions would directly support concessional financing (if required), which would be consistent with our view that concessional finance is most effective when accompanied by appropriate technical assistance. TA will also increase the number of projects supported as the TA is expected to support more projects than the number of transactions expected solely in the investment portfolio (the IDB foresees 15 projects for £150m in investment financing), or around 2 projects per sector for each of the four countries.
- 2.16 In Mexico (IDB case study outlined in Annex B), technical assistance could be used to address barriers for the financing of smaller sustainable infrastructure transactions, and the expansion of ‘green bonds’ in Mexico. Smaller transactions have proved much more difficult to finance than larger transactions in Mexico, and this assistance would address the underlying issues. Technical assistance could include assistance before and after bonds are issued. For example, related to absorbing transaction costs associated with the legal and financial structuring of a new financial instrument, and assistance with reporting requirements. BEIS consulted with stakeholders¹⁸ in Mexico to verify the appetite for this technical assistance and the proposal was widely encouraged. Further, the IDB have proposed that this technical assistance could work together with concessional financing under SIP in order to warehouse a portfolio of projects and support issuance of green bonds.
- 2.17 An additional illustrative case study for possible interventions in Colombia is outlined in Annex B. In order to address barriers to financing of sustainable infrastructure projects, technical assistance could include interventions to strengthen project development and the design and construction stages through feasibility studies, environmental and social assessments, contracting and construction supervision. The approval of such projects in Mexico and Colombia would of course also be subject to the governance requirements of the SIP programme to ensure value for money (described below).
- 2.18 Further to these case studies BEIS has worked with the IDB to model a realistic indicative portfolio of investments that could overcome perceived barriers to private investment in the target countries (the model is explained below in the ‘effectiveness’ section). Table 4 provides a short summary of some of the example projects that have been reviewed in the model to give an indication of some other types of instruments that could be used by SIP and the estimated size of UK involvement needed in each transaction.

Table 4: Four examples of projects modelled in the indicative pipeline for SIP (£ millions)

£millions	Instrument (UK Funding)	Project size	UK (SIP) funding	IDB/IIC funding	Other loan financing (% private)	Private equity	Leverage ratio
Distributed solar aggregation platform (Mexico, 50MW)	UK funding for loans/subordinated debt	27.7	3.0	5.5	13.7 (67%)	5.5	8.1
Energy efficiency project	Green Bond related instruments	27.7	5.5	11.1	5.5 (100%)	5.5	9.0

¹⁷ Exact number and cost of activities will depend on the specific needs of the specific country and sector.

¹⁸ These stakeholders included: Local and international financial institutions; the Mexican Stock Exchange; a local ESCo; relevant Government departments; their environmental agency; their NDPB for energy efficiency and development banks.

(Colombia)							
Risk mitigation instruments for wind projects (Peru, 100MW)	UK funding for subordinated positions (partial credit guarantees and first losses).	138.5	3.7	22.2	84.9 (100%)	27.7	36.5
Clean buses PPP* (electric. Brazil)	UK funding for loans	128.3	22.2	31.4	51.1 (50%)	23.6	4.8

*Project size reflects estimated incremental costs to upgrade to an electric fleet from counterfactual.

Efficiency in delivering outputs

- 2.19 As well as addressing market failures to promote investment in sustainable infrastructure, efficiency considerations also mean ensuring that competitive projects are supported. Similarly, it is important to ensure that concessional financing and technical assistance is only provided where required to ensure value for money (i.e. that projects will be 'additional').
- 2.20 The IDB is considered to have strong governance processes to ensure efficiency in the delivery of project outputs. Firstly, in terms of ensuring that efficient projects are supported, existing IDB governance processes include:
- An eligibility committee** which meets at early stage to see if transactions are in line with the objectives of the IIC (and in this case the SIP programme). This also may include early engagement with a credit officer to ensure that the transaction is likely to be in line with credit risk requirements (i.e. meeting likely competitiveness benchmarks in terms of likelihood of default).
 - For projects that have not been subject to competitive tension in appointing the Engineering, Procurement and Construction (EPC) contractor, they will be subject to a higher level of due diligence involving the appointment of an engineer to review all aspects of the transaction. This review includes costs; ensuring that any contracts with EPC contractor are at arms-length; yield analysis; curtailment issues such as the capacity of transmission infrastructure to support plant; consultation with manufacturers; and ensuring equipment is fit for purpose at proposed site.¹⁹
 - Robust credit approval processes**, which include an economic and financial analysis of the proposed transaction; risk assessment including pricing and contractual structure to assess revenue risk, and loss of off-taker and construction risk; an assessment of the parties to the transaction (including an independent assessment by the IIC Integrity Officer), integrity considerations; and if the proposal is supported by concessional financing a verification memorandum establishing that concessional financing is deployed appropriately.
 - More detailed consideration of the final proposal by the IIC Board that includes re-consideration of most information provided to the credit committee, further consideration of financial and non-financial additionality, alignment with individual country priorities and strategies, and that the intervention is complementary to other donor activities. In addition several other lenders will be providing funding, acting as a cross check for BEIS and the IDB re risk analysis and project documentation and negotiation.
- 2.21 Furthermore, given one of the main objectives of the SIP programme is to mobilise private finance, the current IIC portfolio also demonstrates the IIC's track record in leveraging other finance. The overall leverage ratio for other concessional resources provided to the IIC is 8.8, with a high of 34.4.
- 2.22 As discussed in the strategic case, BEIS will also have the opportunity to feed into the consideration of supported projects through the 'non-objection' process for considering the deployment of TA and concessional financing. This will provide an additional layer of due diligence to help ensure that efficient and

¹⁹ Similarly, after project approval and start of operations, projects will be monitored through the use of an independent engineer to ensure that the asset is performing as expected.

competitive projects are supported. Moreover, this and the general governance processes (outlined in the management case) will help ensure that the investment criteria of the programme are met.

- 2.23 The **£2.5m** allocated to procure third party advisors to conduct **additional sector-specific research to help with the implementation and evaluation** of the programme will guide the future design of the SIP programme and promote the efficient use of BEIS resources. This work will further our understanding of key market failures in the delivery of sustainable infrastructure in the targeted countries, investment needs and gaps, and other possible interventions for the BEIS contributions under SIP.

Minimising market distortion and ensuring additionality

- 2.24 IDB follows MDB guidelines for the use of concessional financing, to ensure that this is only deployed when required and in line with expected criteria. These DFI guidelines are attached at Annex G. A key consideration in the approval of projects through SIP is that projects will catalyse private investment and lead to additional investment (i.e. that the project will not proceed without IDB involvement). In making this assessment, the IDB will assess relevant market failures and ensure that the proposed intervention will not cause further market distortions. This will promote and ensure efficiency in the delivery of outputs, in that BEIS investments through the IIC will be designed to crowd-in the private sector.
- 2.25 One of the ways to maximise the additionality of the SIP engagement is combining the technical assistance with the investment to unlock market barriers in ways that the private sector are unable to engage – through regulatory reform or direct assistance to financial institutions.
- 2.26 For example, in Mexico, BEIS discussed the barriers to the expansion of green bonds in Mexico that have been noted by the IDB with an industry association. This association requires assistance to develop a work programme to ensure that best policy and market practices are established in Mexico (for example, standardising contract documentation). In Colombia, the IDB has also highlighted possible technical assistance interventions that would address policy and regulatory needs, for example, developing the regulatory structure for distributed electricity generation. Such initiatives would be subject to review under the governance arrangements with the IDB.
- 2.27 The case studies at Annex B then indicate how the SIP's capital could then be invested to take some of the first-mover risks associated with the development of these sectors in Mexico and Colombia and encourage private engagement at a relatively risky stage in the development of the relevant sectors.

Effectiveness and cost-effectiveness

- 2.28 This section provides an indicative assessment of the value for money of investing £177.5m (made up of £150m of investment in IIC led sustainable infrastructure projects, combined with up to £25 million in the technical assistance and administration components, and £2.5 million for the evaluation and research components. However, only the monetised benefits of the £150m investment programme are considered (i.e. the benefits of the remaining £27.5 million are not considered). Whilst the modelled expected results only relate to the capital investment in projects, the TA is considered fundamental to enabling a healthy pipeline of projects for investment and for the full potential for benefits to be realised.
- 2.29 Other benefits will flow from the other activities envisaged through the technical assistance and monitoring and evaluation (M&E) parts of the programme (£27.5m) - see the Strategic Case and efficiency discussion above for further information on these activities. The theory of change (Annex E) will inform the design of the monitoring tool (Logical Framework, "logframe") which is used to track progress toward achieving the overall transformational objectives resulting from these activities, and the risks that could limit this. This will include milestones to report against annually during BEIS's Annual Review process. IDB have agreed to work with us to ensure the logframe will be finalised within 6 months of implementation, and reviewed annually thereafter.

- 2.30 The modelling for the economic appraisal is designed to model a range of investments in different countries, sectors and technologies and allow the user to vary key assumptions to carry out scenario and sensitivity testing. The model is driven by an indicative portfolio of projects to be invested in, which has been provided by the IDB. This then produces expected outputs in terms of tCO₂e saved, MW installed, jobs created, leverage achieved, and cost metrics such as cost per tonne of CO₂e and Net Present Value (NPV).
- 2.31 The model has been developed in keeping with BEIS Modelling Integrity Team guidance and is based on the framework/structure of a previously approved ICF model, have undergone the standard ICF QA process and are considered fit for purpose. The Technical Annex (see Annex F) provides more information on the modelling and an assessment of the strength of the evidence of each element of the modelling. Overall the evidence is assessed as moderate given the exact project portfolio is not known at this time but the input data is, on average, judged to be reliable.
- 2.32 The net present values presented in the appraisals below are only partial. Monetised benefits include resource savings from displaced fossil energy generation, private welfare benefits associated with additional energy supply that meets unmet demand (assumed to be negligible in Latin America²⁰); energy savings from energy efficiency proposals; and CO₂e savings from all proposals. Individual projects are expected to have wider non-monetised benefits (or costs)— the exact nature of which will depend on the specific project, but may include local development and poverty reduction benefits from improved energy access, air quality and health benefits from avoided diesel and biomass generation; wider economic benefits from productivity improvements through increased resource availability (for example transport proposals may reduce congestion and allow greater access to transport), and indirect economic benefits such as improved employment, job creation and amelioration of gender impacts.
- 2.33 At the time of writing, the Heads of Terms (HoT) and draft Investment Mandate (IM) has not yet been fully finalised. Where possible, input assumptions to the model have been drawn from draft documents. This analysis will be updated once these documents are finalised in order to monitor the impact on expected results and sense check expected results included in the SIP logframe. At this stage, it is not expected that the HoT will include an investment mandate that limits investment to a cap in a particular sector or country, although it is expected that the programme will focus on around two sectors per country. The current illustrative project portfolio reflects a snapshot of a range of projects given the available information at the time the analysis was carried out, and includes investment in more than two sectors in some countries (this is not considered to be a major issue given sector priorities have not yet been determined). All assumptions are generally taken from IDB provided information (with some minor exceptions, and exception for more generic assumptions such as carbon prices and electricity prices).
- 2.34 It is recognised that there is a risk that this illustrative portfolio may not accurately reflect the future make-up of the SIP portfolio. TA assistance is also expected to help develop programmes that may not currently be foreseen. However, sensitivity analysis has been carried out to test the results are robust to varying key inputs such as the carbon price and additionality. Moreover, following implementation of the programme, the governance processes outlined in the management and strategic cases will ensure that the objectives of the programme are met on a project by project basis, for example, through supporting the theory of change, including transformational change.²¹
- 2.35 We have also carried out some due diligence on the IDB provided information used for the modelling. The technical annex further expands on this, and the process we took to undertake this due diligence. However, as a sensitivity we tested the results through replacing the IDB renewable generation assumptions with World

²⁰ Latin America is estimated to have around a 95% energy access rate, so sensitivities on unmet demand are explored in the sensitivity section below. <http://www.iadb.org/en/topics/energy/energy-access,19009.html>

²¹ The HoT will include investment criteria for the selection of projects (e.g. eligible sectors), but will not explicitly limit the amount of investment in particular sectors or countries. That said, it is expected that the programme objective to focus on two sectors per country will naturally help lead to a diverse portfolio.

Economic Outlook assumptions (supplemented by some more minor BEIS generic assumptions). Generation projects make up over 60% of UK investment.²² Results provided in the sensitivity analysis below.

- 2.36 The modelled distribution of proposed UK’s SIP investments into the portfolio is shown in the table below, revealing a relatively even distribution between countries and sectors. The portfolio provided by the IDB is somewhat influenced by their current pipeline of projects, and so the distribution below may not be reflective of the future distribution of investments. However, it is considered the best available proxy for potential future investments and does not contain any projects outside the remit in the draft HoT.

Table 5: Illustrative modelled portfolio for SIP

Investment Type	Percentage per sub sector by country				Percentage of total by sub-sector
	Brazil	Colombia	Mexico	Peru	
Solar photovoltaics - Buildings	22%	7%	39%	0%	18%
Solar photovoltaics - Large scale	16%	5%	6%	0%	7%
Wind onshore	16%	9%	0%	33%	11%
Hydropower - small-scale	0%	36%	0%	67%	21%
Waste	0%	0%	26%	0%	7%
Energy Efficiency	0%	16%	29%	0%	14%
Transport	47%	27%	0%	0%	21%
Percentage pf total by country	23%	39%	28%	11%	100%

- 2.37 The pipeline also uses a variety of financial instruments. Risk mitigation instruments (e.g. provision of Partial Credit Guarantees or first loss subordinated positions on loans) account for around 18% of BEIS investment, concessional loans account for around 50% of BEIS investment, and around 32% of UK investment would contribute to securitisation facilities (for example related to concessional financing support for a warehousing facility to acquire a portfolio of small low carbon assets, that is then securitised through asset backed securities).
- 2.38 It was also considered more desirable to model a larger portfolio than the £150m to be contributed by BEIS, and pro-rata this back to a £150m investment. The additional benefit of this approach is that a larger portfolio allows for greater diversity between sectors and countries, and for results not to be less influenced by individual projects. We have used a portfolio from the IDB that contains £208 million of UK investments into SIP (and overall size of £3.4 billion, including leveraged funds from the public (including IDB/IIC) and the private sectors). The costs and benefits of this portfolio are then resized to a £150 million UK investment.
- 2.39 BEIS would not expect reflows from the investment, but returns (which are likely) would be reinvested into new projects. It should also be noted that funds to be re-circulated to new projects are not included in the modelling. This is because at this stage the amount is unknown, and these reflows could be redirected to the technical assistance, given this uncertainty we have only modelled the first wave of investments. Any returns that cannot be re-invested would be returned to BEIS during the winding-up of the programme.
- 2.40 Modelling the indicative portfolio suggests that the pilot represents very good value for money in cost effectiveness terms. The headline indicators, presented in Table 6 below, used to assess the effectiveness of the illustrative portfolio are cost per tonne, amount of carbon saved, cost per MW, and leverage of other finance. The model also produces a benefit cost ratio (BCR) and is able to give an indication of the jobs created by the pilot. Given we have assumed 100% attribution of benefits to the UK, project benefits (including carbon savings) and leverage ratios are the same at the project and UK attributed level. However, value for money metrics such as £/CO2e and benefit-cost ratios are different given the much lower total costs that apply in the UK attributed results. These metrics are magnified in the UK attributed results given the relatively high leverage assumptions (discussed further below).

²² Excludes the energy from waste electricity generation project, where there is not a WEO comparator.

2.41 BEIS will provide the IDB with £177.5m (equates to £148m shown above in discounted terms) in financing to cover project investments (£150m), technical assistance and administrative costs (£25m), and evaluation and research (£2.5m) (administrative costs are calculated as on the basis of a draft budget provided by the IDB²³). The UK attributed monetised benefits²⁴ associated with this investment amount to £2.8b for the UK investment of £148m in discounted terms, a benefit cost ratio of 1: 20.0, with an attributed NPV of £2.7bn. This suggests that there is a good value for money rationale for the programme.²⁵ The UK attributed BCR is within the range but relatively high compared to existing expected results from BEIS programmes (maximum BCR central estimate is 24), and this is a function of the relatively high leverage ratio and 100% UK attribution assumption. Relaxing these assumptions, as may occur in some circumstances for particular projects, results in lower BCR ratios (as discussed below).

Table 6: Illustrative VFM results (project total and UK attributed)

Project Totals		UK Attributed Results	
Carbon		Carbon	
Carbon Saved (MTCO2e)	24.8	Carbon Saved (MTCO2e)	24.8
Carbon Valuation (£m)	1,481	Carbon Valuation (£m)	£ 1,481
Jobs Created		Jobs Created	
Jobs Created	12,548	Jobs Created	12,548
Energy Data		Energy Data	
MW Installed (Renewable Investments)	1637.8	MW Installed (Renewable Investments)	1637.8
Energy and Resource Value (m)	1,474	Energy and Resource Value (m)	1,474
Economic Data		Economic Data	
Total Costs	2,128	Total Costs	148
Total Benefits	2,954	Total Benefits	2,954
Net Present Value	827	Net Present Value	2,788
Benefit Cost Ratio	1.4	Benefit Cost Ratio	19.97
Unit Costs		Unit Costs	
Investment Cost Per Tonne (£/CO2e)	£ 85.8	Investment Cost Per Tonne (£/CO2e)	£ 6.0
Investment Cost Per MW Installed (£/MW)	£ 1,299,056	Investment Cost Per MW Installed (£/MW)	£ 90,311
Leverage		Leverage	
Public Leverage	3.8	Public Leverage	3.8
Private Leverage	9.6	Private Leverage	9.6
Overall Leverage	13.4	Overall Leverage	13.4

2.42 The UK attributed costs per tonne of the modelled portfolio is £6.0/tCO2 for the UK investment (and £85.8/tCO2 if all funding sources are taken into account). This is below the currently approved BEIS ICF portfolio expected attributed cost per tonne range of £6-£37²⁶ (spend weighted average attributed cost per tonne of £8.7^[1]) and thus suggests that the SIP provides good value for money in the context of the wider ICF portfolio (as noted above, this is largely a function of the high leverage and 100% attribution assumptions).

²³ Blended finance fees are 2.5% of BEIS investments, grant fees are 5.0% of technical assistance, and other administrative costs averaged 1.6% of the sum of investments and technical assistance.

²⁴ Including carbon and energy savings, and resource value.

²⁵ . From a full project investment basis (i.e. including other funding sources), the BCR is 1.4, and NPV is £0.8b.

- 2.43 As noted above, the relatively high BCR and low cost per tonne for the SIP programme is largely driven by the 100% attribution assumption and high leverage assumptions. As SIP is set up specifically as a vehicle for UK climate finance, and to invest in projects that would not be undertaken without UK money, then it is reasonable to assume that the UK can claim 100% of the project benefits. Further, in collating an illustrative portfolio that it expects to be able to attract other investment, the IDB structured the illustrative portfolio so that the leverage ratio would not exceed 1:15 on a consolidated basis and included some higher leverage transactions (in non-discounted terms, and with a range of between 1:4 and 1:37) for the amount of investment brought in from BEIS' investment (from IDB and other funding, including private equity). For the illustrative portfolio, debt usually makes up around 70-80% of total project funding (from BEIS, IFC/IDB and other sources), and BEIS is usually providing the first loss tranche as sub-ordinated debt or guarantees. As also would be expected, this is higher than the IIC programme average leverage ratio (8.8 unweighted average) but well within the range for leverage ratios for the overall IIC portfolio (0.5 to 34.4, with around 9 projects that exceed the 1:15 leverage ratio, from a portfolio of 44 in the IIC portfolio)²⁷. The IIC have stated that for SIP, they are contemplating medium to high leverage transactions to reflect the perimeter of the program (countries, risk appetite, climate change mitigation in infrastructure, etc.) and BEIS key objectives (e.g. catalyze private sector financing). This is considered to be a sound objective given that it indicates targeting and structuring bankable projects to attract private sector finance. However, in the absence of a defined sector target at this stage and a proposed deal list it is difficult to define individual project leverage ratios at this stage. We also note individual project leverage ratios may be lower during the construction phase, but may potentially increase post completion of construction, resulting in increased senior debt levels.
- 2.44 In the modelled portfolio, the IDB have suggested the possible use of subordinated positions (through guarantees for example) to further unlock infrastructure financing in the region. These may be able to unlock additional funding through reducing the probability of default and/or increasing the expected recovery for the higher capital classes. These types of arrangements have precedent, for example the European Investment Bank EFSI (European Fund for Strategic Investments) has a leverage ratio of 1:26 enabled by the provision £13.5 billion in first loss guarantees.²⁸ We have been unable to confirm this leverage ratio with the EFSI. However, it is important to note that the projects supported by the EFSI to date do not face the same regulatory and political risks that the SIP projects will consider. Therefore, it is not a direct comparable but an example of crowding in private sector finance. Another example is the 20% first loss guarantee provided by CAF (another main Latin American development bank) for a US\$ 145 million project bond (Eten power plant in Peru). The IDB understand that this guarantee was priced at market terms and is exercisable on a pre-default basis. Standard and Poors have assessed that this will help lift the issue's rating to an investment grade rating of BBB- (and also expanding the prospective investor's base). In their illustrative portfolio, the IDB envisage the possibility of using concessional financing to increase leverage in these types of transactions, for example using a IDB guarantee offered at market terms, which is in turn guaranteed by a SIP guarantee.
- 2.45 An example of a transaction with a 1:12 leverage ratio provided by the IDB/IIC is a US\$ 10 million loan fully amortizing linearly under a 20-year amortization profile. The loan is considered to be drawn in a single disbursement. Rating is assumed to be BB/Ba2/BB, in line with IIC's weighted average rating loan portfolio. Recovery rate is assumed at 60% to reflect a secured financing where the financed asset has a low to medium liquidity, as in most project financings in energy and infrastructure. In this example, the IIC use Moody's average cumulative issuer weighted global default rates by rating for the 1983-2014 period. The aggregated non discounted expected losses amount to US\$ 547 thousand. If we were to assume a risk mitigation instrument amounting to 5% of the nominal amount of the loan (US\$500,000) that would cover expected

²⁷ This range reflects the targeted countries, the targeted sectors, and the mandates for each of the different programs managed by Blended Finance (e.g. proof of concept for untested market and technology in high risk country vs. instruments to mobilize financing in middle income country with established capital markets.) according to IIC.

²⁸ Note this guarantee product is similar to the monoline insurer guarantee and the HMT guarantee program. It is a guarantee to lenders or bond holders regarding the timely payment of principal and interest due. The form of support provided by the SIP fund as direct equity funding or as a guarantee in reality make very little difference because the funds are 100% committed under all instruments. In contrast, the insurance company are required to commit less capital against their guaranteed obligations, which makes the product cheaper than direct funding.

losses until fully utilized, the aggregated non discounted expected losses would be reduced to US\$ 47 thousand, hence a 12x multiplier.

- 2.46 Given one of the key objectives of the SIP programme is to mobilise private finance, we would also expect that the leverage ratio would be around the top-end or beyond our current leverage ratio range. For the modelled portfolio, the total leverage of other finance is £1:£13.4 (in discounted terms), of which 72% is private finance²⁹. The private and public leverage ratio of the modelled portfolio are 9.6 and 3.8 respectively, which are within the ranges for the BEIS ICF portfolio (our private leverage ratios range up to £1:11, and the public leverage ratio ranges up to £1:3.9).

Sensitivity analysis

- 2.47 We tested the results against a range of sensitivities, as shown in the table below. We discuss the main sensitivities below, and there is a fuller discussion in Annex F.

Table 7: Sensitivity results

Sensitivity	Benefit Cost Ratio (UK attributed)	Investment Cost per tonne (£/tCO ₂) (UK attributed)
Base case	20.0	6.0
Additionality (75%): baseline is 50%	30.0	4.0
Leveraged funds reduced by 50% versus baseline (1)	9.9	12.0
Attribution shared with IFC (2) (baseline is 100% UK attribution)	4.8	24.6
WEO Capex and Load factor assumptions for electricity generation projects: baseline uses IDB assumptions	18.2	6.6
Failure rate of 15%: baseline is 10%	18.9	6.3
Unmet demand assumption of 25%: baseline is 0%	18.3	7.7
Low carbon values	15.0	6.0
High carbon values	25.0	6.0
Removing high value projects from portfolio		
Remove 5 highest BEIS BCR projects	15.4	7.3
Remove 5 cheapest investment cost (£/tCO ₂) projects	15.7	7.7
Remove 5 highest overall leverage projects	15.7	7.3
Remove 5 highest BEIS Investments projects	26.2	4.9

(1) Assumes that 50% of non-equity funding in the base case from non-BEIS or non IDB sources is unavailable. 75% of this shortfall is then met by the IDB and 25% met by BEIS

(2) Results are attributed to the IIC and BEIS in proportion to their contribution to the programme

- 2.48 **Additionality** compared to the BAU is assumed to be 50%. This is the standard ICF assumption, however other business cases have sometimes assumed up to 75% (the 50% could also be considered conservative given the IDB approval processes are meant to ensure that all projects approved for concessional financing are ‘additional’). In the table above, results for a 75% additionality assumption show that this has a material impact on results.

- 2.49 We also attempted to carry out sensitivity analysis on the **leverage assumption**. In this regard, there is the possibility that other non IDB and BEIS funding sources may not arise, with the gap needing to be filled through other sources (if possible). To test this, we assumed that 50% of non-equity funding from non-BEIS or non IDB sources was unavailable. 75% of this shortfall is then met by the IDB and 25% met by BEIS. This significantly reduces the BCR to 9.9, increases the costs per tonne to £12.0/tCO₂, and reduces private and

²⁹ Total leverage is based on the draft funding profile provided by the IDB.

public leverage to 2.8 and 3.4 respectively. However, the results are still within the overall BEIS portfolio ranges for BCR, costs per tonne, and private and public sector leverage ratios. The overall leverage result of 1:6 is also below the IIC leverage ratio for its portfolio, i.e. it may represent a 'worst case scenario' given the objectives of SIP. It should be noted that the actual impact of a higher leverage assumption would be that the fixed BEIS funding of £150 million would most likely support less projects.

- 2.50 **Carbon benefits** account for around 50% of monetised project benefits and have a significant impact on the NPV. The Central BEIS/DFID ICF carbon prices are used in the main scenario here. When the lower carbon values are used a BCR of 15.0 is returned, and when the high carbon values are used a BCR of 25.0 is returned.
- 2.51 We also tested the portfolio against **removing the most high value projects** in terms of their UK attributed cost per tonne, BCR, BEIS investment amount and overall leverage. The above table shows that the modelled results are robust to these changes.

Modelling Evidence Assessment

- 2.52 As noted above, this modelling is based on an illustrative portfolio provided by the IDB. A range of other sources are also used, and this is set out in the technical annex, which provides detail on each individual element of the modelling and the associated evidence rating. Overall the evidence used in this modelling is considered moderate. We have tried to be conservative in our assumptions were appropriate, and the above sensitivity testing has also shown that results remain within expected result ranges for other BEIS ICF programmes.

Summary Value for Money Assessment

- 2.53 The Options Appraisal showed that the preferred vehicle for delivering SIP was through a regional MDB, and that IDB's experience shows that they have delivered both technical support and investments at the scale we are seeking to achieve.
- 2.54 Overall, the UK attributed net monetised benefits of the SIP programme are estimated to be £3.0b (ranging to £4.4bn under an also realistic 75% additionality assumption), arising from a SIP investment of £177.5 million. This does not include non-monetised costs and benefits, or the benefits of the TA programme. This NPV, the benefit cost ratio (at £20.0:£1) and cost per tonne results (at £6.0/tonne) are relatively robust to variation in key assumptions, suggesting that benefits substantially outweigh costs. These baseline results and sensitivity analysis are also relatively comparable to results from the BEIS ICF portfolio.
- 2.55 While the model is only illustrative, the governance processes to be established for the programme will help ensure that projects to be supported meet the investment criteria for the programme, including ensuring additionality when concessional financing is deployed and promoting competitive projects. Economy considerations are also relatively favourable for the project.
- 2.56 Value-for-money will also be assessed throughout the project through the logframe and KPIs. We will endeavour to learn wider lessons from the implementation of the programme that may be adapted to other parts of the SIP programme (including extensions to other regions) and other parts of the BEIS ICF portfolio. The project will also be reviewed through the UK's Annual Review process, which will apply the three E's approach outlined above.

Chapter 3: Commercial Case

- 3.1 The Appraisal Case provides a high level justification for establishing a new regional programme with the Inter-American Development Bank, including the associated costs and benefits. The following section provides more information on the capabilities and capacity of the programme to deliver against the objectives. The due diligence assessment of the programme in this section will focus on assessing the delivery partners – their track record, strength of the systems and policies they have put into place to ensure rigorous oversight, and quality control.

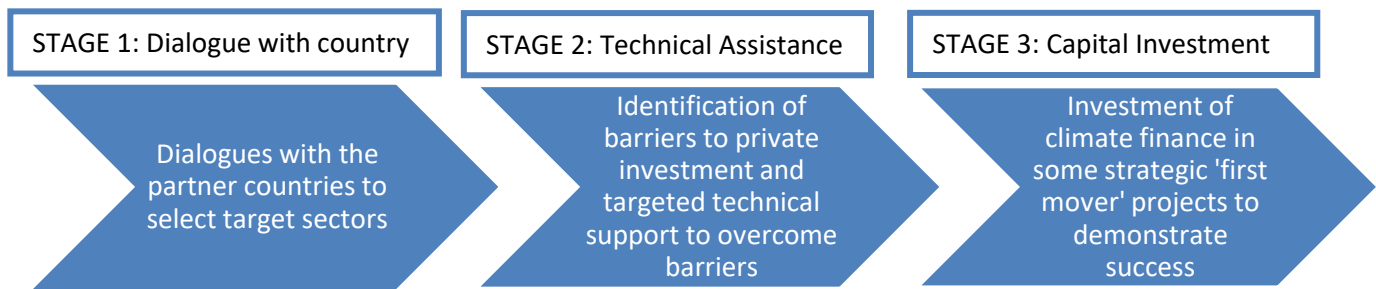
Background on the Inter-American Development Bank (IDB)

- 3.2 The IDB Group offers financial and technical support for countries working to reduce poverty and inequality, improve health and education, and advance infrastructure. It has an overall objective to achieve development in a sustainable, climate-friendly way.
- 3.3 The IDB Group is composed of three organisations: Inter-American Development Bank (IDB), the Inter-American Investment Corporation (IIC) and the Multilateral Investment Fund (MIF), a fund administered by the IDB. These different arms of the Bank all work closely together and the SIP will be involved with both the IDB and the IIC. The IDB will lead on the engagement with countries and technical assistance, whilst the IIC will be responsible for the investment of the capital funding under the SIP.
- 3.4 The IDB's debt rating is AAA, the highest available. The IDB is headquartered in Washington, D.C. and has Country Offices in all 26 of its member countries in Latin America and the Caribbean, as well as in Madrid and Tokyo. The bulk of its support is through lending to sovereign governments from its ordinary capital, which disbursed \$9.6 billion in 2016, and committed new lending and guarantees of \$10.8 billion.
- 3.5 The UK is the 6th largest non-regional shareholder and has less than a 1% shareholding. The UK is part of the Board constituency led by Japan and is currently represented as the Alternate Director on the IDB board. The UK is not currently a member of the IIC.
- 3.6 Whilst the IDB has a large portfolio and extensive operations across Latin America and the Caribbean they see significant value in a possible new programme with the UK due to the classification of our funding as 'concessional'. With their capital, the IIC only invests in for-profit projects and charges market rates for the products and services it provides. However, with a relatively small fund of junior capital from the UK, they have the opportunity to engage in transactions which are not yet ready for purely commercial capital and may have more 'transformational' potential.
- 3.7 The IDB and IIC have several bilateral programmes with donors where they administer their finance according to the mutually agreed mandate. Recently they established a fund with the Canadians called 'The Canadian Climate Fund' (C2F), which has a climate focus. The IDB also manage a forestry programme for DEFRA. We have had conversations with both partners to test their experiences and where we could learn lessons from their programmes.

Ensuring the SIP delivers Value for Money

- 3.8 In order to meet the overall objective of 'greening' several sectors in target countries to support a development path more in line with the 2 degree objectives, the programme will need to maximise the impact of the finance available for technical support and investment.
- 3.9 The following flow chart demonstrates that by allocating support in a sequential way the SIP is more likely to mobilise private investors into the chosen sectors. This is because there may be barriers which pure investment cannot overcome (e.g. regulatory), and if the sectors chosen are not political priorities then they are unlikely to be of interest to the private sector. So by ensuring that the sectors fit with the countries'

strategic priorities, all regulatory barriers are overcome and commercial viability is demonstrated the programme is more likely to achieve the goal of transforming the sector for private investors.



- 3.10 This sequence will take time to establish as the technical support requires long-term engagement. Before stage two is fully established the IDB will still be able to invest climate finance in strategic investments which they think fit with stage 1 and where there are fewer technical barriers.

Dialogues with country: Stage 1

- 3.11 It is intended that high-level dialogues will be used as a means to start the development of roadmaps for sustainable infrastructure investments in each country and identify the priority sub-sectors and potential areas for intervention that could be supported through the TA component.
- 3.12 In addition to BEIS and IDB participation, the high-level dialogues would include partner country participation from: finance ministries, planning agencies, relevant sector ministries, and national development banks to ensure NDCs are included in climate investment decisions and budget allocation. Additionally, relevant private sector institutions will be invited to support the group in understanding existing opportunities and bottlenecks. Preparatory work and analysis may be undertaken to inform and provide inputs to the dialogues in order to enable a focused and evidence based assessment of opportunities and bottlenecks for private sector investment.
- 3.13 These dialogues will also facilitate and promote alignment of efforts with other development finance institutions and donor funded initiatives to avoid duplication and ensure effective targeting of UK SIP funds within the donor landscape.
- 3.14 Based on the outcomes of the high-level dialogues, the IDB, BEIS and the country government will agree a package of technical assistance targeting one or more sub-sectors, and/or cross-cutting activities relating to the eligible low carbon infrastructure sectors for the SIP. Once the main areas and objectives of the TA package have been agreed, the relevant IDB team will be responsible for developing the technical cooperation for each element of the package.
- 3.15 It is anticipated that further dialogues will take place during the investment period to assess and update the approach to TA and identify additional sub-sectors or activities to address through TA (subject to the availability of resources).

Implementation of technical support: Stage 2

- 3.16 The IDB plans to target the use of the SIP technical assistance resources to address barriers to investment and make infrastructure investments more attractive to private investors by:
- Working with national and/or sub-national country governments to improve the enabling environment for sustainable infrastructures. These can include establishing an effective and stable regulatory framework, building institutional capacity that enables planning and implementation of sustainable low carbon infrastructure; Design and promote sustainability within Public Private Partnerships frameworks to support NDC implementation.

- b. Working with project stakeholders (sponsor, investors, financiers etc.) to strengthen know-how and capacity for project preparation – particularly for greenfield investments – and/or execution, including by helping to integrate sustainability considerations.

3.17 Use of the TA component will be determined in two ways:

- a. Strategic TA packages determined through High Level Country Dialogues.
- b. Project related TA determined alongside origination and development of the investment (blended finance) pipeline.

3.18 Evidence suggests that the market requires a range of interventions to tackle the barriers to investment. Availability of resources for TA alongside concessional instruments enables the program to target barriers using the most appropriate intervention, and utilise instruments flexibly and in combination as relevant to a particular sector.

3.19 Indeed, it may also be possible to reduce or eliminate the need for concessional resources altogether by addressing the root causes of market failures and barriers, thereby developing a regulatory environment, institutional capacity and business models that enable private sector investment without concessional support. This will further enable the most efficient use of limited concessional resources over time and ensure long-lasting results.

Process and criteria for selecting projects for investment: Stage 3

3.20 The capital investment will be managed by the blended finance team in the Inter-American Investment Corporation (IIC). They will follow the established due-diligence process for all IIC investments: origination, eligibility checks, credit committee approval and board approval.

Ongoing management and monitoring of investments

3.21 All supported projects will have a monitoring and evaluation plan, this includes periodic monitoring of progress which is fed back to the bank through a 'Progress Monitoring Report'. All projects will comply with the IDB's credit supervision process.

Avoiding unintended consequences – Environmental and Social Standards

3.22 The Bank applies a set of environmental and social safeguard policies and guidelines to projects they finance to help protect against environmental and social harm and to enable borrowers to meet best international practices. The safeguards and policies focus on; Environment, Natural Disaster Risk Management, Involuntary Resettlement, Indigenous Peoples and Gender Equality.

3.23 The IDB and the IIC will comply with the international standards of the IFC Performance Standards, as well as their own environmental and social policies.

Procurement

3.24 The 2016 MOPAN report found that IDB had clear policies and guidelines for procurement, which are all publically available.

Secondary benefits or opportunities for UK companies

3.25 Given the primary aim of SIP is to make infrastructure more environmentally sustainable in Latin America and leverage private sector activity into low-carbon development in these markets (thereby delivering poverty outcomes) there are likely to be some secondary opportunities for both domestic and international companies. As the first country in the world to introduce climate legislation, the UK have some well-developed sectors in relevant fields which may help accelerate the low-carbon transitions set-out in the NDCs and UK companies may benefit from the development of the low-carbon sector in Latin America.

- 3.26 Research commissioned by the FCO to scope where the UK could contribute to accelerating global low-carbon energy transition has found that the UK has key strengths in green finance and in professional and technical services on which it can capitalise now. UK expertise in smart-energy will be important as this sector grows in the medium term.
- 3.27 Additionally, there could be ways that UK businesses could benefit from the development of the low-carbon sectors in Latin America –
- a. **Standardisation** – Standardisation provides a reliable basis for people to share the same expectations about a product or service. In turn, this helps to facilitate trade, provide a framework for achieving economies, efficiencies and interoperability, and enhance consumer protection and confidence³⁰. Offering the development of standards in our priority countries as part of our TA/skills-share could potentially create the right set of opportunities.
 - b. **Expansion of current opportunities** – For companies already operating in the relevant Latin American markets, there could be opportunities to further expand in the region as these markets develop. This has been the case already, particularly where UK companies were involved in the reform. For example, in Mexico, UK support for their Energy Reform has translated into a new electricity market (designed by UK firm Cameron McKenna) with incentives for large-scale RE production. Given their familiarity with the (UK-influenced) market, British firms won large contracts: Solar Century in consortium for a \$180m project, and Zuma Energy – majority owned by UK investment firm Actis – won 18% of September capacity, with two solar and one wind project worth \$800m.
- 3.28 We have been working closely with other Whitehall departments (FCO, DIT, DfID) to foster a collaborative environment wherein we could keep each other informed about potential secondary commercial opportunities which can emanate as a result of SIP.
- 3.29 Additionally, we can collaborate with IDB in several ways to encourage UK secondary commercial interests in the region:
- a. Core groups of IDB could visit the UK and present the commercial opportunities and present the type of expertise required by these countries.
 - b. BEIS and IDB can work on the optimal communication strategy to effectively communicate the benefits of SIP and the underlying UK contribution that can make UK businesses an attractive proposition for such projects.

State Aid

- 3.30 Neither intervention is expected to come under the purview of State Aid.

³⁰ Guidance: Standardisation (Gov.UK, 2012)

Chapter 4: Financial Case

What are the costs?

- 4.1 BEIS, through the ICF, will provide up to £177.5m over an initial investment period of 5 years to a trust fund managed by the IDB. This will include £175m to four countries in Latin America – Mexico, Brazil, Colombia and Peru, as well as up to £2.5m for third party advisors to conduct additional sector-specific research to help with the implementation and an evaluation of the programme. Some of this sector-specific research is likely to be procured by BEIS and therefore deducted from the overall budget.
- 4.2 All expenditure under SIP is classified as Official Development Assistance³¹ (ODA). IDB is classified as an ODA-eligible institution and all the countries to which we are providing financing fall in the DAC List of ODA recipients.
- 4.3 The ICF contribution to the programme will be in the form of a grant and as such, BEIS will not expect any refunds. Any returns that cannot be reinvested would be returned to BEIS during the winding-up of the programme. The funds will flow through a trust fund, which will be setup by the IDB, who will be the primary delivery partner for BEIS in Latin America.
- 4.4 The following table sets out an indicative breakdown of the four lines of expenditure envisaged for SIP:

	2018 £m	2019 £m	2020 £m	2021 £m	2022 £m	Total £m
SIP Investment (CDEL)	19.7	39.4	39.4	29.5	21.7	149.6
SIP Technical Assistance (RDEL)	6.5	4.8	5.3	2.2	0.6	19.4
Administrative and other costs – including M&E (RDEL)	1.5	1.5	2.0	1.0	2.5	8.5
RDEL sub-total	8.0	6.3	7.3	3.2	3.1	27.9
Total (RDEL & CDEL)	27.5	45.4	47.3	32.0	23.7	177.5

**All amounts have been converted to Pound Sterling and are indicative*

- 4.5 The budgets indicate that the provision of technical assistance will be front-loaded given that the initial priority will be putting the governance process in place, such as hiring technical advisors, conducting feasibility studies, etc. This aligns with the aim of technical assistance to reduce the barriers to investment early in the programme.
- 4.6 Concessional financing takes priority in the middle of the investment period while we continue providing the relevant technical, conduct evaluations to understand project impact and develop the necessary communication strategy. This phased approach to payment greatly increases the probability for bringing in transformational change in these countries.

SIP Technical Assistance

³¹ OECD (2008)³¹ defines ODA as “those flows to countries and territories on the DAC List of ODA Recipients (available at www.oecd.org/dac/stats/daclist) and to multilateral development institutions which are: provided by official agencies, including state and local governments, or by their executive agencies.

- 4.7 Technical assistance will be needed alongside the capital investment to address barriers across the sector and unlock greater private investment. £25m (RDEL) will be allocated to the grant element of the programme. This includes the administrative costs associated with the operations of the fund and the technical assistance strand of the programme, which will allow the IDB to provide capacity building support in at least two sectors per country.
- 4.8 The IDB will design country-specific technical assistance programmes, the exact need and scope will be ensured through sector prioritisation exercise in each country as well as including relevant parties in the high-level dialogue for each country.
- 4.9 For example, this exercise could in theory identify access to debt as a key issue for small-scale renewable and energy efficiency projects in Mexico. At the same time, Mexico is the major securitisation market in LAC, representing almost 25% of the USD in the region. SIP technical assistance could therefore help IDB build a financing facility which would support small-scale project developers. They could use the SIP capital (by providing Partial Credit Guarantee or co-guarantee for bond issuances) to de-risk the investment.

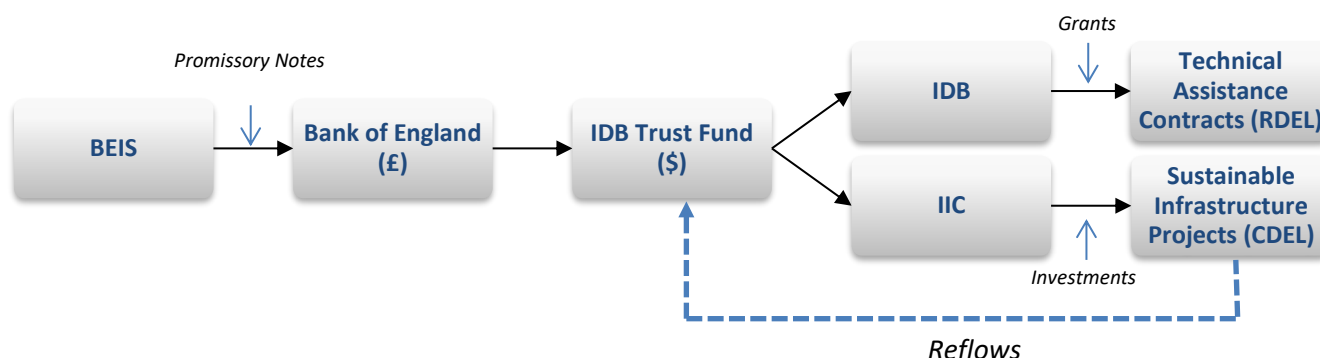
SIP Investment

- 4.10 The capital element of the programme (CDEL) will be used for direct investment in projects, on sub-commercial (“concessional”) terms. This is likely to breakdown to around £35m - £40m (which would be three medium sized projects) per country. A variety of financial instruments could be deployed, for example debt, equity and risk mitigation instruments, and therefore could generate reflows. An assessment of the appropriate financial instrument will be made on a case by case basis.
- 4.11 For example, SIP investment could be used to catalyse private investment into solar energy in Mexico. About \$35m of SIP funding could be allocated to different small and medium sized projects (distributed solar securitisation, distributed solar aggregation platforms/facilities, risk mitigation instruments for solar projects), with the possibility of directly leveraging around \$409m in private finance (combined equity and debt). This example is purely illustrative and following project approval, we will commission further evidence on the investment gaps and where UK ICF would be truly additional and generate real impact. IDB expertise and experience will also be invaluable.

Facility Structure

How the funds will be paid out

- 4.12 The delivery chain for the flow of funds from BEIS to the project and the contractors is shown below:



- 4.13 Since UK is the sole donor in this programme, the UK’s contribution will have to be spent in the manner intended in this business case, and in line with the principles of sound financial management. An analysis of different payment mechanisms for the fund has been conducted, reviewing different cash options as well as use of promissory notes (PN). **Overall there was an assessment that promissory notes best managed BEIS’s interest as well as creating certainty for the annual budgets.**

- 4.14 In order to manage risks it was recommended that the overall contribution was split into several notes, so that not all the money is laid as part of a single upfront PN. Therefore, BEIS will make its tranching payments to IDB via promissory notes which will be laid with the Bank of England. The amount per tranche may vary. BEIS could either combine the first few years' payments in one tranche or disburse the amount in annual tranches.
- 4.15 The indicative payment schedule for all tranches will be agreed between BEIS and IDB as a part of governance arrangements in the contribution agreement. The value of the first PN (expected to be laid in December 2017) is likely to be calculated in line with the expected expenditure in 2018.
- 4.16 As per the governance arrangements, BEIS has an objection period for each project during its window of approval. However, it is not expected to have any impact on the PN drawdown schedule since as per the contribution agreement, BEIS cannot unilaterally cancel the PN. BEIS will still have obligation to spend and therefore, the money will still get spent eventually on a different project.
- 4.17 A drawdown schedule for each promissory note will also be mutually agreed between the IDB and BEIS. Once each PN is laid it is recorded as spent in line with International Financial Reporting Standards (IFRS).

Steps to ensure accurate forecasting of the drawdown schedule

- 4.18 The SIP budget forecasts have been made using the knowledge and experience of IDB, which have a successful record of implementing projects in Latin America. The projects have been benchmarked against other similar initiatives undertaken by IDB. Given the innovative nature of the programme, and that we will be selecting new projects through the technical assistance, there are bound to be some uncertainties around projects costs and this has been accounted for by including contingencies in the forecasts.
- 4.19 To ensure accurate forecasting throughout the investment period of the programme, the following steps will be taken -
- a. A payment schedule will be agreed with IDB and BEIS for phased draw down of funds according to estimated funding needs.
 - b. The IDB will seek a non-objection for deploying Fund Resources in the Blended Finance Investment under the following "Non-objection Process", so UK will have oversight over progress.
 - c. IDB and BEIS will review the indicative drawdown schedule in the programme's bi-annual meetings against the progress of the fund and revise the schedule if needed.

Avoiding payment in advance of need

- 4.20 In line with HMT's guide on Managing Public Money, we will ensure that BEIS is not paying IDB in advance of need. BEIS will monitor the disbursement schedule previously agreed with IDB to see if they are ahead or behind schedule and then revise the disbursement schedule for the PN. That way, BEIS can ensure that none of the funding is paid in advance of need.

Reflows

- 4.21 Any reflows will be used to further finance eligible projects and fund expenses during the fund life. The use and terms will be subject to agreement between BEIS and IDB in the final year of the investment period. At this point BEIS will review the progress of the portfolio and agree with the IDB how the funds could best be allocated, what the associated fees are and the tenor (if investing) given that the fund life is limited to 25 years.

Currency risk

- 4.22 BEIS will issue the PNs in Pound Sterling while IDB will draw down the amounts in USD. Therefore, the payments are susceptible to currency fluctuations in exchange rates between USD and Pound Sterling. This means, in the event of adverse currency movement, there will be reduced potential for project fulfilment.

- 4.23 To mitigate this, BEIS will closely track the matching of movement in exchange rate between USD and Pound Sterling and the timing of payments to IDB to avoid liquidity risk. However, perfect matching may not be possible.
- 4.24 SIP will also have the option to operate local currency. This may expose individual investments to local currency risk and could have implications for reflows. This will be monitored by the IDB and impacts for the portfolio reported to BEIS.

Assessment of financial risk and fraud

- 4.25 Most of the financial risk and fraud emanates from the choice of our delivery partner. The UK Government have been working closely with the IDB for a few years, through DFID and DEFRA, and our experience has been very positive.
- 4.26 This was in line with an independent 2016 MOPAN assessment which found that IDB met the requirements of an effective multilateral organisation that is “fit for purpose”. The IDB has a strong client focus, deep understanding of the regional context and commitment to development effectiveness, and exercises leadership on critical issues in the region such as sustainable cities and climate change.
- 4.27 In addition, IDB have a well-established process to identify and assess fraudulent practices. They have formally established a uniform framework for preventing and combating fraud and corruption with other MDBs.³² All projects have an integrity officer assigned to them from the Office of Institutional Integrity (OII). OII is an independent advisory office responsible for investigating corruption, fraud, and abuse in projects, as well as cases of misconduct involving IDB employees. In case of fraud, the Bank may impose administrative sanctions, such as barring contractors from participating in projects. In cases where laws may have been broken, the IDB can refer information to national authorities.

Financial reporting and audits

- 4.28 IDB will administer and account for the fund resources in accordance with its financial regulations and keep clear accounts and records. Each year, IDB will make available an annual report on operations financed under the previous calendar year.
- 4.29 In addition, IDB will provide unaudited financial report of the activity of the fund as of December 31 of the previous year.
- 4.30 IDB will provide audited financial statements every 3 years, starting in 2018 with the first statement being provided in 2021. Such audited financial statements will be prepared by IDB’s external auditors.

Oversight

- 4.31 The BEIS Director of International Climate Change will be the senior reporting officer for this programme within the UK Government.
- 4.32 It will be the responsibility of BEIS programme officers for ensuring that all procedures for financial reporting, accounting and audit are fully complied with. For this purpose, based on the request of UK, the IDB shall be responsible for contracting the services of a third party to undertake a mid-term evaluation and a final external evaluation of the Fund’s activities.
- 4.33 The scope of such external evaluations will be mutually agreed upon between IDB and UK.

³² E.g. AfDB, ADB, EBRD, EIB, IMF and WB - <http://www.iadb.org/news/docs/Framework&Gdlines.pdf>

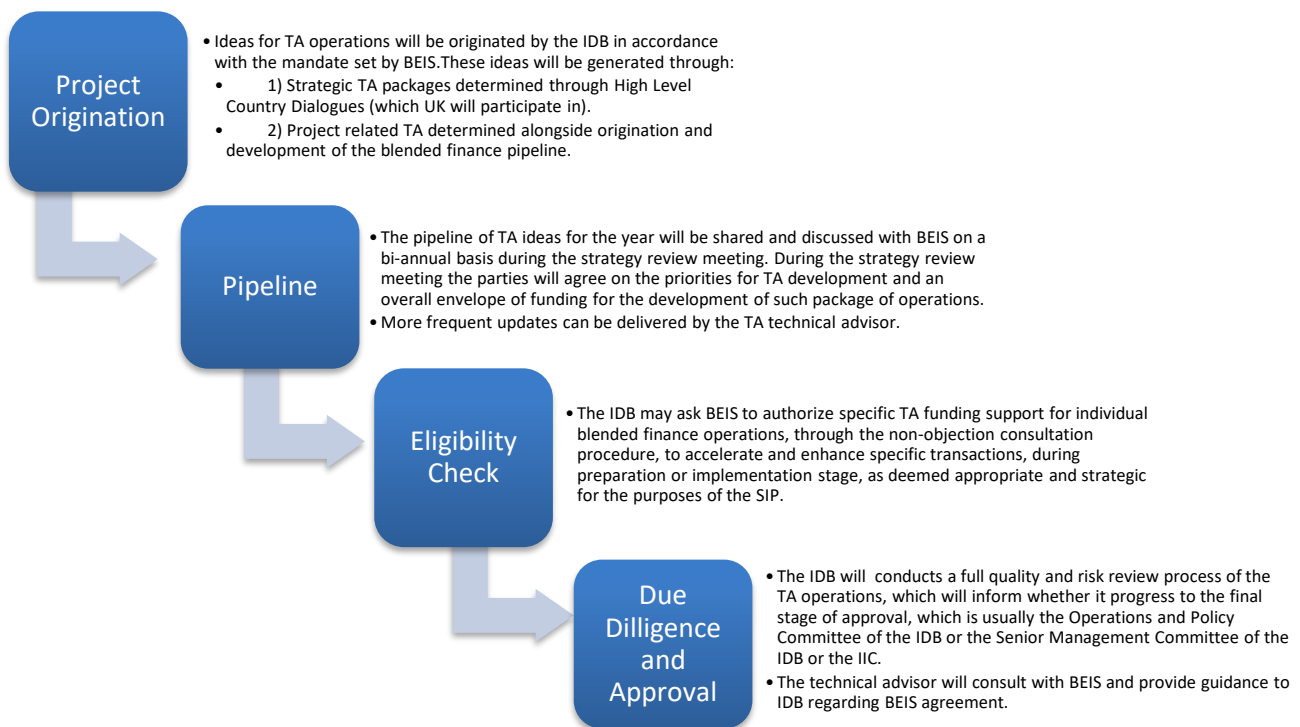
Chapter 5: Management Case

What are the management arrangements for implementing the intervention?

- 5.1 The SIP will be established as a trust fund managed by the IDB. There will be bi-annual bilateral meetings to review the progress of the fund and discuss issues of mutual interest. Either organisation will be able to call special ad-hoc meetings if there are any urgent matters to address between the bi-annual meetings.
- 5.2 BEIS will agree a mandate with the IDB and then take a more hands-off role in the day-to-day management of the fund. Given that we are the only donor we will be able to ensure our requirements are reflected in the administrative arrangements. We have confidence in the delivery partner's ability to deliver the mandate, but need to ensure we have the appropriate checks in place. To monitor this and ensure appropriate level of oversight BEIS will be involved in the earlier stages of the approvals process.
- 5.3 BEIS will have a full-time project manager responsible for the oversight of the programme. They will be supported by a commercial advisor who will be responsible for reviewing project proposals.
- 5.4 There will be two advisors ("technical advisors") managing both the grant and capital investment to ensure value for money.

Governance structure for the technical assistance

- 5.5 BEIS will engage with the technical assistance in the development phase of the packages, through participation in the high-level country dialogues, our commissioned research and early strategy meetings. BEIS will be reliant on the TA technical advisor to update BEIS on progress between strategy meetings and ensure that packages reflect BEIS's agreed approach. Investment specific technical assistance will come to BEIS for 'non-objection' with the investment proposal. The diagram below outlines the TA governance process:



Governance structure for the blended finance (investments)

- 5.6 BEIS will have two points to review prospective investments; at the pipeline stage and pre-credit committee, as well as the technical advisor's input. The diagram below outlines the stages of decision-making and where

BEIS is involved. This demonstrates that BEIS will be engaged at every stage of the project approvals process, but there is only one point where BEIS has the ability to object to projects (post-eligibility). This is to give the delivery partner confidence to negotiate with projects and to ensure efficiency.

Resourcing requirements

5.7 The HMG team required to oversee the SIP under implementation would include (in full time equivalents):

0.7	BEIS Private Finance Head of Sustainable Infrastructure Latin America (G7)
0.5	BEIS Private Finance Policy Advisor (HEO)
0.1	BEIS ICF Head of Private Finance (G6)
0.1	BEIS ICF Monitoring and Evaluation lead (G7)
0.1	Economist time for results quality assurance
0.2	BEIS Commercial Advisor (G6)

*Full time equivalent time estimations are averages for the duration of the investment period (5 years)

5.8 These are all resourced posts so there will be no additional recruitment needed for the programme. There will be additional support in-country (embedded in the relevant embassy) through the climate partnership scheme and these posts are currently being recruited. It is yet to be confirmed how much resource we will require of these individuals.

Contractual Architecture

5.9 The IDB will establish a single-donor trust fund for the administration of this programme. This will be governed by an 'Administrative Agreement' between the two organisations which is not legally binding as is standard for arrangements between the UK and international organisations. This will be the main instrument that governs the relationship between BEIS and the IDB and sets out the mandate within which they can allocate BEIS funding. A summary of the key terms within this agreement are set out in the table below (these are subject to clearance by both BEIS and IDB):

Term	Arrangement
Eligible sectors	<p>For the purposes of the Fund, sustainable low carbon infrastructure sectors include:</p> <ul style="list-style-type: none"> a. Renewable energy (excluding large hydro); b. Transmission and distribution networks for renewable energy; c. Lower-carbon and efficient energy generation (excluding thermal power plant retrofit to fuel switch from a more Green House Gas ("GHG")- intensive fuel to a different and less GHG-intensive fuel type); d. Energy efficiency (excluding for high carbon industries); e. Non-energy GHG reductions (industrial processes only); f. Waste and wastewater; and g. Transport. <p>The Fund resources may also finance cross-cutting themes related to sustainable infrastructure investment in one or more sectors, such as sustainable infrastructure planning, policy and regulation reforms-related activities, or capacity building and market creation activities.</p>
Reporting requirements	<p>Annual report. No later than April 30 of each year, the Bank will deliver to the Donor an annual report on operations financed under the program during the previous calendar year.</p> <p>Unaudited financial statements: No later than April 30 of each year, the Bank will provide an unaudited financial report of the activity of the Fund. The unaudited financial statements will include the income earned and the costs charged.</p>

Audited financial statements: No later than June 30 of every three years, the IDB will deliver to the Donor an audited financial statement of the Fund as of December 31 of the previous year.

Mid-term evaluation: Upon the request of UK, the Bank shall be responsible for contracting the services of a third party to undertake a mid-term evaluation of the Fund’s activities. The scope of such mid-term evaluation will be mutually agreed upon between the IDB and UK, which may include verification of project results.

Impact evaluation: Moreover, the IDB shall be responsible for contracting the services of a third party to undertake an impact evaluation of the Fund’s overall development effectiveness over time. The scope of such evaluation will be mutually agreed upon between the IDB and UK.

Monitoring delays: The IDB will promptly inform the U.K of any event or situation, which could have a significant impact in the disbursement of program resources or the approval of program operations, or if the program is failing behind in relation to any activity mutually agreed by the parties to be implemented during any given year.

Milestones for establishing and delivering the interventions

5.10 The bullet points below set out the indicative delivery timelines of the intervention:

- Confirmation of UK support (subject to approval by the PIC and HMT) – October 2017
- Negotiation of terms of the contribution agreement – by October 2017
 - a. This is underway (see draft terms above) but needs to be approved by both BEIS and IDB.
- Exchange of draft contribution agreement and relevant clearances – October/November 2017
- Announcement of intended UK support (subject to approvals) – November (13th-17th) 2017
 - a. This could be announcement of approval of business case for support, or alternatively announcement of a signed framework agreement (depending on progress).
- Execute Contribution Agreement and lay initial promissory note – November/December 2017
- Platform set-up – November/December 2017
 - a. This includes the recruitment of the technical advisors.
- Launch of SIP, Start of Operations – December, 2017
- Set-up High Level Dialogues with each country – January 2018 onwards
 - a. The timings of these will vary and be decided with the country, they could be adjusted to account for elections.
- Independent assurance review – February 2018
 - a. This is the BEIS quality assurance mechanism for project management so should be conducted once the programme is established.

What are the risks and how will these be managed?

5.11 The following represents the key risks associated and the proposed mitigation plan. These risks will be regularly reviewed and monitored by the BEIS project manager and discussed with the delivery partner.

Risk Summary (Event and Effect)	Probability	Impact	Level	Current Mitigation Plan	Target Risk
Intervention design Some details of the intervention are still to be worked through, and there will be flexibility built into the delivery model. As such, there is a risk that the objectives are not met, for example that the blended finance isn’t deployed in line with the technical assistance for maximum impact.	2	4	M	We are working very closely with the IDB and will be sharing the business case with them to ensure the design is in line with our expectations. We have also engaged their senior officials to flag this risk	L

Investor interest Potential changes in focus of investors due to time lag in getting interventions up and running, or lack of knowledge and understanding of opportunities the interventions present, could lead to a lack of investor buy in meaning that the SIP doesn't achieve the expected results.	1	4	L	This is unlikely given the large scope and flexibility of the model. All sectors in all countries are unlikely to change significantly. We can also get the vehicle up and running fairly quickly.	L
Overlap with other interventions There are other interventions working in this space either with a global focus or with a slightly different sector focus. These are mapped in Annex C and we need to be aware of the risk of crowding the market, or overlapping with other programmes and reducing efficiency and value for money.	3	3	M	By working through the main regional development bank there are strong links to other programmes and other donors. We are also collaborating closely with other donors in country through the FCO.	L
Limited scale of funding These are large countries and projects that require significant amounts of finance. The funding available through the ICF will be limited and limit the scope of what we can achieve. There is a risk that if not used well the impact is reduced.	4	3	M	We are going to focus on specific sectors in each country and increase the portion of technical assistance since this is likely to have a bigger impact for the quantity of funding needed.	M
Conflict of interest The IDB will be using our concessional finance in projects that they are also investing in so there is a risk that our funding leverages IDB's involvement rather than private sector participants. This misalignment of incentives will be addressed through the governance structure	3	3	M	The technical advisor will sit in a different team in IDB to assess the deal, and decide the concessionality element of our funding. This will hopefully distance the decision and add impartiality to the assessment.	L
Key person The success of the Funds depends in substantial part upon the skill and expertise of the technical advisor. This individual will have a significant role in the set-up of the interventions (designing the concessionality of the UK contribution). If this individual is not capable or does not understand our requirements then there is a delivery risk.	3	3	H	We are going to be involved in the recruitment process, as well as having the option to recommend candidates. We are proposing that the technical advisor sits in BEIS for a few weeks to work closely with us and understand our risk appetite and objectives more clearly.	M
Inability to link to commercial opportunities for the UK This is likely to be one of the biggest challenges as it is a secondary consideration, but also our limited scope to directly promote UK interests. We will do our best to work with UKEF/DIT and FCO to increase awareness of the programme and explore opportunities.	4	2	M	We have allocated some resource to work on potential opportunities and have met with UKEF/DIT/IPA to expand the understanding of the programme and explore opportunities for collaboration.	L
Political risk There is an inherent political risk from working with a limited set of countries, and this is increased due to the fact that 3 of the 4 chosen countries have an election in the next year. There is the risk that there isn't buy-in locally (and/or there may be resulting changes in policy) and the level of engagement needed to make a transformational impact.	4	5	H	We judge these countries as vital for inclusion so we can only manage this risk through working with an experienced and well connected delivery partner. We are also confident there is cross-party support for climate.	M

5.12 The risks outlined above can be mitigated to an acceptable level and are deemed to be within tolerances. They will be monitored carefully to ensure that they can be managed appropriately should any of the risks be realised.

How will progress and results be monitored, measured and evaluated?

Monitoring and evaluation

- 5.13 The theory of change (Annex E) will inform the design of the monitoring tool (Logical Framework) which is used to track progress toward achieving the overall transformational objectives, and the risks that could limit this. This will include milestones to report against annually during BEIS's Annual Review process. IDB have agreed to work with us to ensure the logframe will be finalised within 6 months of implementations, and reviewed annually thereafter. The IDB have agreed to report against the UK's Key Performance Indicators (KPI), the central reporting framework for the ICF. We have identified the potential to report against 7 of our KPIs.
- i. KPI 2: access to clean energy
 - ii. KPI 5: jobs created
 - iii. KPI 6: GHGe avoided
 - iv. KPI 7: Installed capacity (MW)
 - v. KPI 12: Private finance leveraged
 - vi. KPI 15: Transformational change
 - vii. KPI 16: Net change in energy consumption (Energy Efficiency)
- 5.14 As a substantial investment in an innovative area, independent evaluation is required to assess the performance of the programme, the governance structure and the likelihood of the intervention meeting the transformational objectives. Importantly this will provide robust evidence to inform the future of the programme operating in Latin America, potential new programmes in Asia and Africa as well as other ICF programmes.
- 5.15 We are currently deciding how best to conduct independent evaluation activity as we have had mixed results in the past when relying solely on delivery partners to lead this. Success has been largely related to buy-in and engagement from the delivery partner from the outset, so we are exploring the possibility of the IDB managing the contract and BEIS sitting on a steering committee to quality assure outputs and specifying this in any funding agreement. The IDB have demonstrated experience in this sector and have recommended a two stage process, a mid-term evaluation and impact evaluation.
- 5.16 A budget of £2.5m has been allocated to the evaluation and external research for the programme. We would expect the evaluation to constitute around 1% of total programme costs and have currently estimated that £1,500,000 would allow for interim evaluations to feed into the ongoing implementation and the design of other Sustainable Infrastructure Programmes. It would also provide sufficient funding for an impact evaluation to take place in the future and assess the true impact of the intervention. Finally this budget would provision for some sector specific research to ensure our impact is maximised and relevant.

Project Specific Indicators

- 5.17 Project specific indicators will be agreed between BEIS and IDB to measure and monitor progress against the broader objectives of the programme, such as the technical assistance. These will be included in the logframe which the IDB will report against and will form the basis for the performance assessment conducted by BEIS in our annual review process. Some examples of likely indicators include:
- i. Number of High-Level Dialogues conducted.
 - ii. Some sector specific targets for the technical support

How will the research budget be allocated?

- 5.18 The research aspect of the £2.5m budget (excluding the evaluation) will be managed by BEIS and allocated where appropriate over the life of the project. The overarching aim for this funding is to ensure the programme continues to learn lessons and make decisions informed by up to date evidence. There will be several key objectives for this budget:
- i. To inform the sector selection and allocation of the grant aspect of the programme, including identification of technical barriers to investment;

- ii. To inform the allocation and focus of the investment capital to ensure it is enhancing the technical support;
- iii. To support the ICF programming in the same geographies to streamline research efforts and identify the best approach to overcome similar challenges; and
- iv. To conduct research in new geographies which can be used to inform the roll-out of a sustainable infrastructure programme to new geographies.

5.19 This budget will be carefully considered and individual aspects of research to be commissioned under this budget will all follow the BEIS research approval process, including seeking committee sign off where appropriate.

Indicative timeline for monitoring, evaluation and research

- December 2017 – March 2018: Draft terms of reference for sectoral research, seek clearances and procure contractor.
 - This would inform the priority sector selection for each country and feed into the first high-level dialogue in each country so decision making is evidence based.
- June 2018: Agree an evaluation plan for the SIP with the IDB.
- September 2018: Review progress and assess need for additional evidence. Likely evidence needs could include:
 - Research into the chosen sectors to assess the barriers that SIP could target.
 - Research into the replicability of the programme in Africa.
- June 2019: Interim evaluation to deliver early evidence of progress against milestones and lessons learned to improve the delivery of the programme.
- June 2019: Consult with evaluation advisor at IDB to develop an evaluation plan for the impact evaluation.
- June 2022: Decide timing for the commissioning of the impact evaluation.

Annex A: Country level analysis – the case for investment in Mexico, Colombia, Brazil and Peru.

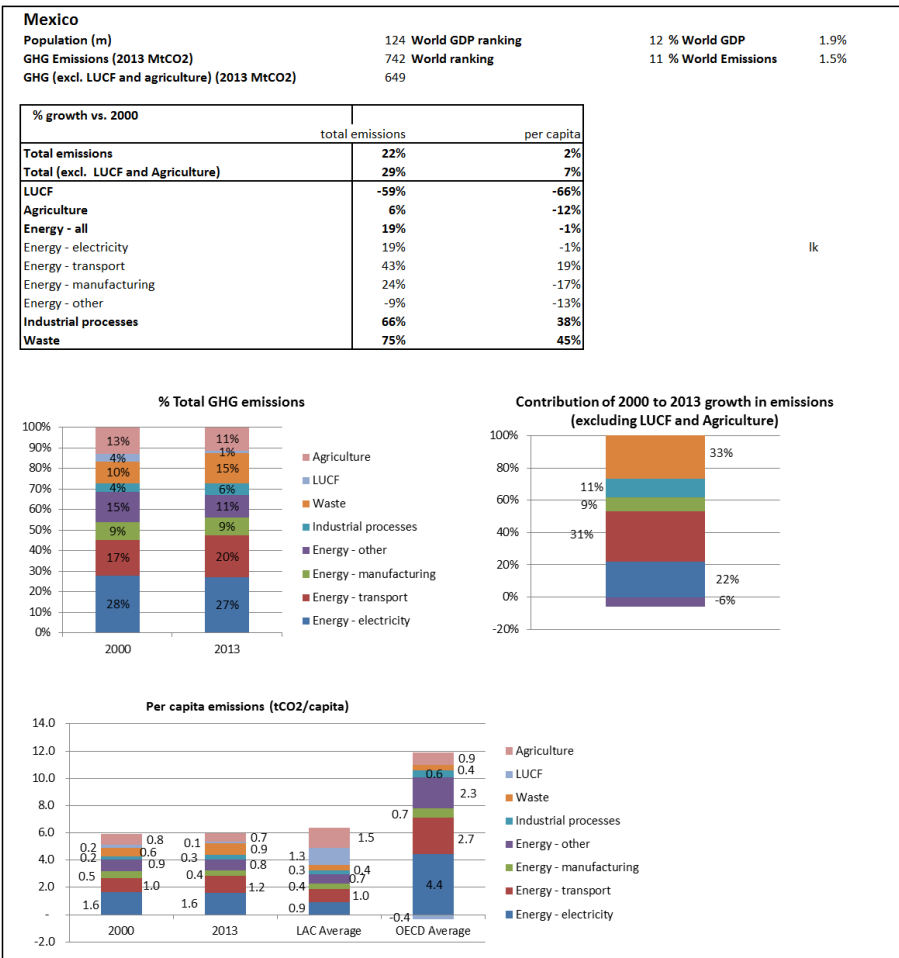


MEXICO

Summary

- Current policies are likely insufficient to meet targets ([New Climate Institute](#)), though has a well advanced climate change policy framework. Transport, waste and electricity sector emissions are growing strongly.
- INDC allocates emission reduction targets to key sectors, and costing of policy options is currently being undertaken by main climate change technical agency.
- Possible need to support the development of the domestic financial system to best support financing of sustainable infrastructure. Public and private financing is a particular challenge at sub-national level, especially for transport and wastes sectors that are delivered at this level.
- Key possible intervention sectors would seem to be transport, waste, and industrial efficiency. Possibly also small scale generation.
- 80% urbanisation rate also provides key challenges for improving urban infrastructure in cities.

Emissions summary



CLIMATE TARGETS AND POLICY	FURTHER INFORMATION	COMMENT
Emission growth	Total emission growth of 29% in non-land-use sectors between 2000-13	30% of growth from electricity, 23% from transport, 17% from waste, 25% from other energy (including manufacturing)
Per capita	Grown slower than overall emissions (7% for non-land-use sectors)	Emissions around LAC average, but large potential for growth given emissions are well below OECD average (though emissions have remained relatively stable despite 9% growth in per capita GDP).
NDC Reduction target	Conditional: 36% vs BAU by 2030	Current policies will likely mean that it is challenging to meet targets ³³
NDC Reduction target	Unconditional: 22% vs BAU 2030	Conditional on international financial and technological support
Other key targets	General Climate Change Law Energy Transition Law	- Reduce GHG emissions by 50 per cent by 2050. - Draft INDC contained sector targets for emission reductions, and seems to have completed significant work to cost measures to achieve NDC targets (though there are transparency and implementation challenges). - 25%/30%/35% of energy should derive from renewable sources by 2018/2021/2024 (though cogeneration, likely from natural gas, is included in these amounts) INDC contains a 51% reduction target.
General climate policy framework	Rated highly by Climatescope (9 th of 55 developing countries)	Generally seen as a favourable policy and financing environment for RE investment, though dominated by foreign investment. 2013 Strategy has 10,20, 40 year visions for key sectors ³⁴ , while the Second Special Programme on Climate Change 2014-2018 contains more detailed measures to achieve targets. ³⁵
INFRASTRUCTURE – SCALE OF THE OPPORTUNITY	Infrastructure ranked 57/138 by WEF	
Average infrastructure investment	% of GDP (2008-13 average to nearest 0.5%) 1%: Public; 0.5%: Private	Much lower than 5% benchmark that is often seen as adequate, though estimates vary. (e.g. World Bank 2017) ³⁶
National Infrastructure Plan	- Focus on energy and urban development. - Private sector spending relatively low in energy and water sectors, but around average for urban infrastructure.	
Urban population	- Growing urbanisation: 80% urbanisation (2013) versus 75% in 2000.	
Scale of sustainable infrastructure opportunity	Opportunities as a result of NDC-related and other commitments: \$791b in total opportunities by 2030 ³⁷ - Large renewable potential including \$11b for wind, \$6b for solar by 2020. - Transport sector will present \$132 billion in investment opportunity by 2020. - Building and waste sectors also provide large opportunities	
MAIN FINANCING CHALLENGES	Financial market development ranked 35/138 by WEF	

³³ Climate Action Tracker, at <http://www.climateactiontracker.org/countries/mexico.html> (downloaded July 2017).

³⁴ Mexico (2013) National Strategy on Climate Change adopted in June 2013, at https://www.transparency-partnership.net/sites/default/files/encc_englishversion.pdf

³⁵ Mexico (2014) Special Program on Climate Change (PECC in Spanish) 2014-2018, at <https://www.iea.org/media/workshops/2015/15thghgtradingworkshop/SpecialClimateChangeProgram20142018Englishversion.pdf>

³⁶ World Bank (2017): *Rethinking Infrastructure in Latin America and the Caribbean—Spending Better to Achieve More*, <http://documents.worldbank.org/curated/en/676711491563967405/pdf/114110WP-6-4-2017-14-11-10-LACInfrastructureMarchFULL.pdf>

³⁷ IFC (2016), *Climate Investment Opportunities in Emerging Markets*, at http://www.ifc.org/wps/wcm/connect/51183b2d-c82e-443e-bb9b-68d9572dd48d/3503-IFC-Climate_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES.

(In addition to general challenges identified in main body)	
General sector development and available instruments.	<ul style="list-style-type: none"> - Financial sector depth probably does not reflect level of economic development (i.e. financial sector less developed).³⁸ Domestic credit to private sector (33% of GDP) is much lower than emerging country average (71%) (InfraCompass). - Limited supply of specialized EE/RE financial products.³⁹ - Financial institutions are hesitant to provide funding to companies and especially SMEs lacking AAA credit ratings.⁴⁰ - Renewable energy largely financed by foreign investment.⁴¹
Financial sector and other sector expertise and understanding of risk	<ul style="list-style-type: none"> - Lack of expertise in financial sector acts as a barrier to developing financing products, and assessing risks. This can also lead to higher interest rates or loan rejections.^{42 43} - High perceived risk given lack of information and understanding of technology risk. ⁴⁴
Upfront costs, transaction costs and liquidity	<ul style="list-style-type: none"> - Act as a key barrier to implementation of low carbon measures - High transaction costs and project development costs ⁴⁵
KEY SECTOR OPPORTUNITIES	
Context and opportunities	
Electricity generation <ul style="list-style-type: none"> - Largest % of emissions (27%) reflecting fossil fuels account for 80% of generation, and has remained a steady percentage of emissions. Per capita emissions lower than LAC average, and almost a 1/3 of OECD average - 19% growth (2000-13), and 22% contribution to total non-land-use emission growth 	Context <ul style="list-style-type: none"> - INDC (2014): 31% reduction by 2030 vs BAU, and represents around 30% of emission reductions to achieve 22% reduction by 2030 vs BAU⁴⁶ - Will be key to meeting 35% renewable energy target by 2024 (increasing gas capacity is main <i>competitor</i>) - Wind and Solar LCOE and auction results are very competitive, with 2016 auction bids of \$43/MWh for onshore wind and \$27/MWh for solar PV. ⁴⁷ - Large solar and wind resource potential. Wind sector seems well developed. Overall opportunities <ul style="list-style-type: none"> - Large scale renewable generation (wind or solar) seems to be attracting investment of its own accord. - Possible opportunity for small scale distributed generation (especially solar). - Transmission and distribution improvements are required.
Transport sector <ul style="list-style-type: none"> - Emissions have grown by 43% (19% in per capita terms). - Per capita emissions around one-half of OECD average. - 31% contribution to total non-land-use emission growth. - Possibly reflects increase in urbanisation from 75% to 79% of population and growth in per capita income (9%). 	Context <ul style="list-style-type: none"> - INDC 18% reduction by 2030 vs BAU, and represents around 23% of emission reductions to achieve 22% reduction by 2030 vs BAU - Sub-national responsibility - Key to containing growth in increased emissions, especially related to fuel efficiency. Overall opportunities <ul style="list-style-type: none"> - Key interventions are possibly public transport interventions to encourage modal shift; improving vehicle efficiency, fuel switch and EVs?

³⁸ IDB (2013), Mexico, IDB Country Strategy 2013-2018, at <http://www.iadb.org/document.cfm?id=38281503>

³⁹ IFC (2012), Market Study of Sustainable Energy Finance in Mexico, at <https://www.ifc.org/wps/wcm/connect/96f316004cf49988afa3eff81ee631cc/October+2012-Market+Study+of+SEF+in+Mexico-EN.pdf?MOD=AJPERES>

⁴⁰ Norton Rose Fulbright (2017), Renewable energy in Latin America, <http://www.nortonrosefulbright.com/files/renewable-energy-in-latin-america-134675.pdf>

⁴¹ Bloomberg New Energy Finance, available at bnef.com

⁴² IFC (2012), see above for details

⁴³ World Bank (2010), *Low Carbon Development for Mexico*, at <https://openknowledge.worldbank.org/bitstream/handle/10986/2398/524580PUB0low0101Official0Use0Only1.pdf?sequence=1&isAllowed=y>

⁴⁴ IFC (2012), World Bank (2010), refer to above for details.

⁴⁵ World Bank (2010), refer to above for details

⁴⁶ Mexico (2016), *Mexico INDC*, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Mexico/1/MEXICO%20INDC%2003.30.2015.pdf>

⁴⁷ IRENA (2017), http://www.irena.org/DocumentDownloads/Publications/IRENA_REAuctions_summary_2017.pdf

Waste sector. - Strongest growing sector (75% between 2000-13) and now more than 15% of total emissions. Emissions much higher than LAC and OECD average. - 33% contribution to total non-land-use emission growth	Context - INDC (2014): 29% reduction by 2030 vs BAU, and represents around 7% of emission reductions to achieve 22% reduction by 2030 vs BAU. ⁴⁸ - Municipal responsibility, and IDB has noted that challenges in the waste sector are often beyond municipalities technical and financial capacities. Overall opportunities - Key mitigation opportunities are generating electricity from landfill gas; recycling initiatives
Industry	Context - 5% reduction by 2030 vs BAU, and represents around 4% of emission reductions to achieve 22% reduction by 2030 vs BAU. ⁴⁹ - IFC (2016) has identified industrial efficiency improvements as a key gap in terms of potential (\$400m need by 2020) and a sector lacking policy incentives or emission reduction targets. ⁵⁰
Energy efficiency (non-transport)	Intended NDC (2014): Residential and commercial emissions planned to reduce by 18% by 2030 vs BAU, and represents around 2% of emission reductions to achieve 22% reduction by 2030 vs BAU. ⁵¹ - Large potential for increased emissions from buildings, and potential to reduce emissions, especially from lighting. - Weak understanding of potential by financiers (and residential and non-residential sectors?)
KEY DONOR AND EXTERNAL INVOLVEMENT	
Top bilateral donors providing ODA to Economic Infrastructure sector and services sector (IDB data)	2013-2015: OECD Creditor Reporting System (from IDB) - Germany (\$249m), France (\$97m), USA (\$25m)
Germany: cross sector (313 climate cooperation programmes in Latin America between 2012-2016. Mexico and Brazil, largest recipients)	Current - Solar Energy Programme in Mexico (2015-2019) to transfer technology, working on financing with development bank (Bancomext), and policy development within SENAR. - German Mexican Energy Partnership - provides advisory services to SENAR on liberalisation, network integration of renewables, energy efficiency. - Urban waste project: mainly TA for pilot projects, and working with private sector. - Sustainable energy programme (2009-2017). - NAMA: Advisory services for the Mexican Government in developing and preparing NAMAs for the construction sector (existing and new buildings), energy efficiency in SMEs and transport/freight International Climate Initiative: 40 Projects.
	Future - IKI (International Climate Initiative) will be their flagship programme.
USAID: Enhancing capacity for low emission development strategies (EC-LEDS)	Currently facing financing challenges for second stage of Mexico Low Emission Development Programme - GHG abatement curve analysis to cost policy options. - Assisted Mexico Government on solar, wind, geothermal auction frameworks - Has a wide ranging future work programme covering energy market reform.
Denmark: cross sector	Mexico-Denmark Climate Cooperation Programme (EE, RE and NDC roadmap consultancy).

⁴⁸ Mexico (2016), refer to above for details.

⁴⁹ Mexico (2016), refer to above for details.

⁵⁰ IFC (2016), refer to above for details.

⁵¹ Mexico (2016a), Draft Mexico INDC, <https://www.thepmr.org/system/files/documents/Monica%20Echegoyen-SEMARNAT-Mexico.pdf>

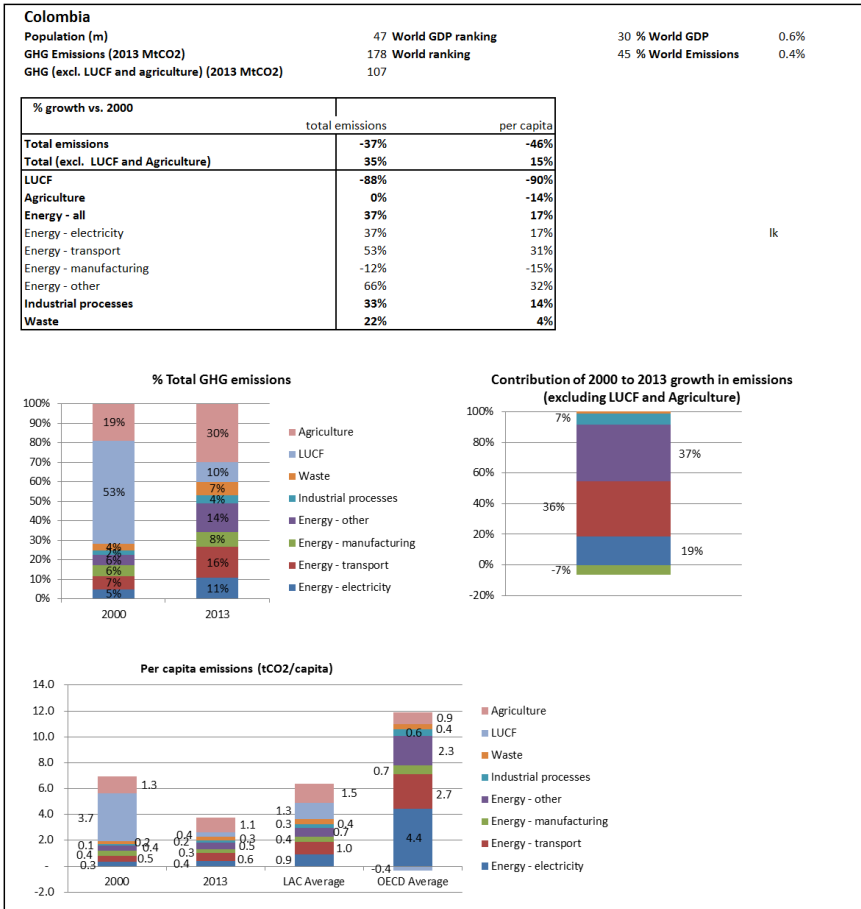
World Bank and IFC	<p>Selected programs</p> <ul style="list-style-type: none"> - World Bank: Municipal Energy Efficiency programme; and has also previously run energy efficient lighting projects. - IFC: Goal of assisting financial institutions (FIs) to build capacity and create financial products for energy efficiency and renewable energy development.
IDB	<p>Has financed a mix of TA and major infrastructure projects (including loans related to wind power, and to support energy efficiency financing through the issuance of Green Bonds).</p>
CTF	<p>Green Freight Transport, Sustainable Urban Transport, Clean Energy Financing/Risk Mitigation, Electricity generation from forestry residues, energy efficiency (residential and agricultural), Urban Transport Transformation project.</p>

COLOMBIA

Summary

- Strong growth in overall non-land use emissions since between 2000-13 at 35%.
- Developing financial depth and a range of suitable instruments is a priority, and there is also a lack of expertise to assess and mitigate risk for sustainable infrastructure.
- Transport is a key intervention opportunity, including related to urban infrastructure. Possible interventions include rail and river (especially for freight) and improving transport connectivity, public transport (including BRT), electric vehicles. Sub-national support also important.
- Intervention opportunities include related to large scale renewable generation (especially wind and possibly solar) and TA related to auctions and improving policy incentives; and possibly small scale solar interventions.
- Residential and commercial lighting, refrigeration, industrial motors, and public lighting have also been highlighted as possible interventions.

Emissions summary



CLIMATE TARGETS AND POLICY	FURTHER INFORMATION	COMMENT
Emission growth	Total emission growth of 35% in non-land-use sectors between 2000-13. Though total emissions decreased by 37%	- 15% of growth from electricity, 25% from transport, 13% from waste, 38% from other energy (including manufacturing) - Energy sector projections (incl. transport) expected to increase by 184% between 2010 and 2040, and industry by 271% (waste by 70%). ⁵²
Per capita	Non land-use grown slower than overall emissions (15%).	Around 2/3 of LAC average, and 1/3 OECD average Emissions excluding land-use have increased by 7%.
NDC Reduction target	Conditional: 30% vs BAU by 2030	
NDC Reduction target	Unconditional: 20% vs BAU 2030	Conditional on support from wealthier nations
Other key targets	Unilateral action on renewable energy (UNFCC 2011)	- At least 77% of energy capacity to be met by renewables by 2020 (6.5% renewable target excluding large hydro) - Sector priorities are under development, though some Sectoral Action Plans (including transport and energy) have been developed based on economy wide marginal abatement curves. ⁵³
General climate policy framework Rated relatively highly by Climatescope (22 nd of 55 developing countries)	Colombian Low-Carbon Development Strategy (CLCDS) National System for Climate Change (SISCLIMA) Financial Committee:	- Identify and assess alternative/opportunities for low carbon development. - Design and implementation of plans, policies and measurements. - Design and construction of MRV system. SISCLIMA main role is to recommend climate change funding strategies.
INFRASTRUCTURE – SCALE OF THE OPPORTUNITY	Infrastructure ranked 84/138 by WEF	
Average infrastructure investment	1 ¼%: Public; 1%: Private % of GDP (2008-13 average to nearest 0.5%)	- Lower than most benchmarks that are seen as adequate. - Major renewable electricity investment category is small hydro and biofuels (large proportion of equity vs debt finance) ⁵⁴
Urban population	Growing urbanisation: 77% urbanisation (2013) versus 72% in 2000.	
National Development Plan (PND: 2014-2018)	Includes a cross-cutting green growth strategy. Highlights the increased focus placed on this area of environmental protection. ⁵⁵	
Scale of sustainable infrastructure opportunity	There is generally little formal evidence of the financing needs required from environmental challenges. ⁵⁶ Opportunities as a result of NDC-related and other commitments ⁵⁷ - Large renewable potential including \$2b for wind, \$0.2b for solar by 2020. - Transport sector will present \$34 billion in investment opportunity by 2020. - Building and waste sectors also provide \$8b and \$1b of opportunities by 2020. \$195b in total opportunities by 2030.	

⁵² Colombia (2014), *Colombia Final Market Readiness Proposal*, <https://www.thepmr.org/system/files/documents/PMR%20CO%20Final%20with%20annex.pdf>

⁵³ IFC (2015), *Aligning Colombia's Financial System with Sustainable Development*

<http://www.ifc.org/wps/wcm/connect/04d3dd804a9ad1bba326ef9c54e94b00/Aligning+Colombia%27s+Financial+System+with+Sustainable+Development+-+IFC-+-.pdf?MOD=AJPERES>

⁵⁴ Blomberg New Energy Finance, available at bnef.com

⁵⁵ Norton Rose (2017), *Country Snapshot: Colombia*, <http://www.nortonrosefulbright.com/knowledge/publications/132911/country-snapshot-colombia>

⁵⁶ IFC (2015), refer to above.

⁵⁷ IFC (2016), refer to above for details.

MAIN FINANCING CHALLENGES (In addition to general challenges identified in main body)	Financial market development ranked 25/138 by WEF
General sector development and available instruments.	<ul style="list-style-type: none"> - Seen as having a mature financial sector⁵⁸, however small size of financial market is seen as a challenge.⁵⁹ Domestic credit to private sector (47% of GDP) is much lower than emerging country average (71%) (InfraCompass). - Users in non-interconnected zones cannot afford [renewable] generation technologies and have limited access to financing.⁶⁰ - Limited development of financial instruments to manage climate change.⁶¹
Financial sector and other sector expertise and understanding of risk	<ul style="list-style-type: none"> - Bias towards hydro and conventional generation given its dispatchable nature versus non-conventional generation (e.g. wind and solar). This increases perception of risk for wind and solar.⁶² - Low capabilities to assess and mitigate the risk in financial operations related to climate change.⁶³ - Capacity across government entities and the private sector is insufficient to understand the financial opportunities presented for mitigation and adaptation activities, which further reduces implementation capacity.⁶⁴
Upfront costs, transaction costs and liquidity	<ul style="list-style-type: none"> - There are very few companies with the financial and technical capabilities to assume the high initial costs of renewables projects - Lack of public funds mean that new and innovative financing mechanisms will be required⁶⁵
KEY SECTOR OPPORTUNITIES	Context and opportunities
Electricity generation - 69% of capacity met by large hydro, with fossil fuels (mainly gas) accounting for around 30% of capacity (20% of generation) - 37% growth (2000-13), and 19% contribution to total non-land-use emission growth	Context <ul style="list-style-type: none"> - Colombia's UPME Energy Generation Expansion Plan from 2014 to 2028 aims at increasing the installed capacity by approx. 15 GW, mainly by hydroelectric plants (11GW), thermal gas, and coal. - Government focus on renewable energy is as much about diversification given drought risks.⁶⁶ - The power sector has seen a relatively low level of climate-related investment. Between 2006 and 2012, investment in clean energy totalled US\$1.2 billion, of which almost half went to biofuels and 40% to small hydro projects.⁶⁷ BNEF show that in each of 2012 to 2014, between \$150-\$200 million in new build renewable asset finance was financed (exclusively small hydro and biofuels). Opportunities <ul style="list-style-type: none"> - High quality wind resources and potential for more small scale solar⁶⁸ - Large potential for additional small scale hydropower, but expansion likely to be limited by environmental concerns. This has also been identified as an opportunity for TA and concessional financing by the IDB given lack of long-term financing available in local capital market. - Auctions for renewables have yet to be implemented.
Transport sector - 53% growth (2000-13), and 36% contribution to total non-land-use emission growth. Per capita emissions around	Context

⁵⁸ E3G, *Strategic National Approaches to Climate Finance*, https://www.e3g.org/docs/E3G_Strategic_national_approaches_to_climate_finance_FINAL.pdf

⁵⁹ IFC (2015), refer to above.

⁶⁰ Ernst and Young (2016): Building the evidence base for Prosperity Fund programming in Colombia, Energy sector report.

⁶¹ IFC (2015), refer to above.

⁶² Norton Rose (2017), refer to above.

⁶³ IFC (2015), refer to above.

⁶⁴ ODI (2014), *The Coordination of climate finance in Colombia*, <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9326.pdf>

⁶⁵ Norton Rose (2017), refer to above.

⁶⁶ IFC (2016), *Lessons from infrastructure lending in Columbia*, <http://www.ifc.org/wps/wcm/connect/a31849004c60eb0bb824bcaccf53f33d/EMCompass+-+Infrastructure+Finance.pdf?MOD=AJPERES>

⁶⁷ ODI (2014), refer to above.

⁶⁸ Norton Rose (2017), refer to above.

<p>one-quarter of OECD average, and less than 50% of LAC average.</p> <p>- Emissions growth driven by emissions related to private car and long distance cargo. Motorization rates expected to increase due to increased purchasing power/economic growth (increase from 100 to 600 vehicles per 1000 inhabitants).</p>	<ul style="list-style-type: none"> - Transport infrastructure quality seen as major brake on competitiveness, and major urban mobility issues. Ranked 98th out of 144 countries by WEF.⁶⁹ <p>Developing sectoral plans and Colombia has and is developing NAMAs. Key opportunities</p> <ul style="list-style-type: none"> - Public transport options, such as BRT (Colombia has been active in developing BRT solutions, and expanding to other district capitals). - EVs (private and public transport). - Improving transport connectivity (road, rail and water) and urban infrastructure (e.g. TOD NAMA). - Freight options (alternatives to freight such as rail and water, and improving efficiency and scrappage schemes)
<p>Waste sector</p> <p>- 22% growth in emissions (2000-13) to nearly double % of GHG emissions (now 7% of total).</p>	<p>At face value, there would seem to be large mitigation opportunities related to composting, recycling, and energy generation (Behrentz 2014).⁷⁰</p>
<p>Energy efficiency (non-transport)</p>	<ul style="list-style-type: none"> - Residential and commercial lighting, refrigeration, industrial motors, and public lighting – were found to be “no regrets” options, i.e. with benefits outweighing costs.⁷¹ - IDB have also identified a possible niche for support for sustainable housing through a credit line to housing developers and supplemental building finance for home owners. This will address a lack of current incentives and awareness on the benefits of sustainable housing.
KEY DONOR AND EXTERNAL INVOLVEMENT	
<p>Top bilateral donors providing ODA to Economic Infrastructure sector and services sector (IDB data)</p>	<p>2013-2015: OECD Creditor Reporting System (via IDB) Germany (\$101m), Canada (\$17m), Switzerland (\$8m)</p>
<p>Cross-donor involvement in developing NAMAs</p>	<p>Sectoral Action Plans (PAS) being developed to implement NAMAs, including assistance from GIZ (transport), Carbon Trust (non-interconnected electricity), Switzerland (thermal districts), USAID and GIZ (sustainable housing)</p>
<p>USAID Enhancing Capacity for Low Emission Development Strategies Program (EC – LEDS)</p>	<p>EC-LEDS has assisted the Colombian Government in designing eight SMAPs—all of them already officially approved and signed: transport, mines, energy, agriculture, industry, hydrocarbons, housing, and solid and water waste</p> <ul style="list-style-type: none"> - Some more recent work including integration of renewable energy in non-connected areas, capacity building in key institutions, capacity building for clean energy innovation and financing. - EC-LEDS supported the Renewable Energy and Energy Efficiency Law.
<p>Germany:</p>	<p>KfW loan for urban mobility and urban climate resilience.</p> <p>International Climate Initiative, including:</p> <ul style="list-style-type: none"> - Includes low emission capacity building programme to facilitate implementation of NDCs. - Transport NAMA related work, including technology transfer <p>Key role in transport NAMAs for:</p> <ul style="list-style-type: none"> - Transport Orientated Development (TOD) - focuses public and private development around transit stations to create neighbourhoods where people can safely walk, live, work, shop and play. Includes proposed use of leveraged private finance. Estimated reductions of annual GHG emissions by 3.6 to 5.5 MtCO₂e by 2040. UK also has involvement. - Freight NAMA given interurban freight is 20% of transport emissions.

⁶⁹ WEF (2017), *The Global Competitiveness Report 2016-17*, http://www3.weforum.org/docs/GCR2016-2017/05FullReport/TheGlobalCompetitivenessReport2016-2017_FINAL.pdf

⁷⁰ Behrentz et al (2014), *Productos Analíticos para apoyar la toma de decisiones sobre acciones de mitigación a nivel sectorial*, Grupo de Estudios en Sostenibilidad Urbana y Regional, Universidad de Los Andes, Bogotá Colombia.

⁷¹ World Bank (2014), *Low carbon development for Colombia*, https://www.researchgate.net/publication/282136441_Low_Carbon_Development_for_Colombia

	Germany supports the GCF in helping Colombia access climate finance through capacity building, pipeline preparation etc. Works with Finance Committee responsible for coordinating climate finance.
CTF	Included funding for Sustainable Urban Transport, Energy Efficiency, Non-conventional renewable energy, large scale RE and industrial EE.
World Bank and IFC	<ul style="list-style-type: none"> - Financiera de Desarrollo Nacional (FDN): Partnership with CAF and IFC: A financial institution that catalyzes investment in Colombian infrastructure and addresses market failures that undercut optimal infrastructure financing. - Partnership for Market Readiness work: to support mitigation in transport sector

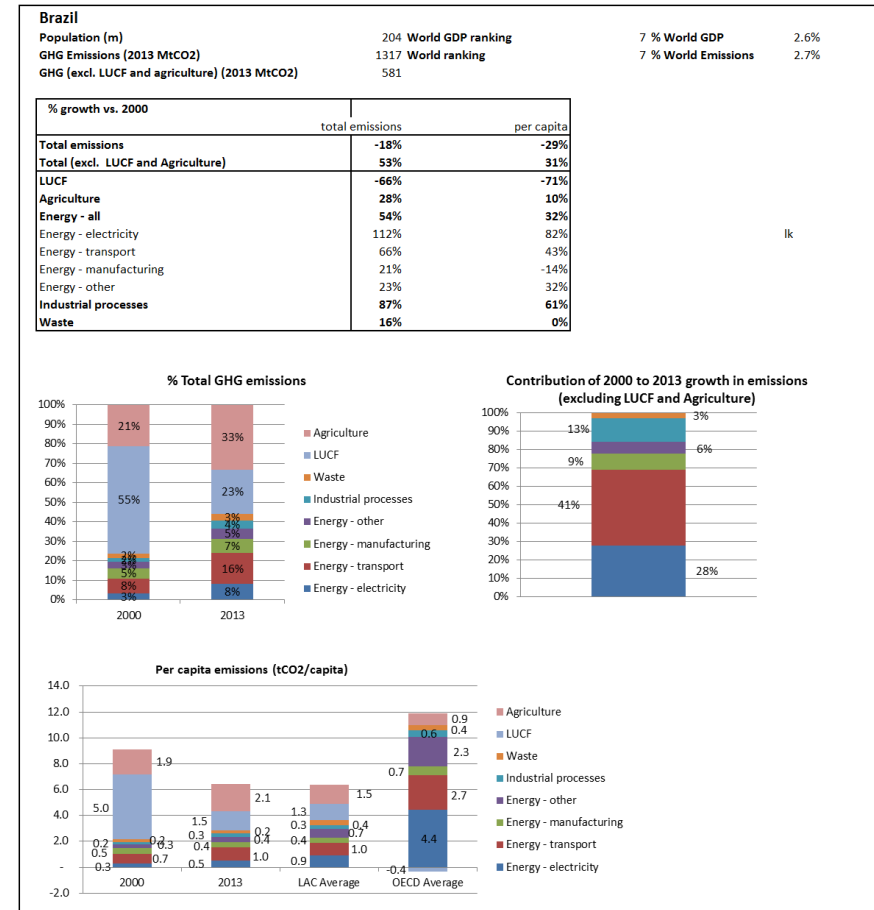


BRAZIL

Summary

- Generally seen as on track to meet commitments (New Climate Institute), although some progress on combatting deforestation related emissions recently been reversed.
- Brazil's infrastructure gap is largely due to the decline of public investment that has not been compensated by increased private investment. Infrastructure quality is also generally lacking (WEF).
- Infrastructure largely delivered at sub-national level, and strong role of BNDES (national development bank) in infrastructure delivery.
- Climate change and renewable industry sector policy frameworks judged relatively strong (auction frameworks and local content rules).
- Nearly 85% of non-land use emission growth between 2000-13 is from transport (41%), electricity (28%) and industrial (15%) sectors. As a result, at this stage, intervention opportunities would seem to be mainly in the renewable electricity generation and transport sectors. Within transport there is both needs related to long distance freight and urban mobility, which also weigh heavily on transport competitiveness. Though further work is required in identifying priorities.

Emissions summary



CLIMATE TARGETS AND POLICY	FURTHER INFORMATION	COMMENT
Emission growth	Emissions decreased by 18% between 2000 -13, but total emission growth of 55% in non-land-use sectors.	Around 50% of current emissions are due to land-use. Other sectors have been increasing in importance, though deforestation has also recently been increasing once again. For contributions to non-land use emission growth, 28% from electricity, 41% from transport, 3% from waste, 13% from industrial processes, and 15% from other energy (including manufacturing).
Per capita	Per capita emission growth of 53% in non-land-use sectors.	Around LAC average, and half OECD average
NDC Reduction target	Conditional: 43% below 2005 levels by 2025	Previously seen as likely to meet targets (New Climate Institute 2016), but recent increases in deforestation are concerning
NDC Reduction target	Unconditional: 37% below 2005 levels by 2030	Favourable scores given use of regular auctions, high value chains driven by local content requirements, and strong renewable investment.
Other key targets	Targets 45% renewable component for total energy mix by 2030, Renewable energy sources other than hydropower in the total energy mix increase to between 28% and 33% by 2030	<ul style="list-style-type: none"> - Increasing the share of renewables (other than hydropower) in the power supply to at least 23% by 2030, including by raising the share of wind, biomass and solar. - For energy efficiency, Brazil aims to achieve 10% efficiency gains in the electricity sector by 2030.
General climate policy framework	National Plan on Climate Change (2008) National Energy Expansion Plan (2011) Rated highly by Climatescope (3rd of 55 developing countries) ⁷²	The focus of the Brazilian government is to <i>plan</i> and <i>design</i> the strategy for NDC's implementation and financing.
INFRASTRUCTURE – SCALE OF THE OPPORTUNITY	Infrastructure ranked 123/138 by WEF ⁷³	<ul style="list-style-type: none"> - Low % of paved roads and congestion are major issues. Adds significantly to logistics costs for businesses. - Electric power transmission and distribution losses have increased and now exceed 15 per cent of electricity output.⁷⁴
Average infrastructure investment	% of GDP (2008-13 average to nearest 0.5%) 1.5%: Public; 1.5%: Private	<ul style="list-style-type: none"> - Much lower than 5% benchmark that has been seen as adequate, though estimates vary.⁷⁵ - Decline in infrastructure spending over recent decades driven by public investment reductions. Private sector has not compensated for decreases. - C75% of public spending is executed at sub-national level.

⁷² Available at <http://global-climatescope.org/en/>

⁷³ WEF (2017), refer to above for details.

⁷⁴ IMF (2015), *Filling the Gap : Infrastructure Investment in Brazil*, <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Filling-the-Gap-Infrastructure-Investment-in-Brazil-43139>

⁷⁵ World Bank (2017): *Rethinking Infrastructure in Latin America and the Caribbean—Spending Better to Achieve More*, <http://documents.worldbank.org/curated/en/676711491563967405/pdf/114110WP-6-4-2017-14-11-10-LACInfrastructureMarchFULL.pdf>

BNDES (development bank)	<ul style="list-style-type: none"> - The provision of capital has become a binding constraint with the only viable sources being retained earnings, or, more usually, subsidized credit from official sources such as Brazil's BNDES development bank or the International Finance Corporation. ⁷⁶ - Strong reliance on BNDES as a source of financing, other than retained earnings, and need to diversify equity and debt components. - Private banks and actors account for around 45% of BNDES loan portfolio, and take on credit risk. Though, results are small relative to overall needs. Use of infrastructure bonds are still relatively small⁷⁷ - Most recently (May 2017, BNDES has indicated that In infrastructure, the highest priorities are sanitation, solar energy, urban mobility, waterways and railways, transport of gas and biofuels, and distribution of gas.
Key infrastructure policy	<ul style="list-style-type: none"> - Brazil has large scale transportation and electrical energy programme investment plans. - 1995 Concession law allows private sector to finance and collect user charge, however it has had difficulties gaining momentum in an environment marked by uncertainty, low growth, and tight financing conditions.⁷⁸ - 2004 PPP law allows the public sector to pay (either partially or fully) for the capital and operational costs of infrastructure. - The Brazilian Investment Partnership Program (created May 2016) aims to increase investment opportunities, including through partnership agreements with private sector. Includes a fund managed by BNDES to support structuring investment partnerships and privatization contracts. - However, lack of national framework and coordination problems between different levels of government.⁷⁹
Scale of sustainable infrastructure opportunity	<p>Brazil's NDC estimates that the resources required to implement Brazil's NDC are between R\$890 and R\$980bi. This amount indicates the need to reorient Brazil's national development plans to enable a transition into a low carbon economy</p> <p>Opportunities as a result of NDC-related and other commitments (IFC 2016). \$1,316b in total opportunities by 2030.⁸⁰</p> <ul style="list-style-type: none"> - Large renewable potential including \$32b for wind, \$8b for solar by 2020. - Transport sector will present \$209 billion in investment opportunity by 2020. - Building (£50b) and waste sectors (£5b) also provide large opportunities
MAIN FINANCING CHALLENGES (In addition to general challenges identified in main body)	Financial market development ranked 93/138 by WEF ⁸¹
General sector development and available instruments.	<ul style="list-style-type: none"> - Local capital markets have played a limited role as a source of infrastructure financing - Credit market not working effectively, especially for medium to long-term credit. This is partly due to segmented financial system where the government has directed public banks to stimulate investment through offering credit at below market rates, increasing their market share from 30-55% of total credit between 2010-14. ⁸² This system implies that higher interest rates are offered to other businesses that do not benefit from below market rates. - Brazilian commercial banks charge spreads that are still among the highest in the world due to the lack of contestability by potential new entrants.⁸³

⁷⁶ Amann et al 2016, Infrastructure and its role in Brazil's development process, *The Quarterly Review of Economics and Finance*, Volume 62, November 2016, Pages 66-73.

⁷⁷ Studart and Ramos (2016) Financing Sustainable Infrastructure in the Americas, GEGi Working Paper 07/2016, <http://www.bu.edu/pardeeschool/files/2016/08/Financing-Sustainable.-StudartRamos.pdf>

⁷⁸ IMF (2016), Article IV Report, <https://www.imf.org/external/pubs/ft/scr/2016/cr16348.pdf>

⁷⁹ World Bank (2016), Brazil - Systematic country diagnostic : retaking the path to inclusion, growth and sustainability, <http://documents.worldbank.org/curated/en/239741467991959045/pdf/106569-SCD-P151691-PUBLIC-non-board-version.pdf>

⁸⁰ IFC (2016), refer to above for details.

⁸¹ WEF (2017), refer to above for details.

⁸² World Bank (2016), refer to above for details.

⁸³ Torres et al (2016), The life-cycle of national development banks: The experience of Brazil's BNDES, *The Quarterly Review of Economics and Finance*, Volume 62, November 2016, Pages 97-104

Access of SMEs to finance	<ul style="list-style-type: none"> - Large companies can access BNDES funds more efficiently, as SMEs largely access through BNDES credit refinanced by commercial banks.⁸⁴ SMEs make up 20% of GDP, but only 12% of credit - half the OECD average of 25%. - Interest rates for smaller businesses are even higher than already high average loan rates. Incomplete and asymmetric information has hindered SMEs' access to financing. Some firms in Brazil report that scarcity of finance is one of the main obstacles to investing in new technology, but the key problems may be more related to the allocation and pricing of credit.⁸⁵
Upfront costs	<ul style="list-style-type: none"> - Financial constraints are particularly important for young start-ups and small firms.
Inadequate skills	<ul style="list-style-type: none"> - Public sector skills gap around project structuring. - Need to strengthen project preparation and coordination across government. - Project financing may not be tested against the market.⁸⁶
Regulatory issues	<ul style="list-style-type: none"> - Regulatory uncertainty over demand and public payment risk is a key investor concern. The private sector could potentially contribute an important share in the necessary investment in infrastructure and help raise the efficiency of public services, if the regulatory framework for PPPs throughout the project cycle is improved.⁸⁷
KEY SECTOR OPPORTUNITIES	<p>Outside of forestry and agriculture sectors, main reduction opportunities are in power, waste and industry sectors.</p> <ul style="list-style-type: none"> - Also seems to be an over-reliance on BNDES.
<p>Electricity generation</p> <ul style="list-style-type: none"> - Fossil fuel generation makes up less than 20% of power generation mix (mix dominated by over 70% hydro). - 112% growth in emissions between 2000-13, and nearly 30% of contribution to growth in non-land-use emissions. - Per capita emissions are relatively low as a result (1 tCO2 per capita) vs. OECD average of 4.4 due to energy mix. 	<p>Context</p> <ul style="list-style-type: none"> - While Brazil mainly proposes large increases in hydro, Brazil also envisages expansion from other renewables such as wind. - 38 GW installed by 2022 (17.4 GW wind, 13.8 GW biomass, 6.9 GW small hydro) and 114GW of large hydro installed by 2022 (New Climate Institute). - The shift to auctions for solar and wind has led to decreased costs, supplemented by other support such as low interest financing from BNDES, reduced transmission and distribution costs and tax reductions. Local content regulations potentially limit productivity and financing capacity.⁸⁸ - Grid inadequacy has led to delays in renewable projects, and large grid investments are required.⁸⁹ <p>Opportunities</p> <ul style="list-style-type: none"> - Onshore wind, though is already at low cost, and solar PV seems under-developed. - Possible transmission and distribution improvements.
<p>Transport sector</p> <ul style="list-style-type: none"> - 66% growth in emissions between 2000-13, and over 40% of contribution to growth in non-land-use emissions. - 43% growth in per capita emissions, which is less than 40% of OECD average. 	<p>Context:</p> <ul style="list-style-type: none"> - Urban mobility issues, including an increase in the use of individual rather than public transportation is a major cause of urban mobility problems in Brazil. - Major drag on productivity (low% of paved roads; low quality of rail and port infrastructure). Advantages of very efficiency agricultural production are lost due to low quality transport infrastructure.⁹⁰ Transportation costs account for nearly 60% of total logistics costs for businesses in Brazil (11.6% of GDP), compared to 8.7% in the United States. Reasons for lack of investment are common to other infrastructure.⁹¹

⁸⁴ Torres et al (2016), refer to above for details.

⁸⁵ World Bank (2016), refer to above for details.

⁸⁶ World Bank (2016), refer to above for details.

⁸⁷ World Bank (2016), refer to above for details.

⁸⁸ OECD (2015), OECD Economic Surveys – Brazil, <https://www.oecd.org/eco/surveys/Brazil-2015-overview.pdf>

⁸⁹ OECD (2015), refer to above for details.

⁹⁰ World Bank (2016), refer to above for details.

⁹¹ IDB (2016), *Brazil IDB Country Strategy*, <http://www.iadb.org/document.cfm?id=40167831>

<ul style="list-style-type: none"> - Vehicle fleet trebled between 2000 and 2015 (World Bank 2016) - 84% of the population lives in urban areas, and the proportion is expected to reach 93.5% by 2050 (IDB 2016) - 	<ul style="list-style-type: none"> - Difficulty of investment execution and management by the government due to the limited number of technical experts - Regulations that create barriers to the hiring of private companies to prepare plans - Scarcity of long-term financing sources - Conflicts among stakeholders and regulatory uncertainty.⁹² - Brazil has established a National Policy on Urban Mobility, which established principles, guidelines and tools to guide municipalities in developing urban mobility plans <p>Key opportunities</p> <ul style="list-style-type: none"> - For light vehicles, options identified, low cost improvements include technology switch to hybrid and ethanol based vehicles.⁹³ - For heavy and commercial vehicles, the main mitigation options are related to improvements in technology. ⁹⁴IFC (2016) also identified large abatement potential from increasing the energy efficiency of vehicles on the road.⁹⁵
<p>Waste sector.</p>	<p>Opportunities</p> <ul style="list-style-type: none"> - McKinsey (2009) identify large abatement opportunities in the waste treatment sector. Recycling initiatives, including for paper and metal, could cover 75% of potential abatement, with the other 23% from direct use of landfill gas or to generate electricity.⁹⁶
<p>Energy efficiency (non-transport)</p>	<p>Context</p> <ul style="list-style-type: none"> - Utilities are obliged to invest 0.25% of their revenues into measures to improve energy efficiency. - Brazil has a National Energy Efficiency Plan (2007). The plan also involves the replacement of one million old refrigerators per year for 10 years. Lastly, the plan aims to improve energy efficiency in industry, transport and buildings. <p>Opportunities</p> <ul style="list-style-type: none"> - IDB notes that Brazil EE sector is under-developed. 42nd out of 111 countries in the Readiness for Investment in Sustainable Energy index – RISE, 2016) compared to e.g. Mexico (in 6th).⁹⁷
<p>KEY DONOR AND EXTERNAL INVOLVEMENT</p>	
<p>Top bilateral donors providing ODA to Economic Infrastructure sector and services sector (IDB data)</p>	<p>2013-2015: OECD Creditor Reporting System France (\$335m), Germany (\$327m), US (\$13m)</p>

⁹² OECD (2015), refer to above for details.

⁹³ IFC (2016), refer to above for details,

⁹⁴ McKinsey (2009), *Pathways to a low carbon economy for Brazil*,

https://www.mckinsey.com/~media/McKinsey/dotcom/client_service/Sustainability/cost%20curve%20PDFs/pathways_low_carbon_economy_brazil.ashx

⁹⁵ IFC (2016), refer to above for details,.

⁹⁶ McKinsey (2009), refer to above for details,

⁹⁷ RISE index available at <http://www.worldbank.org/en/topic/energy/publication/rise---regulatory-indicators-for-sustainable-energy>

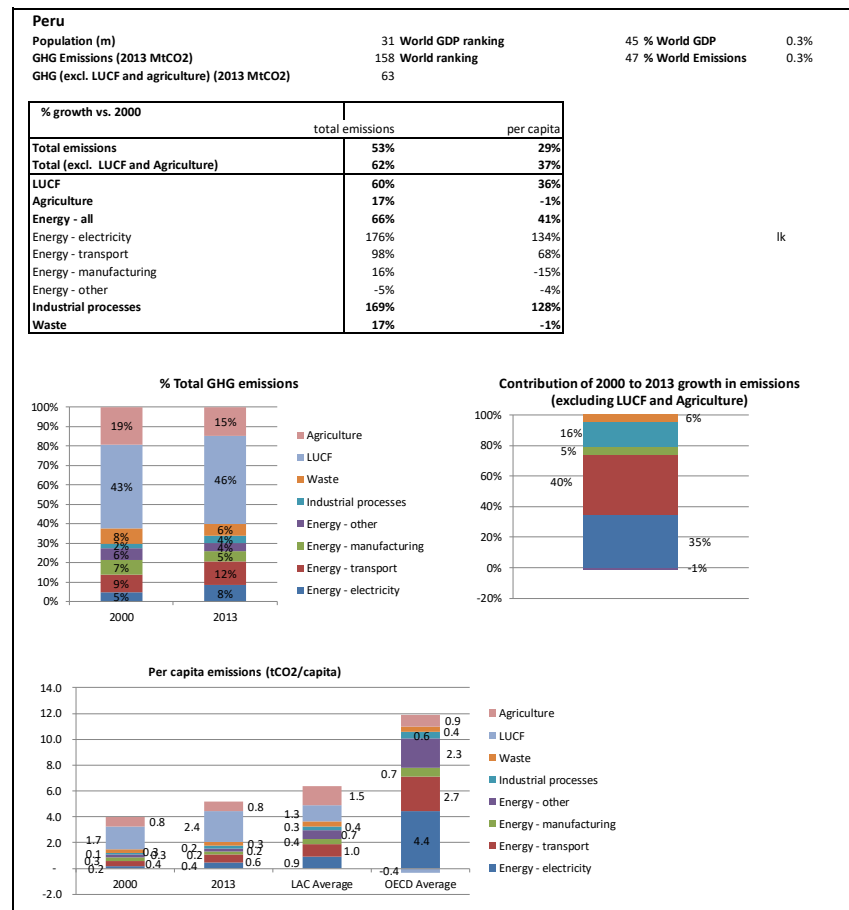


PERU

Summary

- Around 60% of emissions are due to land-use. However, growth in emissions from non land-use sectors grew by around 60% between 2000-13, including 170% growth in electricity sector between 2000-13 and 100% growth in transport sector. These sectors respectively represented around three-quarters of total non land-use emissions growth between 2000-13. Per capita emissions are Less than 50% of OECD average, and around LAC average.
- NDC commits to a 20% unconditional reduction in emissions vs BAU by 2030, and a 30% unconditional reduction. Likely to need to implement further policies to reach its NDC targets, and final NDC does not specify sectoral mitigation targets, though these are included in draft INDC ([Climate Action Tracker](#)).
- Complementary emission reduction targets include increasing the share of renewables in the energy mix to at least 40% by 2021, and to reduce emissions in the waste sector by 7 MtCO₂e in 2021 (compared to the year 2000). Peru also has mandated the setting of five yearly renewable energy targets.
- Peru's National Plan for Infrastructure has estimate a \$16 billion per year infrastructure gap over the 2016-2025 period, with transport accounting for over a third of this (3 per cent of GDP). Energy is the next most important sector.

Emissions summary



Annex B: Two case studies of possible SIP interventions in Mexico and Colombia.

Case Study 1 – Attracting institutional investors’ capital for sustainable infrastructure in Mexico via aggregation and securitization

- The IDB have identified access to debt as a key issue for small-scale renewable and energy efficiency projects in Mexico.
- At the same time, Mexico is the major securitisation market in LAC, representing almost 25% of the USD in the region.
- They are testing the idea of developing a financing facility for small-scale renewable and energy efficiency projects which would use the SIP technical assistance to support small-scale project developers, and use the SIP capital to de-risk the investment.

Summary of possible intervention

Step 1:	A warehousing line (that could be a senior loan or a senior revolving credit line) to finance, accumulate and standardize cash flows from small scale renewables, battery storage, or energy efficiency projects
Step 2:	A refinancing of the warehouse line via a bond offering in the local and/or international capital market, backed by one or more Partial Credit Guarantees “PCG” to provide the external credit enhancement necessary to achieve an investment grade credit rating sufficient to attract institutional investors and also adequate pricing on the transaction
Step 3:	A partial backstop subscription ⁹⁸ (if necessary) of the issuance by IDBG to create pricing and other market benchmarks for the transaction in the market.

The warehousing facility would provide support to project sponsors and developers to allow small scale projects to be aggregated and financed over longer periods of time than is currently possible. This would be supported by UK concessional financing (e.g. subordinated loans or guarantees), and would provide the market with evidence on operating performance and financial benchmarks (addressing the lack of knowledge market failure).

The pool of assets in the warehousing facility would then facilitate the availability of a pool of assets to securitise. The proposed intervention would address the current market barrier for green bond issuance by providing technical assistance prior to and after bond issuance in order to develop local green bond markets. More specifically, technical assistance could be provided to support the structuring and placement of a new asset class, and monitoring post-issuance. This could involve:

- a. profiling and mapping investors to ensure that the bond is attractive and to manage possible execution and placement risk;
- b. meeting upfront transaction costs that are required to facilitate the creation of a new asset class;
- c. certification of new asset class in line with recognised green bond principles;
- d. communication and engagement with investors to promote the new asset class;
- e. determine eligibility criteria for the use of proceeds and/or establish the approach for tracking compliance;
- f. structure and carry out green bond reporting requirements; and

⁹⁸ IIC would purchase the notes for its own balance sheet.

- g. Independent green bond compliance reviews to satisfy investors.

In addition, BEIS and/or IIC financing could be used to support bond issuances by providing a level of guarantees so that the bond is attractive to investors, and to begin to create a small scale green bond market. At the 'country partnership' level, technical assistance could be used to support develop the framework for green bonds in Mexico, and green asset backed securities in particular.

More generally, the proposed intervention would seek to encourage transformational change in Mexican capital markets and increase private sector participation in the financing of sustainable infrastructure, including for small scale assets which are not currently being financed to a large extent by the private sector in Mexico.

Testing the idea

A mission to Mexico by BEIS reinforced our appreciation of the above barriers in Mexico, including through consultation with the securities exchange, bond issuers and financial institutions. This intervention is included in the illustrative portfolio that is modelled in the cost effectiveness section.

Case Study 2: Renewables in Colombia

In addition, the IDB provided BEIS a case study on Colombia that reinforces some of the barriers to investment identified in the strategic case. This includes:

- a. lack of adequate long-term financing coupled with lack of suitable long-term contracts (PPA). For example, when clients seek financing, local banks perceive high risk in the technology and offer high interest rates, high collateral requirements and short-term financing; and
- b. weak policy frameworks – including public-private partnerships frameworks – and incentives which are insufficient to enhance the competitiveness of such forms of low-carbon energy (e.g. power auctions for low carbon energy have yet to be implemented) vis-à-vis alternatives.

The IDB has also identified a comprehensive possible programme to address these market barriers that combines technical assistance (including at the country partnership level) with concessional financing from BEIS.

For example, the programme may work with developers on project design and implementation to help secure financing and address the perception that low carbon technology carries high risks. It may also work with financial institutions to evaluate and finance such projects, and design dedicated financial products. There may also be a case for the development of aggregation and securitisation vehicles as is proposed in the Mexican example above.

Concessional financing could be used to increase the available liquidity in the market for upfront costs (currently lacking) or provide credit enhancements to address high risk perceptions from financial institutions. These possible Colombia interventions are also included in the illustrative portfolio that is modelled in the value for money section.

Annex C: Detailed Options appraisal: The table below summarises how the four options will address the critical success criteria (0 -5, 0 is low and 5 is high). These are all subjective estimates to represent a qualitative comparison of options.

Criteria	Option 1: Do Nothing	Option 2: Put money into (replenish) existing multi-donor fund	Option 3: Create a global fund with a global development bank or private sector organisation	Option 4: Create a regional fund with a regional development bank	Option 5: Create a regional fund with a private sector partner
Estimated ability to mobilise private sector partners	Low: No action	Medium: This would depend on the fund and their objectives. However, we would be limited in our ability to shape this and it would likely be less flexible to specific market's needs.	Medium-High: This would largely depend on the delivery route. This route would likely have a larger focus on the global capital markets and could attract larger sums of private finance due to the scale.	High: This would be country/ region specific which would give it the flexibility to respond to targeted barriers. Done incrementally this could have a significantly transformational impact in the local capital markets.	High: Being delivered by a private sector partner may increase their ability to mobilise partner as the demonstration effect is likely to be more direct.
Potential sustainability and scale	Low: No scale achieved	Medium: There would be limits as to how much the UK is likely to invest to limit the burden share compared with other donors.	High: Setting-up a new global fund would create the potential to disburse significant sums of climate finance as well as establishing a new delivery route globally.	High: This would have the potential for sustainability and scale but would require multiple delivery partners so each regional programme would be smaller.	Medium: A private partner is likely to operate at a smaller scale than the development banks.
Technical assistance component	Low: No activities	Low: This would be dependent on the fund and whether there is a technical assistance component, however the larger infrastructure related funds don't have targeted TA programmes attached.	Low: This would be challenging on a global scale given the multitude of countries involved and the differential needs of each country.	High: A regional development bank has strong ties to governments and already implements TA in each country. Challenges would be making it unique to SIP.	Low: It would be challenging for a private sector company to develop strong ties to governments and get the access of a development bank. Private sector TA would be a strong option.

<p>Ability to mitigate risk in structure:</p> <ul style="list-style-type: none"> • Government control and assurance • ODA eligibility • Ensuring project is in scope of usual spending powers • Financial and accounting • Procurement and legal risk • State Aid 	<p>Low: There is less risk when the funding is not invested.</p>	<p>Low: Through using an established route there is greater unknown and a well-established delivery route that has been tested. Therefore any risk would be known.</p>	<p>Medium: Running a procurement exercise at that scale and setting-up a new vehicle is likely to increase risks. Using a private sector partner would bring into question ODA eligibility and accounting challenges.</p>	<p>High: Working with an established partner who is ODA eligible and compliant with international standards would reduce these design risks.</p>	<p>Medium: Similar to the global option, running a procurement exercise at that scale and setting-up a new vehicle is likely to increase risks. Using a private sector partner would bring into question ODA eligibility and accounting challenges.</p>
<p>Development benefits</p>	<p>Low: No activities</p>	<p>Medium-High: This is dependent on the focus of the programme and the delivery partner.</p>	<p>Medium-High: A global focus would limit the impact in specific countries and is likely to increase the diversification of the programme. It would likely be higher if implemented by a development bank with a greater focus on these benefits.</p>	<p>High: A more focused programme with a development bank would have a core focus on development objectives.</p>	<p>Medium: A private sector organisation may be less familiar with development goals and targets. It would take more time to incorporate this goal and technical support.</p>
<p>UK branding and visibility</p>	<p>Low: No visibility for UK</p>	<p>Low: There would likely be low UK visibility as this would likely be a multi-donor fund and have existing communications strategies which we would have limited influence over.</p>	<p>High: A global fund would be a new vehicle and so be able to be branded according to needs. It would likely be delivered by an internationally reputable organisation with a strong brand.</p>	<p>High: A regional approach would also be able to be branded and may have closer links to the recipient countries. However, again it is likely to be delivered through a well-established partner</p>	<p>High: A regional approach would also be able to be branded. However, similarly to before it is likely to be delivered through a well-established partner, perhaps with a strong brand, which would dilute visibility.</p>

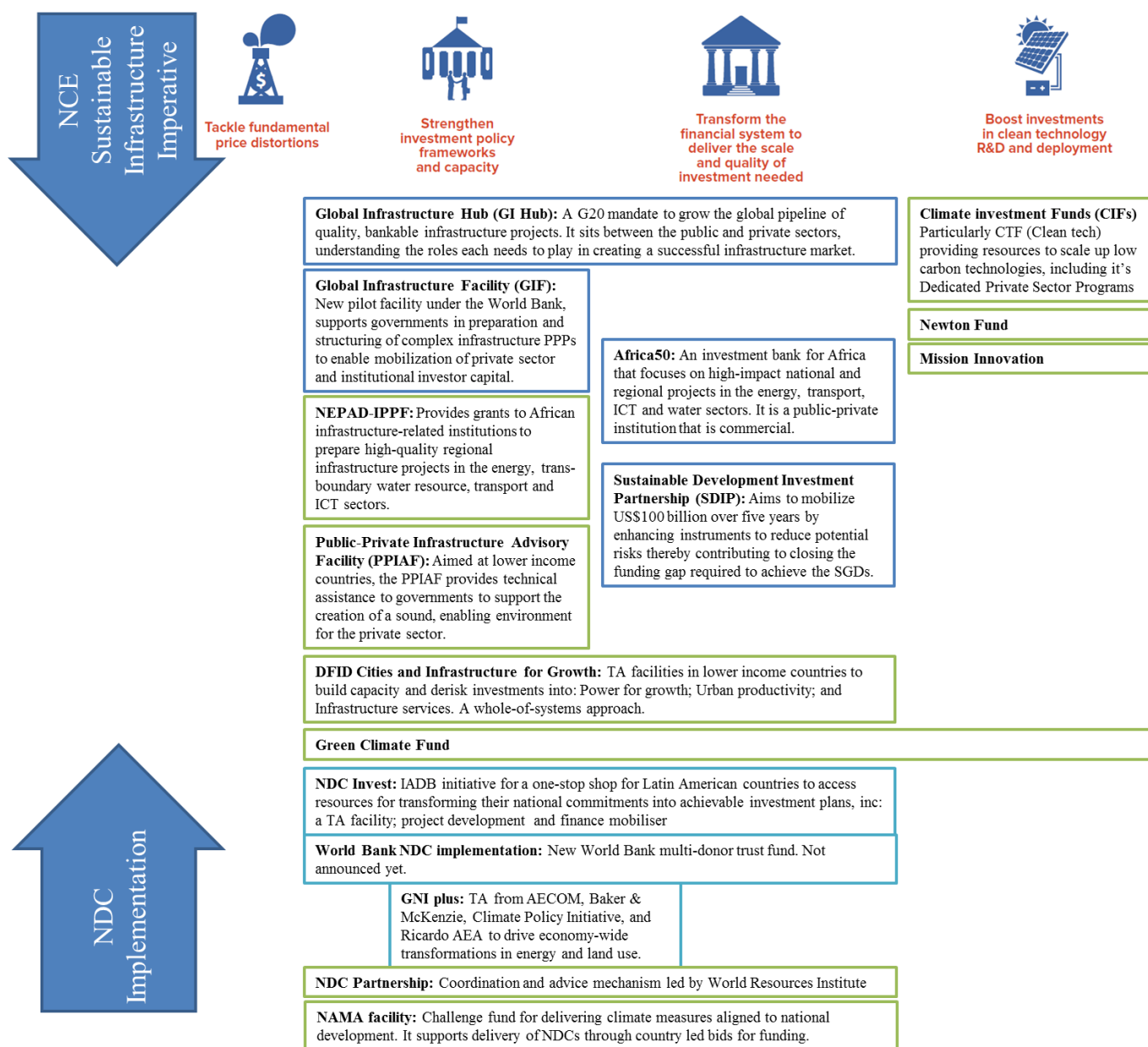
			This would have an impact.	which would dilute visibility.	
Timing / Early impact by 2020	N/A	High: This would be an established route with existing governance.	Low: Depending on whether this required a procurement exercise this is likely to be slow. It would also be incredibly complex given the range of countries it would be operating in so need a slow and detailed design process.	High: This would be with an established MDB with a pipeline and be targeted to specific countries. It would likely be a smaller programme and therefore quicker to set-up.	Low: A procurement exercise is likely to be slow and complex given the scale of the operations.
Potential for secondary benefits for UK companies	No leverage or barriers overcome.	We would have limited input over how the funding is used. We could however communicate impacts.	We would potentially be working with a UK company depending on the outcome of the procurement exercise. There would also be green finance opportunities from activity at a global scale.	Working more closely with countries and linking to our embassy in country there is potential to unlock barriers to investment which UK companies would then be able to take advantage of. This could be communicated through links to The Department of International Trade.	There are similar advantages to the regional approach but uncertainties about the potential for secondary benefits depending on the company that would deliver the programme. E.g. A UK company would have a much higher potential.
Summary:	Low	Medium	Medium-High	High	Medium

Annex D – Mapping sustainable infrastructure and NDC initiatives

Our assessment is that there is a role for UK climate finance in linking the implementation of countries' NDCs to sustainable infrastructure planning and financing. The main initiatives are not, yet, delivering a focused approach with specific countries.

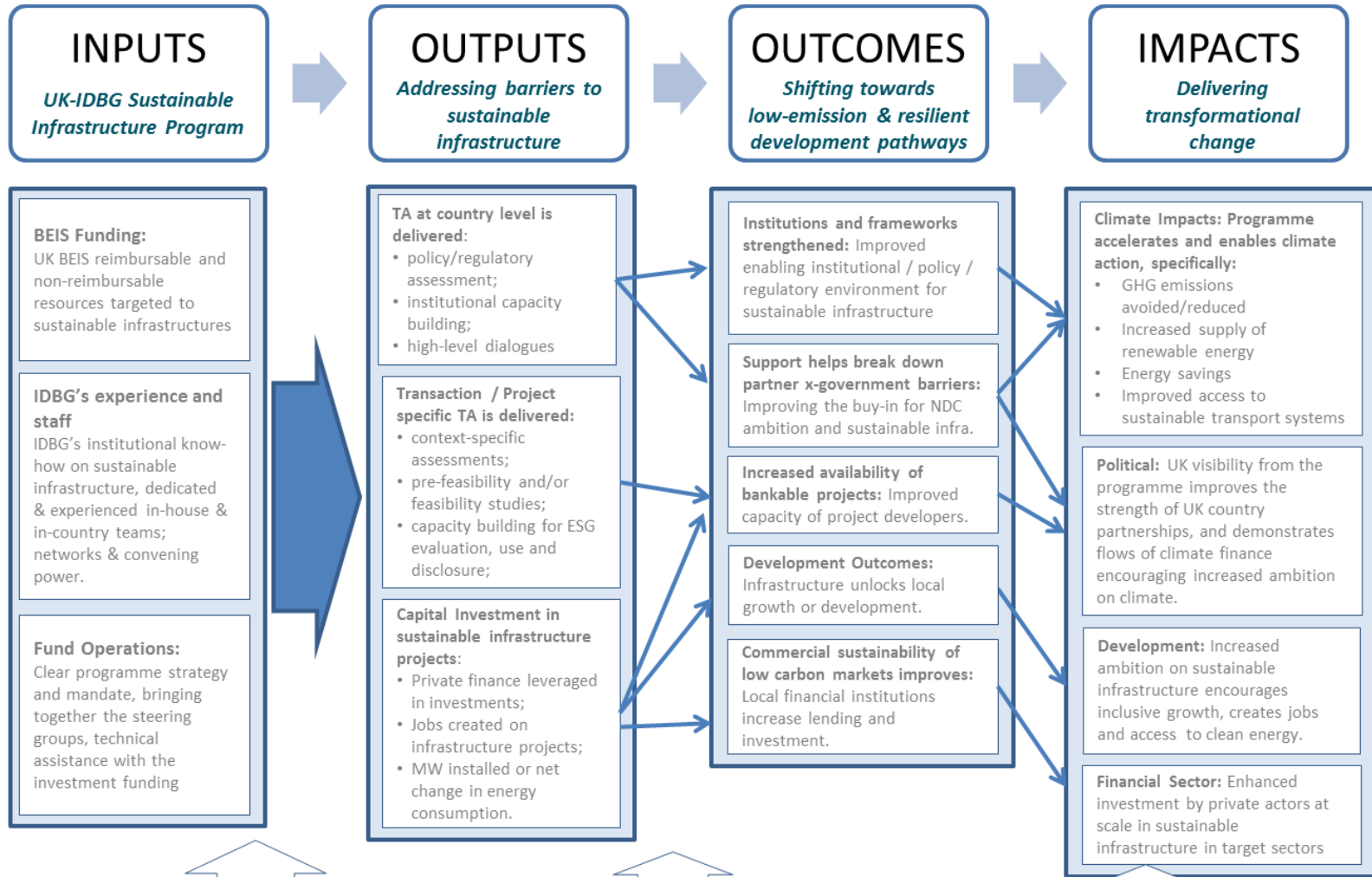
Existing programmes

There are a number of international initiatives to promote infrastructure development and sustainability within them, but there is room to make the explicit link to the Nationally Determined Contributions. Learnings from existing programmes highlight the importance of linking to public policy and technical assistance to the investment mechanisms.



It is worth paying particular attention to NDC Invest, launched by the IDB, as it has a number of elements that provide technical assistance and aim to mobilise finance. The IDB aims to make it a one-stop shop for Latin American countries to access resources for transforming their national commitments into achievable investments plans. For example it has a TA facility in the Programmer and Pipeline Accelerator, does project development through the Pipeline Accelerator and also provides finance through the finance mobiliser. We are designing the SIP so that it compliments their experiences and operations under NDC Invest – see the Theory of Change.

Annex E: Theory of Change – How the SIP toolkit will lead to greater private investment, more sustainable domestic infrastructure plans and greater visibility of UK finance, and the assumptions we’ve made to reach that conclusion.



ASSUMPTIONS

- Suitable pool of projects
 - Project recognize IDB as a viable partner
 - Partner governments and developers have a demand for technical support
 - The mandate fits the requirement in partner countries
 - The Fund is able to meet the tailored demands
- The SIP works with (not against) other donor and UK funding (e.g. TTA programme)
 - The TA is good enough, and targeted at the right country specific barriers.
 - Project specific TA has a knock-on benefit for other developers
 - Private sector see benefits and invest in low-carbon sector
- Partner governments positively recognize the contribution of the UK-IDBG SIP towards the achievement of their NDCs
 - Rebound effects from energy efficiency savings don't outweigh climate impacts
 - That there are projects in all sectors, including transport
 - That growth is inclusive and jobs sustainable
 - That change is sustainable without continued intervention

Annex F: Technical Modelling - Economic Appraisal

Technical Modelling Annex

UK Government contribution

- For modelling and assessment purposes it is assumed that, on behalf of the UK government, the ICF will invest £177.5m, with the following breakdown between activities.
 - £175 million funded through the Inter-American Development Bank (IDB), comprising £150m million in CDEL for financing for investments (through a variety of financial instruments), and £25m in RDEL for technical assistance (TA) and whole programme administration costs.
 - An additional £2.5m to procure third party advisors to conduct additional sector-specific research to help with the implementation and a mid-term and impact evaluation of the programme.
- The modelling assumes that the above funding is committed between 2018 and 2023⁹⁹.

Modelled Portfolio

- For the £150 million of BEIS funding for investment activities, the IDB provided an illustrative pipeline of projects (containing funding profiles from BEIS and non BEIS sources) to value the costs and benefits of projects. This portfolio was discussed extensively between BEIS and IIC/IDB. It should be noted that while the portfolio is informed by projects that are on the IDB/IIC radar for investment under SIP, these are not actual projects and there is a risk that the actual pipeline may end up significantly different in practice.
- The following presents the high level breakdown of investment portfolio between sub-sectors and countries (as shown in the economic appraisal).

Percentage per sub sector by country					Percentage of total by sub-sector
Investment Type	Brazil	Colombia	Mexico	Peru	
Solar photovoltaics - Buildings	22%	7%	39%	0%	18%
Solar photovoltaics - Large scale	16%	5%	6%	0%	7%
Wind onshore	16%	9%	0%	33%	11%
Hydropower - small-scale	0%	36%	0%	67%	21%
Waste	0%	0%	26%	0%	7%
Energy Efficiency	0%	16%	29%	0%	14%
Transport	47%	27%	0%	0%	21%
Percentage pf total by country	23%	39%	28%	11%	100%

- The final Heads of Terms (HoT) and draft Investment Mandate (IM) has not yet been finalised, therefore the modelling contains some of the conditions laid out in the draft legal documents. Exogenously determined assumptions have also been drawn from these documents where possible. This analysis will be updated, as appropriate, once these documents are finalised in order to monitor the impact on expected results and sense check expected results included in the SIP logframe.

Model

- The model is extensively based on the model used for the Green Investment Bank business case, which was developed to be consistent with BEIS Modelling Integrity Team guidelines. However, several significant departures were made to this modelling.
 - The GIB model assumes that no more than certain percentages of the illustrative portfolio can be invested in certain activities, regions or projects. The SIP model removed these restrictions given it has been decided not to impose these type of criteria for the SIP programme. The pro-rating of a portfolio investments to a £150m

⁹⁹ 2017 is the price base year. Limited funding is committed in 2023 (beyond lifetime of requested funding) and this is not expected to materially impact results.

portfolio of BEIS investments is considered to help address this issue, in that it allows a more diverse portfolio to be modelled (another departure from GIB).

- The GIB model only allows energy efficiency and low carbon electricity generation projects to be modelled (an energy from waste project is also modelled in the same way as these low carbon electricity generation projects). The SIP model also models of transport projects.

7. Consistent with other BEIS International Climate Finance (ICF) modelling, only the monetised benefits of investments are included in the modelling, and other benefits of technical assistance are excluded (but are included in the cost side of the equation). Other non-monetised costs and benefits are also excluded (for example, possible air quality improvements from transport projects).

Technical Assistance and administration costs (administration costs through IDB)

8. Consistent with the business case, SIP technical assistance and other administration costs are assumed to be £25 million in total. The profile for this spending is taken directly from IDB provided budget estimates for a £150 million SIP programme. This profile is provided below. This profile does not exactly correspond to the illustrative investment pipeline (for example, the number of investments made in each year), but the impact on the overall modelled results is expected to be marginal. Any changes in administration costs to be included in the draft Heads of Terms will be reflected in any revised modelling.

9. Other administration costs of £2.5 million for the research and evaluation activities are assumed to occur in 2018 (£250,000), 2019 (£25,0000), 2020 (£500,000) and 2022 (£1.5m).

Private and Public Finance

10. For the funding sources, there is a relatively even distribution of BEIS funding over the investment horizon. Proposed investment funding from BEIS is less front-loaded than funding from other sources. Funding from other sources (private sector equity, IDB/IIC debt, and other debt) is assumed to occur at the same rate (same profile) given data was not provided from the IDB on different profiles for non-BEIS funding. The capital costs of projects are generally funded over several years.

11. Benefits are attributed on the basis of the contribution that the UK Government makes to each project. Private finance leveraged is attributed to the UK Government on the same basis as the benefits. In the baseline scenario, it is assumed that 100% of projects benefits are attributable to the UK given all other project finance (public and private) is assumed to be leveraged by UK financing. This assumption is rated as moderate and is based on our best available information. The actual attribution assumption will be decided on a project by project basis after SIP is implemented. As noted in the Appraisal Case, a sensitivity where benefits are attributed between the IDB/IIC and UK is also considered.

12. Assumptions on operating start dates are taken from the IDB. In general, for large scale renewable generation projects (solar, wind and waste), projects are assumed to start the year after the final year of capital funding. For all other projects, which are generally for capital funding for several small projects, operating start dates are given by the investment profile (lagged by half of year, so that 50% of project capacity is available from funding in a particular year, and 50% is allocated to the next year).

Renewable Energy

13. The model includes a range of possible renewable energy investments, these include Wind, Solar (large and small-scale, and energy from waste). Data on cost per megawatt installed¹⁰⁰, net capacity factors (net of down time for operating and maintenance) is from the IDB. The plant size is also provided by the IDB, and is a function of the capital costs per MW for the desired project size (in \$USD). The IDB data on capital costs and capacity factors is generally based on recent similar transactions or proposed transactions in the IDB/IIC portfolio. We have not been able to review this data due to confidentiality issues with IDB transactions. Given this, we rate this evidence as moderate. However actual costs and capacity factors will vary by country, and by situation.

¹⁰⁰ IDB cost data is generally based on actual projects, and includes upfront financing costs, and contingency costs.

14. In order to test the robustness of the results we also used alternative data from the World Economic Outlook modelling assumptions from the IEA (2016). The WEO is widely used and quoted data. In the sensitivity, the cost of renewable energy investments are modelled using the cost per megawatt by the total number of megawatts installed plus legal, financing and other fees of 9%¹⁰¹.

15. Plant lifetimes are from the 2017 BEIS Generation Costs Report¹⁰², downtime and transmission losses are estimated from previous ICF projects and experience¹⁰³. Transmission losses are estimated from previous ICF projects and experience¹⁰⁴. We score this evidence as moderate to strong¹⁰⁵.

16. The output of the investments is modelled by calculating the MWh produced at maximum output adjusted for capacity factor and then adjusted down for transmission losses and year-on-year degradation.

Jobs

17. The data used to calculate the number of jobs created or supported on the project is taken from an Institute for Sustainable Futures study.¹⁰⁶ This data provides the approximate jobs required in the construction and O&M of the energy resource by MW installed, and is based on a range of sources. This data is only for direct jobs, and does not suggest whether these jobs are additional or temporary. No job estimates are provided for energy efficiency or other types of projects (e.g. transport). Therefore the evidence rating for this data is weak to moderate; the best available information but has known deficiencies. Due to a lack of data no valuation is attributed to jobs and therefore does not affect the BCR of the project.

Failure Rate

18. The headline results assume a 10% total loss of projects during the construction phase (a sensitivity tests a 15% failure rate). This is considered to be conservative as the concept of failure changes from one of total loss to an outcome which is different to expectation once projects reach financial closure after the development stage and start construction. This could be a higher construction cost, or a longer construction period. This failure rate was determined by expert opinion and actual project experience of the CIFs and other private sector RE investments. However, we do not know exactly what the failure rate will be, as such we rate this as moderate.

Benefit Valuation

19. The model accounts for a number of the benefits from the projects funded by the SIP programme; social benefit of carbon saved from producing the energy in a carbon intensive manner, welfare benefit of the previously unmet demand, the welfare benefit of future unmet demand and the benefit of saving the carbon based resources.

20. The amount of carbon abated or reduced by the intervention is valued using the BEIS/DECC ICF carbon prices. Central prices are used for the portfolio modelling here and sensitivity analysis¹⁰⁷. The amount of carbon saved is based on the operating and build margin carbon factors as defined by BEIS/DFID guidance. The counterfactual assumes that 0% of the renewable power generated helps meet current or future unmet demand given that Latin America is already well-served by electricity (a sensitivity tests the robustness of the results to the standard ICF assumption of 25%).¹⁰⁸

¹⁰¹ Is standard assumption in similar ICF projects that invest directly into projects.

¹⁰² <https://www.gov.uk/government/publications/beis-electricity-generation-costs-november-2016>

¹⁰³ See GAP company financial modelling.

¹⁰⁴ See GAP company financial modelling.

¹⁰⁵ See modelling for full references on assumptions and input variables.

¹⁰⁶ <https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf>

¹⁰⁷ Carbon prices used for sensitivity analysis are low, central and high BEIS/DECC ICF prices and the central DECC traded carbon price.

¹⁰⁸ This would carry significant welfare benefits in terms of access to energy, however it would not have an associated carbon saving. The welfare benefits are valued at the projected future energy prices supplied by Enerdata, weighted by relative consumption for the relevant region or country

21. It is assumed that the remaining energy generated (100% in the baseline) displaces future and current generating capacity equally. This carries a carbon and resource benefit. The resource benefit is valued at 80% in line with BEIS/DfID guidance of the weighted energy price.

22. Benefits valuation uses a range of data and overall the evidence used to calculate the monetary value of benefits is rated as moderate. The price projections are used widely in BEIS analysis and modelled on the international energy system. We consider this moderate to strong. The grid emission factors are internationally recognised and therefore thought to be strong. However, resource valuation is an estimate only, as are the estimates associated with the displacement of current and future energy production.

Discount rates

23. In line with appraisal guidelines a 3.5% discount rate is applied to global public goods; in this case the carbon benefits accruing from the project. All other costs and benefits are discounted at a developing country discount rate of 10%, this is because we do not know exactly where the fund will invest and therefore cannot use country specific discount factors.

Additionality

24. A key assumption is the impact of the level of additionality, this is the amount of activity that would have happened without the UK finance. The IDB mandate for SIP is to only invest in projects which are additional, in other words those project that would not have happened without SIP money. It is however unlikely that all projects will fall into the category and therefore a conservative assumption of 50% of investments are non-additional is assumed, this is consistent with the assumptions for CTF. There is no way of directly verifying this ex-ante as such the evidence on the additionality is considered moderate-weak, however it is similar to the assumptions used in similar private sector based ICF projects and agreements with delivery partners. Sensitivity analysis is also undertaken on this assumption.

Sensitivity analysis

25. We tested the results against a range of sensitivities, as shown in the table below and further discussed below.

Table 6: Sensitivity results

Sensitivity	Benefit Cost Ratio (UK attributed)	Investment Cost per tonne (£/tCO ₂) (UK attributed)
Base case	20.0	6.0
Additionality (75%): baseline is 50%	30.0	4.0
Leveraged funds reduced by 50% versus baseline (1)	9.9	12.0
Attribution shared with IIC (2) (baseline is 100% UK attribution)	4.8	24.6
WEO Capex and Load factor assumptions for electricity generation projects: baseline uses IDB assumptions	18.2	6.6
Failure rate of 15%: baseline is 10%	18.9	6.3
Unmet demand assumption of 25%: baseline is 0%	18.3	7.7
Low carbon values	15.0	6.0
High carbon values	25.0	6.0
Removing high value projects from portfolio		
Remove 5 highest BEIS BCR projects	15.4	7.3
Remove 5 cheapest investment cost (£/tCO ₂) projects	15.7	7.7
Remove 5 highest overall leverage projects	15.7	7.3
Remove 5 highest BEIS Investments projects	26.2	4.9

- (1) Assumes that 50% of non-equity funding in the base case from non-BEIS or non IDB sources is unavailable. 75% of this shortfall is then met by the IDB and 25% met by BEIS
- (2) Results are attributed to the IIC and BEIS in proportion to their contribution to the programme

26. **Additionality** compared to the BAU is assumed to be 50%. This is the standard ICF assumption, however other business cases have sometimes assumed up to 75%. In this case, given the IDB approval processes are meant to ensure that all projects approved for concessional financing are ‘additional’, an assumption of up to 100% could potentially be applied. We tested the results against a 75% additionality assumption given the 50% could be considered conservative. The break-even level of additionality at which the UK attributed BCR is 1.0 is 3%, all showing that the results are very robust to differences in this assumption.

27. **The UK attributed costs per tonne** of the modelled portfolio is £6.0/tCO₂ for the UK investment (and £85.8 if all funding sources are taken into account). The modelled additionality range above provides a range of £4.0-£6.0/tCO₂ (or £57-£86/tCO₂ if all funding sources are taken into account). This is below the currently approved BEIS ICF portfolio expected attributed cost per tonne range of £6-£37¹⁰⁹ (spend weighted average attributed cost per tonne of £8.7^[1]) and thus suggests that the SIP provides very good value for money in the context of the wider ICF portfolio. Equally the attributed cost per MW installed is approximately £90,300, this is well within the expected range of unit costs and suggests on these measures the pilot represents good value for money. However, given the transformational objectives that the SIP will be working towards, the actual portfolio could well report a higher cost per tonne if more innovative and novel projects are included in the investment portfolio.

28. We also attempted to carry out sensitivity analysis on the **leverage assumption**. In this regard, there is the possibility that other non IDB and BEIS funding sources may not arise, with the gap needing to be filled through other sources (if possible). To test this, we assumed that 50% of non-equity funding from non-BEIS or non IDB sources was unavailable. 75% of this shortfall is then met by the IDB and 25% met by BEIS. The results are shown in the table below, which show that this assumption significantly reduces the BCR, increases the costs per tonne, and reduces private and public leverage. However, the results are still within the overall BEIS portfolio ranges for BCR, costs per tonne, and private and public sector leverage ratios. The overall leverage result of 1:6 is also below the IIC leverage ratio for its portfolio, i.e. it may represent a ‘worst case scenario’ given the objectives of SIP. It should be noted that the actual impact of a higher leverage assumption would be that the fixed BEIS funding of £150 million would most likely support fewer projects.

Table 7: Leverage sensitivity*

	Base case	Leverage sensitivity
BCR (UK attributed)	20.0	9.9
Costs per tonne CO ₂ (UK attributed)	6.0	12.0
Public leverage	3.8	3.4
Private leverage	9.6	2.8
Overall leverage	13.4	6.2
NPV	£2.8	£1.3b

¹⁰⁹ To note: ICF project VfM indicators and expected results need to be considered in the context of each project and may have differing key objectives and non-monetised benefits. Therefore, they cannot be directly compared, figures included here to illustrate ICF portfolio context.

*Debt raised from other sources (not IIC/IDB or BEIS) is reduced by 50%, and IIC and BEIS fill this gap in a 3:1 ratio.¹¹⁰

29. Another key uncertainty is the **attribution assumption**. As discussed above, the portfolio assumes that 100% of results are attributed to the UK. It is possible that it may be appropriate to attribute results to either the IIC or other donors in some circumstances. In order to test this assumption, we checked what would happen if results were attributed to the IIC and BEIS in proportion to their contribution to the programme. This can be considered somewhat unrealistic given the IIC only deploys its own funding on non-concessional terms, and so it is valid to attribute all project benefits to funding provided by concessional partners (e.g. BEIS). However, it is arguably a valid assumption to test given the UK is only providing around 6% of overall programme funding (and the IIC 24%) and in reality it is possible that the IDB may also approach other donors for concessional funding on projects. In these circumstances, the UK provides 25% of total combined IDB/IIC and BEIS investments, TA and administration funding, and benefits are reduced by this proportion. This reduces the BCR from 20.0 to 4.8, and increases the cost per tonne from £6.0/tCO₂ to £24.6/tCO₂). These results are within the range of the overall IFC portfolio.

30. The modelling also assumes a **10% failure rate assumption**, which effectively means that benefits of project investments do not accrue 10% of the time. This assumption is consistent with previous ICF business cases, however, given this project expects to use innovative financial instruments this assumption is subject to some uncertainty. The impact of a 5 percentage point higher failure rate is would reduce the BCR from 20.0 to 18.9, with a break-even level of 95%. It is acknowledged that this is relatively high, and partly reflects the high BCR resulting from the modelling.

31. Another assumption worth briefly exploring is the **unmet demand** assumption given the modelled portfolio assumes that the additional generation only serves existing electricity users (i.e. it displaces existing generation assets only given over 95% of LAC is already served by electricity). If the more common ICF assumption of 25% is applied (rather than 0%), meaning that 25% of the benefits of electricity generation projects serve previously unserved population, the BCR only decreases from 20.0 to 18.3 (showing that results are less sensitive to this assumption).

32. Carbon benefits account for around 45% of monetised project benefits and have a significant impact on the NPV. The Central BEIS/DFID ICF carbon prices are used in the main scenario here. When the lower carbon values are used a BCR of 15.0 is returned, and when the high carbon values are used a BCR of 25.0 is returned.

33. We also tested the portfolio against **removing the most high value projects** in terms of their UK attributed cost per tonne, BCR, BEIS investment amount and overall leverage. The above table shows that the modelled results are robust to these changes. Alternatively, we also added two 'high value' energy efficiency projects that were excluded from the modelled portfolio given they had a large impact on the overall modelled results. The addition of these projects shows that there the modelled portfolio also has some potential upsides from, for example, high value demand side projects.

¹¹⁰ This sensitivity is only illustrative. In reality the IDB may use 'rule of thumb' that may not allow it to increase funding for particular projects beyond a certain percentage funding contribution.

Annex G: DFI Guidance for use of concessional finance



Annex 4 - DFI
Guidance for Using Inv

Annex H: Additional information on the ICF Climate Partnerships

1. In parallel to the Sustainable Infrastructure Programme and the Transformational Technical Assistance programme, the team is developing a new approach to working closer with key countries on lowering carbon emissions. This will be a strategic, country-focused approach to providing capacity and finance. Working closely and at ministerial levels with a small number of developing country governments with high climate ambition, we aim to achieve greater and more targeted transformational climate impacts through our ICF programmes, and increase the secondary benefits for the UK.
2. These partnerships will bring together existing and new 'flagship' climate finance programmes (including Prosperity Fund, where relevant) in a few key countries to support implementation of their Nationally Determined Contributions (NDCs) towards the Paris Agreement. They will build on and amplify existing climate diplomacy efforts to create stronger country coherence, and a clearer narrative under the banner of a joint political agreement.
3. Minister Claire Perry has asked that **Colombia** and **Mexico** be piloted for this approach due to the existing positive relationships, strong engagement in climate action and working collaboratively, and the potential for transformational impact.
4. Both countries are already very engaged in international climate action, and we benefit from existing good relationships and successful programmes already in delivery in order to amplify impact. We therefore consider that these favourable conditions provide the best opportunity for a partnership approach. Rolling out the Sustainable Infrastructure Programme and Transformational Technical Assistance programmes in 2018 will build momentum and lay the foundations for a deeper relationship between the UK and these countries in the years leading up to 2020 and beyond.
5. We have worked closely with our FCO colleagues at Post in both countries to scope appetite and feasibility for interventions, and have received positive encouragement and guidance on the demand in-country for working in potential key sectors.

