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Exploring Potential Data Sources for Estimating Private Climate Finance

Randy Caruso, Raphaël Jachnik

Research Collaborative
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The data used for the purpose of the analysis and presentation thereof are only intended to illustrate ideas expressed in this paper and are not to be interpreted more broadly. This research was undertaken in the context of a broader international Research Collaborative on Tracking Private Climate Finance. Additional information on the Research Collaborative can be found in Annex 1 of the report as well as at www.oecd.org/env/researchcollaborative.

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ABSTRACT

The paper reviews a number of commercial and public data sources to examine their potential for increasing coverage and understanding of the volume and characteristics of private climate finance beyond renewable energy projects. Such information is needed to assess progress towards the global transition to low-carbon, climate-resilient economies, as well towards the fulfilment of international commitments by developed countries under the United Nations Framework Convention on Climate Change.

The data sources investigated in this analysis are evaluated across four areas relating to their: (i) use of sectoral classification systems; (ii) coverage of private finance transactions and instruments; (iii) definitions and methods for categorising finance as private and identifying its geographic origin; and (iv) data access restrictions and methodological transparency. To provide a frame of reference, the paper distils corresponding definitions and methodologies used by key known data sources for tracking climate-specific finance as well as investments and finance more broadly.

The analysis finds that the reviewed databases capture a vast amount of at least partial data on private finance and investment in climate-relevant sectors. However, a number of limitations complicate efforts to use these databases to meaningfully identify, isolate and characterise climate-specific private finance, such as a lack of granularity in sector classifications. This issue is particularly acute for adaptation finance, the tracking of which requires additional contextual information. The databases cover a range of financial instruments and transactions, such as syndicated loans, bond issuances, private-equity transactions, and large project-financing deals. However, there are significant gaps in coverage of private de-risking instruments (e.g. insurances and guarantees), small scale (e.g. microcredit), more informal transactions (household spending) and certain intercompany transactions (e.g. corporate self-financing). Even for those instruments and transactions where coverage exists, transaction values are often not disclosed or disaggregated by financier. Furthermore, characterising finance as private or by its geographic origin often depends on the point of measurement in the financial value chain as well as the principles being applied. While this report suggests a number of potential ways to at least partly address these limitations, such issues complicate any efforts to systematically characterise private finance as climate-specific, estimate it across financial instruments and transaction, and attribute it to actors and countries.

Policy makers may need to assess the acceptability of the technical limitations of the different datasets as well as of the proxy methods that may be developed to mitigate but not overcome them. Regarding the use of commercial databases, implications in terms of public access to data and transparency of underlying definitions and methods should also be considered. As this assessment will vary according to specific information needs and intended use, further work in this area may require taking a differentiated approach between generating broad estimates of private climate finance on the one hand, and making longer term progress towards its measurement and reporting on the other hand. Clarity on the order of priority of tracking certain sectors, instruments, and financial characteristics, based for instance on their relative importance in developing countries, could provide a constructive starting point for future work.

JEL classifications: C81, F21, F53, G39, Q56, O16, O19

Keywords: climate change, private finance, data sources, databases, estimation, measurement, reporting.

RÉSUMÉ

Ce rapport passe en revue un certain nombre de sources de données publiques et privées afin d'examiner dans quelle mesure elles peuvent contribuer à améliorer la couverture des données concernant la finance climat privée et ses caractéristiques au-delà des projets d'énergies renouvelables. Ce type d'information est nécessaire pour évaluer les progrès en termes de transition vers une économie à faible intensité de carbone et résiliente au changement climatique, ainsi que vers la réalisation des engagements internationaux pris par les pays développés dans le contexte de la Convention-Cadre des Nations Unies sur les Changements Climatiques.

Les sources de données examinées sont évaluées dans quatre domaines : (i) leur utilisation de systèmes de classification sectorielle ; (ii) leur couverture en termes de transactions et instruments de finance privée ; (iii) leurs définitions et méthodes pour classifier la finance comme privée ou publique et pour lui attribuer une origine géographique ; (iv) les restrictions d'accès aux données et questions de transparence méthodologique. Afin de fournir un cadre de référence, le rapport distille les définitions et méthodes correspondantes utilisées par des sources de données connues mesurant la finance climat ainsi que les investissements de manière plus générale.

L'analyse montre que les bases de données examinées contiennent une grande quantité de données au moins partielles concernant la finance et les investissements privés dans des secteurs ayant une incidence sur le climat. Cependant, un certain nombre de facteurs, comme le manque de granularité des classifications sectorielles, compliquent l'usage de ces bases de données dans le but d'identifier, d'isoler et de caractériser la finance privée spécifique à l'action climatique. Cela est particulièrement le cas pour le financement de l'adaptation, dont la mesure nécessite des informations contextuelles supplémentaires. Les bases de données couvrent une gamme d'instruments et transactions financiers, tels les crédits syndiqués, l'émission d'obligations, les transactions de capital-investissement, et les opérations de financement de grands projets. Elles comportent cependant des lacunes importantes dans la couverture des instruments de réduction des risques (ex. assurances, garanties), les transactions à petite échelle (ex. micro-crédit) ou informelles (ex. dépenses des ménages), et certaines transactions internes aux entreprises (ex. autofinancement). Même pour les transactions et instruments couverts, leur valeur monétaire n'est souvent pas disponible ou non-désagrégée par source de financement. De plus, la caractérisation de la finance comme privée et de sa provenance géographique dépend du point de mesure choisi dans la chaîne de valeur de la finance ainsi que des principes appliqués. Bien que ce rapport suggère un certain nombre de solutions possibles afin de s'attaquer à ces limitations, ce type de problème complique tout effort de classification de la finance privée comme étant spécifique à l'action climatique, d'estimation sur l'ensemble des instruments et transactions financiers, et d'attribution a des acteurs et pays spécifiques.

Les décideurs politiques peuvent être amener à évaluer l'acceptabilité des limites techniques des différentes séries de données, ainsi que des méthodes d'estimation qui pourraient être développées pour pallier à ces limites, sans cependant les résoudre pleinement. Concernant l'utilisation de bases de données commerciales, les incidences en termes d'accès public aux données et de transparence des définitions et méthodes doivent également être prises en compte. Compte tenu du fait que cette évaluation variera en fonction des besoins et utilisations attendues de l'information, les travaux supplémentaires dans ce domaine pourraient nécessiter une approche différenciée entre produire des estimations de la finance climat

privée d'une part, et, d'autre part, réaliser des progrès à plus long terme vers sa mesure et son reporting. Plus de clarté sur l'ordre de priorité du suivi de certains secteurs, instruments et caractéristiques financières, par exemple sur la base de leur importance respective dans le contexte des pays en développement, pourrait constituer un point de départ utile aux travaux futur sur ce sujet.

Classification JEL: C81, F21, F53, G39, Q56, O16, O19

Mots clés: changement climatique, finance privée, sources de données, estimation, mesure, reporting.

EXECUTIVE SUMMARY

A sharp increase of investments in low-carbon, climate-resilient (LCCR) activities is needed to mitigate and adapt to climate change. While a significant share of this financing is expected to come from the private sector, data on private finance for LCCR development are sparse beyond large-scale renewable energy. This lack of data makes it difficult to track progress towards the global transition to LCCR economies and development. Additionally, enhanced data on the volume and characteristics of private climate finance is necessary (though not sufficient) for understanding its mobilisation by public interventions. Using improved data on private finance to better understand and estimate its mobilisation could help both in enhancing trust and transparency in relation to international commitments in the context of the United Nations Framework Convention on Climate Change (UNFCCC), as well as in designing more effective policies to mobilise resources globally. The second order question of how to measure private climate mobilisation is however not addressed in this report, and would require considering issues such as causality between public interventions and the occurrence of private finance.

This paper focuses on the preliminary and necessary step of exploring data availability for private climate finance. In doing so, it aims to contribute to an improved mapping of total private climate finance. To this end, the analysis compares and assesses a number of commercial (i.e. Bloomberg, Dealogic, Factset, Preqin, Thomson Reuters,) and public (i.e. OECD, UNCTAD, UNEP Risø Centre, World Bank) databases to examine their potential use for increasing coverage and understanding of the volume and characteristics of private climate finance. The databases are reviewed in relation to their: (i) use of sectoral classification systems; (ii) coverage of private finance transactions and instruments; (iii) definitions and methods for categorising finance as private and identifying its geographic origin; and (iv) data access restrictions and methodological transparency. To provide a frame of reference, the paper distils definitions and methodologies used by key financial data sources. These reference points include those that focus on monitoring, reporting and/or collating climate-specific finance (i.e. Climate Bonds Initiative, Climate Policy Initiative, the International Development Finance Club, the OECD Development Assistance Committee, and the joint-reporting by a group of Multilateral Development Banks) as well as investments and finance more broadly (i.e. the International Monetary Fund, Eurostat, the United Nations Statistics Division, and various OECD statistical bodies).

Use of sectoral classification systems

Estimating the volume of private climate finance requires both definitions of the specific activities that can be considered ‘climate’ as well as the ability to isolate these activities within broad financial datasets. In the absence of a single internationally agreed definitions of ‘climate finance’, this analysis used institution-specific definitions of climate activities to examine the extent to which these activities could be identified and isolated within the sectoral classification systems used by reviewed data source. These systems, such as the International Standard Industrial Classification (ISIC) or North American Industrial Classification System (NAICS), allow the identification of private finance and investment into broad climate-relevant sectors and sub-sectors such as energy, agriculture, forestry, transportation and water. However, they generally lack the sectoral granularity required to isolate climate-specific activities (i.e. those with positive mitigation and adaptation impacts) within broader climate-relevant sectors (i.e. those with positive or negative impacts).

Separating climate-specific activities from those with neutral or negative climate impacts would necessitate investing significant effort and time to re-process data at the level of individual financial transactions. While the nature of the project or activity itself might in some instances be enough to qualify it as having mitigation benefits (e.g. renewable energy technologies), qualifying an activity as having adaptation benefits requires additional qualitative and contextual information rarely provided in the datasets reviewed. This means that even detailed reworking of available data is unlikely to generate a comprehensive picture of private climate finance for adaptation purposes. In terms of potential ways forward, the development of proxy methods (e.g. using complementary data series on carbon or energy intensity, corporate revenue data, and/or gross fixed capital formation) could allow estimating climate-specific private finance within broad climate-relevant sectors. From an actual monitoring and reporting perspective, the types of data sources reviewed as part of this study could be combined with and complement available data from international public finance institutions.

Coverage of private finance transactions and instruments

A variety of private financial instruments and transaction types are used to finance the transition toward LCCR development in developing countries. The databases reviewed capture a vast amount of at least partial data on a sub-set of these private finance instruments and transactions, such as syndicated loans, bond issuances, private-equity transactions, and large project-financing deals. However, there are significant gaps in coverage of de-risking instruments provided by the private sector (e.g. insurance, guarantees), small scale (e.g. microcredit), more informal financing (e.g. household spending) and certain intercompany transactions (e.g. corporate self-financing). The presence and importance of such instruments therefore remains difficult to identify and systematically assess using the commercial and public databases reviewed.

Financial instruments and transactions are used throughout the financial value chain, including in upstream private financing and investment in companies and funds, as well as downstream into projects or assets. This means that limiting estimates of climate finance to only part of the financial value chain, such as project finance, can lead to improperly estimating and mischaracterising private finance. In particular, this could prevent capturing the full range of private finance that public actors are mobilising through various upstream and downstream public interventions throughout the financial value chain.

The databases reviewed could contribute to building an expanded picture of climate-relevant finance beyond just project-level financing by capturing corporate- and fund-level transactions involving instruments that they cover. Simply summing together these flows would however result in some degree of double-counting, as a portion of corporate- and fund-level finance will continue downstream to the project-level. Efforts to reconcile these flows to avoid double counting would likely have significant resource and cost implications. Practical limitations, such as the absence in most databases of a breakdown of amounts provided by individual financiers involved in the same transaction, also hinder efforts to attribute finance and avoid double-counting. As a possible first step, climate finance data collectors, collators, and reporters could increase efforts to better highlight and present the role of upstream financial transactions as distinct from downstream project finance.

Definitions and methods for categorising finance as private and identifying its geographic origin

Characterising financial actors and the finance they provide as public or private, as well as their geographical origin, is useful for understanding, measuring and reporting climate finance. However, several definitional and technical issues prevent such characterisation from always being meaningful, a problem that extends beyond climate finance. For both characteristics, the analysis highlights the availability and use of multiple definitional options, which can be applied at the immediate, intermediate, or ultimate institution levels. For example, actors (and, as a result, the finance they provide) can be

categorised as public or private based on direct ownership (e.g. over 50% shareholding) or risk-based principles (e.g. degree of commitment of government intervention in case of default). The review of databases however confirmed that such principles can prove difficult to apply in a systematic manner, especially in the case of joint ventures or complex/pooled financial structures.

There are also different methods to characterise the country of origin of an actor or related investment. This can be based on the location of the specific actor or fund (e.g. corporate or tax base home), its ownership structure, its centre of economic interest, and/or origin of revenues. These different methods can lead to widely differing results. Data post-processing and combining datasets could allow for deeper investigation of enterprise ownership structure and help to classify finance by geographic origin. Characterising private finance however depends on the point of measurement in the financial value chain, the choice of which needs to be considered in light of the intended use of such analysis. Various existing principles to define public and private or geographic origin and destination in other arenas where these issues have been addressed can be used to guide future climate policy decisions on what to account for as private. For instance, the analysis highlighted that countries already define "government" or "public-sector" in a variety of ways in the context of official statistics, such as reporting national accounts or calculating GDP. Likewise, decades of national and international experience in collecting official investment statistics (in particular on Foreign Direct Investment) underline the need for applying clear and practical definitions in determining country of origin and destination.

Data access restrictions and methodological transparency

Commercial data providers have a key role to play and self-interest in providing in-depth and improved information about financial markets and transactions. They also have the ability to innovate in terms of finding pragmatic estimation and imputation methods to tackle technical and confidentiality limitations relating to private finance transactions. However, they all require paid subscriptions to access the data they collect and collate. Furthermore, their inherent interest to protect the competitive advantage of their business model can lead to certain restrictions such as the use of a proprietary industry and sector classification system as well as limited transparency on definitions, methodologies (metadata) or data quality control methods. Further (possibly pooled) efforts by official statistics offices as well as non-governmental actors to collect and publicly disclose policy-relevant private finance data could provide a more transparent and widely accessible alternative. Innovative approaches by commercial data providers, such as producing climate-related 'league tables' that rank private financial institutions on their deal volumes, could nevertheless provide an incentive for better self-reporting by private finance providers of climate-specific finance and investment activities. In considering the potential use and role of commercial databases, policy makers may need to balance the potential benefits these databases offer in terms of enhanced coverage with their respective limitations in terms of public access to data and transparency of underlying definitions and methods.

Implications in relation to information needs

The assessment of the specific benefits and limitations of various data sources will vary according to the intended use of the information. For instance, several datasets provide additional information on syndicated loans, bond issuances, and private equity that can help to paint a more complete picture of private finance to climate-relevant sectors in developing countries. In the context of the measurement, reporting and verification of developed countries' international commitments under the UNFCCC, the reviewed databases, however, generally do not provide "off-the-shelf" data for estimating the volume and characteristics of climate-specific flows. These databases do not allow for analysing private finance simultaneously across multiple dimensions (e.g. sector, public or private, geographic origin and destination) without investing significant time and effort to combine, reconstruct, and re-process data at the level of individual transactions. Even when this type of multi-dimensional analysis is possible, it is not

always meaningful. Examples where characterisation as private and of geographical origin may be misleading include investments into financial sector intermediaries, instruments and funds with joint public-private ownership, and to and/or from multinational-enterprises associated with several geographies. Such limitations complicate attribution of private climate finance to specific actors and countries.

Moving forward, policy makers may have to consider and assess the acceptability of the technical limitations of different datasets as well as of the proxy methods that could be developed to mitigate but not overcome these limitations. Considering that this assessment will vary according to context, specific information needs, and intended use, further work in this area may necessitate taking a different approach than relying on estimates originating from multiple inconsistent data sources. This could include enhanced monitoring and reporting by public finance providers of climate-specific private co-financing. Further, clarity on the order of priority of tracking certain sectors, instruments, and financial characteristics, based on their relative importance in developing countries, could provide a constructive starting point for future work.

1. INTRODUCTION

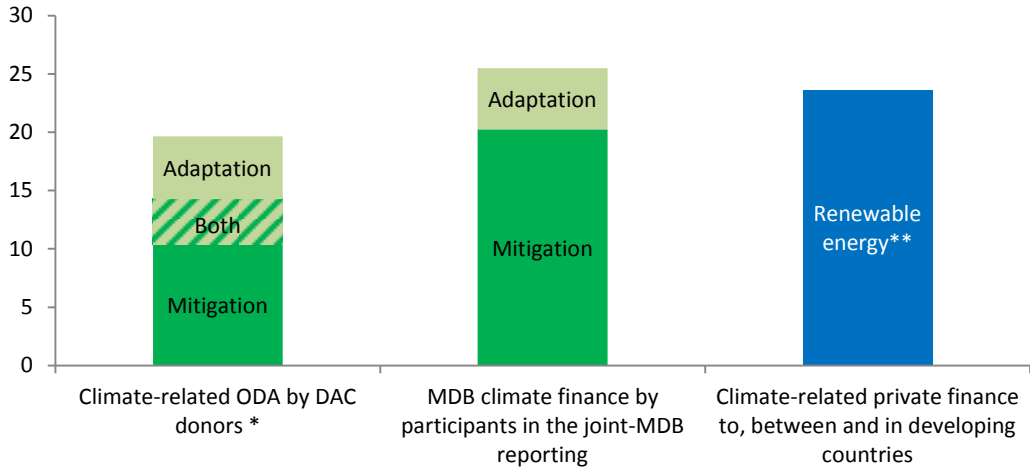
1.1 Background

Tracking private climate finance, together with public climate finance, is a key task in monitoring progress in global efforts to address climate change. Information about levels of climate finance and investment can help broadly assess the extent to which these efforts are being scaled up globally to support the transition towards low-carbon, climate-resilient economies (LCCR). It is also needed to help address some of the specific data and information needs under the United Nations Framework Convention on Climate Change (UNFCCC), including the measurement, reporting and verification (MRV) of climate finance support mobilised for developing countries.

Efforts to date to improve climate finance data availability, quality and coverage have mainly focused on public finance from developed to developing countries. In that context, a number of international monitoring and/or reporting initiatives and systems provide data and information on mitigation- and adaptation-specific public finance, including the OECD Development Assistance Committee (DAC) Statistical System and joint reporting by a group of-Multilateral Development Banks (MDBs).

Figure 1. Illustration of availability of comprehensive data series on climate-specific finance to developing countries

(USD billion commitments, annual average based on 2011 and 2012 data)



* ODA can be both bilateral and multilateral, leading to a partial overlap between OECD DAC and joint-MDB reporting.

** Private asset finance, venture capital/private equity, corporate debt and grants to six renewable energy sectors (wind, solar, marine, small hydro, biomass, geothermal) above given capacity thresholds e.g. >1MW capacity for solar and wind.

Note: Data sources use different definitions of 'developing' countries (i.e. ODA = DAC recipients, joint-MDBs = varies by each MDB, and renewable energy = World Bank's low- and middle-income countries based on GNI per capita).

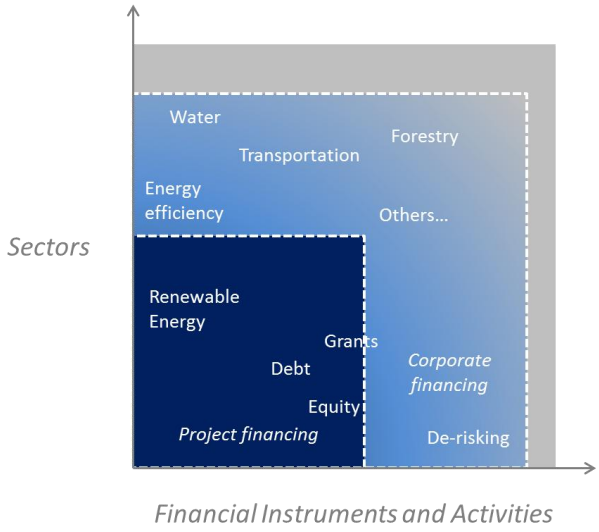
Sources: OECD Development Assistance Committee (OECD, 2014a), Multilateral Development Banks Joint reporting (MDBs, 2013, 2012a,b), Bloomberg New Energy Finance (BNEF, 2014).

On the private side, fundamental data gaps remain. As illustrated by Figure 1, data coverage of private flows to large renewable energy projects and activities is relatively good, since the inherent nature of these technologies makes them easier to identify and isolate. However, comprehensive data series on private finance for mitigation activities and sectors that are more context- or condition-specific (e.g. energy efficiency, transport, water and forestry) are not readily available. For adaptation, which depends significantly on context, the lack of data is even more acute.

1.2 Objectives

This paper aims to facilitate an improved mapping of total private climate finance. To this end, the analysis investigates possible options for expanding future coverage across two dimensions by: (i) broadening sectoral coverage by looking at the availability of data in climate-relevant sectors and activities other than renewable energy (e.g. water, waste, forestry, and transportation); and (ii) expanding the coverage of financial activities and instruments (e.g. beyond asset financing). These two dimensions are illustrated in Figure 2 below.

Figure 2. Increasing data coverage across sectors, financial instruments and activities



In addition, this study also aims to outline scoping work towards addressing some of the remaining gaps and inconsistencies identified, by suggesting possible approaches to isolate and extract climate-specific data. In the short term, the possible benefits from this work are to encourage reconciliation of existing and potential data sources on private climate towards more compatible and comprehensive measurements, including integration with on-going efforts to collect and collate climate finance data. This in turn would help inform an improved mapping of climate finance. In the mid-/long-term, findings from such analysis as well as any follow-up work could provide relevant input to on-going and future developments of monitoring and reporting systems towards systematic and comprehensive private climate finance data coverage e.g. in the fields of development finance and foreign direct investment (FDI).

It is important to point out that enhanced data on the volume and characteristics of private climate finance itself is necessary, though not sufficient, for understanding and measuring its mobilisation by public interventions. Addressing this second order question, which requires analysing issues such as causality, is not covered in this report. Instead, this analysis focuses on the preliminary step of exploring data availability for private climate finance altogether. Improving the overall coverage of private climate finance and the understanding of its interaction with public interventions will then allow for improved estimations of publicly mobilised private finance.

1.3 Methodology

In order to accomplish these objectives, the report reviews and compares a number of commercial and public databases on private finance. Key steps taken to initiate this assessment, explained in more detail in the subsequent subsections, involved:

- Selecting review and comparison criteria.
- Identifying definitional and methodological reference points from key data sources that track climate finance or investments and finance more broadly.
- Identifying potential data sources to address current gaps in private climate finance data.

1.3.1 Selecting review and comparison criteria

The following review and comparison criteria were developed and chosen in light of both broad information needs for tracking overall finance to LCCR activities as well as more specific data needs relating to MRV of climate support under the UNFCCC. For the latter, this was in part informed by relevant reports that discuss the information needs and reporting guidelines under the Convention (e.g. ODI, 2014b; Caruso and Ellis, 2013; Clapp et al., 2012).

The review and comparison criteria broadly focus on analysing the following four themes:

- Use of sectoral classification systems (e.g. scope and granularity of data).
- Coverage of private finance transactions (e.g. corporate or project financing) and instruments (e.g. grants, debt, equity, de-risking).
- Definitions and methods for categorising finance as private and identifying its geographic origin (e.g. treatment of intermediaries).
- Data access restrictions and methodological transparency.

1.3.2 Identifying definitional and methodological reference points

Ideally, a single definitional reference point would be used as a benchmark to assess the performance of the reviewed data sources across the review and comparison criteria. This was not possible due to the absence of a single internationally-agreed definition of climate finance. Thus in order to provide a frame of reference for this analysis, the practices and coverage of reviewed databases are assessed alongside the definitions and methodologies utilised by: (i) a range of known initiatives that monitor, report or collate climate finance data; and (ii) other relevant institutions that track broader financial data. The first group includes Climate Policy Initiative (CPI), the OECD DAC, BNEF, joint-reporting by MDBs and the IDFC. The second group includes a number of other institutions or initiatives working with financial data more broadly, such as the International Monetary Fund (IMF), Eurostat, the United Nations Statistics Division (UNSD) as well as various OECD statistical bodies. The analysis references definitions and methods they use for issues that are not specific to climate finance, such as possible options to define what is “private” and to attribute flows by their geographic origin.

Although the measurement of public climate finance is out of scope of this study, the analysis includes reference points that cover public finance. This is because many of the definitional and methodological considerations at stake are common to the measurement and reporting of both public and

private finance. Furthermore, much more effort has been placed to date on monitoring public climate finance than private. This explains why a number of definitions of what qualifies as a "climate" project or activity have been developed in relation to public climate finance. Public finance tracking efforts therefore provide useful starting points in terms of definitions as well as data collection methods and systems. Finally, it should also be kept in mind that the end-purpose of trying to better measure private finance is to enhance the understanding of its interaction with and mobilisation by public interventions (finance and policies).

1.3.3 Identifying potential data sources

Desktop research and consultations with colleagues at the OECD Directorate for Financial and Enterprise Affairs, Economics Department, Development Centre and Development Co-operation Directorate (all of which make use of finance-related commercial databases and/or public data sources) allowed the identification of a number of relevant data sources to investigate as part of this study. As a result of this process, the data sources listed in Table 1 below were selected for the review and comparison exercise. They consist of both commercial and public data sources, although more time and efforts were spent on the former given that, in contrast to public data sources, access to data and underlying definitions and methodologies is typically restricted to paying subscribers. While not intended to be exhaustive, this review aims to cover a wide enough range of data providers to enable drawing relevant conclusions regarding the use of such databases for tracking private climate finance.

Table 1. Private finance databases reviewed

TYPE	PROVIDER	DESCRIPTION
Commercial databases	Bloomberg	Bloomberg Professional ('Terminal') database on equity and fixed income transactions
		BNEF database of clean energy and carbon investments (equities, corporate and asset-backed bonds, syndicated debt, VC, PE and M&A)
	Dealogic	Database of global equity and fixed income transactions
	Financial Times	fDi Markets database of cross-border greenfield investments
	FactSet	FactSet's databases on private equity transactions, M&A, and private company ownership
	Preqin	Private Equity and Venture Capital modules of alternative asset funds and deals
		Infrastructure investments and fund module
	Thomson Reuters	ThomsonOne database of project finance transactions, PE and VC, as well as M&A data
		Eikon database of bond issuances/holdings and Point Carbon database of global carbon markets/projects
Public databases	OECD	Directorate for Financial and Enterprise Affairs' aggregate FDI statistics
	United Nations Conference on Trade and Development	FDI statistics including a one-time attempt (in 2010) to measure low-carbon FDI
	World Bank Group	Private Participation in Infrastructure (PPI) Database (including PPI Renewable Energy Database)*
	UNEP Risø Centre	Clean Development Mechanism project pipeline.

* The World Bank PPI database is included in the scope of this analysis due to its cross-institution coverage as opposed to focusing on the World Bank's role as an individual finance provider.

Note: PE = Private equity, VC= Venture capital, M&A= Mergers and acquisitions, FDI = Foreign direct investment.

The scope of data providers reviewed as part of this exercise is limited to those providing systematic data across multiple countries (covering both cross border and domestic finance), investors and financiers. Individual countries and providers of finance whether public (e.g. national or multilateral public banks) or private (e.g. commercial banks, private equity funds) were therefore not considered as data sources. The rationale for this choice relates not only to the practical challenges of reaching out to individual stakeholders, but more fundamentally to the core focus and scope of this work being to identify existing comprehensive data series rather than alternative ways of collecting primary data. Annex 2 provides a complementary list of data sources that fall within this scope and were initially considered but not reviewed due to their lack of comprehensive data on private finance beyond renewable energy, and/or difficulties in gaining access to the required information in the required timeframe.

While not within the scope of this report, it is worth noting that a number of institutions collect information on private co-financing associated with public interventions. This includes efforts by public financial institutions such as individual MDB's or bilateral finance institution's (BFIs) records of projects they finance, the Multilateral Investment Guarantee Agency's public database of guarantees issued to private actors and the Global Environment Facility's (GEF) ad-hoc data on project-level private co-financing. However, such information is not always publicly-available. For a more detailed discussion of public financial institutions' efforts to capture private co-financing, see Caruso and Ellis, 2013. Additionally, the OECD DAC conducted a survey of development finance institutions on the private finance mobilised by guarantees for development over 2009-2011, which included a flag for climate-relevance of the guarantee (Mirabile et al., 2013). This might lead to systematic data collection moving forward. There have also been efforts by non-governmental organisations to collate bottom-up data on private co-financing associated with individual transactions or projects from publicly available sources. For example, the Overseas Development Institute's compilation of private co-financing associated with 17 public interventions to date (ODI, 2014a).

2. REVIEW AND COMPARISON OF POTENTIAL DATA SOURCES

This section highlights the scope, data coverage and methods of the data sources and databases reviewed in relation to the four thematic areas outlined in the methodology section.

2.1 Use of sectoral classification systems

Estimating the volume of private climate finance requires both definitions of the activities that can be considered "climate" and the ability to isolate these activities within broad financial datasets. To this end, this section examines how activities are classified within commercial and public databases. This involves assessing the scope of such classification systems i.e. how relevant are the categories they use in relation to climate activities, and how separable are mitigation- and adaptation-specific transactions from other activities within a broad category. Although there are no internationally agreed definitions of climate finance, this analysis uses working definitions of climate activities provided by reference points to examine the extent to which these activities could be identified and isolated within the sectoral classification systems used by the data providers reviewed. This paper uses the term "climate-specific" to refer to activities that target LCCR development objectives or outcomes, and "climate-relevant" to refer to a much broader set of activities that will either positively or negatively influence GHG emissions and/or vulnerability and resilience (Buchner, et al. 2011).

2.1.1 Why sectoral classification systems are important

How financial transactions and activities are organised impacts the extent to which mitigation and adaptation activities can be identified and isolated within financial datasets. This identification and isolation is a necessary starting point for estimating private climate finance.

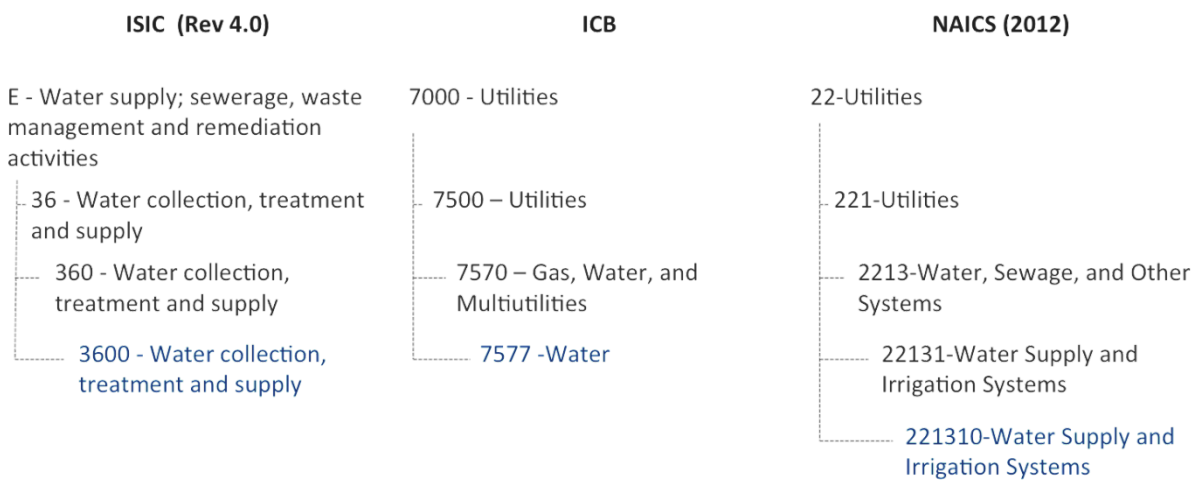
Classification systems group actors engaged in the same, or similar, kinds of production or service activities into one or more sub-groups within a hierarchical structure of parent-groups. These systems can be based either on international and national standards or proprietary methods. For instance, Figure 3 below illustrates where potentially climate-specific activities, such as the building of water desalinisation systems, might be located, though not actually isolated, within the hierarchies of three typical classification systems**:**

- The International Standard Industrial Classification system (ISIC), a publicly available international standard developed by the United Nations Statistics Division and used for example in the context of FDI statistics collected by the OECD (UNSD, 2008a).

- The Industry Classification Benchmark (ICB), a proprietary standard initially developed by the Dow Jones and FTSE, both stock-market indexing firms, and used for example by the NASDAQ, New York Stock Exchange, and commercial data providers such as Thomson Reuters (ICB, 2010).

- The North American Industry Classification System (NAICS), an international standard developed and used for national official statistics by Canada, Mexico, and the United States, as well as used by various commercial data providers such as Dealogic, FactSet, and Thomson Reuters (NAICS, 2012).

Figure 3. Sector and sub-sectors in classification systems: a lack of granularity for isolating climate-specific activities



The economy-wide and cross-sectoral nature of mitigating and adapting to climate change means that climate finance flows will not be limited to a narrow range of sectors and sub-sectors. Thus, the usage of sectoral classification systems in estimating climate finance flows requires a fundamental understanding of a particular sector or sub-sector's relationship to climate change mitigation and adaptation activities. However, these classification systems were not created specifically for usage within the context of climate finance and investment, but rather global economic activity more broadly. This means that these systems

often lack the granularity needed to isolate climate-specific activities, i.e. those with positive mitigation and adaptation impacts. In many cases, climate-specific activities will be located within top-level climate-relevant sectors or bottom-level sub-sectors that also contain activities with minimal or even negative climate impacts. For example, the "238220 - plumbing, heating, and air-condition" subsector within the 2012 NAICS includes both technologies with clear climate mitigation benefits (e.g. solar-water heaters, air pollution scrubbers) as well as activities with little to no climate relevance (e.g. fire-sprinkler systems, drinking fountains).

On the other hand, the bottom-level NAICS sub-sector, which is represented by six digits as illustrated in Figure 3, is usefully broad to include water supply activities important to consider in an adaptation context, such as water filtration, irrigation, reservoir, and treatment systems. This also highlights the limitations of using classification systems in the context of adaptation, since the adaptation-relevance of most activities is context-specific rather than linked to the inherent nature of the activity.

Lastly, in addition to the uncertainties surrounding the definition of the specific activities that can be considered as climate finance, it is also unclear what activities are to be included throughout the value-chain. Taking solar photovoltaic panels as an example, classification systems could allow for the identification of activities relating to: (i) research and development; (ii) manufacturing (of both component parts and final assembly of the entire product); (iii) wholesale and/or or retail trade; (iv) installation and construction; and subsequent (v) electrical power generation. As investments across the entire value chain are necessary for the desired global scaling-up of solar PV generation capacity, it is unclear where to delineate the boundary of climate finance.

2.1.2 Sectoral and activity classifications used by relevant reference points

Existing data sources on climate finance categorise activities as climate-specific based on their own lists of mitigation and adaptation activities. In some cases, reference points only focus on a sub-set of activities, such as BNEF for "clean energy". The definitions developed by reference points include activities such as "improving resilience of coastal infrastructure" or "reduction of non-energy GHGs from production processes" (CPI, 2013; IDFC, 2013; Joint-MDBs, 2013; OECD, 2013). Unfortunately, these are not the types of activities on which international or national classification systems are based. Nevertheless, these lists of mitigation and adaptation activities are helpful in identifying the broad sectoral areas or sub-sectors within which these climate-specific activities are likely to be located.

As an example, Table 2 below collates major sectors that contain activities relevant to sustainable transportation from those used by CPI, the OECD DAC Creditor Reporting System (CRS) "Rio Markers", and the joint-MDB reporting[1], and presents these alongside their related sub-sectors within NAICS. Here, NAICS (rather than other standard or proprietary classification systems) was chosen merely to illustrate some of the typical benefits and limitations associated with using classification systems to identify climate-relevant transactions.

While demonstrating that classification systems do contain relevant sub-sectors, Table 2 highlights that they most often do not provide the required granularity to identify and isolate the climate-specific activities as defined by existing reference points tracking climate finance. An illustration of related NAICS activities across all of the collated mitigation-relevant sectors used by the definitional reference points can be found in Annex 5.

[1] See Annexes 3 and 4 for a comparative overview of the mitigation and adaptation "climate-relevant" definitions or activity-lists used by CPI, the Rio Markers, and the joint MDB reporting initiative.

Table 2. Identifying mitigation-relevant activities in NAICS, example of transportation

SECTOR	EXAMPLES OF CLIMATE-RELEVANT ACTIVITIES[2]	NAICS 2012 SECTOR	NAICS 2012 EXAMPLE
Transportation	Public transit (e.g. metro, trains, tracks, tramways, subways, buses, non-motorised). Freight (e.g. rail, air, ports). Urban development. Transport planning and management.	48-49 Transportation and Warehousing	485112 Commuter Rail Systems
			485113 Bus and Other Motor Vehicle Transit Systems
			485119 Other Urban Transit Systems (e.g. subway, trams, light rail)
			481112 Scheduled Freight Air Transportation
			481212 Non-scheduled Chartered Freight Air Transportation
			482 Rail Transportation
			483111 Deep Sea Freight Transportation
		54 Professional, Scientific, and Technical Services	541320 Urban planning services
			541330 Traffic engineering consulting services,
			541614 Transportation management consulting services

Source: Buchner et al.(2013), OECD DAC-CRS Database (OECD, 2014a), joint-MDB reporting (Joint-MDBs, 2013), IDFC reporting (IDFC, 2013), NAICS codes from U.S. Census Bureau (NAICS, 2012).

Table 3 below presents a similar table for two adaptation-relevant sectors (water and infrastructure) identified by reference points. An illustration of related NAICS activities across all of the collated adaptation-relevant sectors used by the definitional reference points can be found in Annex 6.

These tables highlight the level of interpretation needed to draw relationships between existing definitions of climate activities and the taxonomies of classification systems such as NAICS. For instance, “water” and “infrastructure” as used in the context of adaptation by the reference points are not sectors as such, but could involve the construction, alteration, and rehabilitation of infrastructure across multiple sectors. Within these categories, adaptation-relevant finance would be related to investments in new climate-proofed infrastructure or buildings (greenfield investment) as well as alteration or rehabilitation of infrastructure to enhance resilience or adapt to climate change.

This poses significant challenges for accounting for adaptation finance, since the additional contextual information that would be required is usually not contained in project or transaction descriptions. Additionally, while some reference points (e.g. the joint-MDB reporting) try to capture the share of public finance related with only the climate-specific sub-component of larger projects, such disaggregation and analysis is not possible for private finance using classification systems alone.

[2] These activities were drawn from the definition and methodology sections of the following reports (CPI, 2013), (IDFC, 2013), (MDBs, 2013), as well as by backtracking Rio-Marked mitigation activities to their sector from DAC CRS (OECD, 2013).

Table 3. Identifying adaptation-relevant activities in NAICS, example of water and infrastructure

SECTOR	EXAMPLES OF CLIMATE-RELEVANT ACTIVITIES[3]	NAICS 2012 SECTOR	NAICS 2012 EXAMPLE
Water	Sanitation Water supply and management Improvement in catchment management planning and regulation of obstructions. Domestic rainwater harvesting equipment and water storage Rehabilitation of water distribution networks	23 Construction	237110 Water and Sewer Line and Related Structures Construction (e.g. storm sewers, water desalination plants, storage tanks and towers, utility lines, water wells)
		54 Professional, Scientific, and Technical Services	541620 Environmental consulting services
		92 Public Administration	924110 Administration of Air and Water Resource and Solid Waste Management Programs (incl. water, waste, and sanitation control agencies)
Infrastructure	Building of dikes Mangrove planting to build a natural barrier Improve the resilience of existing infrastructure (e.g. water, transport, energy, tourism, waste, and human settlements)	23 Construction	237990 Other Heavy and Civil Engineering Construction (incl. dike and other flood control structure construction, breakwaters, levees, shore protection etc.)
			237130 Power and Communication Line and Related Structures Construction
			237310 Highway, Street, and Bridge Construction (incl. raised highways, resurfacing),
			236220 Commercial and Institutional Building Construction (incl. hotel construction, renovation, and alteration.)
		56 Administrative and Support and Waste Management and Remediation Services	561730 Landscaping services (incl., bracing, planting, trimming, hydro-seeding)
		72 Accommodation and Food Services	721110 Hotels (except Casino Hotels) and Motels

Source: Buchner et al. (2013), OECD DAC-CRS Database (OECD, 2014a), joint-MDB reporting (Joint-MDBs, 2013), IDFC reporting (IDFC, 2013), NAICS codes from U.S. Census Bureau (NAICS, 2012).

2.1.3 Sectoral and activity classifications used by reviewed data sources

The commercial and public databases reviewed in this paper all contain at least partial data on private finance flows across a wide range of sectors that include and have the potential to complement existing climate-relevant financial data on the renewable energy sector. Thus, the core challenge lies in identifying and isolating climate-specific activities within broader climate-relevant sectors. Whether and the extent to

[3] These activities were drawn from the definition and methodology sections of the following reports (CPI, 2013), (IDFC, 2013), (MDBs, 2013), as well as by backtracking Rio-Marked adaptation activities to their sector from DAC CRS (OECD, 2013).

which this can be done in practice depends on the classification system used by a particular dataset. Table 4 presents the sectoral classification systems used by the commercial and public data providers considered in this paper.

Table 4. Classification systems used by reviewed databases

PROVIDER	DATABASE	MODULE	CLASSIFICATION SYSTEMS USED (LEVEL)
Thomson Reuters	ThomsonOne	Project Finance	Non-standard: sector, sub-sector
		PE/VC	VEIC*, SIC (4 digits), NAICS (6 digits)
		Debt	SIC, NAICS
	Eikon	Bonds	ICB*, SIC, NAICS
FactSet	FactSet	PE/VC	FactSet (mapped to SIC), SIC (4 digits), NAICS 2007 (6 digits)
Preqin	Preqin	PE/VC	Non-standard*
		Infrastructure	Non-standard*
Financial Times	fDi Markets	fDi Markets	Non-standard*
OECD	OECD.*Stat* FDI	FDI	ISIC 3.1, 4.0 (2 digits publicly available)
Bloomberg	Bloomberg New Energy Finance	Asset Finance	Non-standard*
		PE/VC	
		Corporate Debt	
		Grants	
	Bloomberg Professional	Fixed Income	BICS*, GICS*, ICB*
		Equity	
Dealogic	Dealogic	Loan Analytics	SIC, NAICS
		ECM Analytics	
UNEP Risø	CDM/JI Pipeline Analysis Database	CDM Pipeline	Non-standard: CDM type, sub-type
UNCTAD	UNCTAD FDI Statistics	World Investment Reports	ISIC 3.1 (2 digits publicly available)
World Bank	Private Participation in Infrastructure Database	Project Database	Non-standard: Energy, Telecom, Transport, Water and Sewerage

Notes: * = denotes proprietary classification systems where limited or no-mapping is available. **BICS** = Bloomberg Industry Classification System; **GICS =** Global Industry Classification Standard (Morgan Stanley and Standard & Poor's); **ICB** = Industry Classification Benchmark (FTSE); **ISIC** = International Standard Industrial Classification (United Nations Statistical Division); **NAICS** = North American Industry Classification System (Canada, Mexico and the US); **SIC** = Standard Industry Classification (US); **VEIC**= Venture Economics Industry Codes (Thomson Reuters).

Classification systems used by commercial and public databases usually contain at least one international or national standard-based system that allows for mapping correspondence between different classification systems. Thus, should LCCR activities be identified and isolated within one system, these can for the most part be used to identify corresponding activities across taxonomies. This would allow for similar data (e.g. project level equity flows) to be broadly compared for a given sector across data providers as well as examined for compatibility with complementary data (e.g. PE/VC flows).

Data providers typically assign actors (e.g. corporations) to one or more sector(s) based on the main areas of economic activity in which the actor is involved, ideally based on sources of revenue. These actor-level assignments can then be used to identify transactions to, from, or between actors in sectors of interest. Some data providers source their assignments from third-party providers such as Bureau van Dijk, WorldScope or Compustat[4]. For data providers that allow for self-reporting of transactions, such as Preqin's PE and Infrastructure databases, sector information can be entered directly by finance providers and investors.

However, classifying actors into sectors is not always straightforward in practice. This is especially the case for actors engaged in multiple types of activities, such as financial institutions and intermediaries (e.g. investment banks, PE/VC funds), which are typically classified into a "financial services" sector. This can also be the case for enterprises that generate revenue from multiple lines of business, such as a construction company that is engaged in both climate and non-climate-relevant activities or operates within multiple climate-relevant sectors such as water and power infrastructure. Most databases allow for querying based on the primary sector code, determined based on importance or revenue generated, or all sector codes assigned to that actor. This can mean that the same actor, as well as its associated investments, may appear in multiple sectors, which would need to be reconciled if aggregating data across sectors in order to avoid or at least minimise double counting.

In the context of the challenges outlined in this section, Box 1 illustrates the difficulties involved in estimating private investment into mitigation and adaptation-relevant activities across three climate-relevant sectors: power, transportation, and water. While the inherent characteristics of certain activities or underlying technologies, such as mass transit or solar, allow some climate-specific activities to be isolated within broader climate-relevant sectors, this is more often the exception than the rule. In most cases, commercial databases lack the additional qualitative and contextual information required to mark activities as having specific mitigation or adaptation benefits.

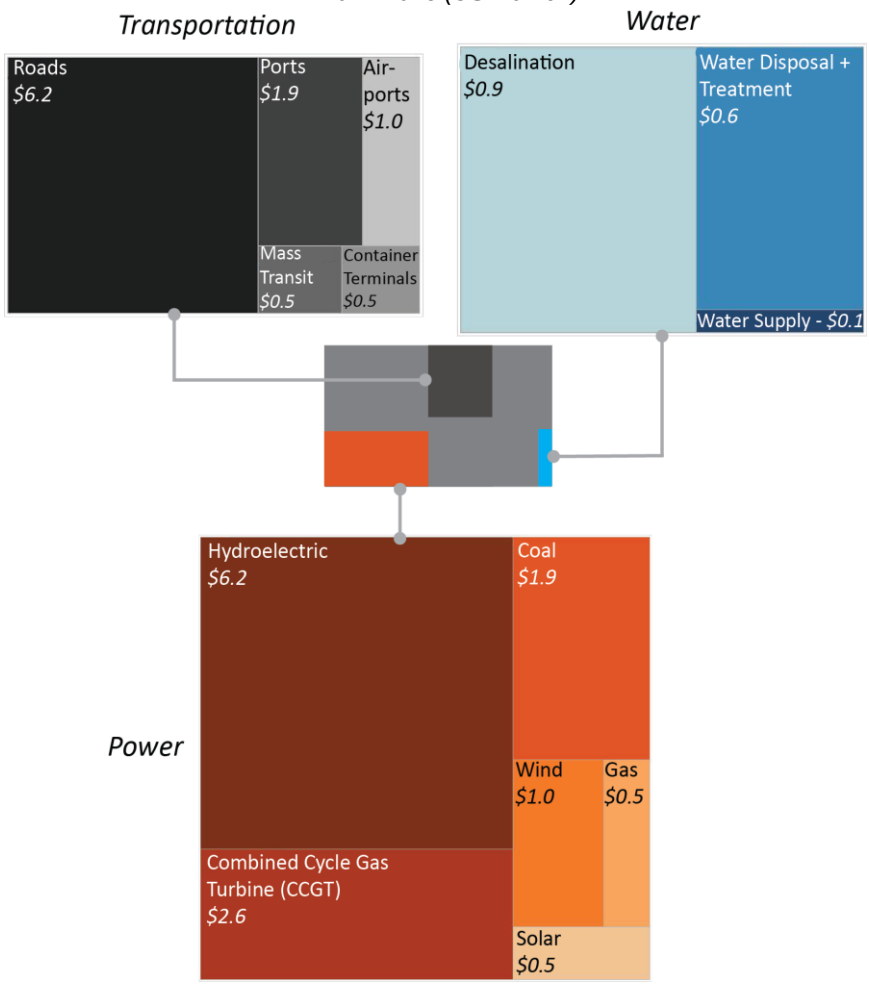
For example, not all water desalination plants will necessarily have mitigation or adaptation benefits, the determination of which would depend on their engineering specifications and geographic context. This means that even detailed post-processing will make it difficult to generate a comprehensive picture of private finance for activities whose climate-specificity depends on contextual or baseline information. This is in particular the case for activities such as adaptation, modal shifts in transportation, energy efficiency or process improvements.

[4] Bureau van Dijk contains hierarchical ownership relationships for 120 million companies globally. WorldScope, a ThomsonReuters company, and Compustat, owned by Standard & Poor's, are two examples of "meta-databases" that contain fundamental information on active and inactive companies globally such as corporate structure and relationships, geographic information, financial data, business descriptions, and industry classifications. For more information, see www.bvdinfo.com, http://im.thomsonreuters.com/solutions/content/fundamentals/, and www.compustat.com.

Box 1. Illustration of potential sectoral estimates using the data sources reviewed

The figure below illustrates the possibility of using the reviewed data sources to estimate project finance volumes in climate-relevant sectors beyond renewable energy. It is based on data from the ThomsonOne Project Finance database, which uses a non-standard industry classification system that consists of two levels only (i.e. sector and sub-sector). Flows to, between, and in developing countries recorded for 2012-2013 amount to around USD 10 billion for "transportation" (39 projects), USD 1.6 billion for "water"(10 projects), and USD 12.6 billion for "power" (34 projects) (Thomson Reuters, 2014a).

Investment into water, transportation and power sectors to, between and in developing countries in 2012-2013 (USD billion)



From the transportation sub-sectors available in ThomsonOne, "Mass Transit Systems" is the most likely to include a majority of climate-specific projects. It however only accounts for between 5% and 6% of the total volumes recorded, while investments in road infrastructure attract over 62%. Beyond the ability to track climate-specific projects, this data may also be relevant to the broader discussion on monitoring the transition from "brown" to "green" infrastructure investments.

In terms of identifying projects in ThomsonOne that correspond to available climate finance working definitions (e.g. MDBs positive list), this would require a one-by-one review of the investment projects recorded. In addition to the time required to do so, one key limitation is that the individual project descriptions available from the commercial databases are not designed to directly assess climate benefits.

Source: data from ThomsonOne Project Finance (Thomson Reuters, 2014a).

2.1.4 Potential ways forward

A key hurdle to broadening private climate finance sectoral coverage using the reviewed data sources is the challenge of isolating and extracting climate-relevant data from large datasets. To make further progress in this area, two possible approaches could be explored.

The first, a more bottom-up type of approach, would involve using existing primary data from international finance institutions (i.e. MDBs, BFIs and national development banks (NDBs)) or reporting platforms such as the DAC CRS. This would involve using transactions tagged as climate-relevant by MDBs, BFIs and NDBs and then identifying these within commercial databases to gain complementary private co-financing information for corresponding projects. However, such an approach would exclude private finance associated with projects and transactions where no public finance was involved.

The second, a more top-down approach, involves developing proxy methods to estimate private climate finance flows within broad financial data and/or sectoral classifications. In both cases, this would likely involve the use of complementary data series and information. A number of on-going efforts, such as those by the Financial Times and the London Stock Exchange (FTSE) and CBI, already use data on corporate revenues to evaluate the extent to which specific actors are involved in climate-relevant activities. To apportion the climate share of non-climate specific corporate bonds, CBI addresses the misalignment between its taxonomy of climate-specific activities and sectoral classification systems by using keyword searches of business descriptions and examining corporate revenue reports. This approach allows CBI to examine the financial transactions of actors that are engaging in activities that fall within its own climate-specific taxonomy (Oliver and Boulle, 2014).

Furthermore, there have been a number of past attempts to determine and define "green" or climate-specific sub-sectors within classification systems. Such efforts, a selection of which are summarised in Table 5, were produced in a variety of contexts and based on methods ranging from manual identification to survey-based approaches.

Table 5. Selected exercises mapping classification systems to green or climate-specific definitions

INSTITUTION	YEAR	DESIGNATION	CONTEXT	SYSTEM(S)	SCOPE
Eurostat	2009	Environmental Goods and Services Sector (EGSS)	EU official employment and economic statistics on EGSS	CPC 1.0, ISIC 3.1, NACE 1.1	Products, services
OECD	2013	Customised List of Environmental Goods (CLEG)	International trade	HS 2007 (6-digit)	Products
OECD	2008	Green-FDI	Estimating green FDI	ISIC 3.1	Products, services
U.S. BLS	2011	Bureau of Labor Statistics (BLS) Green Goods and Services (GGS)	Official GGS-related employment statistics	NAICS (6-digit)	Products, services
WTO	2005	Synthesis of submissions on environmental goods	International trade	HS (4- or 6-digit)	Products

Source: Eurostat, 2009; OECD, 2014, 2013, 2008; U.S. BLS, 2011; WTO, 2005.

Of particular note is the U.S. Bureau of Labor Statistics (BLS) approach for measuring employment in Green Goods and Services (GGS) sectors. Essentially, BLS takes a hybrid approach of the bottom-up and

top-down options outlined here by (i) identifying the relevant NAICS sub-sectors potentially engaging in green goods and services (BLS identified 325 sub-sectors and their corresponding 6-digit NAICS codes), and then (ii) surveying a sample of business establishments within those sub-sectors to determine the share of their revenue from GGS products (US BLS, 2013; 2010). The BLS then used the revenue share as "a proxy for the share of the establishment's employment associated with the production of GGS" noting that their research and field testing found that "revenue share is both a reasonable proxy and collectable" compared to surveying green employment directly.

More broadly, potential ways forward for improved sectoral coverage of private climate finance data are tentatively summarised and illustrated in Table 6 below.

Table 6. Examples of possible options for expanding private climate finance sectoral coverage

	MONITORING AND REPORTING	PROXY ESTIMATION
Bottom-up	Match climate projects or activities identified by public finance providers (e.g. OECD-DAC Rio Markers, joint-MDB, IDFC) with corresponding transactions in commercial databases to collect complementary private co-financing data.	Use granular sector-, country-, and/or technology-specific data (e.g. installed capacity, sales data, trade flows) for climate-relevant products and activities in combination with average unit costs assumptions to estimate adaptation- and mitigation -relevant investment.
Top-down	Identify climate- relevant or specific activity sectors and sub-sectors within international standard classification systems (e.g. ISIC for FDI data).	Apportion aggregate financial data (e.g. gross fixed capital formation, FDI, value of corporate bond issuance) using relevant environment or energy related coefficients (e.g. environmental data series on emissions or energy intensity, share of clean energy in corporate revenue data.)

A number of these options have already been put into practice. For example, Ren21 estimates the amount of total investment in the small-scale solar heating sub-sector using installed capacity data from the International Energy Agency's Solar Heating and Cooling Programme (Mauthner and Weiss, 2013) combined with assumptions on average technology unit costs (REN21, 2013).

The appropriateness of these different approaches will depend on their intended use, which will be discussed in Section 3 in relation to implications for different climate finance data needs. It is also important to keep in mind the costs implications associated with complex monitoring and reporting or estimation methods that require significant data and post-processing.

2.2 Coverage of private finance transactions and instruments

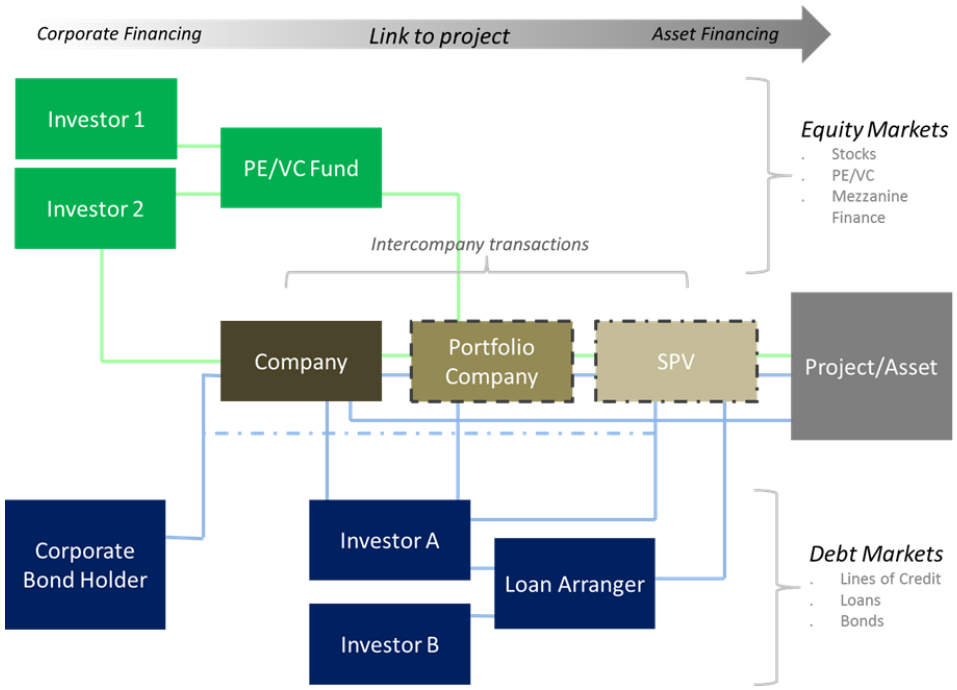
Public and private actors use a broad range of financial instruments to finance LCCR activities in developing countries.[5] These instruments and transactions are used throughout the financial value chain, including upstream private finance and investment into companies and funds as well as downstream into projects or assets. The choice and structure of these instruments and their point of entry in the financial value chain will vary according to specific factors related to the country (e.g. policy and regulatory frameworks, depth of financial markets, risk factors, level of economic development) and technology (e.g. maturity, lifespan, size, capital intensity). This section investigates the importance and practicality of measuring private finance and investment across the financial value chain, along with its touch points with public finance.

[5] While governments also support projects through a range of policy and regulatory-based instruments, the focus of this report is on financial instruments, which are required to understand and estimate the mobilisation impact of the former.

2.2.1 Why coverage of instruments and transactions across the value chain is important

Limiting estimates of private climate finance to a sub-set of financial activities (e.g. project finance) along the financial value chain can lead to improperly estimating and mischaracterising total financing. For instance, public finance provided upstream may appear as private finance further downstream, and vice versa. This mischaracterisation can in particular result in overlooking public actors' direct financing and/or mobilisation of private finance upstream. This is because public financial instruments (e.g. debt, equity, and related de-risking instruments) can be involved in transactions at the corporate-, fund- and project-levels, as illustrated in Figure 4.

Figure 4. Illustration of the relationship between corporate and project financing across the financial value chain



Note: PE/VC = private equity / venture capital, SPV = special purpose vehicle.

Box 2 further illustrates the different types and importance of upstream and downstream transactions that can be involved in climate financing, using the case of institutional investors in green infrastructure. However, climate finance is sometimes reported only in terms of financial instruments used in project-level transactions (e.g. CPI Landscape of Climate Finance). While the direct mitigation and/or adaptation benefits are easier to determine at the project-level, a narrow scope limits estimates of climate-finance to only a sub-set of financial transaction types.

Beyond the delineation of corporate-, fund- and asset-level transactions, sub-transaction types such as mergers and acquisitions (M&A), refinancing or disinvestments (e.g. PE portfolio exits) can also be important in the accounting context. For instance, some financiers may support a project by refinancing and providing lower-cost debt once construction is complete and the associated risk diminishes. While such financing may not fund the construction of a project or asset, it plays an important role in improving the perceived risk-return profile of LCCR investments, thereby participating in enhancing the confidence of first round financiers and investors.

In relation to estimating private climate finance, both investments and disinvestment may provide useful insights. For instance, it would be hard to judge whether levels of finance are consistent with meeting a national climate investment plan using gross inflows into companies or PE/VC funds without contextualising this with the corresponding value of outflows e.g. withdrawals or disinvestment.

Box 2. Institutional Investors Involvement across the Financial Value Chain

Recent OECD analysis of actions governments can take to mobilise green infrastructure finance from institutional investors underpins the importance of monitoring upstream flows. The analysis identified three main transaction channels for institutional investors to finance green infrastructure: corporate investment, direct project investments, or investment through funds or vehicles (Kaminker et al., 2013). These transactions occur at upstream and downstream points along the financial value chain, with some having little or no direct connection to project-level assets.

Institutional investors' involvement in green infrastructure across the financial value chain

TRANSACTION LEVEL	CONNECTION TO PROJECT	EXAMPLE
Corporate	· None to indirect	· Purchase by an investor of company shares (equity) or bonds (debt) · Provision by a bank of a loan (debt) to that same company
Funds and Vehicles	· None to indirect	· Investment in pooled vehicles or private equity/venture capital funds
Project	· Direct	· Purchase by an investor of shares (equity) or bonds (debt) linked to a project's asset · Provision by a bank of a loan (debt) to that same company

Source: Adapted from Kaminker et al., 2013.

Monitoring and reporting such upstream indirect or semi-direct investments is relevant because they play an important role in filling the climate finance and investment gap, in particular by:

- *Providing* funds for corporations (e.g. utilities) and funds to then invest directly downstream in low-emission climate resilient infrastructure projects and assets;
- *Aggregating* small projects and packaging them with public credit enhancement mechanisms to better match investor appetite;
- *Increasing* accessibility of certain project types to smaller investors lacking expertise in assessing project-associated risks (e.g. technological, political) and due diligence;
- *Financing* the strengthening and development of actors in climate-relevant industries and trade sectors. This is needed in order for ensuring the necessary capacity building in those industries and sectors that are required to supply low-emission climate resilient technologies, solutions and services (Kaminker et al., 2013; Nelson and Pierpont, 2013; and OECD, 2012a).

2.2.2 Coverage of private finance instruments and transactions by reference points

Current estimates and analysis of climate-relevant private finance are mainly limited to project-level financing in the renewable energy sector, as for instance presented in the CPI Landscape of Climate Finance, based mostly on BNEF data. This however does not reflect the fact that BNEF and other data providers also track corporate-related investments (e.g. PE/VC, corporate debt), providing users with some ability to monitor these upstream flows. For example CBI measures not only project but also corporate level climate-relevant bond issuances using Bloomberg Professional (a separate Bloomberg product from

BNEF). Considering that project-level bonds currently represent less than 3% of total value of climate bonds reported by CBI in its 2013 "Bonds and Climate Change" report, monitoring corporate-level issuances is vital to properly analyse the role of bonds in financing climate-relevant investment in the other 97% of issuances (CBI, 2013). However, Bloomberg Professional does not tag climate-relevant transactions, which requires CBI to invest significant efforts in identifying, classifying and apportioning climate bonds, including those that are publicly-backed (the majority) versus those that can be considered as fully private.

The reference points also draw distinctions based on a number of other characteristics related to financial transactions. These include the distinction between measuring flows, reported as positive or negative values over a reference period, versus stocks, which measure accumulated flows at the end of a reference period. Here, the clear focus of all reference points is on gross flows (i.e. new investments or provision of finance during a given period). Some reference points also provide complementary information on disinvestments (e.g. FactSet), mergers and acquisitions (e.g. BNEF) and debt/loan reimbursements (e.g. CBI, OECD DAC), which can make it possible to calculate and report net flows for a given period and, possibly, actual stocks at a given point in time. An additional characteristic relates to whether financing is reported at the time of commitment or disbursement. For instance, the OECD DAC tracks both commitments and disbursements, the joint-MDBs report based on commitments, and BNEF tracks commitments and financial closure.

2.2.3 Coverage of private finance instruments and transactions by reviewed data sources

The databases reviewed capture a vast amount of at least partial data on a sub-set of the private finance instruments and transactions that are financing the transition towards LCCR development. As summarised in Table 7, the analysis found that in the debt capital markets, partial data are available for bonds, project-finance, and syndicated loans. These data sometime include qualitative information on the presence of or intended use of these instruments to function as export credits, revolving credit facilities, or guarantee facilities. Data coverage of the equity capital markets mainly consists of project-level equity financing and PE/VC transactions into portfolio companies (though not always the companies, projects or assets that the portfolio companies may themselves go on to finance). Some data sources also track grants provided by a number of private academic, research, and philanthropic organisations.

However, significant gaps in private finance coverage remain in the areas of (i) de-risking instruments (e.g. insurance, guarantees), (ii) small scale, more informal transactions (e.g. microcredit, household spending) and (iii) certain intercompany transactions (e.g. corporate self-financing). Furthermore, not all data providers disaggregate finance by instrument type. For example, UNEP Risø's only estimates total investment flows associated with CDM projects and the World Bank's PPI database only provide estimates of total private investment, without showing what portion was debt or equity.

Table 7. Coverage of private finance instruments and transactions by reviewed databases

Relative data availability

- ←→ +

INSTRUMENT TYPE	EXAMPLES		EXAMPLE SOURCES
Grants	Private grants		BNEF and OECD DAC (using US Foundations Center data)
Debt	Corporate loans		BNEF, Bloomberg, Dealogic, FactSet, ThomsonOne, OECD (FDI)*
	Project loans		BNEF, Dealogic, ThomsonOne, Preqin Infrastructure
	Bonds (project and corporate)		Bloomberg, BNEF, Dealogic, Eikon, FactSet
	Other, e.g. microfinance, informal loans		No systematic data
Equity	Publicly traded		Not considered in this study
	Corporate level balance sheet financing		Bloomberg, BNEF, FactSet, ThomsonOne, Preqin PE/VC, OECD (FDI)*
	Project level balance sheet financing		BNEF, Dealogic, ThomsonOne, Preqin Infrastructure
	Other, e.g. microfinance, household investment, informal		No systematic data
De-risking	Insurance		No systematic data
	Guarantees		No systematic data
	Derivatives		No systematic data
Non-equity or debt related spending	Household spending		No systematic data
	Enterprise reinvested earnings		No systematic data

Notes: * OECD (FDI) data is reported in aggregate as 'debt' or 'equity'. UNEP Risø CDM and World Bank PPI data on total investment is not disaggregated by instrument.

Grants

A handful of the commercial and public databases reviewed contained information on grants provided by a number of private academic, research, and philanthropic organisations. For instance, the US-based Foundations Center agreed in 2014 to report data it collects on around 131 000 grant-making institutions to the OECD DAC. BNEF also tracks private (as well as public) grants into companies or projects in the clean energy sector.

Debt

In terms of the possibility to monitor and report financial transactions taking place on the debt capital markets, the largest volume of data relates to corporate-level financing, mainly in the form of debt issuances in the bond and syndicated loan (provided by a group of lenders) markets. Bond data is however mainly limited to issuances, without coherent coverage of who originally purchased or currently holds the bond.

Data on the syndicated loan market usually captures basic details such as total loan amount, issuer, the mandated lead arranger, as well as other banks involved in the syndicate. However, a breakdown of the exact amounts provided by each of the banks is often not provided. For example, in a USD 100 million loan syndicate composed of two commercial banks and an MDB, it is not always possible using information provided only by these databases to determine the split between actors. Apportioning between the two would require making default assumptions. However, by combining primary data from the MDB and secondary data from the commercial databases, it may be possible to impute the total amount provided by both private banks together.

Smaller scale or more informal debt instruments, such as credit extended by microfinance institutions or loans provided by the informal financial sector, are not covered by the reviewed databases. To the extent that these types of instruments play a significant role in financing LCCR development in a given sector or developing country (see e.g. Whitley, 2014; Whitley and Tumushabe, 2014), relying on these databases alone could result in underestimating private climate finance and investment.

Equity

On the equity capital markets, the focus of this analysis was limited to upstream PE/VC transactions and downstream project-level equity rather than shares traded on public exchanges. Within this scope, PE/VC transactions represent the bulk of the data, with for instance over a hundred thousand transactions to developing countries in the FactSet dataset since the 1970s and around 5,000 in the ThomsonOne dataset in 2011-12 alone (FactSet, 2014 and Thomson Reuters, 2014a). These data series usually provide information on investors, their related funds, and the portfolio companies receiving the investment. These portfolio companies can be parent companies, subsidiaries, or special purpose vehicles (SPVs) as previously depicted in the financial value chain in Figure 4. Regardless, intercompany transactions between these actors can move this finance throughout their hierarchical structure. This finance can then be used for a range of purposes including research and development, expanding working capital, acquiring other enterprises, or can ultimately make its way into projects in the form of balance sheet financing.

Project-level debt and equity is that which is provided directly to a project or its attached SPV. Data on project-level private debt and equity is found within project-financing datasets. Project-level financing may also come from the balance sheets of project co-financiers. While difficult to reconcile completely, an analysis of BNEF asset-financing data for renewable energy projects in developing countries over 2011-12 found that the source of financing was listed as balance sheet finance close to 85% of the time. It is unclear whether this accurately reflects market trends in asset-finance or is a result of default coding. In the latter case, this would have significant implications in terms of potential mischaracterisation of finance in terms of e.g. its geographical origin or whether it is to be accounted for as public or private. As in the case of small-scale and more informal debt instruments, the reviewed databases also lack coverage of equity instruments provided by microfinance institutions or the informal financial sector in developing countries.

De-risking

None of the datasets contain systematic data on private de-risking instruments, apart from instances where certain debt or equity instruments, such as guarantee facilities, may be used to address project-level risk. Some datasets (e.g. BNEF, ThomsonOne) capture qualitative information in their descriptive or narrative sections on the presence of de-risking instruments such as private insurances. This however only provides a limited basis for assessing the role of the private sector in providing de-risking instruments to facilitate the transition to LCCR development.

Non-equity or debt related spending

There are also a number of non-equity or debt private finance instruments that can be relevant in financing mitigation and adaptation activities in developing countries. These primarily relate to internal sources of financing such as household spending and enterprises reinvested earnings. Household self-financing of cook stoves, solar water heaters, residential energy efficiency projects, rooftop solar panels, or activities that decrease climate vulnerability are examples of activities likely to be associated with this type of financing. In the commercial context, this can include corporate self-financing of wind-turbines and solar panels, demand-side energy-efficiency improvements, more efficient production and process technologies, or investments that make assets more resilient. Since these do not involve external financial transactions aside from the purchase of traded goods and services, they prove difficult to track using the types of databases reviewed as part of this study.

2.2.4 Potential ways forward

The previous sections highlighted that ignoring the value chain question prevents capturing the full range of both private finance activities and approaches used by public finance providers to mobilise private climate finance. As a possible first step, data collectors and collators could increase efforts to better highlight and present the role of up-stream financial transactions.

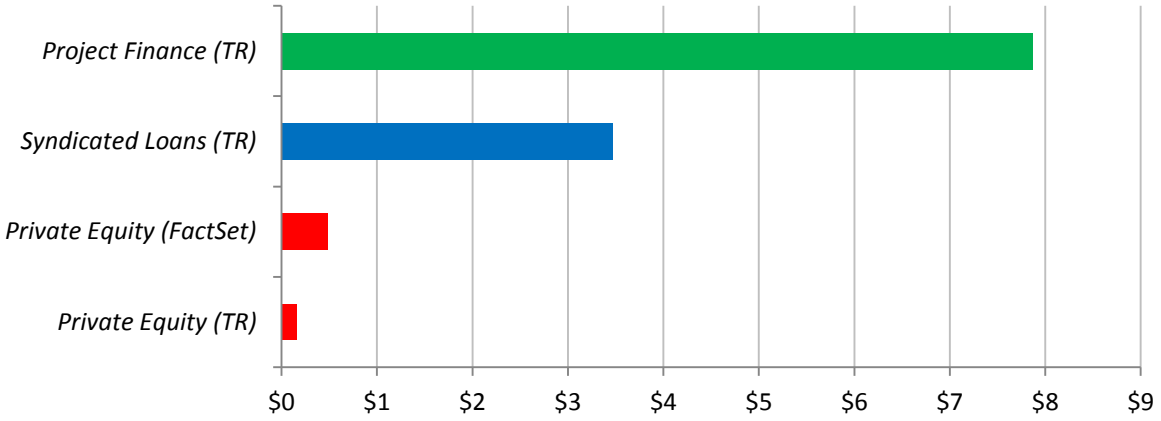
Box 3 illustrates how different data on transactions and instruments could be brought together towards providing a more complete picture of climate finance across the corporate and asset financing value chain. However, simply adding corporate-level and project-level finance would lead to partial (and possibly significant) double counting. In order to help partially address the risk of double counting, information reported on the “use of proceeds” (i.e. the issuers intended use of capital raised from the instrument) could be used for some up-stream instruments and transactions. Where available, this information could allow estimating the amount of finance expected to continue downstream, e.g. if the use of proceeds is stated as being used for “project financing”. This amount could then be subtracted from the investment amount reported at the corporate level in order to minimise double counting.

The information required for such calculations is sometimes available within commercial databases for syndicated loan deals or bond issuances, although the level of useful detail and completeness of these fields can vary widely. However, conducting this type of analysis and data post-processing in a systematic manner would have significant cost and resource implications.

Box 3. Illustration of tracking flows across the corporate and asset financing value chain

Different modules of the Thomson Reuters and FactSet databases were used to try to show the scales of transaction values that can be identified and recovered at different points along the financial value chain. This information is presented below for investment into the water and sewage sector over 2012-13.

Investment to, in and between developing countries into the Water and Sewage Sector 2012-13 (USD billion)



Note: Based on total investment into either companies or projects in developing countries in 2012-2013, as defined by NAICS 2007 'Water, Sewage and Other Systems' for FactSet and Thomson Reuters PE and Syndicated loans and the 'water and sewage' sector (including jointly-tagged projects from other sectors) for Thomson Reuter's project finance data, which is not reported in NAICS.

Beyond illustrating partial volumes of various transaction and instrument types, this highlights the need to keep in mind that such individual estimates cannot be simply added with each other and would require:

- Treating each separately and making transaction/instrument-specific market estimates. This might then enable analysis of the mobilisation impact or effectiveness of a specific type of instrument. Although needed and suited to participate in answering the broader question on financing the transition to LCCR development, such an approach does not provide a suitable basis to respond to the need to monitor and report total climate finance (public and private across transaction and instrument types) without partly counting multiple times the same volumes and not accounting for changes of ownerships.

- Relying on existing or developing relational databases that can allow following the life cycle of finance from e.g. upstream bond issuances to downstream end-points - in particular private equity investments and project finance.

Source: data from FactSet (2014) and Thomson Reuters (2014a) Private Equity and Syndicated loans.

To address remaining gaps in coverage of certain instruments and transaction types, research into relevant additional sectoral or national datasets as well as the development of proxies would need to be explored. This could include, for instance, estimating the volume of private self-financing of LCCR technologies by households and corporates using data on the trade of goods and services in combination with assumptions on underlying investment cost. This approach would however not result in instrument-specific estimates.

Furthermore, existing systems and initiatives to track public and private climate finance could place additional focus on monitoring and reporting data broken-down by transaction and instrument. This would enhance possibilities to measure and characterise climate finance across the finance value chain, and thereby allow a broader set of touch points to be identified between private finance and the provision of public finance upstream from end-projects.

2.3 Characterising public and private sector finance and assessing its geographic origin

This section examines how and to what extent the reviewed data sources enable the identification of whether actors and flows are public or private as well as attribution to their geographic origin.

2.3.1 Why characterising actors and flows is important

Understanding whether actors involved in financing LCCR activities are public or private is necessary to then measure or estimate the mobilisation of private finance by public finance and policies. Further, information on the geographical origin of finance enables highlighting the respective importance and role of domestic and foreign capital pools. More broadly, an enhanced understanding of the characteristics of financial transactions and actors involved can help governments devise more effective policies and approaches for mobilising finance for LCCR development.

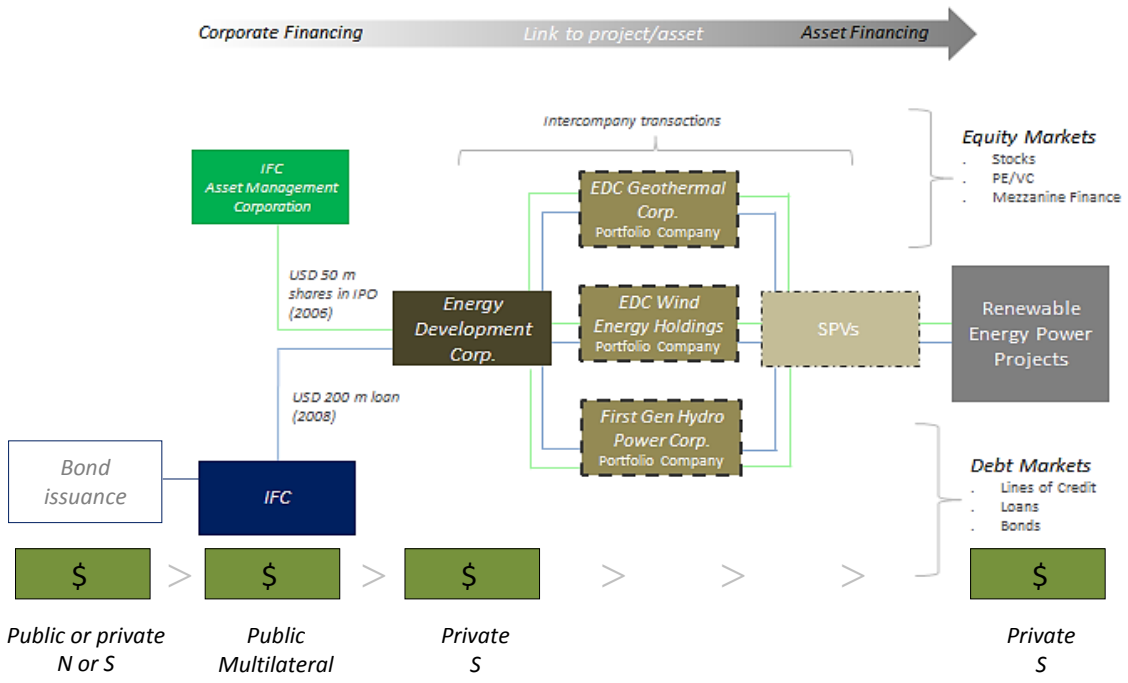
Not fully understanding, or even mischaracterising, actors and the finance they provide can lead to improperly estimating public support provided by country governments. Identifying the public or private ownership and nationality of an actor (and, as a result, of the finance it provides) is however inextricably linked to the previous discussion on the financial value chain, as the characteristics of actors and flows typically change at different points of measurement along the finance value chain.

Such analysis is further complicated by the specific structure of some financial transactions, which can impact the extent to which certain upstream interventions by public actors may appear as private finance at the asset or project level. This can include the prevalence of balance sheet financing, SPVs, holding companies, and complex financial structures such as PE funds of funds. For instance, the prevalence of balance sheet financing by SPVs in asset financing means that upstream corporate-level public finance (e.g. equity investment, bond-guarantees, purchase of common shares) may appear and be reported as private further downstream.

Correctly attributing these flows to public actors would require tracking financing activities along the financial value chain. For example, if governments provide corporate debt or equity finance at a parent-company level, such flows could be obscured through intercompany transactions with no trace of public involvement at the end project level.

Drawing on an example of upstream financing provided by the International Finance Corporation (IFC), Figure 5 highlights the importance of the point of measurement within the financial value chain when identifying the public or private nature and nationality of a specific investment. In this example, the immediate source of IFC's finance from bond issuances on the debt capital markets can be from both public and private investors in the North and the South. Once on IFC's balance sheet, the characteristics of this finance changes to being public financing from the North. However, after being provided to the Energy Development Corporation (EDC), a publicly listed company headquartered in the Philippines, this finance could be labelled as being private finance from the South until it appears in a project as balance sheet financing from one of EDCs subsidiaries, portfolio companies, or SPVs.

Figure 5. Identifying ownership and nationality of finance across the value chain



Source: BNEF (2014), FactSet (2014) and Thomson Reuters (2014a).

2.3.2 How actors and flows are characterised by reference points

Characterising actors and the finance they provide as public or private and originating from a specific country is a challenge that extends well beyond the climate finance community. For example, a clear delineation of public and private sector economic activities is a cornerstone of official statistics such as national accounts and GDP. Likewise, official international statistics on FDI require a harmonised approach for attributing finance to source and destination countries. This section distils relevant principles and practices for making these characterisations from guidelines developed by institutions such as Eurostat, the IMF, UNSD, and the OECD.

Defining the scope of analysis

In the context of determining the public or private nature and nationality of an actor, relevant reference points often start by defining the scope, or institutional unit of analysis for making such a determination. Summarised in Table 8, the institutional unit of analysis can be defined to include only the *immediate* institution, any *intermediate* institutions, or the *ultimate* institution in its scope, which may or may not be the same in all cases.

While referenced mainly in the context of finance providers, these principles can also be applied to those receiving finance. As global financial flows are increasingly driven by multinational enterprises, the importance and difficulty of defining and applying these principles also increase.

Table 8. Scope of analysis for characterising actors and the finance they provide

SCOPE	DEFINITION	EXAMPLE
Immediate	The institution directly providing the finance.	The local branch financing a specific project or transaction.
Intermediate	The immediate institution's direct parent(s).	The owner(s) of the local branch financing a specific project, asset, or transaction.
Ultimate	The immediate institution's ultimate parent(s).	The ultimate controlling parent of the local branch financing a specific asset, project, or transaction.

Identifying public and private actors

There is no single internationally accepted or standard method for defining entities as belonging to the public or private sector. In practice, definitions vary across institutions, including official definitions by governments. For instance, the IMF records the definitions of "government" used by 130 countries in the context of legal-arrangements between it and its member countries, highlighting the range of narrow to broad definitions in use (IMF, 2013). Some of these definitions, for example, include State-owned Enterprises (SOEs) in their definitions of government while others explicitly exclude them.

In order to more easily understand and compare these different definitions, the IMF has established a framework of components of government (i.e. what is to be considered as "public"), which it then uses to map various official definitions (IMF, 2001). A full reproduction of this framework is included in Annex 7. It starts with narrow definitions of government being the "budgetary central government" (GL1), to increasingly broader definitions that include the "central government" (GL2), "general government" (GL3), the "non-financial public sector" (GL4), up to the "public sector" (GL5).

Choosing the components to include as government-related (or "public") will depend on the context of the analysis. For example, the IMF sets the definition of government at the GL3 level according to its views on what is most relevant for fiscal policy and economic analysis, including in the context of metrics for its own programs (e.g. government debt ratios, GDP calculations). Under the IMF's own criteria, this excludes public financial and non-financial enterprises considered to be part of the corporate sector, although these institutions may be relevant in monitoring the fulfilment of public policy targets in other contexts such as climate finance.

In principle, actors may be categorised as being public or private based on ownership-, control-, or risk-based principles, as highlighted in Table 9. Clearly defining and applying such principles is especially important in the context of official statistics as well as international agreements that require a common reporting framework. To help ensure principles are applied consistently, a number of international statistical bodies have outlined definitions determining whether an enterprise is considered to be in the public or private sectors (Eurostat, 2013; UNSD, 2008b; IMF, 2001). For instance, to ensure that statistics on public and private sector actors are recorded in national accounts data in a comparable manner, Eurostat has established objective criteria and a decision tree (provided in Annex 8) for making this determination.

Table 9. Examples of principles for categorising actors as public and private

PRINCIPLE	DEFINITION	EXAMPLE
Ownership	Based on whole, minority, or majority holdings of shares	Government holds 51% of shares in an enterprise.
Control	Ability to exercise significant control over enterprise operations.	Government officials on supervisory or management boards; enterprise subject to government reauthorisation or review in accordance with fulfilling government mandated policy objectives
Risk	Bearing the ultimate risk in the event of enterprise default.	Creditors have a legal recourse to government assets if the enterprise cannot meet defined terms on a held security.

Institutions and initiatives that currently monitor and report climate finance use a number of these options, as presented in Table 10. For instance, BNEF has separate categories for SOEs, governments and other private financial actors, which are categorised on the basis of ownership. CBI attributes bonds based on the characteristics of the issuer regardless of whether the security is purchased by a public or private actor. While this is easier to do in the case of sovereign or MDB bond issuances, this methodology is more difficult to apply to SOEs or other mixed ownership structures. In these cases, CBI takes a risk-based approach by considering S&P rating agency assessments of whether enterprises would likely benefit from state support if they were at risk of defaulting. CBI categorises these actors as "publicly-backed" rather than strictly public or private (Oliver and Boulle, 2014).

Table 10. Examples of principles in use by relevant reference points

PRINCIPLE	INSTITUTION	DEFINITIONAL APPLICATION
Ownership	OECD	State-owned Enterprises - enterprises where the state has significant control, through full, majority, or significant minority ownership.
Control	Eurostat	Control over an entity is the ability to determine the general policy or programme of that entity.
Risk	OECD (DAC)	Official transactions- undertaken by central, state or local government agencies at their own risk and responsibility.
	CBI	Public-backed – enterprises where the government is perceived as being likely to intervene in the case of default.

Source: OECD Development Assistance Committee, (OECD, 2013a), OECD Directorate for Financial and Enterprise Affairs, (OECD, 2005); Eurostat (2011) and Oliver and Boulle (2014).

However, such principles can prove difficult to apply in a systematic manner. This is especially the case with certain financial products, joint ventures, or pooled financial structures. For example, it would be difficult to attribute flows in absolute terms where a state actor provides equity finance as a limited partner in a privately-managed PE fund receiving both public and private investments. In such cases, these principles could be used to apportion the finance provided by institutions with multiple types of upstream funders and/or shareholders. For instance, this could in some instances be done by applying an ownership-based principle by using a public actor's share in a PE fund to attribute its share of the fund's total investments.

Alternatively, one could take a risk-based approach by using the government's perceived risk burden to weight its share of the fund's total investments, as evidenced by its position in the capital structure or tranche of an enterprise or fund (e.g. senior secured loan, subordinated debt, or "C share" equities). Box 4 presents a definition used by the OECD DAC, as well as highlights some of the practical difficulties involved in applying these principles across different types of instruments and transactions.

Box 4. Applying principles in practice: the case of the OECD Development Assistance Committee

The OECD DAC CRS defines *official* transactions as those:

> "…undertaken by central, state or local government agencies at their own risk and responsibility, regardless of whether these agencies have raised the funds through taxation or through borrowing from the private sector. This includes transactions by public corporations i.e. corporations over which the government secures control by owning more than half of the voting equity securities or otherwise controlling more than half of the equity holders' voting power; or through special legislation empowering the government to determine corporate policy or to appoint directors…"

Where *responsibility*

> "covers the choice of the purpose of expenditure, the decision as to the terms of a transaction, and the acceptance of the risk involved in undertaking the transaction (i.e. meeting the loss that occurs if the recipient fails to amortise or delays payment on a loan)."

What are the implications of the OECD DAC's definition?

The DAC goes on to define private transactions as "*those undertaken by firms and individuals resident in the reporting country from their own private funds*" (OECD, 2013a). Using this risk-based principle, private finance raised via government issued bonds or debt on the capital markets would be considered as public finance. However, in interpreting this principle in the context of de-risking instruments, the DAC currently classifies private finance backed by a government guarantee as private.

Source: OECD, 2013a.

Identifying country of origin and destination

As in the case of identifying public and private actors, there is no single internationally accepted or standard method for characterising the country of origin or destination of actors and the finance they provide. In principle, this can be broadly based on the location of the specific actor or fund in question, ownership structure, centre of economic interest, and/or based on revenue. Definitions and examples of these principles are captured below in Table 11, which can be applied at the various institutional-levels outlined previously in Table 8.

Table 11. Examples of principles for geographic attribution of actors and their climate finance flows

PRINCIPLE	DEFINITION	EXAMPLE
Location	Based on the nominal location of a specific institutional unit.	Office or headquarters of the institution financing a specific transaction, asset, or project.
Ownership	Based on the nationalities of an enterprise's owners.	Nationality of the enterprises majority shareholder. Apportioning ownership amongst shareholders, or threshold thereof.
Centre of economic interest	Based on the enterprise's (and/or its parent's) main centre of economic interest.	Using revenue data to determine or apportion an enterprise's activities to specific geographies.

Table 12 presents selected examples of the principles used by climate-relevant reference points to attribute actors and flows to specific geographies. This table also shows the level of the institutional-unit or scope selected for the application of these principles. Box 5 further exemplifies how these different principles are applied in practice, using the example of an MDB.

Table 12. Examples of principles used to determine geographic attribution

PRINCIPLE	SCOPE	INSTITUTION	DEFINITIONAL APPLICATION
Location	Immediate	BNEF	*Country* - assigned based on an institution's nominal headquarters of the branch providing finance.
	Ultimate	OECD (FDI)	*Ultimate investing country* – based on the country of residence of the ultimate controlling parent (for *inflows*).
Ownership	Ultimate	OECD-DAC	*Imputed contributions to multilateral institutions* – imputing the amount of climate-relevant aid to specific countries by multiplying their share of total contributions (which are partially determined by their ownership stake) by the institution's total climate-relevant expenditure.
Centre of economic interest	Immediate	CBI	*Revenue-based* – currently exploring potential for attributing capital raised by enterprise bond issuances using geographically-disaggregated revenue data.

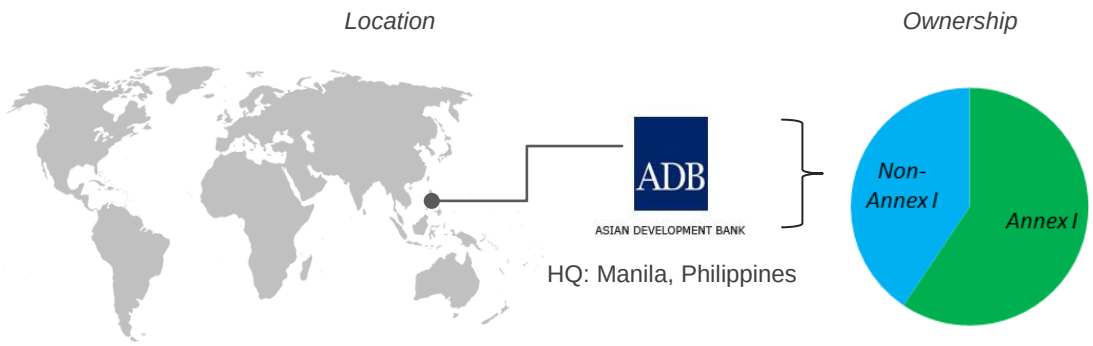
Source: BNEF, 2014; Oliver and Boulle, 2014; OECD, 2014a, 2009a.

In addition to the challenges illustrated by the example in Box 5 below, public participation in mixed-ownership investment funds, which may be legally domiciled in offshore financial centres (OFCs) for tax-purposes, also complicate the application of these principles. For some climate reference points, such as the joint-MDB and IDFC reporting, it is not always explicitly clear how they define nationality and apply these principles in practice.

Box 5. Applying principles in practice: geographic attribution of finance from MDBs

While the Asian Development Bank (ADB) has its global headquarters in Manila, Philippines, its largest shareholders are developed countries, as shown in the figure below.

Profile of Asian Development Bank



Thus, a location-based approach would classify flows from ADB as originating in the "South", while an ownership-based approach would apportion them based on shareholdings. In practice, early reports by BNEF attributed all finance from ADB as a South-South flow (BNEF, 2010), while CPI calculates flows using both approaches for its various "low" and "high" scenarios (Buchner *et al.*, 2013). However, an ownership-based principle for attributing finance to specific countries would be difficult, and possibly undesirable, to apply across all types of actors, especially in the case of companies with diffuse ownership structures, e.g. publicly listed enterprises.

Source: Ownership data based on subscribed capital commitments reported by Asian Development Bank as of 31 December 2012 (ADB, 2013).

2.3.3 How actors and flows are characterised by reviewed data sources

Most of the commercial databases reviewed include at least partial information on upstream ownership structures of parent companies and subsidiaries. However, in the majority of cases, reconstructing ownership hierarchies to allow for the scope of analysis to be applied at the intermediate- or ultimate- institutional level would require significant time and resources for data post-processing. Where available, this type of information however allows for the identification of indirect (e.g. intermediate or ultimate) government ownership and investment in private enterprises. This information can enable deeper exploration of both the private versus public as well as geographic origin of flows (facilitating in particular analysis beyond the level of local SPVs, OFCs, or projects).

For example, in the context of FDI, large concentrations of finance were previously attributed to countries that are popular OFCs due to the application of a location-based principle with a scope limited to immediate enterprises. However, updated guidance from the OECD's Benchmark Definition of FDI now instructs countries to "exclude resident SPEs and to look through non-resident SPEs in the analysis of source/destination of FDI" (OECD, 2009a). By using available information on intermediate and ultimate ownership, such an approach helps to avoid accounting for the mere "pass through" or "round-tripping" of flows.

The ability of commercial databases to provide hierarchical ownership information relates to their underlying relational datasets on ownership structure and attributes. In the context of defining the public and private nature of an actor, most databases allow for identifying, for example, their ultimate parent company, board membership, and ownership holdings. In practice this information generally appears to be

most robust and reliable for publicly listed, large, or other actors subject to stringent regulatory disclosure requirements. Across data providers, most definitions of a public-sector actor were apparently limited to general-government- (GL3) level institutions, thus excluding SOEs. In general, one crucial limitation is that at the transaction-level, such data are most often presented based on the characteristics of the immediate institutional units involved. This is regardless of the relationships that are contained elsewhere in the database, such as the case of ultimate government ownership of an SOE.

In the context of transactions in the debt capital markets, one exception is the syndicated loan data provided by ThomsonOne. This dataset contains characteristics on location and whether the financier is characterised as government actor for both the immediate borrower and its ultimate controlling parent. For equity transactions, most data providers however only report the nominal location or ownership of the immediate portfolio company and investment firm, with some data providers also presenting transaction-level data on the legal domicile of the fund being used by the investor.

Bond data is systematically reported by all databases in relation to the issuing institution's (never the subscriber's) geographic and ownership characteristics as well as to those of the financial institution acting as the lead manager for the issuance. A complicating factor is that the same issuance can be listed on multiple exchanges or clearing systems. This necessitates meticulous reconciliation to avoid double counting. To aid in the identification of the nationality of actors or flows, some data providers, such as FactSet and Preqin, make efforts to record multiple locations for offices, which allows for the user to be more aware of this issue and choose which location may be most meaningful depending on specific information and analytical needs.

Box 6 below illustrates the extent to which the reviewed databases may allow identifying geographic origin of PE flows to specific countries or country groupings. This particular illustration analyses FactSet data on investment into portfolio companies in all non-Annex I countries (excluding South Korea) and sectors from all geographic sources since the 1970s. Among other things, the analysis highlights the large number of cases where the country of origin of the investor is not disclosed. Where this information does exist, it allows drawing broad conclusions on the geographical origin of finance, including both cross-border and domestic finance.

Box 6. Possibilities of identifying Origin of PE Flows from Annex-I and Non-Annex I Countries

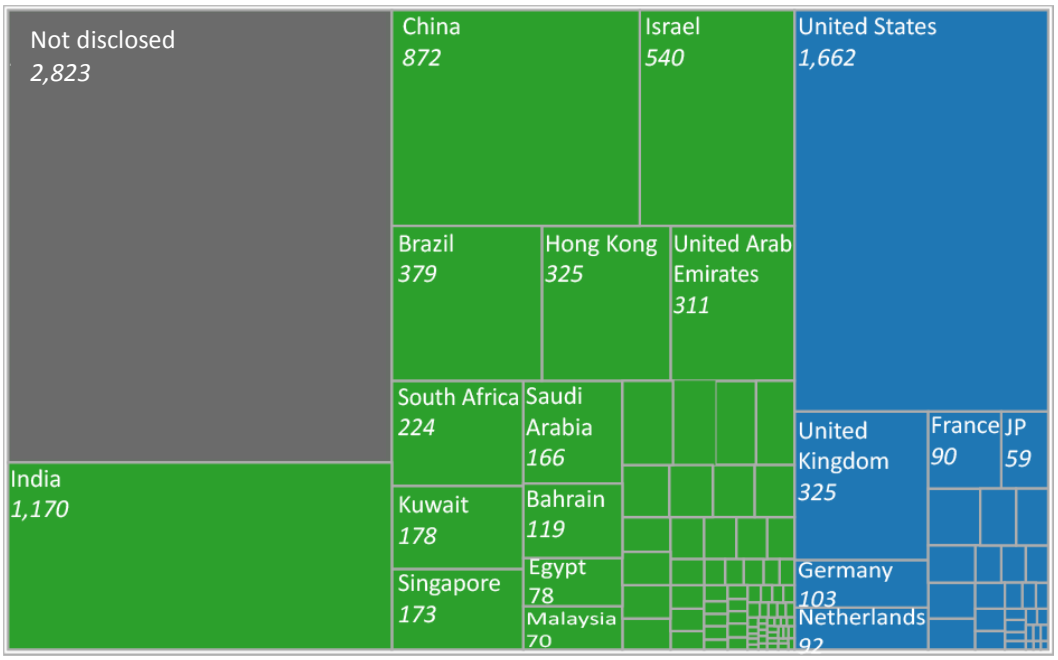
Using data from FactSet, the figure was constructed by first identifying portfolio companies located in Non-Annex I countries, then by extracting all of the transactions into those companies, and finally by looking at the locations of the PE firms making these investments (which FactSet defines as the legal domicile of the firm manager). The analysis found that of the 10,824 instances of a unique investor investing into a portfolio company in a developing country, 24% were in Annex I countries (plus South Korea), 50% in Non-Annex I countries, and were not disclosed in 26% of cases.

A separate analysis using OECD and non-OECD (rather than Annex I and Non-Annex I) countries yielded only marginally different results in this specific case, with the portion of transactions originating from OECD countries amounting to 30% and non-OECD 44%. Similarly to the conclusion drawn from the previous illustration, the crucial limiting factor in the context of attributing flows to specific geographies lies not only in the technical or definitional challenges of identifying the geographical origin of finance providers. It also relates to the fact that there are major gaps in disclosure and coverage of the values associated with such investments. Investment values can be missing for up to half of the transactions in a given dataset.

Box 6 continued over page

Box 6 continued

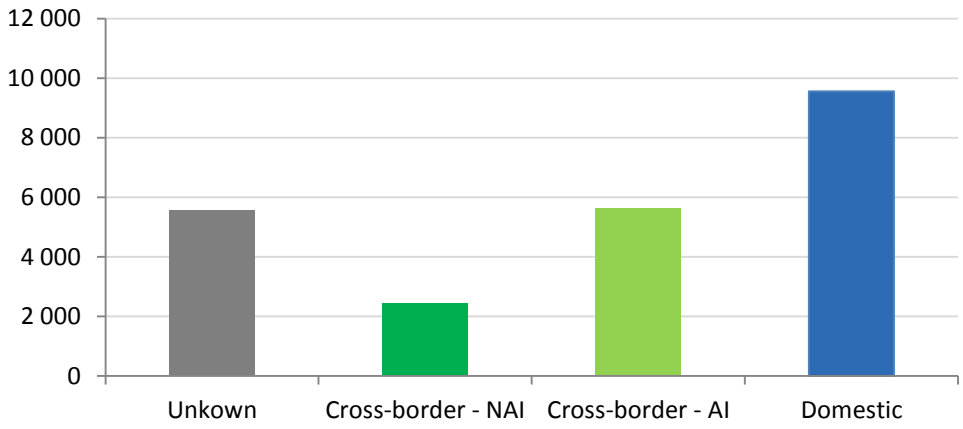
Geographic origin of PE investment into developing countries, by number of deals (Annex I = Blue, NAI = Green[6])



Notes: JP = Japan. South Korea was included in Annex I for the purposes of this illustration.
Source: Based on FactSet, 2014.

In terms of differentiating between domestic and cross-border finance, the figure below highlights the breakdown of investments into portfolio companies according to their domestic or international origin. This type of breakdown would allow for categorising investments as being executed to, between, or in developing countries.

Cross-border vs. domestic origin of PE investment into developing countries, by number of deals



Notes: South Korea was included in Annex I for the purposes of this illustration.
Source: Based on FactSet, 2014.

[6] The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

2.3.4 Potential ways forward

The fundamental problem in characterising flows and actors is that this determination will depend on the chosen scope and point of measurement in the financial value chain. In terms of characterising ownership and geographic origin and destination, initial findings and conclusions from this study suggest that the limitations are only partly technical. Identifying the location or ownership of an investor or fund is sometimes possible, although trying to do so along the full finance value chain would be complex and very time consuming.

Here, further research and discussion is needed on what point and scope of measurement is most meaningful in order to guide more in depth analysis that would attempt to provide this type of partial disaggregation. The selection of a meaningful point of measurement is likely to differ depending on whether the objective is to monitor, report and aggregate climate finance data across finance providers and countries (in which case avoiding double-counting is a priority), or to measure effectiveness of its mobilisation at the individual institution or fund level (in which case the ability to attribute finance and its mobilisation is a necessity). In any case, considering that a major part of resource provision involves complex channelling structures, there might be a need to measure both at the point of financial commitment and at the final recipient point where resources transform to physical goods or products (e.g. infrastructure) or intangible goods and services (e.g. policies, laws).

2.4 Data collection, transparency and access

This section focuses on more qualitative concepts of data collection and access. This includes a broad discussion on relevant aspects of how data is collected and verified, its quality and completeness, access costs and restrictions, as well as transparency on definitions and methods.

2.4.1 Why data collection methodologies, transparency, and access are important

Understanding how data has been collected and how characteristics are defined and applied are crucial for meaningful interpretation and analysis. Transparency is a key component of this, and includes clarity on different underlying methods and metadata. This includes, among other things, clearly highlighting when and how estimated, imputed, or proxy values were calculated, methods used for assigning actors to sectors, classifying them as public or private, or attributing them to a specific geographical origin.

In the context of using commercial data for public policy purposes, access is another important component. Access refers to subscription cost, user knowledge requirements, and the often significant post-processing efforts needed to compile data in the format needed to meet data needs in the context of estimating private climate finance and its mobilisation. For more specific policy-related data needs and uses (e.g. econometric analysis) aspects such as consistency in coverage of companies and countries over time become of primary importance.

2.4.2 Data access restrictions and methodological transparency for reference points

The analysis found that government and official statistics bodies most often provided greater transparency on definitions and methodological guidance for applying those definitions than commercial data providers. However, the extent of this transparency ranges significantly. For instance, this includes several-hundred-page guidance manuals for non-climate-specific statistics (e.g. national accounts) from institutions such as the OECD, UNSD, Eurostat, and IMF.

Considering that climate-finance tracking is relatively new, the definitions and methods for tracking and reporting climate-relevant finance are significantly less developed. Methodological and definitional

transparency for climate-specific data series includes most notably the OECD DACs statistical directive, Rio-Marker handbook and accompanying transaction-level database (OECD DAC CRS).

2.4.3 Data access restrictions and methodological transparency for reviewed data sources

The data providers reviewed in this analysis collect data from a variety of primary and secondary information sources. These can include publicly-available sources (e.g. websites, press releases, public announcements) as well as private sources such as experts in the field, informal relationships with investors and financial institutions. In some cases, this involves more formal relationships with financial institutions, leveraging the key role played by certain data providers in producing "league tables" that rank financial institutions on deal volume. Considering the role that league tables play in shaping perceptions of dominance of a particular financial institutions in certain types of transactions, geographic regions, or sectors, financial institutions have an inherent motivation to report and disclose as many transactions as possible.

Additionally, some data providers (e.g. FactSet and Dealogic) also function as trading platforms and will thereby capture some transactions directly. For publicly sourced data, most providers advertise internal policies that require corroborating information with individuals with direct knowledge of or involvement in the transaction.

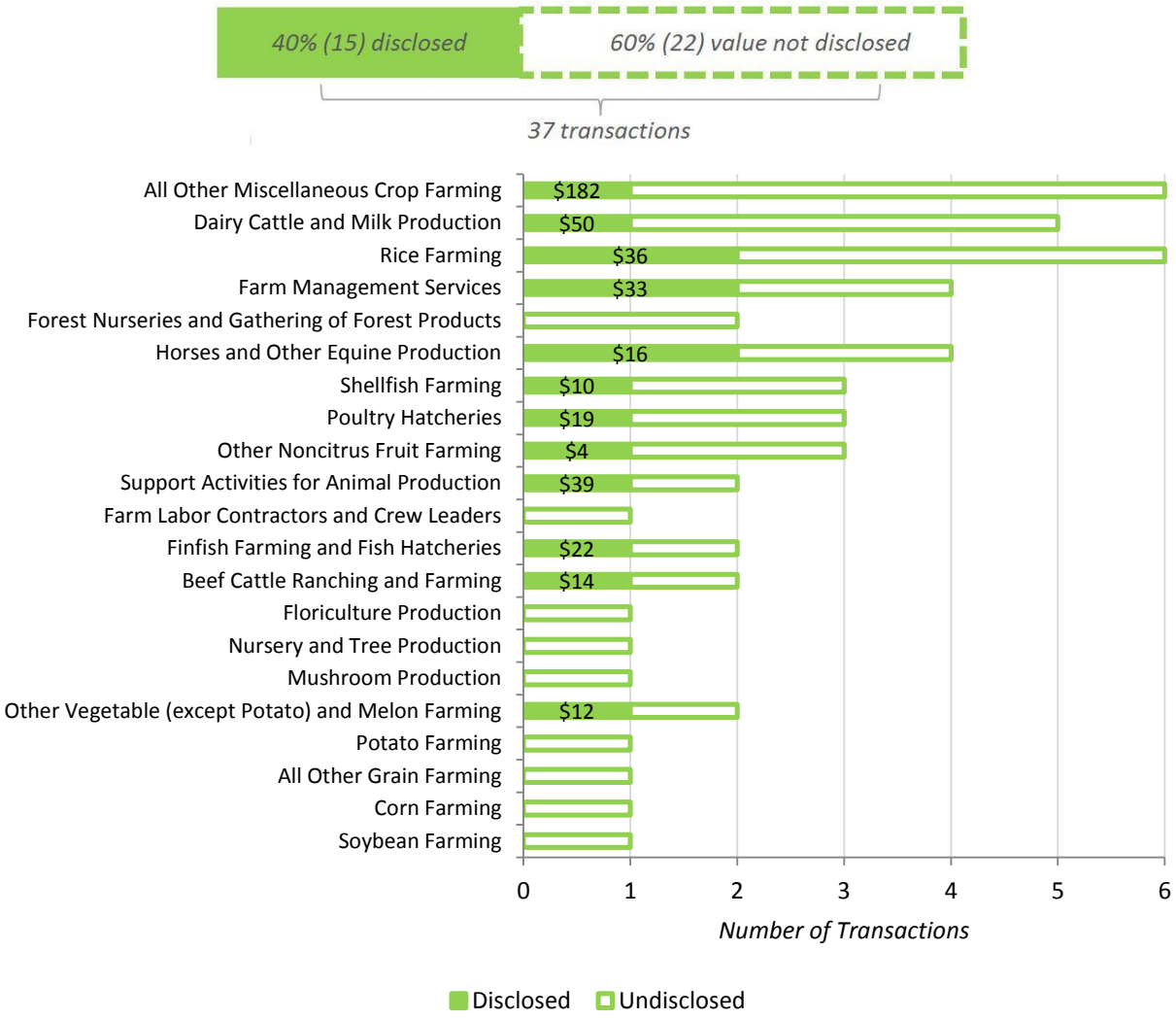
Data quality and completeness vary more by financial transaction type and instrument than by data provider. In particular, the nature of and confidentiality agreements surrounding PE/VC transactions mean that deal values are less often disclosed than for syndicated loans. For instance, only 45% of the more than a hundred thousand PE/VC transactions into developing countries contained in FactSet had transaction values disclosed. This limitation is further illustrated in Box 7, which highlights the prevalence of missing values for PE/VC investments in the agriculture sector.

This can also be the case in the context of project-finance transactions, for which financial information may also not be disclosed or disaggregated by individual financiers within a given instrument category. For example, the BNEF database had no disclosed transaction value for around 59% of clean energy asset financing deals in Non-Annex I countries over 2011-12 (excluding Korea) (BNEF, 2014). Additionally, BNEF only systematically reports (where available) total project cost, total debt, total equity, names of debt financiers, and names of equity financiers. It does not attribute a specific portion of the debt or equity to named financiers.

Box 7 Illustration of the frequent absence of disclosed transaction values

The figure below presents the PE/VC investments into the agriculture sector from ThomsonOne's Private Equity data series. In the case of PE/VC transactions, transaction values are often not disclosed for a significant percentage of investments. Where transaction values are disclosed, they are provided for the entire cost of the project, with finance rarely apportioned to specific debt or equity providers. For instance, the below figure shows the sub-sector breakdown of the 37 transactions recorded, where values where disclosed for only a sub-set of 15 transactions (~40% of the total) totaling USD 437 million.

PE investment into the agriculture sector in 2012-2013 (USD million and number of investments)



Source: data from ThomsonOne Project Finance (Thomson Reuters, 2014a).

2.4.4 Potential ways forward

In practice, some reference points and data providers rely on proxy methods to impute missing deal values. This is easier to do for project financing, since there will be additional information available to make such estimates (e.g. average price data per MW of thin-film PV installed, length of sewerage line, km

of roadway constructed). For example, for a small share (about 2%) of projects where no transaction value has been disclosed, BNEF provides project-level estimates by imputing values based on market/expert knowledge and assumptions. BNEF also imputes values when presenting certain aggregate investment data, such as global or technology-specific investment. While these aggregate estimation approaches can help fill gaps in understanding the total volume of finance and investment, they do not provide the level of granularity that would allow characterising their public, private, or geographic origin.

Private data providers have a role to play and self-interest in providing in depth and improved information about financial markets and transactions. This could involve, for instance, having private data providers produce league tables for green or climate-relevant transactions. In turn, this could potentially encourage financial institutions to identify and disclose green or climate-relevant transactions based on their inherent self-interest in communicating their speciality in structuring and closing transactions and projects in this increasingly important business area. Commercial data providers also have the ability to innovate in terms of finding pragmatic estimation and imputation methods to tackle technical and confidentiality limitations. They however have an inherent interest to protect the competitive advantage their business model is built on. This can materialise through, for instance, the use of a proprietary industry and sector classification system as well as limited transparency on definitions (metadata) or data collection and quality control methods. Further efforts by official statistics offices as well as non-governmental actors to collect and publicly disclose policy-relevant data could provide a more transparent and widely accessible alternative to pay-for databases.

3. IMPLICATIONS FOR DIFFERENT INFORMATION NEEDS

3.1 Tracking the global transition to low-carbon, climate-resilient economies

Preliminary research highlights some value added by the data sources reviewed. This includes supporting a possible broad scaling of climate-relevant private finance through tracking a number of financial instruments and transactions, as well as in better capturing “upstream” public financing of funds and enterprises playing a role in “downstream” private financing of specific projects. The volume of transactions into sectors beyond renewable-energy in the datasets reviewed could improve knowledge of overall private flows into additional climate-relevant sectors although, as highlighted, the issue of undisclosed transaction values poses limitations. However, it is unclear at this stage to what degree of comprehensiveness and accuracy climate-specific flows can be isolated within these overall flows.

In the context of tracking global transition to LCCR economies, issues surrounding the attribution of flows to specific geographies and actors could be put aside, at least initially, in order to deal with the first order question of estimating overall LCCR finance. To help address specific challenges identified within this report, potential technical solutions proposed earlier, such as the use of different types of proxy methods, could be further explored and pilot tested to start advancing the current state of knowledge in this area. As progress is made on underlying technical and methodological issues, these estimates would improve over time and gradually narrow down towards more climate-specific transactions. From the perspective of more accurate measurement of climate finance, such progress can be complemented by parallel increased efforts to collect primary private climate finance data e.g. public finance institutions monitoring and reporting private co-financing and/or mobilisation for the climate projects they finance.

3.2 Tracking climate finance under the UNFCCC

Within the context of the UNFCCC, data requirements range from broad information needs for conducting the Biennial assessment and overview of financial flows to those required for the MRV of climate finance support to developing country Parties. The information needs of the biennial assessment (e.g. "information on the geographical and thematic balance of such flows") relates closely to the broader context discussed above (UNFCCC, 2011).

The scope of tracking progress towards the USD 100bn commitment, however, is narrower than that of measuring total global climate finance. This is clearly the case in terms of geographic scope as, for instance, inflows to and domestic climate finance in developed countries is not considered. Political consensus and definitions under the Convention are still lacking in terms of the specific types of finance (private in particular) and financial instruments that are to be included in accounting for the mobilisation of the USD 100bn commitment. Enhanced transparency and data on past and current levels of climate finance (including private) could participate in facilitating such a consensus being reached.

As a result of this lack of political consensus, the precise information needs remain largely undefined. While the reporting guidelines agreed at COP 17 focused on public finance provided by Annex II parties, these guidelines further state that Annex II Parties "should report, to the extent possible, on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties, and should report on policies and measures that promote the scaling up of private investment in mitigation and adaptation activities in developing country Parties" (UNFCCC, 2011). In light of this, the findings from this report provide insights into the extent to which the reviewed data sources provide information on climate-relevant private finance flows that might provide data to support such reporting.

Making use of the additional sectoral coverage provided by the reviewed database depends on the extent to which a defined set of climate-relevant activities can be identified and isolated within broader sectors and sub-sectors. Considering that no such set of activities has been defined within the context of the UNFCCC, an exact assessment of how these databases could be used is not possible. Generally speaking, the extent to which such activities could be identified and isolated would depend on the extent to which future definitions of climate finance could be aligned with international standards-based classification systems.

In order to ensure consistency and clarity within international treaties and negotiations, a number of other multilateral agreements make use of standard classification systems. For instance, multilateral environmental agreements such as the Convention on International Trade in Endangered Species (CITES); Montreal Protocol (ozone depleting substances); Basel (hazardous waste), Rotterdam (waste and pesticides), and Stockholm (persistent organic pollutants) Conventions are referenced to codes under the Harmonised System (HS). The main purpose of the HS, to facilitate negotiation on specific product and service groupings of tariffs under the WTO and their subsequent implementation, itself provides another example. Similarly, a reference to a standard classification system under the UNFCCC could facilitate methodological developments towards better data coverage as well as participate in improving data transparency and consistency.

However, it is unclear whether such systems would or could be useful or acceptable in the UNFCCC context. If it is determined that such systems do provide a useful basis, but common agreement cannot be reached under the UNFCCC, countries could nevertheless provide further transparency on the definitions and sub-sectors used in their reporting. It is also unclear to what extent proxy-based approaches for estimating climate-relevant private finance from within these sectors would be acceptable in the absence of any clear references to such systems.

Some of the examples presented in this paper also highlight the limitations to identify government mobilisation efforts when a strict project-level approach is adopted. On the other hand, corporate-financing and asset-financing transactions cannot be added together without partly double counting. In general, the need to avoid double-counting will make it difficult for data sources reviewed in this exercise to offer relevant data without significant post-processing efforts. The ability to reconcile the measurement of private climate finance flows and its mobilisation across upstream and downstream flows is key to decrease the risk of double counting. This ability increases with the number of Parties reporting under a common framework and the similarity of the underlying definitions and methods that they use.

The analysis demonstrated that there are a variety of principles that are used to categorise public and private actors. Considering the political sensitivities of the perceived relationship and boundaries between the public and private sectors, it is unlikely that a single definition of public and private actors, and of the financial flows emanating and terminating between them, would be possible. In light of this, if reporting occurs in either the context of collective or individual reporting framework(s) or system(s), provisions would need to be agreed for either a standard definition or country-determined definitions to be used. Such reporting would need to be accompanied by or refer to transparent definitions used to allow for clearer interpretation. In any case, the continued use of varying definitions will prevent comparability and meaningful aggregation.

Many of the reviewed databases do not allow for the identification or measurement of finance by its geographic origin and destination. In some instances, the structure of a database allows easy identification of the legal domiciles of the immediate and ultimate controlling parent, if such principles are chosen. In other cases, some databases would only support identifying the geographic origin of finance provided based on a single reported headquarter location of the financier, which may or may not be meaningful (e.g. in the case of OFCs, SPVs, or other financial intermediaries). The question of which principles to apply to make this determination in the context of the UNFCCC, and the extent to which different databases support their application would likely persist under both collective and individual reporting frameworks.

4. CONCLUSIONS

The analysis found both opportunities and challenges for enhancing the understanding of the volume and characteristics of private climate finance. These were identified based on the review of commercial data providers such as Bloomberg, FactSet, and Thomson Reuters, as well as public data providers like the OECD and UNCTAD.

While the report highlighted the existence of data series containing information on private finance and investment into climate-relevant sectors, it also identified a number of outstanding technical issues and limitations. These relate to core aspects of estimating climate-specific private finance such as how transactions are categorised into broad non-climate-specific sectors, what types of transactions and instruments are covered, and how actors and their flows are characterised as coming from the public or private sector and specific geographical origins. Limitations also relate to important aspects of data collection, transparency, and access.

The key findings from this analysis are summarised below:

WHAT THE REVIEWED DATA SOURCES OFFER	WHAT THEY DO NOT OFFER
Sectoral classification	
· Broad scaling of private finance and investment in a range of sectors of relevance to climate change (e.g. water, agriculture, energy, waste, transportation).	· Granularity that would allow isolating climate-specific transactions from those with neutral or negative climate impacts. · Contextual information that would allow for assessing how a transaction enhances adaptive capacity and resilience. Consistent definitions and methods across databases
Coverage of financial transactions and instruments	
· Partial data on both corporate and project-level transactions in climate-relevant sectors along the financial value chain. · Partial data on debt (e.g. syndicated loans, bond issuances) and equity (e.g. PE/VC and mezzanine) instruments.	· Coverage of small scale and/or informal financial activities e.g. microfinance, households or small and medium sized enterprises transactions. · Transaction values for all types of transactions and instruments. · Value of the financing associated with specific co-financiers involved in a transaction. · Systematic data on instruments and products that de-risk and sit behind debt and equity instruments (e.g. insurance, guarantees, currency swaps).
Characterisation of public/private and identification of geographical origin	
· Relational databases that allow for exploring characteristics of actors according to immediate, intermediate, and ultimate ownership. · Diverse principles and tools for categorising actors and flows as public and private, North or South.	· Links between relational databases of actors and their transactions. · Ability to easily apply these different principles in practice. · Consistent definitions and methods across databases

Even in cases where relevant information on climate-relevant private finance is provided by different databases, making use of this information would often require significant data post-processing, compilation and reconstruction. Such efforts carry significant time and resource implications.

4.1 Potential ways forward

In light of the challenges and limitations identified, the analysis outlines a number of options and ways forward that would allow extracting as much information as possible from the data available by at least partly addressing and mitigating technical challenges. For instance, the report suggested a number of possible options to help transition from a broad scaling of investment into climate-relevant sectors towards narrower estimates of climate-specific transactions and projects. These options range from top-down approaches that could use economic or environmental data to proxy private climate finance flows (e.g. commercial building energy efficiency to adjust data on private investment into the commercial building sector) to bottom-up approaches that would make use of monitoring and reporting by public financial providers (e.g. record-linkage using their climate tagged transactions). In essence, these options would be used to help better triangulate the volume of finance associated with climate-benefits while excluding those with neutral or negative climate impacts.

In terms of expanding coverage of the types of transactions and instruments covered, the analysis identified a use for those tracking and collating climate finance data to better highlight and present the role

of financial transactions up-stream from projects. Recognising that simply summing together these flows would result in double-counting, information on use of proceeds of syndicated loans, bonds, and private equity funds, where available, may be used to help partly reconcile these flows to avoid double counting. To address remaining gaps in coverage of certain instruments and transaction types, further research into relevant additional sectoral or national datasets as well as the development of proxies would need to be explored. This could include, for instance, estimating the volume of private self-financing of LCCR technologies by households and corporations using data on the trade of goods and services in combination with assumptions on underlying investment cost. This approach would however not result in instrument-specific estimates.

Not all challenges can be addressed by technical solutions alone. For instance, answers to questions of public or private involvement and geographic attribution are often relative to the chosen point of measurement in the financial value chain. Different actors will have varying perspectives and legitimately different views on what a meaningful and acceptable attribution method might be. Answers can also depend on whether the scope of analysis includes the immediate, intermediate, and ultimate actors involved. This highlights a need for further discussions on what point of measurement is most meaningful in the context of the different information needs relating to climate finance.

Enhanced dialogue and engagement between policy makers (as well as more broadly those in need of improved data on private climate finance) and commercial as well as public data providers could be helpful in addressing aspects related to data collection, transparency, and access. Governments could collaborate further with private data providers towards, for instance, producing specific league tables ranking financial institutions on deal volume for climate-relevant (possibly climate-specific) transactions. In turn, this could encourage financial institutions to identify and disclose green or climate-relevant transactions, making use of their inherent self-interest in communicating their speciality in structuring and closing transactions and projects in this increasingly important business area.

4.2 Implications in relation to information needs

Moving forward, policy makers may have to consider the acceptability of the technical limitations of different datasets as well as of the proxy methods that may be developed to mitigate but not overcome these limitations. This assessment will however vary according to context, specific information needs, and intended use. Further work in this area may therefore necessitate taking a differentiated approach between generating broad estimates on the one hand, and making longer-term progress towards actual measurement and reporting on the other hand. Clarity on the order of priority of tracking certain sectors, instruments, and financial characteristics, based on their relative importance in developing countries, could provide a constructive starting point for future work.

For instance, several datasets provide additional information on syndicated loans, bond issuances, and private equity that can help to paint a more complete picture of private finance to climate-relevant sectors in developing countries. However, in the specific context of the MRV of the international commitments under the UNFCCC, the reviewed data sources generally do not provide “off-the-shelf” data for estimating the volume and characteristics of these flows. They do not allow for analysing financial flows simultaneously across multiple dimensions (e.g. sector, public or private, geographic origin and destination) without dedicating significant efforts to combine, reconstruct, and re-process data. When and where possible, this type of multi-dimensional approach does not necessarily generate meaningful results. Examples of where characterisation as public or private and geographical origin may be misleading include investments into the financial sector, the use instruments and intermediaries with joint public-private ownership, and investments to and from multinational-enterprises associated with several geographies. Such limitations complicate attribution of private climate finance to specific actors and countries.

4.3 A need for transparency, convergence and increased primary data collection

Data sources reviewed as part of this study include a number of commercial data providers. In addition to requiring the payment of a subscription, such providers may have vested interests in not facilitating efforts to resolve incompatibilities across data sets and providers. This might include for example using proprietary classifications to safeguard competitive positions. Political needs for transparency on methods, definitions, data quality and verification processes may not be aligned with the business need and logic of commercial data providers to not disclose potentially commercially sensitive information.

There are also limitations to combining or cross-linking multiple commercial and public data series. These are often built on varying sector and industry classifications, which can be explained by the fact that each has different underlying objectives e.g. tracking flows of development finance (aid), PE/VC investments, stocks of FDI (investment), provision of export credits (trade). In that respect, the on-going work of the OECD DAC to streamline FDI and export credit data within development finance statistics may provide valuable findings and conclusions in relation to methodological and data compatibility between different types of datasets.

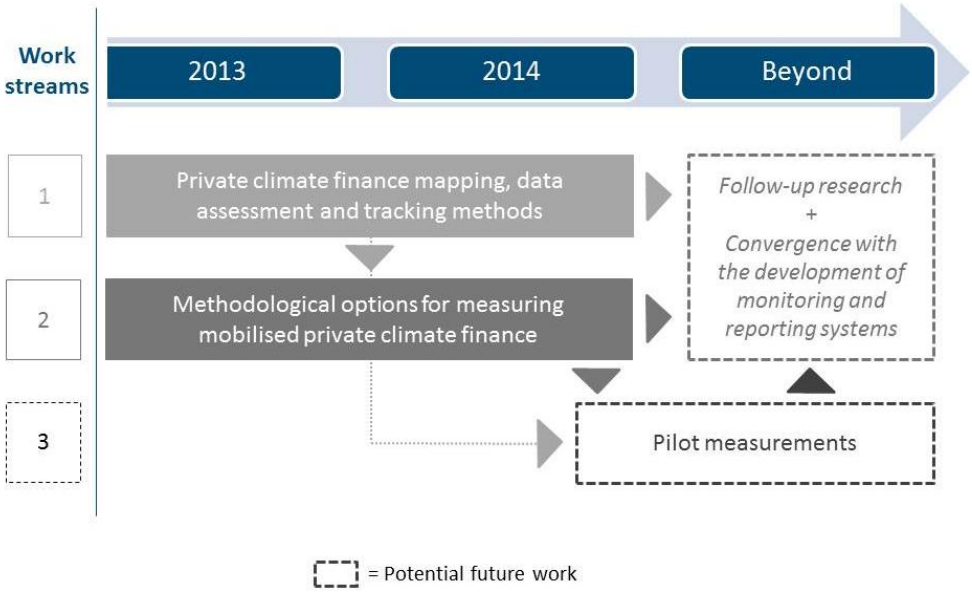
These limitations highlight a longer-term need for more comprehensive and comparable data collection and reporting. This need is particularly acute in relation to MRV requirements under the UNFCCC. In this context, broad aggregate estimates or proxy methods may not be sufficient to demonstrate levels of climate finance support mobilised by developed countries for developing countries. Efforts towards harmonising data monitoring and reporting initiatives should therefore be further encouraged and supported, along with the progressive scope expansion of existing tracking systems. It could include in particular enhanced monitoring and reporting of climate-specific private co-financing by public finance providers. This will be faced by confidentiality restrictions and require time and resources to be put in place, but would improve the availability and consistency of primary data.

In addition, contributions by economists and statistical experts to explore some of the potential ways forward could add significant value. This could in particular include the development of proxy methods for estimating private climate-finance within specific sectors or geographies by combining relevant financial, trade and environmental data series.

ANNEX 1. A COMPONENT OF THE RESEARCH COLLABORATIVE ON TRACKING PRIVATE CLIMATE FINANCE

This research was undertaken in the context of a broader international Research Collaborative on Tracking Private Climate Finance. The Research Collaborative is a network, co-ordinated and hosted by the OECD Secretariat, of interested OECD member governments, relevant research institutions and national and international finance institutions. Its overall aim is to contribute to the development of more comprehensive methodologies both for measuring private climate finance flows to, between and in developing counties, and for determining those private flows mobilised by developed countries' public interventions. The three Work Streams of the Research Collaborative are illustrated below.

Research Collaborative on Tracking Private Climate Finance work streams (as of June 2014)



Source : www.oecd.org/env/researchcollaborative

This study is being undertaken under Work Stream 1, which builds upon on-going private climate finance monitoring and reporting efforts, while conducting additional research to identify and explore data, definitional and methodological gaps. Work Stream 1 includes collaborations with relevant groups working on longer term more consistent and comprehensive statistical measurements, in particular in the areas of development finance and foreign direct investment.

ANNEX 2. DATA SOURCES INITIALLY CONSIDERED BUT NOT REVIEWED

Type	Designation	Description	Reason for not being reviewed
Private data providers	Cleantech Group	Database of clean technology investments, initial public offerings, mergers and acquisitions	No access gained. Partly redundant with BNEF's coverage.
Public data providers	IMF	National Accounts data (e.g. Gross Fixed Capital Formation)	Lack of sectoral breakdown for developing countries' data.
	World Bank	Carbon Finance Unit's State and Trends of the Carbon Market annual publication. National Accounts Data (e.g. Gross Fixed Capital Formation)	Lack of investment data. Lack of sectoral breakdown for developing countries' data.
	IDFC reporting	Annual report on mitigation and adaptation finance.	No private finance data
	UNFCCC	Country Biennial Reports and FSF reports)	No detailed private finance data
Other initiatives	Global Investor Coalition on Climate Change	Repository of institutional investors' climate-relevant investments under development	Work in progress to build the repository

ANNEX 3. COMPARISON OF MITIGATION ACTIVITY-BASED LISTS OF REFERENCE POINTS

Theme	CPI	Joint MDB	IDFC	OECD DAC
R&D	Excluded	Included	-	-
Manufacturing	Excluded	Included	*Production of long-lived products or equipment for the generation of RE*	
Renewable Energy	*Renewable Energy Generation* – Wind – Solar – Hydro (<50 MW) – Tidal – Geothermal – Biomass – Biofuels	*Renewable Energy* – Wind – Solar – Hydro (if net reductions can be demonstrated) – Ocean (wave, tidal, ocean currents, salt gradients, etc.) – Geothermal – Biomass or biogas (that does not decrease biomass and soil carbon pools) – Greenfield transmission systems – Solar water heating – Thermal applications of geothermal power in all sectors	*Lower carbon energy generation* *Renewable energy supply*	*Energy Generation & Supply*
Low-carbon Transportation	*Sustainable transport modes supporting modal shift (mitigation-relevant projects only)* – Public and freight transport systems that contribute to reducing traffic and/or emissions (e.g. metro, trains, tracks, tramways, subways, buses) – Non-motorized urban transport (bicycles and pedestrian mobility)	*Sustainable transport* – Vehicle fleet retrofit or replacement (including use of lower-carbon fuels or technologies) – Urban transport modal change. – Urban development (incl., integration of transport and urban development, transport demand management measures). – Inter-urban transport and freight (incl. improvement of transport logistics, railway transport modal shift, and waterway modal shift) improvement or construction of infrastructure.	*Sustainable transport*	*Transport & Storage* – Air transport, – Rail transport, – Road transport, Transport policy & admin mgmt.
Energy Efficiency	*Energy Efficiency* – Demand-side EE in buildings and industry (incl. transport when not modal shift) – Retrofit of transmission lines, distribution systems or substations to reduce energy use or loss – Excludes efficiency improvements to fossil fuel-fired power plants	*Energy Efficiency* – Demand-side, brownfield in commercial and residential sectors/buildings – Reduction of energy use for public services – Reduction of energy use in agriculture – Industrial EE via improvements in processes or equipment – Supply-side, brownfield in T&D and power plants – Includes EE improvements in existing thermal power plants – Thermal power plant retrofit fuel switching	*Energy Efficiency in industry and buildings*	

Annex 3 continued

Agriculture, Forestry, and Land Use	*Agriculture, Forestry, Land Use and Livestock Management (Mitigation-relevant projects only)* – Afforestation – Reforestation – Forest management – Reduced deforestation – Enhanced soil carbon sequestration – Restoration of organic soils and degraded lands – CO/methane/N2O reduction via improved agricultural practices – Crop, grazing land and livestock management	*Agriculture, forestry, and land use* – Afforestation – Reforestation – Sustainable forest management – Reducing emissions from the deforestation or degradation of ecosystems (incl. biosphere conservation projects and PES) – Agriculture projects that do not deplete and/or improve existing carbon pools – Production of biofuels – Livestock projects to reduce methane or other GHG emissions	*Forests*	*Agriculture Forestry Fishing*
Water and Waste	*Waste and wastewater (mitigation-relevant projects only* – Waste to energy projects and projects aimed at reducing methane by e.g. shifting from open dumps and lagoons to municipal industrial waste (water) treatment. – Switch to composting – Switch to waste incineration – Biogas plants – Landfill capture	*Waste and waste water* – Treatment of wastewater if not a compliance requirement as part of a larger project. – Solid waste management that reduce methane. – Waste recycling projects that recover or reuse materials and waste as inputs into new products or resources.		*Water and Sanitation*
Industry	– Process emissions in industry and fugitive emissions – Reduction of non-energy GHGs from cleaner and improved production (e.g. cement, chemical, etc.) – Reduction of gas flaring or methane fugitive emissions in O&G, coal mine methane capture	*Cross sector activities and others* *Non-energy GHG reductions:* – Industrial processes – AC and cooling (refrigerants with lower GWP) – Fugitive emissions and carbon capture (CCS, including EOR, reduction of gas flaring or CH4 fugitive emissions in O&G), coal mine CH4 capture	*CCS*	*Mineral Resources* *Mining Industry*

Annex 3 continued over page

Annex 3 continued

Other (e.g. capacity building, health, policies)	*Capacity building* – Enabling environment activities, – awareness raising, technical assistance, – planning, – policy development and implementation	*Cross-sector activities and others* *Cross-sector activities* – Policy and regulation – Energy audits – Supply chain improvements – Financing instruments (carbon markets and intermediary financing LOC, microfinance, etc.) – Low-carbon technologies (incl. R&D and manufacturing) – Activities with GHG accounting (other activities with demonstrable mitigation effect)	*Local, sectoral or national budget support to a climate mitigation policy*	*Government & Civil society* *Health* *Education* *Population* *Policies/Programmes and Reproductive Health* *Multi-sector/cross-cutting* *Humanitarian Aid* *Business and other services* *Trade Policy and Regulations and Trade Related Adjustment* *Banking and Financial Services* *Commodity Aid and General Protection* *Other Social Infrastructure and Services*

ANNEX 4. COMPARISON OF ADAPTATION ACTIVITY-BASED LISTS OF REFERENCE POINTS

Theme	CPI	Joint MDB	IDFC	OECD DAC
Water	*Water Supply and Management* – Improvement in catchment management planning and regulation of obstructions – Domestic rainwater harvesting equipment and water storage – Rehabilitation of water distribution networks to improve water resources management to address changes in water flows, water quality, etc.	*Water and wastewater systems* – Water supplies – Wastewater infrastructure – Water resources management	*Water preservation*	*Water and Sanitation*
Agriculture, Forestry, and Land Use	*Agriculture, Forestry, Land Use Management, and Natural Resource Management* – Reforestation programs – Provision of information on crop diversification options to strengthen resilience – Management of slopes and basins to avoid impacts of soil erosion – Adoption of sustainable aquaculture techniques to face challenges in fish stocks	*Agriculture and ecological resources* – Primary agriculture and food production – Agricultural irrigation – Forestry – Livestock production – Fishing – Ecosystems (including ecosystem-based flood protection measures)	*Agriculture, natural resources and ecosystem based adaptation*	*Agriculture* *Forestry* *Fishing*
Infrastructure	*Infrastructure and Coastal Protection* – Building of dykes to protect infrastructure to adapt to the loss and damage caused by storms and coastal flooding and sea level rise – Mangrove planting to build a natural barrier to adapt to increased coastal erosion and to limit saltwater intrusion into soils caused by sea level rise – Improve the resilience of existing infrastructure, e.g. water infrastructure, transport infrastructure, energy, and human settlements	*Infrastructure, energy and built environment* – Construction – Transport – Coastal and riverine infrastructure (incl. built flood protection infrastructure) – Urban development – Tourism – Waste management – Energy generation (including renewables) – Energy transmission and distribution	*Coastal Protection*	*Other Social Infrastructure and Services*

Annex 4 continued over page

Annex 4 continued

Theme	CPI	Joint MDB	IDFC	OECD DAC
Disaster Risk Management	*Disaster Risk Management* – Early warning systems or emergency response systems to adapt to increased occurrence of extreme events by improving disaster management – Construction or improvement of drainage systems to adapt to increase occurrence in floods – Provision of insurance mechanisms against natural disasters in order to enhance the ability to cope with extreme weather events		*Other Disaster Risk Reduction* *Improved Resilience of Infrastructure*	
Industry, manufacturing, and trade	-	*Manufacturing* – Food processing, distribution, and retail – Trade – Extractive industries (oil, gas, mining, etc.)		
Capacity-Building	*Capacity-Building* – Enabling environment activities awareness raising – Technical assistance – Planning – Policy development and implementation	*Other* – Financial services (banking, insurance) – Institutional capacity (e.g. professional services, ICT) – Human capacity (e.g. education, health) – Disaster risk management	*Local, sectoral, or national budget support to a climate change adaptation policy*	*Government & Civil society*

ANNEX 5. MITIGATION-RELEVANT EXAMPLES IN NAICS

Theme	Mitigation-Relevant Activities[7]	NAICS 2012 Sector	NAICS 2012 Example
Research and Development	Research and development of low-carbon technologies, processes, and materials	54 Professional, Scientific, and Technical Services	541712 Research and Development in the Physical, Engineering, and Life Sciences
Manufacturing	Manufacture of low-carbon technologies, processes, and materials	31-33 Manufacturing	325991 Reformulating plastics resins from recycled plastics products
			327120 Cement, clay refractory, manufacturing
			334413 Solar cells manufacturing
			334413 LED (light emitting diode) manufacturing
Clean Energy	RE (wind, solar, hydro, tidal, geothermal, biomass). Transmission systems solar water heating	22 Utilities	221114 Electric power generation, solar
			221117 Biomass Electric Power Generation
		23 Construction	237130 Power and Communication Line and Related Structures Construction
			238220 Solar heating equipment installation
Sustainable Transportation	Public transit (e.g. metro, trains, tracks, tramways, subways, buses, non-motorized). Urban development Transport planning and management Freight (e.g. rail, air, ports)	48-49 Transportation and Warehousing	485112 Commuter Rail Systems
			485113 Bus and Other Motor Vehicle Transit Systems
			485119 Other Urban Transit Systems (e.g. subway, trams, light rail)
			481112 Scheduled Freight Air Transportation
			481212 Non-scheduled Chartered Freight Air Transportation
			482 Rail Transportation
			483111 Deep Sea Freight Transportation
		54 Professional, Scientific, and Technical Services	541320 Urban planning services
			541330 Traffic engineering consulting services,
			541614 Transportation management consulting services
Energy Efficiency	Demand-side brownfield EE in buildings and industry, Demand-side greenfield EE in buildings and industry Supply-side brownfield Sector specific reduction of energy use (agriculture, public admin) Construction or improvement of transmission and distribution systems Energy audits	23 Construction	236118 Residential Remodelers
			236210 Industrial Building Construction
			236220 Commercial and Institutional Building Construction
			237130 Power and Communication Line and Related Structures Construction
			236210 Kiln construction
			237130 Power and Communication Line and Related Structures Construction, 22112 Electric Power Transmission, Control, and Distribution
		54 Professional, Scientific, and Technical Services	541350 Energy efficiency inspection services

Annex 5 continued over page

[7] These activities were drawn from the definition and methodology sections of the following reports (CPI, 2013), (IDFC, 2013), (MDBs, 2013), as well as by backtracking Rio-Marked mitigation activities to their sector from DAC CRS (OECD, 2013).

Annex 5 continued

Agriculture, Forestry, and Land Use	Forest management (e.g. reforestation), Soil management (e.g. enhanced soil carbon sequestration, restoration of organic soils and degraded lands, CO, CH4, N20 reduction) Land and livestock management (e.g. grazing, reduction of CH4) Production of biofuels	11 Agriculture, Forestry, Fishing and Hunting	115310 Support Activities for Forestry (incl. reforestation)
			115116 Farm Management Services
			115210 Support Activities for Animal Production
			115112 Soil Preparation, Planting, and Cultivating
			112519 Algae farming
		31-33 Manufacturing	325193 (non-potable) Ethyl Alcohol Manufacturing,
Waste and Wastewater	Water management and supply. Waste management (e.g. landfill capture, biogas plants, composting, incineration, waste to energy) Materials recovery and recycling	22 Utilities	221310 Water Supply and Irrigation Systems
			221320 Sewage Treatment Facilities,
		56 Administrative and Support and Waste Management and Remediation Services	562219 Compost dumps,
			562213 Solid Waste Combustors and Incinerators
			562111 Recyclable material collection services
Industry	Reduction of gas flaring or methane fugitive emissions in O&G. Reduction of non-energy GHGs from cleaner and improved production (e.g. cement, chemical, etc.) Air conditioning and cooling (refrigerants with lower GWP) Coal mine methane capture	22 Utilities	221210 Natural Gas Distribution,
		23 Construction	237120 Oil and Gas Pipeline and Related Structures Construction (incl. rehabilitation and repairs),
			236210 Industrial Building Construction (incl. alterations to cement and chemical plants)
		31-33 Manufacturing	325120 Industrial Gas Manufacturing,
			333415 Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing
Cross-sector and other	Policies and regulations. Enabling environment activities, awareness raising, technical assistance, planning, policy development and implementation financing instruments (carbon markets and intermediary financing LOC, microfinance, etc.) Supply chain improvements	52 Finance and Insurance	522291 Consumer Lending
			522298 All Other Non-depository Credit Intermediation (incl. agricultural credit institutions)
		54 Professional, Scientific, and Technical Services	541614 Process, Physical Distribution, and Logistics Consulting Services
		92 Public Administration	924110 Administration of Air and Water Resource and Solid Waste Management Programs,
			926130 Energy development and conservation programs, government

ANNEX 6. ADAPTATION-RELEVANT EXAMPLES IN NAICS

Sector	Adaptation-Relevant Activities	NAICS 2012 Sector	NAICS 2012 Example
Research and Development	Research and development into technologies, processes, and materials that enhance adaptive capacity and resilience	54 Professional, Scientific, and Technical Services	541711 Research and Development in Biotechnology (incl. agriculture)
Manufacturing	Manufacture of technologies and materials or using processes that enhance adaptive capacity and resilience	31-33 Manufacturing	332312 Flood gates, metal plate, manufacturing
Water	Sanitation, water supply and management. Improvement in catchment management planning and regulation of obstructions Domestic rainwater harvesting equipment and water storage Rehabilitation of water distribution networks to improve water resources management to address changes in water flows, water quality, etc.	23 Construction	237110 Water and Sewer Line and Related Structures Construction (e.g. storm sewers, water desalination plants, storage tanks and towers, utility lines, water wells)
		54 Professional, Scientific, and Technical Services	541620 Environmental consulting services
		92 Public Administration	924110 Administration of Air and Water Resource and Solid Waste Management Programs (incl. water, waste, and sanitation control agencies)
Agriculture, Forestry, and Land Use	Forestry (e.g. reforestation) Agricultural irrigation provision of information on crop diversification options to strengthen resilience Management of slopes and basins to avoid impacts of soil erosion Adoption of sustainable aquaculture techniques to face challenges in fish stocks Livestock production Fishing Ecosystems (including ecosystem-based flood protection measures)	11 Agriculture, Forestry, Fishing and Hunting	115310 Support Activities for Forestry (incl. reforestation),
			113210 Forest Nurseries and Gathering of Forest Products
			111419 Hydroponic crop farming
			1125 Aquaculture (incl. 112511 Finfish Farming and Fish Hatcheries)
			114111 Finfish Fishing
		22 Utilities	221310 Water Supply and Irrigation Systems (e.g. reservoirs, filtration, distribution)
		54 Professional, Scientific, and Technical Services	541330 Erosion control engineering services,

Annex 6 continued over page

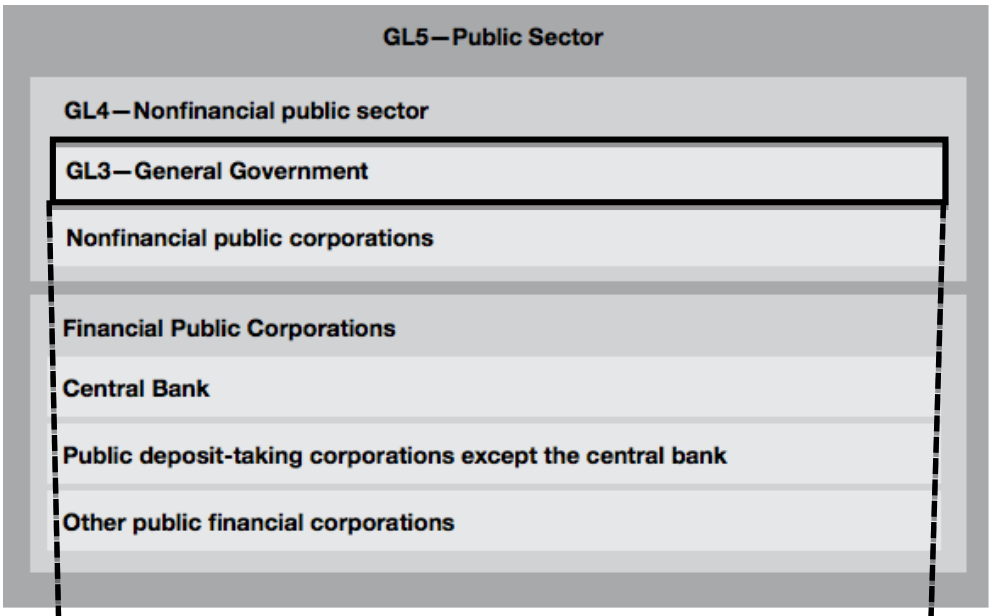
[8] These activities were drawn from the definition and methodology sections of the following reports (CPI, 2013), (IDFC, 2013), (MDBs, 2013), as well as by backtracking Rio-Marked adaptation activities to their sector from DAC CRS (OECD, 2013).

Annex 6 continued

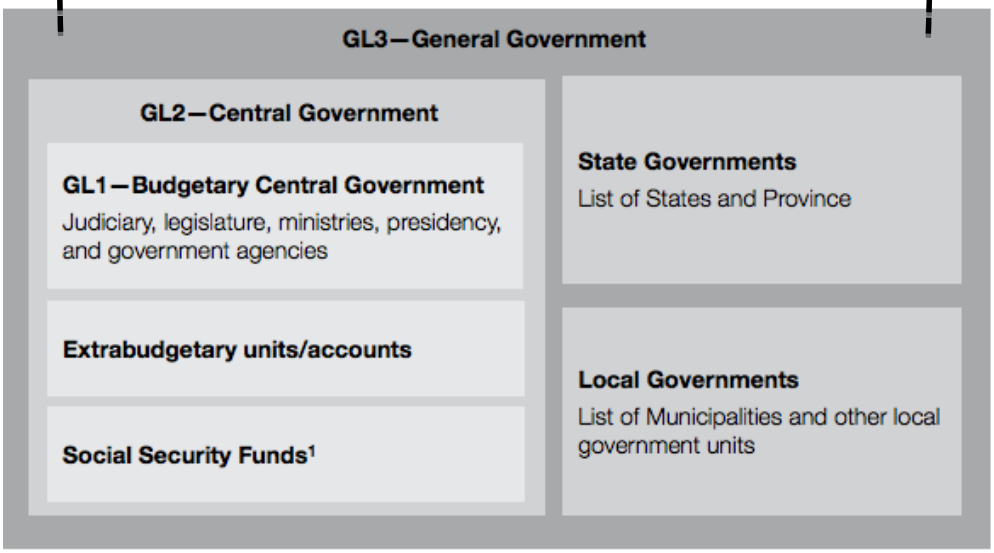
Sector	Adaptation-Relevant Activities	NAICS 2012 Sector	NAICS 2012 Example
Infrastructure	Building of dykes to protect infrastructure to adapt to the loss and damage caused by. storms and coastal flooding and sea level rise. Mangrove planting to build a natural barrier to adapt to increased coastal erosion and to limit saltwater intrusion into soils caused by sea level rise. Improve the resilience of existing infrastructure, e.g. water infrastructure, transport infrastructure, energy, and human settlements. Tourism. Waste management	23 Construction	237990 Other Heavy and Civil Engineering Construction (incl. Dike and other flood control structure construction, breakwaters, levees, shore protection etc.)
			237130 Power and Communication Line and Related Structures Construction
			236220 Commercial and Institutional Building Construction (incl. hotel construction, renovation, and alteration.)
			237310 Highway, Street, and Bridge Construction (e.g. raised highways, resurfacing),
		56 Administrative and Support and Waste Management and Remediation Services	561730 Landscaping services (e.g., bracing, planting, trimming, hydro-seeding)
		72 Accommodation and Food Services	721110 Hotels (except Casino Hotels) and Motels
Disaster Risk Management	Early warning systems or emergency response systems to adapt to increased occurrence of extreme events by improving disaster management. Construction or improvement of drainage systems to adapt to increase occurrence in floods. Provision of insurance mechanisms against natural disasters in order to enhance the ability to cope with extreme weather events	23 Construction	237990 Other Heavy and Civil Engineering Construction (incl. drainage, canals, and ditch projects)
		52 Finance and Insurance	524126 Direct Property and Casualty Insurance Carriers (incl. crop, livestock, agricultural, property)
		62 Health Care and Social Assistance	624230 Emergency and Other Relief Services
Capacity-Building	Enabling environment activities, awareness raising, technical assistance, planning, policy development and implementation. Institutional capacity (professional services, ICT) Health	92 Public Administration	926130 Mosquito eradication districts

[9] These activities were drawn from the definition and methodology sections of the following reports (CPI, 2013), (IDFC, 2013), (MDBs, 2013), as well as by backtracking Rio-Marked adaptation activities to their sector from DAC CRS (OECD, 2013).

ANNEX 7. IMF FRAMEWORK FOR DEFINING PUBLIC SECTOR



Source: *Government Finance Statistics Manual 2001* (*GFSM 2001*). For country-specific information see the *Government Finance Statistics Yearbook* (*GFSY*).



[1] In some countries, social security funds are not part of the central government in terms of legal arrangements. However, for comparability in the *Government Finance Statistics Yearbook*, they are included outside GL1 and inside GL2.

Source: *Government Finance Statistics Manual 2001* (*GFSM 2001*). For country-specific information see the *Government Finance Statistics Yearbook* (*GFSY*).

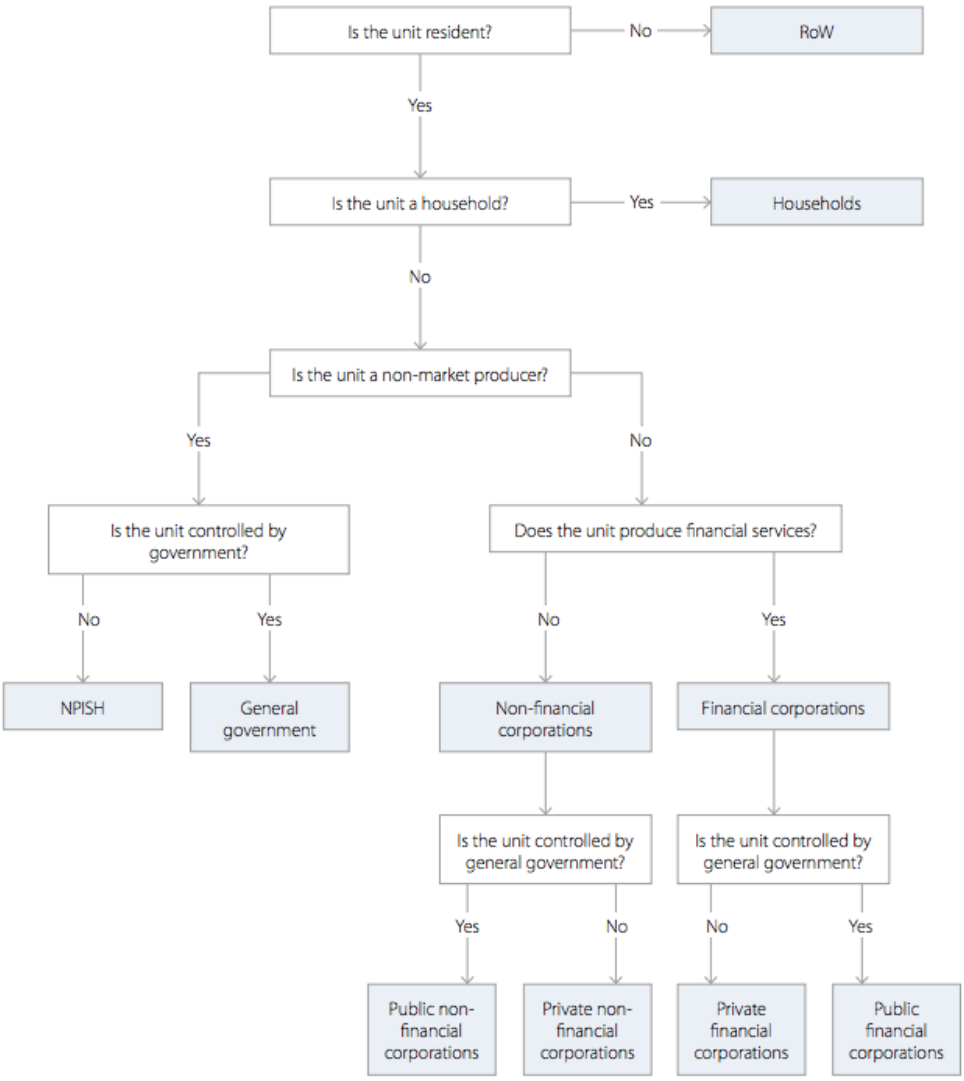
Source: IMF (2001).

ANNEX 8. EUROSTAT TAXONOMY, DECISION TREE AND CRITERIA FOR DETERMINING OWNERSHIP AND DELINEATING PUBLIC AND PRIVATE SECTORS

Taxonomy for delineating the public and private sectors

Criteria	Controlled by government (public sector)	Privately controlled (private sector)
Non-market output	General government	NPISH
Market output	Public corporations	Private corporations

Decision tree for determining whether an institution belongs to the public or private sector



As depicted in the decision tree in Figure X, *control* is chosen as the core principle for determining whether an institution belongs to the public or private sector. Eurostat provides the following criteria and definitions for assessing *control:*

Control over a financial or non-financial corporation shall be defined as the ability to determine general corporate policy, for example by choosing appropriate directors if necessary.

A single institutional unit (another corporation, a household, a non-profit institution or a government unit) secures control over a corporation or quasi-corporation by owning more than half the voting shares or otherwise controlling more than half the shareholders' voting power.

In order to control more than half the shareholders' voting power, an institutional unit need not own any of the voting shares itself. A given corporation, corporation C, could be a subsidiary of another corporation B in which a third corporation A owns a majority of the voting shares. Corporation C is said to be subsidiary of corporation B when either corporation B controls more than half of the share- holders' voting power in corporation C or corporation B is a shareholder in C with the right to appoint or remove a majority of the directors of C.

General government secures control over a corporation as a result of special legislation, decree or regulation which empowers the government to deter- mine corporate policy. The following indicators are the main factors to consider in deciding whether a corporation is controlled by government:

1. government ownership of the majority of the voting interest;
2. government control of the board or governing body;
3. government control of the appointment and removal of key personnel;
4. government control of key committees in the entity;
5. government possession of a golden share;
6. special regulations;
7. government as a dominant customer;
8. borrowing from government.

A single indicator may be sufficient to establish control, but, in other cases, a number of separate indicators may collectively indicate control.

For non-profit institutions recognised as independent legal entities, the five indicators of control to be considered are:

1. the appointment of officers;
2. the provisions of enabling instruments;
3. contractual agreements;
4. the degree of financing;
5. the degree of government risk exposure.

As with corporations, a single indicator may be sufficient to establish control in some cases, but, in other cases, a number of separate indicators may collectively indicate control.

Differentiating between market and non-market, and so for public sector entities classification between the general government sector and the corporations sector, depends on the criteria set out in paragraph 1.37.

Source: Eurostat (2013).

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GLOSSARY

ADB	Asian Development Bank
AI	Annex I countries (to the UNFCCC)
BNEF	Bloomberg New Energy Finance
CBI	Climate Bonds Initiative
COP	Conference of the Parties (of the UNFCCC)
CPI	Climate Policy Initiative
DAC	Development Assistance Committee (of the OECD)
DFI	Development finance institution
FDI	Foreign Direct Investment
GGS	Green Goods and Services
GHG	Greenhouse gas
HS	Harmonised System (of the World Customs Organization)
ICB	Industry Classification Benchmark
IDFC	International Development Finance Club
IEA	International Energy Agency
IFC	International Finance Corporation
IFI	International financial institution
IMF	International Monetary Fund
ISIC	International Standard of Industrial Classification
LCCR	Low-carbon, climate-resilient
MDB	Multilateral Development Bank
MRV	Measurement, Reporting, and Verification
NAI	Non-Annex I (to the UNFCCC)
NAICS	North American Industry Classification System
OECD	Organisation for Economic Co-operation and Development
OFC	Offshore Financial Centre
PE	Private Equity
RC	Research Collaborative
SPV	Special Purpose Vehicle
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistical Division
VC	Venture Capital
WEF	World Economic Forum
WTO	World Trade Organization