

# Mainstreaming Low-Carbon Climate-Resilient growth pathways into Development Finance Institutions' activities

*A research project on the standards, tools and metrics to support transition to the low-carbon climate-resilient development models<sup>1</sup>*



October  
2015

## Paper 1

# Climate and development finance institutions: linking climate finance, development finance and the transition to low-carbon, climate-resilient economic models

Claire Eschalier,<sup>2</sup> Ian Cochran,<sup>3</sup> Mariana Deheza<sup>4</sup>

## Abstract

Development finance institutions (DFIs) are in a position to be key actors in aligning development and the 2° challenge. One of the principal challenges today is to scale-up the financial flows to the trillions of dollars per year necessary to achieve the 2°C long-term objectives. Achieving this transition to a low-carbon, climate resilient (LCCR) economic model requires the integration or 'mainstreaming' of climate issues as a prism through which all investment decisions should be made. This paper presents an overview of the opportunities and challenges of linking a LCCR transition with the objectives of development finance. It first presents the two-fold challenge of climate change and development for countries around the world. Second, the paper explores the role of development finance institutions and their support for the transition to a low-carbon, climate-resilient economic model. Finally, it examines a necessary paradigm shift to integrate climate and development objectives to establish a 'LCCR development model' able to simultaneously tackling development priorities and needs for resilient, low-carbon growth. This will necessitate a move from focusing on a 'siloes' vision of climate finance to a means of aligning activities across the economy with the LCCR objectives to ensure that the majority of investments are coherent with this long-term transition.

---

<sup>1</sup> The research project under which this report was elaborated received financial support from Caisse des Dépôts and Agence Française de Développement.

<sup>2</sup> Claire Eschalier was a Research Fellow at I4CE during the elaboration of this report

<sup>3</sup> Ian Cochran is Program Director on Finance, Investment, Climate at I4CE – [ian.cochran@i4ce.org](mailto:ian.cochran@i4ce.org)

<sup>4</sup> Mariana Deheza is Project Manager on Climate and Development at I4CE – [mariana.deheza@i4ce.org](mailto:mariana.deheza@i4ce.org)

## Authors

This study was completed by Claire Eschalier, Ian Cochran and Mariana Deheza.

Corresponding author: Ian Cochran – [ian.cochran@i4ce.org](mailto:ian.cochran@i4ce.org)

## Acknowledgements

The authors would like to thank Ophelie Risler and Pierre Forestier (AFD) who gave significant input during steering committees of this research program and reviewed draft versions of this document.

## Disclaimer

I4CE – Institute for Climate Economics is an initiative of Caisse des Dépôts (CDC) and Agence Française de Développement (AFD). This think tank provides independent expertise and analysis when assessing economic issues relating to climate & energy policies in France and throughout the world. I4CE aims at helping public and private decision-makers to improve the way in which they understand, anticipate, and encourage the use of economic and financial resources aimed at promoting the transition to a low-carbon economy

The research project under which this report was elaborated received financial support from CDC and the AFD. The research presented in this publication was carried out by the I4CE on an independent basis. CDC group and AFD are not liable under any circumstances for the content of this publication.

# Table of contents

<b>EXECUTIVE SUMMARY</b>	<b>4</b>
<b>1 DEVELOPMENT AND CLIMATE: A TRANSITION TO A LOW-CARBON, CLIMATE-RESILIENT OF DEVELOPMENT MODEL?</b>	<b>9</b>
<b>2 THE CLIMATE AND DEVELOPMENT CHALLENGE: LINKED AGENDAS AND OBJECTIVES</b>	<b>10</b>
2.1 The climate and development challenge	10
2.2 Tackling climate change and economic development: a twofold challenge for Developing countries	12
2.3 Financing development: increased linking of climate and development finance in international discussions	15
2.3.1 The sustainable development finance challenge	15
2.3.2 The 100 billion USD commitment and the increasing importance of “climate finance flows” in international development aid discussions	16
2.3.3 The scale of effort needed to achieve the 2°C objective	17
<b>3 ROLE FOR DFIs IN FOSTERING CLIMATE AND LCCR-COHERENT DEVELOPMENT</b>	<b>19</b>
3.1 Support the energy transition of developing countries to reduce greenhouse gas emissions and mitigate future climate change	19
3.2 Mainstreaming adaptation	21
3.3 Financial risk and appropriately valuing investments	21
3.4 Important progress made on “climate finance” but sufficient for the 2° objective?	22
<b>4 A PARADIGM SHIFT FROM ‘CLIMATE FINANCE’ TO MAINSTREAMING THE LCCR TRANSITION?</b>	<b>23</b>
4.1 Rethinking development as a systemic shift towards a low-carbon, climate-resilient economic model	23
4.2 Aligning short-term development aid and the long-term LCCR transition objectives: a need for country-level roadmaps?	25
4.3 Potential barriers to the implementation of an LCCR strategy by DFIs - mandates, accountability and recipient-country engagement	26
4.4 The importance of coordination between DFIs	27
<b>5 NEXT STEPS: IMPLEMENTING THE LCCR TRANSITION</b>	<b>28</b>
<b>6 BIBLIOGRAPHY</b>	<b>29</b>

## **Executive Summary**

### **The climate and development challenge**

Developing countries are today characterized by a high demand for infrastructure, economic development to meet the needs of fast-growing populations. As these needs are progressively met, the demand for energy in developing countries will swell. If historical trends are followed, this increase in demand will result in a rapid increase in GHG emissions. At the same time it is increasingly accepted that exceeding certain concentrations of greenhouse gas emission levels in the atmosphere will provoke severe systemic changes which would not only threaten the world's environmental system, but also jeopardize social and economic development.

This paper presents an overview of the necessity, the opportunities and the challenges of linking a low-carbon, climate-resilient economic model (LCCR) transition with the objectives of development finance. It first presents the two-fold challenge of reconciling climate change and development for countries around the world. Second, the paper explores the role of development finance institutions (DFIs)<sup>5</sup> and their support for the transition to a low-carbon, climate-resilient economic model. Finally, it examines a potentially essential paradigm shift to align climate and development objectives to establish a 'LCCR development model' able to simultaneously tackle development priorities and the need for resilient, low-carbon growth.

### **The two-fold challenge of reconciling development and climate objectives**

As the development community arrives at the end of the Millennium Development Goals process and the Sustainable Development Goals are adopted, there is a consensus that achieving these goals remains a significant challenge in terms of coordination and financing. Within this process, climate has often been seen as an additional issue requiring further, dedicated financing. However, given the transversal nature of climate change, there is a case to 'mainstream' climate and the broader challenge of achieving low-carbon, resilient economic and social growth across development objectives. Considering the scale of the challenge and the limited resources to finance both issues separately, the need to tackle multiple challenges simultaneously is becoming more acute. The integration of climate change considerations into development finance is therefore gaining momentum within the international community, and is reflected in the Post-2015 Development Agenda, which attaches great importance to environment and climate change-related objectives.

At the Rio+20 Summit in 2012, the international community recognized the necessity to account for different national circumstances, capacities and priorities in the sustainable development objectives<sup>6</sup>. Thus, the level of development of each country should be considered as an essential element of national sustainable development strategies. Furthermore, the principle of "common but differentiated responsibilities" implies that, given their historic responsibility for many environmental problems – including climate change - developed countries are expected to take the lead in addressing sustainable development challenges. Conversely, least developed countries are given priority for economic development and are generally bound by less stringent rules and obligations on climate change mitigation.

Nevertheless, the potential physical and resulting economic impacts stemming from climate change are in themselves a significant reason for developing countries to concentrate their efforts on low-carbon, climate-resilient development. Developing countries are often highly exposed due to their

---

<sup>5</sup> For the purpose of this study, DFIs include Multilateral Development Banks (MDBs), Multilateral Financial Institutions, Sub-Regional Banks and Aid Coordination Groups.

<sup>6</sup> United Nations Conference on Sustainable Development (2012): The Future we Want (II.56)

geographical location, often low levels of diversification of their economy and export structures, and have low resilience to natural disasters and impacts. These facts stress the importance for the international community to take consideration of the potential impact on climate change of economic growth in developing countries, as well as the impacts of economic development on the global climate.

### **Breaking down the walls between development and climate finance**

At the UNFCCC Conference of the Parties in Cancun in 2010, the international community recognized the importance to address the specific mitigation and adaptation needs of developing countries, and established a goal of jointly mobilizing a total USD 100 billion per year by 2020 towards developing countries.<sup>7</sup> These resources were expected to be additional to existing official overseas development aid flows. Today, the term 'climate finance' is often solely linked to this political commitment. This is a key piece of the international political negotiations as it focuses on providing financing and hence building trust between developed and developing countries. This trust is a necessary condition to reach any meaningful international agreement to tackle the climate challenge.

Given this importance, tracking the contribution of countries and institutions to the climate finance commitment has become a focus of many discussions. This, however, has at times taken precedent over finding means of increasing the impact of the flows themselves. While studies suggest that the current climate finance flows are progressing towards the order of magnitude needed to fulfil the 100 billion USD political objective, they are still far from the levels of investment necessary to finance the shift to a low-carbon, climate resilient growth model. Achieving the trillions of dollars per year of financing estimated necessary<sup>8</sup> will require that both development and climate agendas be linked. This objective will require not only increasing flows to low-carbon projects, but equally capping – and reducing – investments in carbon-intensive activities. Thus, the integration of climate change into investment decisions making as a separated, siloed consideration, flow or asset class will not be sufficient to reach the scale of investment needed.

Channeling development finance toward clean and sustainable activities as early as possible appears crucial to avoid lock-in of emission-intensive infrastructure and future refurbishment costs as well as the risk of non-resilient and “stranded” fossil fuel-dependent development models based on. While LCCR development in many instances may imply high up-front investment costs, aligning development and climate-related objectives can reduce future costs and lead to considerable co-benefits in terms of economic growth, employment, agricultural outputs, health care, local air pollution and energy security. The OECD estimates that in the case of delayed or moderate mitigation action up to 2020, the pace and scale of efforts needed after 2020 would be significantly higher and the related costs could surge by up to 50% by 2050 (OECD 2011).

Developing countries are thus at a cross-road: by adjusting to LCCR development models, they could gain significantly from adopting less fossil-fuel dependent development models with economic (fossil fuel imports, subsidies) and environmental (local air pollution) co-benefits. Furthermore, achieving the long-term 2°C climate objectives will require all countries to take action in the medium- to long-term – as seen in the submission of Intended Nationally Determined Contributions of over 120 countries. Moreover, all countries worldwide are in a position today to reduce the cost of future action by making choices that will enable mitigation of emissions both possible and less expensive. Finally, the economic burden of environmental hazards and other climate related changes is likely to get heavier over the years and delaying action is proven to be costly.

---

<sup>7</sup> United Nations (2010): Framework Convention on Climate Change - Conference of the Parties - Decision 1/CP.16, paragraph 98.

<sup>8</sup> The 2014 report for the Global Commission on the New Climate Economy suggests that between 2015 and 2030 approximately USD 92 trillion financing is necessary to meet infrastructure and development needs without jeopardizing global emission reduction objectives (NCE 2014)

## **Role for DFIs in fostering climate and LCCR-coherent development**

Development Finance Institutions (DFIs) are important actors in channeling official development aid as well as providing capacity support to recipients on development issues. Over the last decade, a number of these institutions have developed methods and indicators to ensure that a part of their activity contributes to low-carbon objectives and track their increasing contribution to climate finance flows. They appear to be well positioned to foster the urgently needed change in development models that could pave the way for a pragmatic, yet effective, transition to a low-carbon, climate-resilient economy.

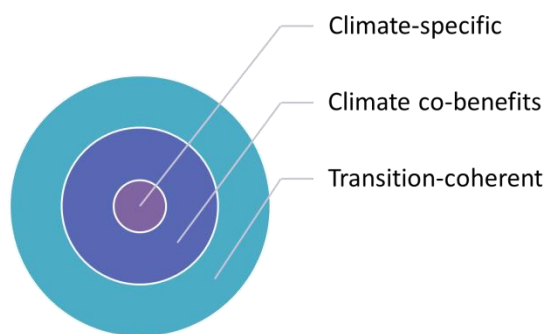
Different roles can be played by these institutions in fostering LCCR-coherent development:

- *Supporting the energy transition of developing countries:* DFIs have a role to play in facilitating the shift of public and private investments towards LCCR projects, programs and fostering evolutions in regulatory frameworks. They are in the front line for responding to market failures which limit positive investments and assisting in developing regulatory frameworks and new markets coherent with both long-term development and climate objectives. In practice, DFIs can contribute to the energy transition in developing countries by taking on three main responsibilities: i) facilitating access to capital, ii) assisting in developing national development strategies coherent with a low-carbon transition, and iii) working with national banking and financial industries.
- *Mainstreaming adaptation:* DFIs can help ensure that current and future climate risks are systematically taken into account for every investment decision, and that appropriate adaptation measures are undertaken. By making climate resilient investments, DFIs can meet the requirements made the Development Assistance Committee (DAC) in terms of evaluating development assistance, whereby the benefits of a development project are “likely to continue after donor funding has been withdrawn”; and “Projects need to be environmentally as well as financially sustainable” (OECD 2000). To date, efforts to mainstream climate resilience into development are mainly focusing on reducing the physical vulnerability of investments to climate change.
- *Integrating financial risk and appropriately valuing investments:* With potentially important internal benefits for themselves, DFIs can play a role in improving the integration of climate and carbon risks into investment decision making and selecting investments. “Climate risk” can be categorized through two main sources: i) physical risk and ii) correlation with other risks. “Carbon risk” specifically considers the impact of fight against climate change as it is channeled through policies and regulations. By integrating these risks, DFIs can reduce their own exposure, thus limiting the financial consequences of short-term policy changes or medium- to long-term stranded assets. They can also assist beneficiary countries and counterparties in understanding and integrating these risks into their economic and financial analysis.

## **A paradigm shift from ‘climate finance’ to mainstreaming the LCCR transition?**

Today’s challenge to scale-up the financial flows to the trillions of dollars per year necessary to achieve the 2°C long-term objectives will necessitate a move from focusing on a ‘siloeed’ vision of climate finance to a means of aligning activities across the economy with the LCCR transition. For financial institutions, mainstreaming these issues will be an important issue to not only to increase the flows going to climate-specific investments, but also to ensure that the majority of investments are coherent with this long-term transition. This paradigm change would require changes in how financing is assessed. Methods used by DFIs may not currently go far enough in contextualizing the contribution of individual investments and the transition to a LCCR economic model for the recipient country, and more broadly, globally.

**Figure 1: The multiple layers of finances to support a low-carbon, resilient economic model**



*Source: Authors*

First, a transition to a low-carbon, resilient economic model will require investments in areas today that are may not be specifically classified as ‘climate finance.’ For a number of institutions, climate finance focuses on the identification and prioritization of investment in projects that are ‘climate specific’ – or those where GHG mitigation or adaptation are the principal objective. However, while these projects are important, they may represent only a small portion of the required investments.

Second, a focus on the ‘climate co-benefits’ or the climate impact of projects may be more appropriate to understand the links between projects selected for development reasons that can equally be optimized to contribute to LCCR development. Thus, moving towards a climate-related assessment of all projects and financial interventions is key. This assessment of the climate co-benefits fosters on understanding of how individual development projects can be improved or ‘optimized’ to maximize development potential and minimize negative climate impacts.

Third, some investments may be coherent with the transition to a low-carbon development model, but may not lead directly to climate co-benefits by the methods as currently defined. Their relevancy for the transition lies in their support for a new economic model– such as stepping stones in the short- or medium-term between technologies. This emerging concept of ‘transition-coherent’ is, nevertheless, highly contextual as it is dependent on the given pathway that a country has chosen to decarbonize its economy and the potential of a DFI to contribute to this transformative change.

Finally, the time horizon within which the sufficiency and ambition of climate finance is understood becomes crucial when the concept of a transition is introduced. Some interventions may reduce emissions marginally – or slightly improve resiliency – without contributing to placing the broader economy on a LCCR-aligned trajectory. Research has pointed to the problems of focusing on the most inexpensive abatement options to reach short-term targets that can create a carbon-intensive lock-in and make the 2050 target more expensive to reach.<sup>9</sup>

### **Potential barriers to the implementation of an LCCR strategy by DFIs - mandates, accountability and recipient-country engagement**

DFIs are confronted with mandates and objectives that span multiple time horizons. They are subject to short-term performance objectives (signatures, disbursement, financial performance) as well as medium-to long-term development objectives. DFIs must juggle multiple considerations across sectors, disciplines and time-horizons in their decision-making processes. These objectives are further nuanced given explicit and implicit objectives from mandating institution and the local policies and priorities in recipient countries.

---

<sup>9</sup> Vogt-Schilb and Hallegatte 2014

*Climate and development finance institutions: linking climate finance, development finance and the transition to low-carbon, climate-resilient economic models*

The activities of DFIs are generally tied to the resources and mandates passed on by national governments and stakeholders; thus they are dependent on the policy orientations to structure their activities. The use of the financial resources with which they have been charged is increasing tracked and reported upon and DFIs face a wide range of voluntary, recommended and obligatory reporting. These requirements can be related to impact measurements or financial commitments and are associated with a range of reporting tools and methodologies. Ensuring that this reporting incentivizes investments in transition-coherent areas is essential.

Given the specificities of both beneficiary and donor countries in terms of national priorities, level of development and available resources, it is essential that the international action be well coordinated for climate to be recognized as a cross-cutting issue. The impact of DFIs strongly relies on the political engagement in its regions of intervention. The success of climate development is also dependent on the engagement of the recipient government to embrace low-carbon, resilient economic model as a policy priority. Success is dependent on both the recipient and the donor governments rallying around development priorities which frame long-term development objectives through the prism of the climate change challenge.

Accordingly, achieving a LCCR transition cannot be achieved by a single financial institution acting individually. Concerted and coordinated action between DFIs at the local level can allow for low-carbon development projects to be scaled-up and to have a larger impact. Increasing harmonization between the requirements and methodologies applied by DFIs is critical to reduce counterproductive competition and overlapping at local level. Given the importance of contextualization to understand what investments are transition-coherent, the development of country-level scenarios or roadmaps to identify the priority sectors and technologies in line with a domestically-established and supported vision of a decarbonized pathway appear necessary. This would be a dynamic process which considers behavioral, economic and technological progression as a catalyst for low-carbon, resilient investments.

A strong case exists for the alignment of development priorities and climate change objectives. Success appears based on broader domestic policy and economic regulations, incentives and policies to integrate the negative externalities of a fossil-fuel based economy and support development in line with the 2°C goal. Furthermore, ensuring the interventions of DFIs to support these local transformations in coordination with beneficiary governments is essential. The steps taken to date by DFIs to do this are explored in Paper 2 of this series and the case of *Agence Française de Développement* is explored in paper 3.



## **1 Development and climate: a transition to a low-carbon, climate-resilient of development model?**

2015 is a pivotal year as the international community negotiates the international agreements that will follow both the United Nations Millennium Declaration and the Kyoto Protocol. The right to development and the achievement of the recently adopted Sustainable Development Goals, as well as other development objectives, cannot be denied. Nevertheless, the world is confronted at the same time with the closing window of opportunity to be able to limit the global average temperature increase to below 2 °C above pre-industrial level until the end of this century.

Supporting the economic and social development of the poor and developing countries is inextricably linked with the fight against climate change. In fact, the prospects for successfully limiting the “dangerous anthropogenic interference with the climate system” (UN 1992) as laid out in the UN Framework Convention on Climate Change cannot be dissociated from the efforts to create “an environment which is conducive to development and to the elimination of poverty” (UN 2000) emphasized by the UN Millennium Declaration. The international community has therefore recognised the need to address both challenges simultaneously (OECD 2005), thus laying the foundation for a new development model, based on innovative solutions tackling both climate change and development issues.

Recent estimations of the level of financing needed at the global level to successfully manage the transition to a 2°C future differ by their orders of magnitude. Currently, the pledge made by developed countries to mobilize \$ 100 billion financing annually by 2020 to support developing countries to cut their emissions serves as a reference for international discussions. However, estimates suggest that the order of magnitude of investment needs may be in the trillions rather than billions. Achieving this transition to a low-carbon, climate resilient (LCCR) future will thus require the integration or “mainstreaming” of these issues as a prism through which all investment decisions should be made. This poses a broad number of operational challenges.

Development finance institutions (DFIs) are in a position to be key actors in aligning development and the 2° challenge. DFIs are important actors in channelling official development aid as well as providing capacity support to recipients on a number of development issues. Over the last decade, a number of these institutions have developed methods and indicators to ensure that a part of their activity contributes to low-carbon objectives and to track their increasing contribution to climate finance flows. They are the cornerstone of the urgently needed “climate coherent” development model that should pave the way for a pragmatic yet effective transition to a low-carbon, climate-resilient economy. Whether action is based on explicit official mandates or on a forward-looking risk-based assessment, public and private financial institutions have a role to play to channel short- and long-term financing to the investments that are coherent with these types of pathways.

Drawing on existing studies of current practice among mainly public development finance institutions,<sup>10</sup> this paper presents an overview of the necessity, of the opportunities and challenges of linking a LCCR transition with the objectives of development finance. It first presents the two-fold challenge of climate change and development for countries around the world. Second, the paper explores the role of development finance institutions and their support for the transition to a low-carbon, climate-resilient economic model. Finally, it examines a potentially necessary paradigm shift to integrate climate and

---

<sup>10</sup> This includes work by (Cochran et al. 2014; RICARDO-AEA 2013; Smallridge et al. 2012)

development objectives to establish a 'LCCR development model' able to simultaneously tackle development priorities and needs for resilient, low-carbon growth.<sup>11</sup>

## **2 The climate and development challenge: linked agendas and objectives**

### **2.1 The climate and development challenge**

Developing countries are today characterised by a high demand for infrastructure, economic development and fast-growing population. As development needs are progressively met, the demand for energy in developing countries will swell. This economic development is expected, if following historical trends, to result in a rapid increase in carbon emissions. In 2009, CO<sub>2</sub> emissions per inhabitant were smaller in developing countries than in advanced economies. However, the same year, total emissions had already caught-up and even surpassed those of OECD countries<sup>12</sup>. In the Environmental Outlook to 2050 (OECD 2011), the OECD projects that under a business as usual scenario, Greenhouse Gas (GHG) emissions would rise by 50% by 2050, mainly driven by a 70% increase in CO<sub>2</sub> emissions from energy use. By 2050, it is projected that the six countries constituting the BRIICS<sup>13</sup> will have increased their total CO<sub>2</sub> emissions by 44%, compared to a 23% rise for OECD countries and a 26% surge for the rest of the world (Figure 1).

The highest contributions to the increase in CO<sub>2</sub> emissions are expected to come from power generation and transport in developing countries. By 2050, the emissions per capita are expected to have risen by 93% in the BRIICS countries, compared to 14% in OECD countries and an average of 45% for the rest of the World (Figure 2).

It is increasingly accepted that exceeding certain concentrations of greenhouse gas emission levels in the atmosphere will provoke severe systemic changes which would not only threaten the world's environmental system, but also jeopardise social and economic development (World Bank 2015). Yet, the developing world faces the considerable challenge of funding the necessary infrastructures to meet the basic needs of its population. These facts stress the importance for the international community to take into consideration the potential impact of climate change on economic growth in developing countries, as well as the impacts of economic development on the global climate. Channelling development finance towards clean and sustainable activities as early as possible appears crucial to avoid a surge in the real cost of developing low carbon climate resilient systems through future retrofitting.

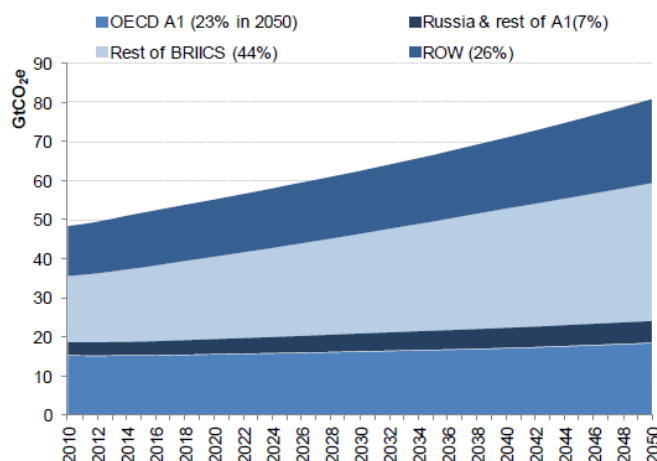
---

<sup>11</sup> The concept of LCCR or "climate-smart" development is described in further detail by the World Bank in "Climate-Smart development – Adding up the benefits of actions that help build prosperity, end poverty and combat climate change" (World Bank 2014).

<sup>12</sup> A distinction is made between OECD countries and Non-OECD countries. However, International conventions generally consider UNFCCC's definition of Annex 1 Parties as opposed to Non-Annex 1 Parties. Annex 1 Parties include the industrialized countries that officially committed to reductions in their GHG emissions in the Kyoto Protocol. Annex 1 Parties are comprised of the 24 original OECD members, the European Union, and 14 countries with economies in transition. Non-Annex 1 Parties refers to countries that have ratified the United Nations Framework Convention on Climate Change but are not included in Annex I of the Convention.

<sup>13</sup> Six of the largest non-OECD economies are included under the acronym "BRIICS", namely: Brazil, Russia, India, Indonesia, China and South Africa

**Figure 2: GHG emissions by region (in GtCO<sub>2</sub>e): Baseline scenario (2010-2050)**

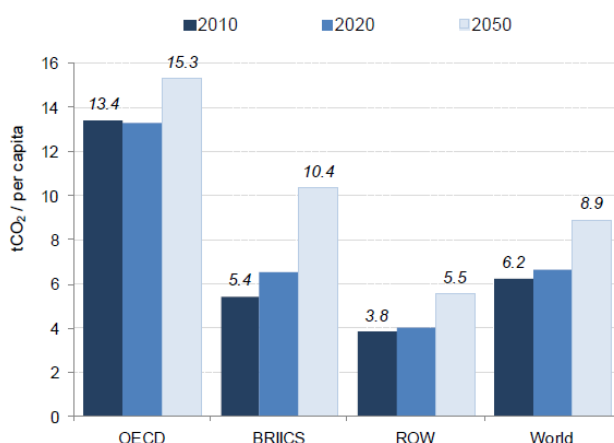


Note: GtCO<sub>2</sub>e = Giga tons of CO<sub>2</sub> equivalent - ROW = Rest of the World  
Source: (OECD 2011)

The uncertainties that surround the time and scale of “tipping points”<sup>14</sup>, imply that action must be taken as early and as broadly as possible to limit the risk of large-scale, irreversible changes affecting the global economy beyond its adaptive capacity. The policy decisions that are made today in both the developed and developing world are therefore decisive to ensure that the risk related to climate-change remains manageable in the coming years.

The massive needs in terms of building, replacing and renovating infrastructure offer the opportunity to place development on the 2°C pathway by shifting capital investments to low-carbon climate resilient projects (IEA 2014; Kennedy and Corfee-Morlot 2012; NCE 2014; OECD and Cochran et al 2014; WEF 2013). Investment decisions made today and aligned with long-term low-carbon “transition” objectives can avoid the locking-in of emission-intensive infrastructures and development models and hold the potential to reduce the cost of achieving long-term objectives while simultaneously limiting shocks to the economy (Kennedy and Corfee-Morlot 2012; NCE 2014; Vogt-Schilb and Hallegatte 2014).

**Figure 3: GHG emissions per capita: Baseline, 2010-2050**



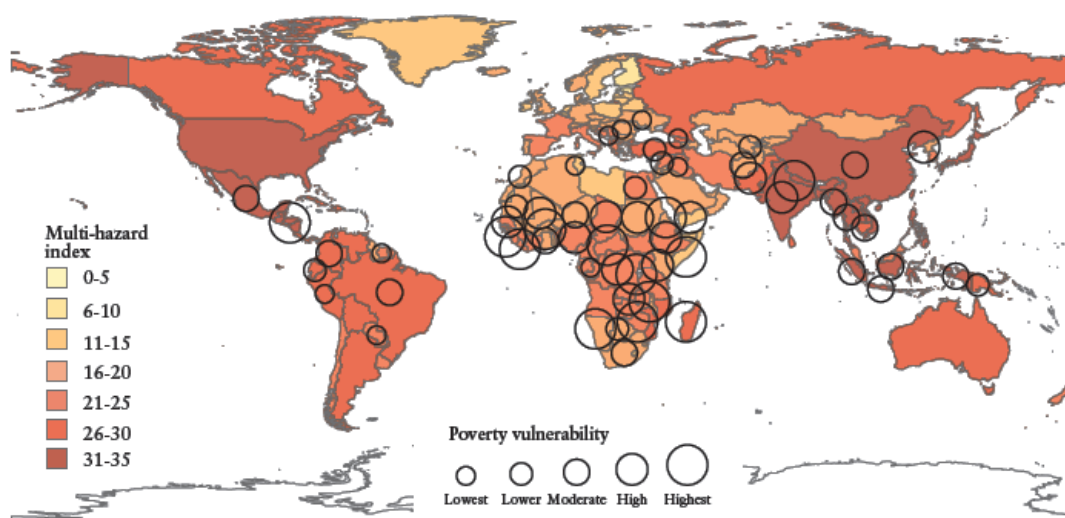
Source: OECD Environmental Outlook

<sup>14</sup> “Tipping points” can be defined as “irreversible changes in the climate system caused by increasing carbon dioxide and temperature”. For further detail, please refer to (Lemoine and Traeger 2011)

## 2.2 Tackling climate change and economic development: a twofold challenge for Developing countries

The potential physical impacts stemming from climate change are in themselves a significant reason for developing countries to concentrate their efforts on “low-carbon, climate-resilient” development. Firstly, because many developing countries still suffer from a low level of diversification of their economy and export structure, they are more dependent on natural resources to maintain economic growth than are developed economies (Gelb 2010). Agriculture represents a larger part of their economy and the level of technologies introduced so far does not prevent the sector from being highly vulnerable to climate change and environmental disasters. Secondly, in general, developing countries are located in areas that are more likely to suffer the impacts of climate hazards and disasters, both in terms of intensity and frequency. This is aggravated by their low-level resilience to natural disasters and impacts, which is due to inexistent or poorly developed protective infrastructure, and fragile political and institutional systems. The population and assets that will be primarily affected by low-resilience are those with the highest vulnerability that generally come from the poorest, most marginalised areas. As seen in Figure 3, the Overseas Development Institute (ODI) estimated that in 2030, up to 325 million extremely poor people will be living in the 49 most hazard-prone countries, mainly in South Asia and sub-Saharan Africa (Shepard et al. 2013).

**Figure 4: Hazards and vulnerability to poverty in 2030 – overlaying the multi-hazard index and the poverty-vulnerability index**



Source: Shepard et al. 2013

Reducing greenhouse gas emissions is key to mitigating and reducing changes in the global climate – and thus is - and will remain - a priority. However, even a 2° Celsius increase in global average temperature will have potentially significant consequences. Thus adaptation to climate change through risk preparedness will be a key issue for developing countries. The World Development Report for 2014 was drawn-up based on these strong observations (World Bank 2013). Proactive, systematic, and integrated risk management is shown to be the cornerstone of future development. Poorly planned development, poverty, environmental degradation and climate change have been identified as having a catalyst effect on the exposure of vulnerable populations. Although the upfront investment needs are accepted as being substantial, the cost-benefit analysis performed by the World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) shows that that building climate-resilient infrastructures is an effective solution if no-regret strategies are optimized (see Box 1). Risk management requires shared action and responsibility both at the local and international level. Providing an enabling environment and channelling direct support to vulnerable areas will be an

essential part of the future climate-smart development model and should help avoid locking-in development on the wrong path.

If no significant action is taken soon, the costs of adaptation will be a burden for the global economy. Up until now, adaptation costs had been estimated at between USD70 billion and USD100 billion. These calculations have been revised in a recent report prepared by UNEP to estimate the financial, technological and knowledge gap between adaptation needs and reality. The analysis found that adaptation costs had been underestimated particularly for post-2030. In reality the 2050, costs of adaptation might be up to five times higher than current estimates (Pachauri 2008).

The financial incentive to take action now is found in the incremental benefits of a more climate-resilient economy. Considerable co-benefits<sup>15</sup> are also estimated to be induced by the implementation of a LCCR development model. Based on case studies undertaken for six different regions, the World Bank has stressed the positive impacts of reducing emissions in terms of economic growth, employment, agriculture, health care and energy costs. The report concludes that by focusing on both short-lived climate pollutants and CO<sub>2</sub> emission reductions, the benefits of development projects can be enhanced in the short-run and in the long-run. In addition to these conclusions, a comprehensive framework has been established by the World Bank to measure and value the co-benefits of climate-smart development actions and demonstrate the win-win outcomes of dealing with climate and development at the same time (World Bank 2014). More generally, the co-benefits carried by mitigation actions might include more efficient and lower use of fossil fuels (and thus subsidies and costs related to imports), higher energy security, lower local air pollution which would induce substantial health benefits and employment and economic opportunities induced by the greater use of renewable energy resources and the deployment of technologies (Pachauri 2008).

At the national level, the cost of climate policies to limit greenhouse gas concentration could be compensated by a lower need for adaptation. An energy-mix that relies more on renewable energies would for instance reduce the costs of imports for fossil fuel dependant economies. At the project level, integrating climate change considerations into decision making can be justified from an economic point of view, where climate resilience is valued and included in the economic and financial appraisal of a project and compared to the cost of “building back better” after disasters (See Box 1).

Given their vulnerability to climate-change impacts, the sometimes heavy dependency of their economic system on the price of natural resources and the potential climate co-benefits that have been identified, it is in the short-, medium- and long-term best interest of developing countries to adopt climate-smart development practices. Furthermore, by aligning development with climate change objectives, developing countries and donors can ensure that these countries begin the “low-carbon, climate-resilient” transition as early as possible to avoid costly lock-in and enact the systemic changes necessary to contribute to long-term climate objectives.

The OECD has demonstrated the consequences of investment choices with regards to the future lock-in of greenhouse gas emission pathways and the vulnerability or climate-resilience of the global economy (Cochran et al. 2014; Kennedy and Corfee-Morlot 2012; Corfee-Morlot, Marchal, and Dahou 2012). Furthermore, in the Environmental Outlook to 2050, the OECD warns against the implementation of delayed or moderate mitigation action up to 2020. Under such circumstances, the pace and scale of efforts needed after 2020 would be significantly higher and the related costs could

---

<sup>15</sup> In this report, we use the term “co-benefits” as it is described by the World Bank (2014) in Climate-Smart Development – Adding up the benefits of actions that help build prosperity, end poverty and combat climate change: additional benefits, such as reduced outdoor pollution, that may be associated with a global climate policy. The benefits described here include climate and socioeconomic benefits associated with both CO<sub>2</sub> and SLCP reductions and may be considered as multiple or comprehensive benefits

surge by up to 50% by 2050 (OECD 2011). Furthermore, delaying emission reductions until 2030 could likely lead to the “stranding<sup>16</sup>” of hundreds of billions of dollars of assets (den Elzen et al. 2013).

**Box 1: The Cost of “Building Back Better”**

Among the costs that are linked with climate resilience are the upfront costs of “building back better”, i.e. building or retrofitting with safer standards. Safer structures require design changes that typically cost 10 to 50% more to build—and even more if transport or water networks need to be relocated during reconstruction.

The “cost of building better” is calculated by multiplying replacement costs by a “building back better factor” which includes: i) the costs of quality improvements, ii) the cost of technological modernisation, iii) the cost of reallocating to safer areas (if needed), iv) the cost of disaster risk reduction standards and v) multiannual Inflation.

Source: (World Bank and GFDRR 2013)

**Figure 1: Estimated cost of building better**

Sector	Building Back Better Factor
Housing	1.10-1.35
Schools	1.10-1.50
Hospitals	1.10-1.50
Agriculture/Livestock and Fisheries Infrastructure	1.10-1.40
Industrial Facilities	1.10-1.40
Commerce and Trade	1.10-1.35
Water and Sanitation	>1,00*
Transport	>1,00*
Electricity	>1,00*
Communication	>1,00*

\* Factors for infrastructure sectors vary highly depending on the choice of reconstruction.

Source: GFDRR, World Bank (2010,2013)

Such estimations depend on various factors and have to be calculated depending based on a specific project and location. The cost of “building back better” is to be considered as part of the cost-benefit analysis at project level.

Many developing countries are therefore acknowledging the need to act sooner rather than later and to take climate change into consideration in their national development policies. They have recognised the near-term positive impacts of implementing green-growth policies at the national level. The World Bank summarises these benefits into four main categories. Firstly, “LCCR” policies can help improve productivity through better preservation and management of the available natural, physical, and human capital available. Mitigation and adaptation measures can help reduce both potential capital losses due to natural disasters, and negative consequences on the health of vulnerable populations. Secondly, “climate-smart” policies can have positive impacts on efficiency by removing market distortions such as fossil fuel subsidies or by increasing the effectiveness of the “price” and valuing climate friendly behaviours. Thirdly, innovation can be fostered by climate-smart policies through

<sup>16</sup> Johnson & al (2014) propose the following definition for “Stranded capacity”: Stranded capacity designs the installed capacity that is not utilized when a plant is operating below the load factor for which it is designed. It generally occurs when the cost of electricity generation renders capacity uncompetitive in the electricity market. With climate policy, this can occur at fossil-based plants when payments for CO2 emissions increase operating costs. For further information see: Stranded on a low-carbon planet: Implications of climate policy for the phase-out of coal-based power plants

increased research and development spending and a general upgrade in environmental practices and technologies. Finally, climate-smart policies can have a positive impact on inequality and poverty alleviation, thus improving the general welfare of the local population (Fay 2012).

## **2.3 Financing development: increased linking of climate and development finance in international discussions**

In the light of the transversal benefits of linking climate to development and considering the limited resources faced by most advanced economies to finance both issues separately, the need to kill multiple birds (economic and social welfare, environmental protection) with one stone (climate-smart development/sustainable development finance) is becoming more acute. The integration of climate change into development finance is therefore gaining momentum within the international community. This is reflected in the Post-2015 Development Agenda recently adopted in New York last month<sup>17</sup>, which attaches great importance to environment and climate change-related objectives. A coherent yet differentiated strategy must therefore be established to foster low-carbon and resilient growth at the global level.

### **2.3.1 The sustainable development finance challenge**

The international community is making substantial efforts to meet the objectives to devote 0.7% of Gross National Income (GNI) to Official Development Assistance (ODA). The cost of eradicating poverty, or in other words of providing every person in the world with a minimum income of USD 1.25 per day<sup>18</sup>, has been estimated at around USD 66 billion per year. Furthermore, the concept of sustainable development was defined as being “predicated on goals and targets that integrate economic, social and environmental aspects” (OECD 2012). Currently, the cost of achieving sustainable development is hard to estimate with precision, nevertheless estimates range in the hundreds of billions to trillions as seen in Figure 5. Sustainable development takes into consideration all types of investment needs that will contribute to economic development without jeopardising the global environment.

At the Rio+20 Summit in 2012, the international community recognised the necessity to account for different national circumstances, capacities and priorities in the sustainable development objectives<sup>19</sup>. In other terms, the level of development of each country must be considered as an essential element of the national sustainable development strategies. Furthermore, the principle of “common but differentiated responsibilities”<sup>20</sup> implies that, given their historic responsibility for many environmental problems – including climate change - developed countries are expected to take the lead in addressing sustainable development challenges. Conversely, least developed countries are given priority for economic development and are generally bound by less stringent rules and obligations.

---

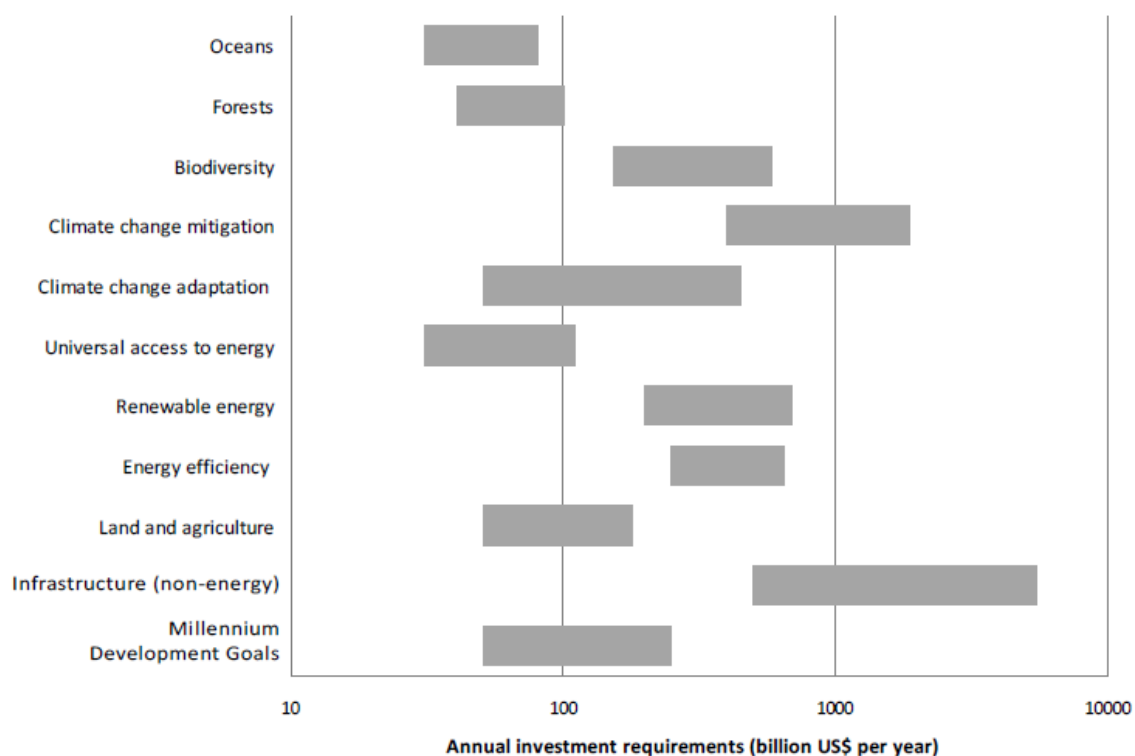
<sup>17</sup> UN(2015), Transforming our world: the 2030 Agenda for Sustainable Development  
<https://sustainabledevelopment.un.org/post2015/transformingourworld>

<sup>18</sup> In early October 2015, The World Bank announced raising the poverty line threshold going from \$1.25 to \$1.90 a day.

<sup>19</sup> United Nations Conference on Sustainable Development (2012): The Future we Want (II.56): “We affirm that there are different approaches, visions, models and tools available to each country, in accordance with its national circumstances and priorities, to achieve sustainable development in its three dimensions which is our overarching goal.”

<sup>20</sup> The Principle of “common but differentiated responsibility” was first brought up by the Stockholm Declaration (1972) which pointed out the need to consider “the applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for the developing countries.” In the In the Rio Declaration (1992), states further agreed that “environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply,”

**Figure 5: Annual Financing needs to achieve Global Sustainable Development**



Source: Intergovernmental Committee of Experts on Sustainable Development Financing (2014)

### **2.3.2 The 100 billion USD commitment and the increasing importance of “climate finance flows” in international development aid discussions**

At the Conference of the Parties of the United Nations Framework Convention on Climate Change (COP) that was held in Cancun in 2010, the international community recognised the need for “meaningful mitigation actions and transparency on implementation”. In addition, to address the specific needs of developing countries, a goal of jointly mobilising a total USD 100 billion per year by 2020 was set.<sup>21</sup> These resources were meant to principally address the mitigation and adaptation needs of developing countries and were therefore expected by a number of parties to be additional to existing official overseas development aid flows.

Stemming from this commitment, much of the international discussions concerning financing climate change mitigation and adaptation focus on the 100 billion objectives. Today, the term “climate finance” is closely connected to this commitment and to the issue of additional financing for climate action from developed to developing countries, from both public and private sources. This is a key piece of the international political negotiations as it focuses on providing financing and hence building trust between developed and developing countries. This trust is a necessary condition to reach any meaningful international agreement to tackle the climate challenge.

A key issue has been the quantification and tracking of climate flows. Tracking produces the necessary information to understand the link between individual projects, the financing of climate-related sectors and the impact on emissions and increased resiliency. Nevertheless, no single

<sup>21</sup> United Nations (2010): Framework Convention on Climate Change - Conference of the Parties - Decision 1/CP.16, paragraph 98.



definition of “climate” investments has yet been established. Thus, the definition used and the perimeter of what is counted often depend on the activities of the institution doing the counting. At the international level, the UNFCCC’s first biannual assessment of climate finance flows conducted by its Standing Committee on Finance (SCF) states that “climate finance aims at reducing emissions, and enhancing sinks of greenhouse gases and aims at reducing vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts” (UNFCCC 2014).<sup>22</sup>

At the project level, much focus has centred on defining what types of projects and technologies can be counted as “climate investments.” This can include investments that contribute in their entirety to reducing greenhouse gas emissions or increasing resiliency, such as renewable energy installations or protective infrastructures. Climate investment is also at times used for the incremental investment necessary to use a more efficient, less emissive or more resilient technology or approach in any type of project, such as increasing the energy efficiency of residential buildings. Furthermore, from a project perspective, costs go beyond the capital expenditures (CAPEX) spending during construction – including R&D, pre-investment studies and project design as well as the cost of capital repayment and risk instruments during operations and post-construction.

Although the exact definition of “climate” or “green” investments remains a subject for discussion, existing methodologies unanimously find that LCCR “infrastructure”<sup>23</sup> will account to a large part of these investments.

### ***2.3.3 The scale of effort needed to achieve the 2°C objective***

While the current climate finance flows are showing progress to fulfil the 100 billion USD political objective in 2020, reaching 62 billion USD in 2014 according to the recent OECD/CPI report<sup>24</sup>, they are still far from the levels of investment necessary to finance the shift to a low-carbon, climate resilient growth model. While estimates vary, the 2014 report for the Global Commission on the New Climate Economy suggests that between 2015 and 2030 approximately USD 92 trillion financing is necessary to meet infrastructure and development needs without jeopardizing global emission reduction objectives. This amount represents a net incremental cost of 4.1 trillion dollars or a 5% increase in upfront investment between 2015-2030 compared to the required investment of 89 trillion USD to maintain or strengthen economic growth over the same period (NCE 2014).

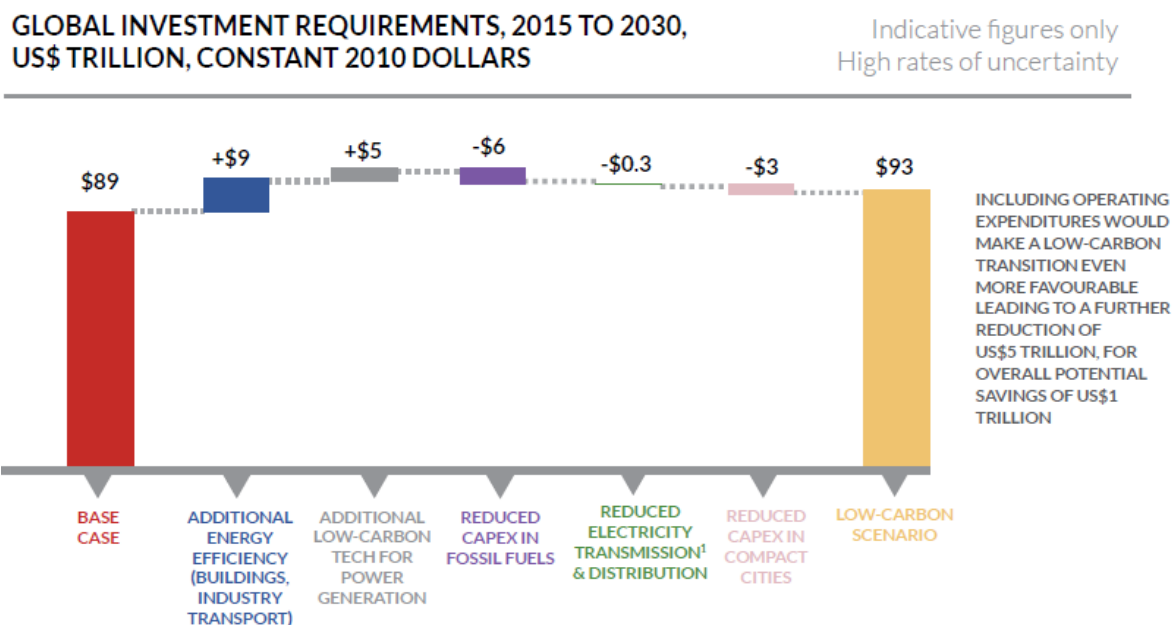
---

<sup>22</sup> For further detail please report to: UNFCCC Standing Committee on Finance - 2014 - Biennial Assessment and Overview of Climate Finance Flows Report (UNFCCC 2014)

<sup>23</sup> The use of the term infrastructure by the climate finance community includes investments in fixed capital (buildings, industry, transport, basic services, energy networks and generation capacity, etc.) as well as energy efficiency improvements to existing infrastructures.

<sup>24</sup> Public and private finance mobilised were estimated at USD 62 billion in 2014, up from USD 52 billion in 2013 - OECD/CPI (2015)

**Figure 6: Global Investment Requirements 2015 to 2030**  
US\$ Trillion, Constant 2010 Dollars



Source: NCE, November 2014, *Technical Note on Infrastructure Investment Needs of a low-carbon scenario*

Other estimates, such as the IEA, suggest that 2 trillion USD per year by 2035 are estimated to be necessary to meet energy infrastructure needs without jeopardizing global emission reduction objectives. Although this amount represents an additional need of only \$ 400 billion per year compared with business-as-usual scenarios (IEA, 2014), the shift of investments it will require is significant. Nevertheless, these reports conclude that the added benefits of a transition to a low-carbon economy – whether direct economic benefits from lower operating expenses and longer lifespans to indirect health and environmental improvements – outweigh the additional costs (see Figure 6).

Achieving this objective will require that not only increasing flows to low-carbon projects, but equally capping – and reducing – investments in carbon-intensive activities. Thus, the integration of climate change into investment decisions making as a separated, siloed consideration, flow or asset class will not be sufficient to reach the scale of investment needed. As such, it appears necessary for both climate change – and the transition to the low-carbon climate resilient economy that will allow an achievement of long-term 2°C objectives – be mainstreamed or integrated across all investment and economic decision making.

Thus, developing countries are at a cross-road: by adjusting to LCCR development models, they could gain significantly from adopting less fossil-fuel dependent development models with economic (fossil fuel imports and subsidies) and environmental (local air pollution) co-benefits. Furthermore, achieving the long-term 2°C climate objectives will require all countries to take action at some point. Moreover, all countries worldwide are in a position today to reduce the cost of future action by making choices that will enable future mitigation of emissions both possible and less expensive. Finally, the economic burden of environmental hazards and other climate related changes is likely to get heavier over the years and delaying action is proven to be costly. As such, development must take into consideration the need to adapt as early as possible to limit the unavoidable impacts.

### 3 Role for DFIs in fostering climate and LCCR-coherent development

At the crossroads between the developing and the developed world, Public Finance Institutions (PFIs) are often first in line to drive financial resources and influence public policies (Ratnovski and Narain 2006) towards low-carbon investments. A subset of these institutions - Development Finance Institutions (DFIs)<sup>25</sup> are important actors in channelling official development aid as well as providing capacity support to recipients on development issues. Over the last decade, a number of these institutions have developed methods and indicators to ensure that a part of their activity contributes to low-carbon objectives and to track their increasing contribution to climate finance flows. They appear to be a cornerstone of the urgently needed change in development model that should pave the way for a pragmatic yet effective transition to a low-carbon, climate-resilient economy.

#### 3.1 Support the energy transition of developing countries to reduce greenhouse gas emissions and mitigate future climate change

DFIs have a role to play in facilitating the shift of public and private investments towards LCCR projects, programs and fostering evolutions in regulatory frameworks. They are in the front line for responding to market failures which limit positive investments and assisting in developing new markets coherent with both long-term development and climate objectives. Their instruments generally include long-term funding which is dedicated to the achievement of national and international policy priorities.

**Table 1: Roles and tools of DFIs in supporting the low-carbon energy transition**

Role	Functions	Tools and Instruments
<b>Facilitating access to capital</b>	<ul style="list-style-type: none"> <li>• Providing access to long-term capital</li> <li>• Identification of sectors and technologies</li> <li>• Prioritisation of actions in national climate action plans</li> <li>• Development of incentivising national policy framework to support investment</li> <li>• Facilities to channel financing through local banking network</li> </ul>	<ul style="list-style-type: none"> <li>• Concessional and non-concessional lending</li> <li>• Equity investment</li> <li>• International climate funds</li> <li>• Public-private partnerships</li> <li>• Risk sharing instruments (guarantees, structured finance...)</li> <li>• Grants</li> <li>• Technical assistance</li> </ul>
<b>Assisting in developing national development strategies</b>	<ul style="list-style-type: none"> <li>• Capacity building</li> <li>• Political dialogue</li> </ul>	<ul style="list-style-type: none"> <li>• Programme loans</li> <li>• Technical assistance</li> <li>• Information tools</li> </ul>
<b>Support innovation</b>	<ul style="list-style-type: none"> <li>• Direct financing of demonstration projects</li> <li>• Assist in leveraging additional sources of financing (international and domestic)</li> <li>• Provide international expertise</li> </ul>	<ul style="list-style-type: none"> <li>• Specific grant financing</li> <li>• Technical assistance</li> <li>• Risk sharing</li> </ul>

*Source: Authors, based on OECD (2014).*

<sup>25</sup> For the purpose of this study, DFIs include Multilateral Development Banks (MDBs), Multilateral Financial Institutions, Sub-Regional Banks and Aid Coordination Groups.

*Climate and development finance institutions: linking climate finance, development finance and the transition to low-carbon, climate-resilient economic models*

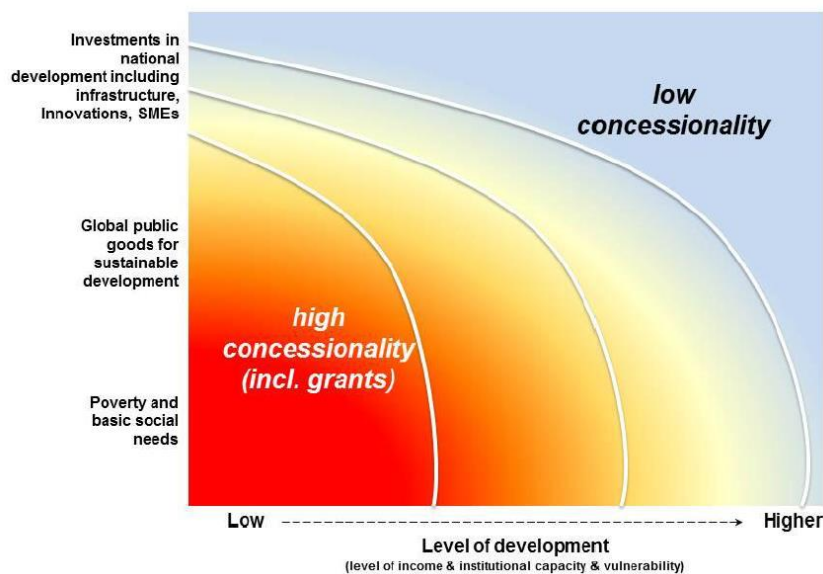
In practice, DFIs can contribute to the energy transition in developing countries by taking on three main responsibilities: i) facilitating access to capital, ii) assisting in developing national development strategies coherent with a low-carbon transition, and iii) working with national banking and financial industries. DFIs can channel donor aid as well as leverage capital at below-market rates and lend these resources to developing countries at attractive conditions. These comparative advantages can be used to promote private-sector investment and financial and technological innovation, and thus serve as demonstration investments. However, in order to do so, they develop specific tools and instruments which are tailored to their objectives and adapted to the specificities of sustainable development finance (Cochran et al. 2014).

The scope of responsibilities taken by DFIs is highly dependent on the mandate set by their national government. The importance of other priorities such as the local economic diplomacy or political objectives can therefore not be neglected.

The primary purpose of DFIs is generally to provide financing for economic and social development. Given the historical dominance of fossil-fuel intensive energy and development pathways, current investment portfolios may contain a significant share of activities which are incompatible with a low-carbon energy transition. The overall impact of the portfolio of assets could be negative as far as climate change and the environment are concerned. The dual objective sought by DFIs justifies the mainstreaming of climate change issues into their development finance investment decisions. According to the Intergovernmental Committee of Experts on Sustainable Development Financing, DFIs are in a position to tackle poverty and climate objectives simultaneously, the main remaining distinction being the level of concessionality of the financing depending on the level of development (See Figure 7) (ICESDF 2014).

Policy makers and Finance Institutions are therefore encouraged to consider ‘triple win’ strategies that result in low emissions, build resilience and promote development simultaneously. Consequently, comprehensive climate and environment decision-making tools are increasingly being developed and integrated into project appraisals by DFIs.

**Figure 7: Indicative targeting of international public financing according to countries’ levels of development and different sustainable development needs**



Source: (ICESDF 2014)

## **3.2 Mainstreaming adaptation**

DFIs can equally play a role in mainstreaming adaptation to future changes in the climate into development. As this report previously mentioned, sustainable development takes into consideration the efforts undertaken to limit the vulnerability of communities to natural disasters which is strongly and inversely correlated to the level of social and economic development. Sound disaster risk management has been recognised as priority on the international development agenda.

The IPCC identifies three channels through which development finance can affect resilience (IPCC 2007). Firstly, resilience can be affected through a change in the exposure of the system, consecutive to the investment. The development of resource intensive economic activities or the construction of certain types of less sustainable infrastructures can ultimately increase the exposure of a system to the magnitude of climate impacts. The second channel is sensitivity, or in other words, the degree to which the system will react to a given change in environment. Investments can play a role on the sensitivity of a system by strengthening certain economic sectors such as the protection of the ecosystem. Lastly, investments targeting development can influence the resilience of a system by increasing or reducing its adaptive capacity. As a result of these new considerations, the notion of “climate-resilient development” has appeared (OECD 2014). The targeted objective is to maintain the improvements in economic growth and poverty reduction, whilst simultaneously taking into account the direct and indirect effects of climate change. “Climate-resilient development” implies that current and future climate risks be systematically taken into account for every investment decision, and that appropriate adaptation measures be undertaken.

Existing studies demonstrated that climate and disaster resilient development are clearly effective in the long run and can in many cases yield important benefits<sup>26</sup>. The World Bank is currently testing the effects of “Robust Decision Making” on a range of their investments. Robustness is a property of a plan or strategy that performs well over a wide range of plausible future scenarios even if it does not perform optimally in any particular scenario (Lavell et al. 2012). The objective sought by the World Bank is to counter deep uncertainties by identifying decisions that are robust given a wide range of potential futures. Different investment plans are stress-tested according to various climate scenarios in order to select the one that appears likely to be the most sustainable of all (World Bank and GFDRR 2013). By making climate resilient investments, IFIs can meet the requirements made the DAC in terms of Evaluating Development Assistance, whereby the benefits of a development project are “likely to continue after donor funding has been withdrawn”; and “Projects need to be environmentally as well as financially sustainable” (OECD 2000). To date, the efforts to mainstream climate resilience into development are mainly focusing on reducing the physical vulnerability of investments to climate change. The other types of vulnerability are considered as being part of the economic and financial analysis of the investments.

## **3.3 Financial risk and appropriately valuing investments**

In addition to their mandates as investors acting to achieve long-term public objectives, as investment institutions DFIs also have a number of reasons to manage the LCCR-coherence of their portfolio. From an investor’s point of view, the WRI sees two major reasons why financial institutions should take climate into account when choosing their investments (WRI 2013). The first reason identified is the reputational benefits that would occur from financial institutions shifting to cleaner investment

---

<sup>26</sup> See in particular: World Bank (2013): Building Resilience – Integrating Climate and Disaster Risk into Development; World Bank (2013): Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience and McKinsey (2009): Pathways to a low carbon economy.

portfolios. In the case of DFIs, the reputation of the State as a whole is at stake. Ensuring that the investment portfolios of their public financial institutions are LCCR-coherent can be part of the positioning of countries at international negotiations. DFIs channel public financing and therefore showcase the efforts undertaken at the international level. The implementation of green investment portfolios can have a demonstration effect on other investors at a domestic level as well as at an international level.

The second incentive for including climate considerations into investment decisions is the financial benefit for the investor and the opportunity to better maximise its risk/return ratio. “Climate risk” can be categorised through two main sources: i) physical risk and ii) correlation with other risks. “Carbon risk” specifically considers the impact of fight against climate change as it is channelled through policies and regulations. Preferring and valuing “clean investments” hedges the investors’ exposure to “climate risk” and “carbon risk”, thus limiting the financial consequences of short-term policy changes, of stranded assets or of possible climate change effects in the medium to long-term (2°ii 2013). In 2014, the Bretton Woods Project pointed out the exposure faced by Multilateral Development Banks (MDBs) of a “potential carbon bubble”, whereby investments in fossil fuels companies could become “stranded assets” if serious action were taken to limit greenhouse gas emissions. These “stranded assets” would result in heavy losses if the regulatory environment were to shift towards a transition to a low-carbon economy (BWP 2014). Thus, public funds can be considered at risk due to the fact that MDBs are generally backed by national governments.

To this date, the regulation remains poor as far as charging an additional capital cost sufficient to systematically disfavour “carbon intensive” investments. However, it seems plausible that the international community will in term drive the discussions in the direction of stricter regulations, which take into consideration the mutual impacts of climate and investments on each other and encourage the development actors to invest in the face of uncertainties.

### **3.4 Important progress made on “climate finance” but sufficient for the 2° objective?**

Figure 8 presents the global landscape of climate finance as estimated by the Climate Policy Initiative (CPI 2014). Their analysis has constantly demonstrated that DFIs are important actors in facilitating global public climate finance flows. In 2013, DFIs committed USD 126 billion, or 38% of total climate finance flows. These include flows from international multilateral and bilateral institutions, as well as investments made and financing provided by national development finance institutions. Additionally, these institutions manage multilateral climate funds. DFIs have made strides in mobilizing both public and private finance to address mitigation and adaption issues. The amount of financing and resources dedicated to climate change has been growing – as well as the accountability requirements in terms of the direct impact of their activities.

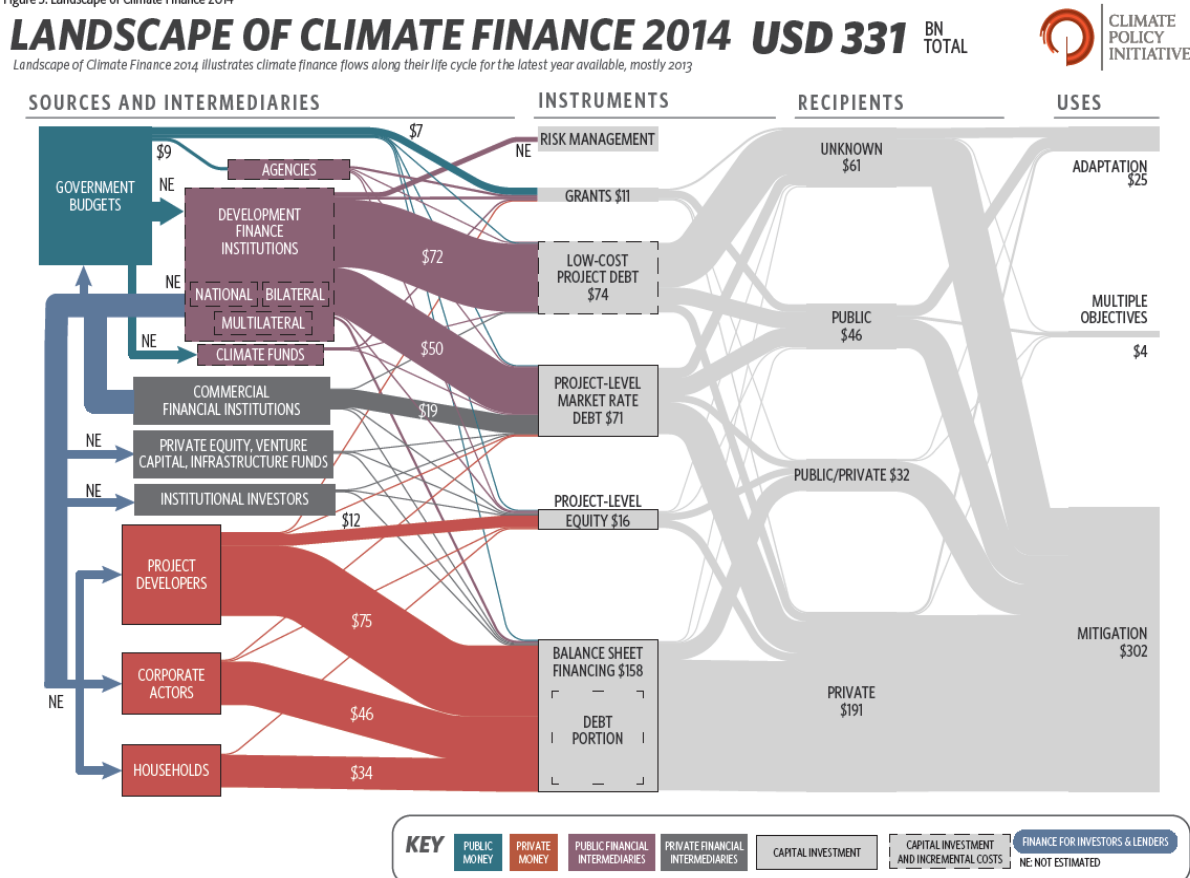
Nevertheless, despite the recent significant progress to link development and climate change, the 2°C objective will necessitate further ambition whereby the focus shifts from climate change to a more dynamic “transition” to a low-carbon climate-resilient economic model. Through 2020 and beyond, DFIs will remain important actors in channelling international climate finance flows in line with agreed “climate finance” objectives. However, achieving the level of financing necessary to fulfil long-term international objectives will require a systemic shift in terms of aligning the majority of activities with low-carbon, climate resilient development model. This will require that DFIs identify climate-specific investments and strive to achieve all development objectives in means that not only reduce emissions but also increase resiliency in line with long-term objectives. In many instances, additional “climate finance” flows may be able to play a role in financing the associated increased cost of projects and programs.

*Climate and development finance institutions: linking climate finance, development finance and the transition to low-carbon, climate-resilient economic models*

The next section takes a closer look at what shift in the development paradigm may be necessary to achieve long-term objectives – as well as the potential barriers.

**Figure 8: 2013 Climate finance flows as estimated by CPI**

Figure 3: Landscape of Climate Finance 2014



Source: (CPI 2014)

## 4 A paradigm shift from 'climate finance' to mainstreaming the LCCR transition?

One of the principal challenges today is to scale-up the financial flows to the trillions of dollars per year necessary to achieve the 2°C long-term objectives. This will necessitate a move from focusing on a 'siloed' vision of climate finance to a means of aligning activities across the economy with the LCCR transition. For financial institutions, mainstreaming these issues will be an important issue to not only to increase the flows going to climate-specific investments, but also to ensure that the majority of investments are coherent with this long-term transition.

### 4.1 Rethinking development as a systemic shift towards a low-carbon, climate-resilient economic model

The mainstreaming of the low-carbon climate resilient transition across economic activities and investment decisions implies that it becomes a prism through which all investment and finance activities – as well as development plans, country and regional strategies, and institutional policies – must be viewed. Climate finance reporting today is used by DFIs and other institutions to demonstrate their contribution to the international commitment of jointly mobilising USD 100 billion per year by 2020

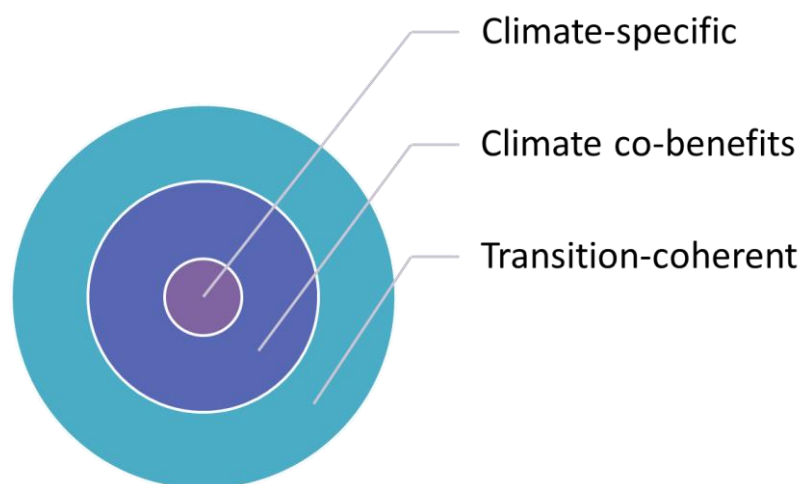
*Climate and development finance institutions: linking climate finance, development finance and the transition to low-carbon, climate-resilient economic models*

to support developing countries in their efforts to engage on a sustainable development path. Today, international discussions tend to focus on what flows are eligible to fulfil these commitments (public vs. private; subsidies and concessional resources vs. loans and debt products). Thus, the question of the ambition and sufficiency of the actions financed to reach long-term climate objectives and facilitate the transition to a potentially radically different economic model are left to one side.

Thus, a shift in the current conceptual reporting framework may be needed to move from a discussion and practices focused on ‘siloes climate finance’ to one looking at ‘finance for a low-carbon, climate-resilient transition.’ This paradigm change would require changes in how financing in this area is assessed. Current methods do not establish a direct link between the contribution of individual investments and the transition to a LCCR economic model for the recipient country, and more broadly, globally.

First, a transition to a low-carbon, resilient economic model will require investments in areas today that are not specifically classified as ‘climate finance.’ For a number of institutions, climate finance focuses on the identification and prioritization of investment in projects that are ‘climate specific’ – or those where GHG mitigation or adaptation are the principal objective (Buchner, Brown, and Corfee-Morlot 2011). However, as suggested above, while these projects are important, they may represent only a small portion of the required investments. Second, other institutions, such as *Agence Française de Développement*, focus on the ‘climate co-benefits’ or the climate impact of projects that are selected for development reasons, but equally have a positive impact on climate-related issues. This step goes beyond climate-specific projects and an assessment of all projects is key. An assessment of the climate co-benefits fosters on the understanding of how individual development projects can be improved or ‘optimized’ to maximize development potential and minimize negative climate impacts.

**Figure 9: The multiple layers of finances to support a low-carbon, resilient economic model**



Source: Authors

Third, some investments may be coherent with the transition to a low-carbon development model, but not count as climate finance or having climate co-benefits by the methods currently in use. Their relevancy for the transition lies in their support for a new economic model– such as as a short- or medium-term stepping stone between technologies for example. For example, some investments – such as efficient gas-fired power plants – could in certain circumstances thus be considered as part of transition financing if they serve to support the deployment of renewable energies in a given national context. This concept of transition-coherent is thus highly contextual as it is dependent on the given pathway that a country has chosen to decarbonize its economy.

In addition, the lens through which the sufficiency and ambition of climate finance – whether specific or co-benefits based – is understood becomes crucial when the concept of a transition is introduced.



Some interventions may reduce emissions marginally – or slightly improve resiliency – without contributing to placing the broader economy on a LCCR-aligned trajectory. For example, subsidizing 1 million USD of relatively low-impact window replacement versus 1 million USD used to leverage private investment for comprehensive thermal renovations of buildings do not have the same contribution to achieving long-term objectives. In the context of development finance, thinking in terms of a systemic transition is even more important as it could allow developing countries to shape the basis of their energy and industrial and rural production structures around technologies and practices coherent with long-term climate objectives. For example, using only the most inexpensive abatement options to reach the 2020 target can create a carbon-intensive lock-in and make the 2050 target too expensive to reach (Vogt-Schilb and Hallegatte 2014).

Thus, all investments should be assessed in terms of their coherence with long-term objectives – even those occurring within ‘climate change compatible’ sectors and technologies that reduce greenhouse gas emissions, improve efficiency or encourage sustainable transport. This, in some cases, may mean that some investments that today would be counted as climate finance – the proverbial ‘low-hanging fruit’ such as low-ambition energy efficiency projects – would not necessarily be prioritized for support given the need for future additional investments to achieve the 2° or other ambitious targets. Furthermore, a transition-based approach requires systemic consideration. For instance low-direct emission infrastructure projects (such as pipelines) need to be assessed taking into consideration their lock in potential in terms of supporting a fossil-fuel, carbon-intensive development model.

Assessing the climate-related actions of development financial institutions only in terms of the amount of finance dedicated to ‘climate finance’ or emissions reduced may no longer be a sufficient indicator in light of ambitious long-term objective. Thus, and assessment of the ‘transition coherence’ or ‘transition potential’ to prioritize actions that foster systemic change within developing country economies is essential.

## **4.2 Aligning short-term development aid and the long-term LCCR transition objectives: a need for country-level roadmaps?**

Given the importance of contextualisation to understand what investments are transition-coherent, the development of scenarios or roadmaps to identify the priority sectors and technologies in line with a decarbonised pathway appears necessary. This would be a dynamic process which considers behavioural, economic and technological progression as a catalyst for low-carbon, resilient investments. This process would focus on how to achieve development objectives in a LCCR-coherent fashion rather than focusing on individual ‘climate’ investments. The challenge resides in forecasting – or backcasting - different pathways for the progressive evolution of a country’s development model. Different possibilities will exist that minimise emissions at the same time as contributing to economic growth and social welfare. Evaluating whether the choices made are in line with what a pathway coherent with the 2°C climate objective becomes a necessity. However, to do so, finding a way of linking short-term investment decisions and long-term LCCR objectives becomes essential.

However, in many instances today, there is no clear vision of what a LCCR future compatible with both development needs and climate needs would look like. As such, it is difficult to understand the “transition potential” or “transition impact” of a single investment. Ideally, this should be done by national governments who are best placed to implement many of the economic and regulatory changes needed to foster such a transition. A number of initiatives exist today to assist both developed and developing countries to establish a LCCR vision of economic development. These include the Low Emission Development Strategies (LEDS) process launched in the COP16 in Cancun; and the United Nations’ Global Initiative called the Sustainable Development Solution Network (SDSN) pursuing the development of Deep Decarbonisation Pathways (see Box 2). The development of these potential development pathways could be used as baselines or counterfactuals in assessing

investment decisions. They could also contribute to identifying how to align individual investments and short- and medium-term objectives with long-term objectives. Development of these potential development pathways to be used as baselines or counterfactuals in assessing investment decisions will most likely be necessary country by country or at the very least on a regional scale in partnership with government and international stakeholders.

#### **Box 2: The Deep Decarbonisation Pathways Program**

The Sustainable Development Solutions Network (SDSN) established under the auspices of the United Nations qualifies this steep decline in carbon intensity across all sectors of the economy as a “deep decarbonisation” transition (SDSN and IDDRI 2014). Based on a back-casting methodology where the starting point is the objective to limit the rise in temperature to a maximum of 2°C, the SDSN developed country-level “Deep Decarbonisation Pathways” that put forward the economic and technologic transformations needed to meet the overall climate target. This work is based on various national and global policy assumptions which are soon to be refined. The “Deep Decarbonisation” project constitutes a valuable starting point to reconsider the development model and initiate the shift towards climate-compatible action. The scope of action may include: i) policy and regulatory frameworks, ii) development of transition-oriented sectors and project pipelines, iii) energy pricing, iv) industrial and economic policy and v) education, capacity building, and expertise.

For more information, see <http://unsdsn.org/what-we-do/deep-decarbonization-pathways/>

### **4.3 Potential barriers to the implementation of an LCCR strategy by DFIs - mandates, accountability and recipient-country engagement**

However, LCCR transition compatible development is only one of a wide range of considerations which must be included in the development agenda. While climate change will have potentially catastrophic consequences, particularly in the developing world, it is often weighed against short-term political, economic or financial issues. However it is essential for climate to be understood as an overarching transversal issue given the potentially catastrophic physical, economic and social impacts of climate change. As such, development that is not coherent with the LCCR transition will most likely not support the long-term capacity of recipient countries to respond to the broader long-term development needs of their population. Thus, linking the shift to a ‘greener,’ more resilient global economy with the other complex and rapidly-changing prioritizes must occur given the current tendency of short-term considerations to be prioritized over long-term objectives.

Development Finance Institutions are confronted with mandates and objectives that span multiple time horizons. As seen in Table 2, DFIs are subject to short-term performance objectives (signatures, disbursement, financial performance), medium-term development objectives (such as the Sustainable Development Goals currently in discussion) or long-term objectives (such as the LCCR transition). As a result, the individuals involved in the project and program assessment and decision-making process must juggle multiple considerations across sectors, disciplines and time-horizons. These objectives are further nuanced given explicit and implicit objectives from mandating institution and the local policies and priorities in recipient countries.

**Table 2: Examples of different DFI objectives across time horizons**

Short-Term Objectives	Medium-Term Objectives	Long-Term Objectives
Annual performance objectives: <ul style="list-style-type: none"> <li>- Volume</li> <li>- ESG</li> <li>- Climate Finance Reporting</li> </ul>	<ul style="list-style-type: none"> <li>- Multi-year strategic plans and objectives</li> <li>- Formal external performance objectives from mandating institutions</li> <li>- National and international development aid financing objectives (0.7% of GNI, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Low-Carbon, Climate Resilient Energy Transition</li> <li>- Eradication of poverty</li> <li>- Eradication of certain diseases</li> <li>- Universal literacy</li> <li>- Gender equality</li> </ul>

Furthermore, the activities of DFIs are generally tied to the resources and mandates passed on by national governments and stakeholders; thus they are dependent on the policy orientations to structure their activities. The use of the financial resources with which they have been charged is increasing tracked and reported upon and DFIs face a wide range of voluntary, recommended and obligatory reporting. These requirements can be related to impact measurements or financial commitments and are associated with a range of reporting tools and methodologies. Ensuring that this reporting incentivizes investments in transition-coherent areas is essential. As mentioned above, climate is generally treated as a separate 'silo' for spending. In some cases, transversal international institutions may fix quantitative targets which could have the effect of encouraging quantity rather than quality or coherence of climate finance.

Finally, the impact of DFIs strongly relies on the political engagement in its regions of intervention. Beyond the macro-economic and political situation of beneficiary countries, the success of climate development is also dependent on the engagement of the recipient government to embrace low-carbon, resilient economic model as a policy priority. Achieving a LCCR transition cannot be achieved by a single financial institution acting individually. Broader policy and economic regulations, incentives and policies are needed to integrate the negative externalities of a fossil-fuel based economy – particularly given the inter-generational and global nature of the challenge. The recipient country needs to demonstrate willingness to embark upon a profound and long-lasting transition path. Development priorities and climate change objectives must be aligned and an enabling policy environment for investment must be created jointly by both parties. If these conditions are not met, the influence of DFIs is likely to be significantly reduced.

#### **4.4 The importance of coordination between DFIs**

Given the specificities of both beneficiary and donor countries in terms of national priorities, level of development and available resources, it is essential that the international action be well coordinated for climate to be recognised as a cross-cutting issue. Success is dependent on both the recipient and the donor governments rallying around development priorities which frame long-term development objectives through the prism of the climate change challenge.

Policy coherence and communication between different institutions is critical. The international community is expected to bridge the gaps in multilateral frameworks and to adopt coherent and adapted policies at local level. On the other hand, recipient countries should play a key role in determining the most suitable low-carbon pathway given social and economic development objectives, without impinging on the global capacity to achieve the 2°C target.

In this context, DFIs could play a significant role by coordinating the financial flows. Their close interactions with other types of financial institutions (public and private, national, regional and international) allow them to play a central role in driving and leveraging financial resources. Since they are often the sole providers of low-cost financial resources, they hold a privileged position to support national strategy elaboration and implementation.

Concerted and coordinated action between DFIs at the local level allows for low-carbon development projects to be scaled-up and to have a bigger impact. Increasing harmonisation between the requirements and methodologies applied by DFIs is critical to reduce counterproductive competition and overlapping at local level. Furthermore, a concerted action would help find a balance between competition and collaboration among DFIs and induce significant comparative advantages (see Prada 2012). In the context of low-carbon climate-resilient development, this implies that IFIs are willing to agree on the standards they apply for investment eligibility, according to local specifics. In practice, competition among DFIs for the financing of “bankable” investments can lead to emissive projects being supported by the least “demanding” donors, thus preventing the economy from optimising its LCCR pathway.

Finally, by providing international expertise, cheap financial resources and by taking a share of the risk, DFIs can help local actors embrace innovative low-carbon technologies, thereby supporting the shift towards a decarbonised economy. Such a transition requires the development of a ‘common LCCR vision,’ which is shared by DFIs, private investors, local governments and public and private companies.

## **5 Next steps: implementing the LCCR Transition**

Putting this approach into practice will not be simple, as it requires an assessment of what a low-carbon future could look like and investment, technological and infrastructure steps necessary to get there. In many instances, constraints on available resources may mean that relatively simple evaluation tools are put into place. Nevertheless, it is becoming increasingly clear that only systemic changes, rather than marginal optimization changes, are necessary to achieve the levels of decarbonisation of the global economy to stop catastrophic climate change (IPCC 2014).

Within DFIs, the mainstreaming of LCCR issues into strategic frameworks and investment guidance will be a key element to develop an intervention approach that is coherent with a long-term trajectory of sustainable economic development. This guidance is needed to identify which investments contribute to the “decarbonisation” of an economy and must be tailored to local contexts and scenarios to adapt climate considerations to the country-specific specificities of development. A toolkit containing the best practices, standards and norms inspired by LCCR guidance is necessary to facilitate the selection of activities that best support decarbonised development.

A step to producing such guidelines and tool kit is to understand the current approaches that DFI’s use to mainstream climate change into investment decisions making. Paper 2 of this series thus draws off existing studies and the experience of the authors to presents a stylized model of how public financial institutions in general – and DFIs in particular – are currently mainstreaming climate change. The current approaches present a number of lessons in terms of the next steps to take to integrate the LCCR transition into DFI investment and support activities. While the operational activities of IFIs can vary greatly, the proposed typology is designed to serve as a basis for discussion in terms of how these issues can be mainstreamed or used as a prism to understand the coherence of development and transition objectives.

## 6 Bibliography

- 2°ii. 2013. *From Financed Emissions to Long-Term Investing Metrics - State-of-the-Art Review of GHG Emissions Accounting for the Financial Sector*. 2° Investing Initiative.
- Buchner, Barbara, Jessica Brown, and Jan Corfee-Morlot. 2011. *Monitoring and Tracking Long-Term Finance to Support Climate Action*. OECD /IEA.
- BWP. 2014. *Multilateral Development Banks' Unburnable Carbon*. Bretton Woods Project. <http://www.brettonwoodsproject.org/2014/09/mdbsunburnablecarbon/>.
- Cochran, Ian, Romain Hubert, Virginie Marchal, and Robert Youngman. 2014. *Public Financial Institutions and the Low-Carbon Transition: Five Case Studies on Low-Carbon Infrastructure and Project Investment*. 72. OECD Environment Working Papers. Paris: Organization for Economic Cooperation and Development. [http://www.oecd-ilibrary.org/environment-and-sustainable-development/public-financial-institutions-and-the-low-carbon-transition\\_5jxt3rhpgn9t-en?crawler=true](http://www.oecd-ilibrary.org/environment-and-sustainable-development/public-financial-institutions-and-the-low-carbon-transition_5jxt3rhpgn9t-en?crawler=true).
- Corfee-Morlot, Jan, Virginie Marchal, and Karim Dahou. 2012. *TOWARDS A GREEN INVESTMENT POLICY FRAMEWORK The Case of Low-Carbon, Climate-Resilient Infrastructure*. OECD.
- CPI. 2014. *Global Landscape of Climate Finance 2014*. Climate Policy Initiative. <http://climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2014/>.
- Den Elzen, Michel, William Hare, Niklas Höhne, K Levin, J Lowe, Keywan Riahi, and Joeri Rogelj. 2013. *The Emissions Gap Report: Are the Copenhagen Accord Pledges Sufficient to Limit Global Warming to 2 Deg. C or 1.5 Deg. C? A Preliminary Assessment*. United Nations Environment Programme.
- Fay, Marianne. 2012. *Inclusive Green Growth: The Pathway to Sustainable Development*. World Bank Publications, 2012. World Bank Publications.
- Gelb, Alan. 2010. *Economic Diversification in Resource Rich Countries*. IMF.
- ICESDF. 2014. *Report of the Intergovernmental Committee of Experts on Sustainable Development Financing*. Intergovernmental Committee of Experts on Sustainable Development Financing.
- IEA. 2014. *World Energy Investment Outlook*. International Energy Agency. <http://www.worldenergyoutlook.org/investment/>.
- IPCC. 2007. *Contribution to Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. International Panel on Climate Change.
- . 2014. *Fifth Assessment Report*. International Panel on Climate Change. <http://www.ipcc.ch/report/ar5/>.
- Kennedy, Christopher, and Jan Corfee-Morlot. 2012. *Mobilising Investment in Low Carbon, Climate Resilient Infrastructure*. 46. OECD Environmental Working Papers. Organization for Economic Cooperation and Development.
- Lavell, A., M. Oppenheimer, C. Diop, J. Hess, J. Li, R. Muir-Wood, and S. Myeong. 2012. "Climate Change: New Dimensions in Disaster Risk, Exposure, Vulnerability, and Resilience." In *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC)*, 4133. Cambridge, UK: Cambridge University Press.
- Lemoine, Derek M., and Christian Traeger. 2011. *Tipping Points and Ambiguity in the Integrated Assessment of Climate Change*. Working Paper 1704668. Department of Agricultural & Resource Economics, UC Berkeley. [http://www.eea-esem.com/files/papers/eea-esem/2011/1434/eea\\_tipping\\_pts\\_2011-02-14.pdf](http://www.eea-esem.com/files/papers/eea-esem/2011/1434/eea_tipping_pts_2011-02-14.pdf).
- NCE. 2014. *The New Climate Economy - The Global Commission on the Economy and Climate*. *The New Climate Economy*. <http://newclimateeconomy.report/misc/downloads/>.
- OECD. 2000. *Principles for Evaluation of Development Assistance*. Organization for Economic Cooperation and Development.
- . 2005. *Linking Climate Change and Development*. Organization for Economic Cooperation and Development.
- . 2011. *Environmental Outlook to 2050*. Organization for Economic Cooperation and Development.
- . 2012. "Measuring and Monitoring External Development Finance." *OECD AND POST-2015 REFLECTIONS*.

*Climate and development finance institutions: linking climate finance, development finance and the transition to low-carbon, climate-resilient economic models*

———. 2014. *Climate Resilience in Development Planning*. Organization for Economic Cooperation and Development.

OECD, and CDC Climat. 2014. *Public Finance Institutions and the Low-Carbon Transition: Five Case Studies on Low-Carbon Infrastructure and Project Investment*. Working Paper. Organization for Economic Cooperation and Development & CDC Climat Recherche.

Organisation for Economic Co-operation and Development (OECD) in collaboration with Climate Policy Initiative (CPI) 2015.- *Climate Finance in 2013-2014 and the USD 100 billion goal*

Pachauri, R. 2008. *Battling Climate Change by Promoting Environmentally Sustainable Development*.

Prada, Fernando. 2012. *World Bank, Inter-American Development Bank, and Sub-Regional Development Banks in Latin America: Dynamics of a System of Multilateral Development Banks*. 380. Working Paper. Asian Development Bank Institute.

Ratnovski, Lev, and Aditya Narain. 2006. *Public Financial Institutions in Developed Countries - Organization and Oversight*. WP/07/227. IMF Working Paper. International Monetary Fund. <https://www.imf.org/external/pubs/ft/wp/2007/wp07227.pdf>.

RICARDO-AEA. 2013. *European and International Financial Institutions: Climate Related Standards and Measures for Assessing Investments in Infrastructure Projects*. Ricardo-AEA/R/ED57769 Issue Number 2. Report for the European Commission: DG Climate Action. RICARDO-AEA, Adelphi & ODI.

SDSN, and IDDRI. 2014. *Pathways to Deep Decarbonisation*. Sustainable Development Solutions Network (SDSN) and the Institute for Sustainable Development and International Relations (IDDRI). <http://unsdsn.org/what-we-do/deep-decarbonization-pathways/>.

Shepard, Andrew, Tom Mitchell, Kirsty Lewis, and Amanda Lenhardt. 2013. *The Geography of Poverty, Disasters and Climate Extremes in 2030*. ODI.

Smallridge, Diana, Barbara Buchner, Chiara Trabacchi, Maria Netto, José Juan Gomes Lorenzo, and Lucila Serra. 2012. *The Role of National Development Banks in Intermediating International Climate Finance to Scale Up Private Sector Investments*. Inter-American Development Bank.

UN. 1992. *United Nations Framework Convention on Climate Change*.

———. 2000. *United Nations Millennium Declaration*. United Nations.

UN 2015. *Transforming our world: the 2030 Agenda for Sustainable Development*

UNFCCC. 2014. *Biennial Assessment and Overview of Climate Finance Flows*. United Nations Framework Convention on Climate Change. [http://unfccc.int/cooperation\\_and\\_support/financial\\_mechanism/standing\\_committee/items/8034.php](http://unfccc.int/cooperation_and_support/financial_mechanism/standing_committee/items/8034.php).

Vogt-Schilb, Adrien, and Stéphane Hallegatte. 2014. "Marginal Abatement Cost Curves and the Optimal Timing of Mitigation Measures." *Energy Policy* 66 (C).

WEF. 2013. *The Green Investment Report: The Ways and Means to Unlock Private Finance for Green Growth*. World Economic Forum.

World Bank. 2013. *World Development Report 2014: Risk and Opportunity, Managing Risk for Development*. Washington, DC: World Bank.

———. 2014. *Climate-Smart Development – Adding up the Benefits of Actions That Help Build Prosperity, End Poverty and Combat Climate Change*. World Bank Group.

———. 2015. *Decarbonizing Development: Three Steps to a Zero-Carbon Future*. World Bank Group. [www.worldbank.org/decarbonizingdevelopment](http://www.worldbank.org/decarbonizingdevelopment).

World Bank, and GFDRR. 2013. *Building Resilience – Integrating Climate and Disaster Risk into Development*. World Bank Group.

WRI. 2013. *Accounting for Risk: Conceptualizing a Robust Greenhouse Gas Inventory for Financial Institutions*. Washington D.C.: World Resources Institute.

———. 2015. *Getting to \$100 Billion: Climate Finance Scenarios and Projections to 2020*. World Resources Institute. <http://www.wri.org/publication/getting-100-billion-climate-finance-scenarios-and-projections-2020>.