

# Private finance for climate action

Estimating the effects  
of public interventions

POLICY PERSPECTIVES



# Context

The private sector has a critical role in financing low-emissions and climate-resilient economies. Tracking climate-related private finance is, thus, key for assessing progress towards the fulfillment of intended contributions and commitments under the United Nations Framework Convention on Climate Change (UNFCCC).

In particular, under the UNFCCC, developed countries committed to mobilising USD 100 billion a year by 2020 for climate action in developing countries in the context of meaningful mitigation action and transparent implementation. Besides tracking public climate finance, making an assessment of progress towards this commitment also requires the measurement of private finance mobilised by developed countries' public interventions.

Quantifying and analysing the effects of climate-related public interventions on private investment can also contribute towards informing broader processes, such as assessing the extent to which financial flows are consistent with climate objectives. It can further inform the effective design and use of climate policy and associated financial instruments in such a way as to mobilise further private finance.

In this context, the Research Collaborative on Tracking Private Climate Finance, an OECD-led network of research organisations, international finance institutions, and governments, was set up in 2013. The group contributes towards data and methodological developments for estimating publicly-mobilised private finance for climate action in developing countries. This Policy Perspective summarises the current state of play, and puts forward next steps for further work and research towards improved data and methods.

Information about completed and on-going Research Collaborative-related work can be found at:  
[www.oecd.org/env/researchcollaborative](http://www.oecd.org/env/researchcollaborative)

On behalf of the Research Collaborative, the OECD would like to thank Australia, Austria, Canada, the European Commission, Finland, France, Germany, Japan, the Netherlands, Norway, Switzerland, the United Kingdom and the United States for funding work conducted since 2013.

## Key Messages

**The provision of private finance for low-emissions and climate-resilient projects is typically the result of the combined effects of a range of public interventions and of broader enabling conditions.** Project-level public climate finance typically mobilises private finance for climate action directly, by improving the risk-return profile of specific low-emissions and climate-resilient projects. Financial support resulting from climate-related policies (e.g. tax breaks, feed-in tariffs) provides clear incentives. Capacity building and other policies can be considered as having more indirect effects on private investment, while broader enabling conditions provide the initial catalyst.

**Significant progress has been made on measuring the direct mobilisation of private finance by public climate finance.** There is ongoing work to develop methodologies by the OECD Development Assistance Committee and the Research Collaborative, in co-operation with public finance providers. Such methodologies are characterised by causality assumptions and attribution techniques that balance accuracy with practicality and aim to avoid double counting, which is a commonly agreed upon principle that underpins international tracking efforts. Further work in this area will progressively enhance coverage and institutionalise the tracking of mobilised private finance at the level of institutions and countries as well as international statistical systems.

**Estimating the effects of capacity building and policy interventions on private finance remains more challenging.** This is due to data constraints, methodological issues (defining accounting boundaries, addressing time lags) as well as high risks of double counting. Approaches tested to date include the use of cash flow analyses, consultations, and econometric techniques. Consultation- and econometric-based approaches have the potential to capture the effects of all relevant public interventions but are constrained by, respectively, subjective assessments by consultees and highly intensive data requirements. Cash flow-based approaches are relatively objective and practical but cannot account for the effects of policies that do not result in financial support and of capacity building.

**To address data gaps, capacity building providers and policy implementers should explore possibilities for collecting data about private investment occurring over time within the scope of the project, programme, or sector being supported.** On that basis, interested countries could, with the support of researchers, run pilot estimates of mobilisation by policies providing financial support at the level of programmes and sectors using cash flow-based approaches. In addition, researchers could further test the use of econometric- and consultation-based results to construct factors at the level of sectors or groups of countries to adjust estimates of private finance mobilised by public finance. Ensuring coherent accounting boundaries and information availability across actors so as to avoid double-counting remains a major challenge here.

**Alternatives to estimating and attributing volumes of private finance mobilised must be sought where data and methodological constraints as well risks of double counting persist.** Future work may seek to identify or develop indicators of the effect that capacity building and policies have on private finance. Monetary indicators would be of highest relevance, such as estimates of total private investment within a given timeframe and sector, which specific capacity building and policies can assert to have jointly contributed to mobilising.

# 1 Drivers of private finance: mobilisation and catalytic effects

The provision of private finance to low-emissions and climate-resilient projects in a given country is typically the result of a combination of climate-related public finance and policy interventions, in the context of broader policy environments and enabling conditions (Hascic et al., 2015). The effect of these different factors on private finance can be more or less direct. While some improve the overall readiness of private sector actors to invest in a given country and climate-related sector or technology, others mobilise private finance for climate action more directly by improving the risk-return profile of specific low-emissions and climate-resilient projects. Figure 1 provides an overview of these different effects and of the corresponding potential nature of the causal links between each factor and private investment.

Quantifying the effects that public interventions have on private finance implies addressing a range of definitional and methodological issues, as illustrated by a framework of decision points developed under the Research Collaborative (Jachnik, Caruso and Srivastava, 2015).

Decisions need to be made in particular about:

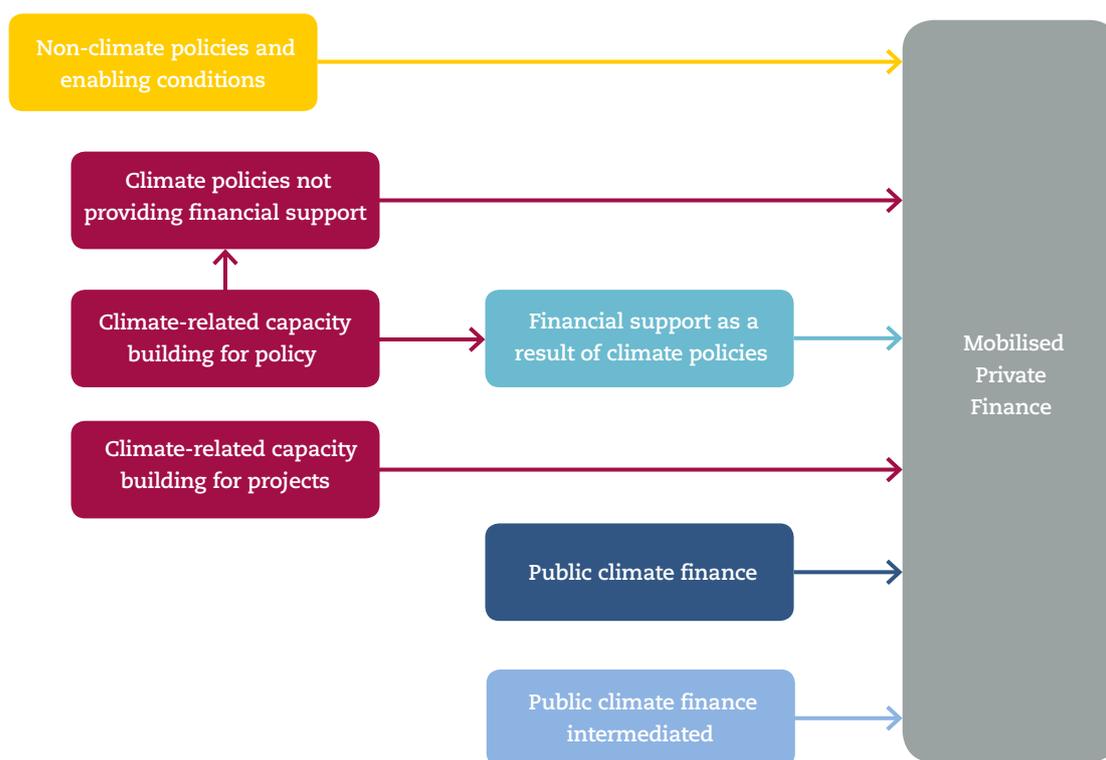
- The type of public interventions for which the effect on private finance will be estimated;
- How to value these different public interventions;
- Accounting boundaries of private finance considered, including over time;
- Causality assumptions between public interventions and private finance; and
- How to attribute private finance where multiple public interventions/actors are involved.

Measuring direct (or intermediated-direct) mobilisation is the scope of statistical work of the OECD Development Assistance Committee (DAC) as well as of tracking efforts by public finance providers themselves (see pages 6-9). The effects of climate-related public capacity building activities and policies are, however, not captured. Since such interventions may affect a small or large number of projects including over time, quantifying their effects on climate finance is inherently more challenging. A number of methodologies have, however, been tested to this end (see pages 10-17). Such research is intended to complement (rather than substitute for) existing efforts to measure private finance mobilised by public finance.

A snapshot of Figure 1 is presented in the various sections of this brochure to illustrate, with dotted lines, which categories of factors are covered by respective approaches.



Figure 1. Illustration of the potential effects of different factors on private finance for low-emissions and climate-resilient projects



Potential causal link	Factor category	Example	Effect on project-level private finance	Legend
<b>Direct mobilisation</b>	Public climate co-finance to individual projects	Grants, loans, direct equity investments, guarantees	Improve the risk-return profile of specific projects and contribute to convincing private financiers to invest	Dark Blue
<b>Intermediated-direct mobilisation *</b>	Public climate finance intermediated through upstream instruments	Credit lines, fund-level investments	Increase upstream funding availability to then contribute to finance and de-risk specific projects	Light Blue
<b>Financial incentivisation</b>	Public financial support (financial incentive) as a result of climate policies or programmes	Subsidy schemes, tax breaks	Improve the risk-return profile of specific projects and contribute to convincing private financiers to invest	Light Blue
<b>Indirect mobilisation</b>	Capacity building for climate project demonstration or policy development	Capacity building grants, loans, technical assistance	Improve the overall readiness of private financiers to invest in a climate-related sector or technology	Dark Red
	Climate policies not providing financial support	Mandatory targets, labelling schemes		
<b>Catalytic effect</b>	Non-climate policies	Investment- and trade-related policies	Improve the overall readiness of private financiers to invest in a given country, sector or technology	Yellow
	Enabling conditions	Political stability, legal environment, investment conditions, technology cost		

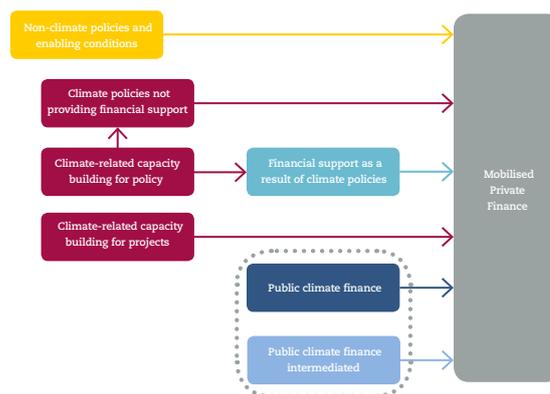
\* Where public finance is provided upstream of project-level investments (typically at the level of a fund, fund of funds, or credit line), private finance can be mobilised sequentially at both the upstream- and project-level. See Brown et al. (2015) for further details on the concept of intermediated-direct mobilisation, and Benn et al. (2016) for methodologies developed by the OECD DAC to measure private finance mobilised at the level of funds and credit lines.

Note: Factors that have a negative effect on private investment for climate projects (such as fossil fuel subsidies) are not considered.

# 2 Measuring private finance mobilised directly by public finance

This section draws together progress on developing methodologies to estimate private finance that has been mobilised by public finance. While the OECD DAC is at the forefront of developing methods and collecting data to assess the mobilisation role of development finance, Multilateral Development Banks (MDBs) and donor countries have engaged in parallel efforts. Under the umbrella of the OECD Research Collaborative, it has been possible to estimate private finance mobilised for climate action in developing countries, in particular by developed countries in the context of the USD 100 billion commitment.

## OECD DAC METHODS FOR MEASURING MOBILISATION BY OFFICIAL DEVELOPMENT FINANCE



### General description and key features

The OECD DAC is working to modernise its statistical framework to better reflect the current development co-operation landscape in support of the 2030 agenda and the sustainable development goals. One key element of modernisation is the implementation of regular data collection, at the activity-level, on amounts mobilised from the private sector by bilateral and multilateral official development finance interventions, including for climate action. Since 2013, the DAC has progressively developed

instrument-specific methodologies and collected survey data to this end. As of 2017, regular data collection on amounts mobilised has been implemented in the DAC international statistical system. In order to be realistic and avoid double-counting, DAC methods (Table 1) strive to be conservative in terms of causality assumptions between public and private finance, fair in terms of attribution among public finance providers involved, as well as pragmatic in terms of data requirements.

**Table 1. Core methodological characteristics of the DAC measurement of mobilised private finance**

Decision point	Methodological characteristic
Type of public interventions and instruments	Official development finance interventions only; to date: public guarantees, syndicated loans, shares in collectives investment vehicles, direct investment in companies, and credit lines
Valuation of public interventions	Face value for all instruments except guarantees, which are not valued unless activated.
Accounting boundaries of private finance*	Instrument-specific boundaries of private finance taking into consideration characteristics (e.g. private finance within a loan syndication) and mobilisation over time (e.g. private finance committed within 5 years of public finance for collective investment vehicles, and private finance over the lifetime of the facility for credit lines).
Causality assumptions*	Instrument-specific causality assumptions, to reflect realistic causal links e.g. it is assumed that private financiers would not invest in a collective investment vehicle or company without public investment in a riskier tranche, or participate in a syndication without an official finance provider arranging/participating in it.
Attribution of private finance*	Instrument-specific attribution methodologies reflecting the relative risk taken, role played, or volume of finance committed (or a mixture of the three criteria) by each of the public actors involved in the transaction.

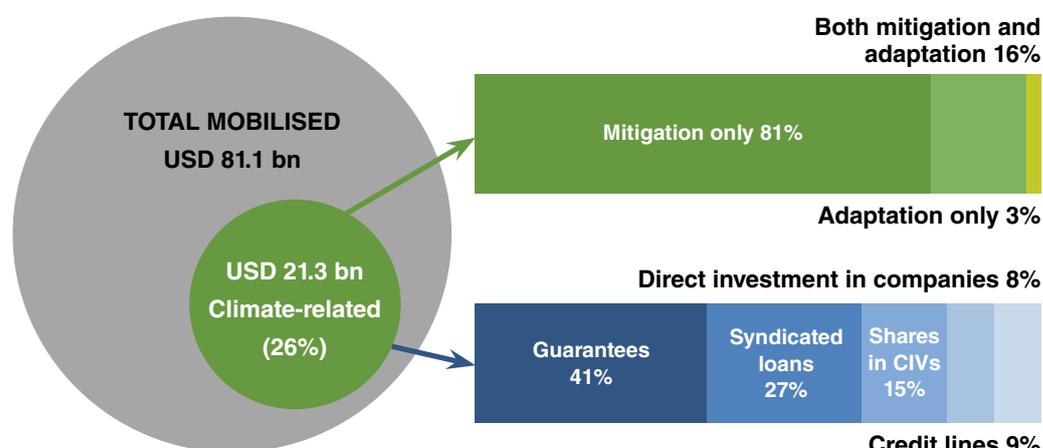
\* For full methodological details by instrument, see <http://www.oecd.org/development/stats/mobilisation.htm>

## State of development and illustration of results

By mid-2017, DAC methods and data collection cover the following official development finance mechanisms: guarantees, syndicated loans, shares in collective investment vehicles, direct investment in companies, and credit lines. Analysis of the most recent survey data (displayed in Figure 2) indicates that 26% of the total amount of private finance mobilised by these mechanisms targeted climate mitigation and/or adaptation, out of which 81% mitigation only, 3% adaptation only and 16% both. This includes activities reported using the DAC Rio markers for climate mitigation and climate adaptation or the MDBs' climate component approach, as well as other activities in support of renewable energy.

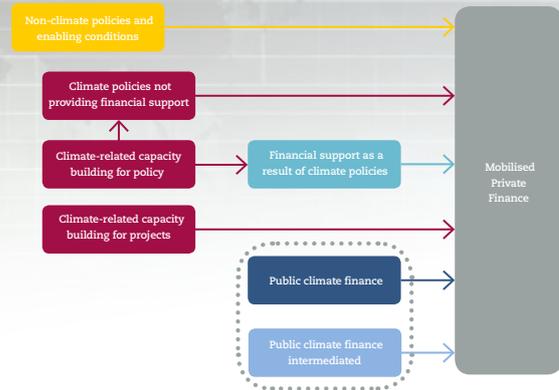
In terms of instruments, 41% of private sector finance targeting climate change was mobilised through guarantees, followed by syndicated loans (27%) and shares in collective investment vehicles (15%), credit lines (9%) and direct investment in companies (8%) (Benn, Sangaré and Hos, 2017). Methodologies for measuring the mobilisation effect of other instruments and mechanisms, such as stand-alone loans and grants, as well as complex project finance structures are under development.

**Figure 2. Amounts mobilised from the private sector by official development finance instruments (2012-15, USD billion)**



Source: Benn, Sangaré and Hos (2017).

# PARALLEL METHODS AND APPLICATIONS

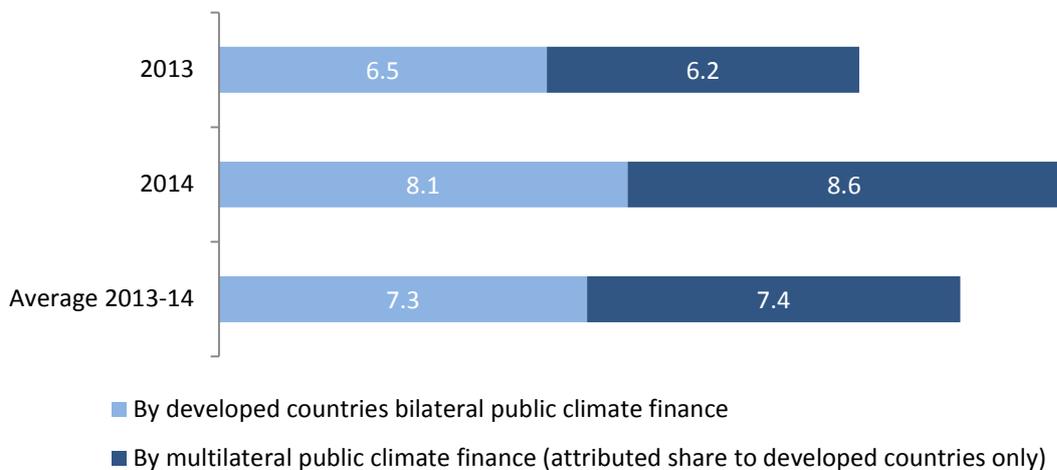


In parallel to developments by the OECD DAC, Multilateral Development Banks (MDBs) have piloted joint work to measure and report aggregates of total private finance committed alongside the finance (total and climate-specific) that they provide (World Bank, 2017; EBRD, 2015). Further, a number of donor countries have also conducted first pilot studies of private finance mobilised by their bilateral public climate finance (e.g. Abeille et al., 2015).

Combined with complementary methodological work by the Research Collaborative, these efforts made it possible to produce first estimates of private finance attributable to developed countries in the context of their commitment to mobilise USD 100 billion per year by 2020 for climate action in developing countries (OECD, 2015).

As presented in Figure 3, results showed that developed countries bilateral public finance mobilised on average USD 7.3 billion private finance per year in 2013-14, while multilateral public finance (developed country share only) mobilised USD 7.4 billion. Such estimates were based on an analysis of best-available activity-level data sourced from countries, bilateral and multilateral development finance institutions, as well as DAC surveys. The estimates were further informed by coherent methodological principles agreed by donor countries, aimed in particular at ensuring attribution across all public actors involved (bilateral, multilateral and domestic alike) and avoiding double counting (Technical Working Group, 2015).

**Figure 3. Estimates of private finance mobilised by developed countries for climate action in developing countries (2013-14, USD billion)**



Source: OECD (2015).

## NEXT STEPS

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Continued work and collaboration on measuring direct private finance mobilisation by the aforementioned actors will continue to progressively enhance the depth and breadth of public finance instruments and mechanisms covered. Over time, this will result in institutionalising the tracking of mobilised private finance at the level of development finance institutions and countries.

Importantly, when tracking mobilisation at international level, avoiding double counting is conditional to the use of common methodologies by public finance providers to address issues of accounting boundaries, causality, and attribution. In this context, international statistical systems, at the forefront of which is the OECD DAC, as well as relevant official and third party data collators have a central role to play.

Methodologies underpinning international data collection (by the OECD DAC in particular) ensure that private finance is attributed across all public finance

providers involved in a project (bilateral, multilateral and domestic alike) in order to avoid overestimating the role of any individual actor and to minimise the risk of double counting. However, institutions and countries that do not report to the DAC will not feature in final results and statistics. Hence, there is a need to identify channels to explicitly account for and report on the mobilisation of private finance by:

- Domestic public finance providers such as national development banks and agencies (see McNicoll et al., 2017 for a case study of South Africa);
- Public finance (whether international or domestic) that does not have a developmental mandate per se but contributes towards financing climate action. This may, for instance, include finance committed by state-owned enterprises and commercial banks, public pension funds and sovereign wealth funds, as well as official export credit agencies (see Jachnik et al., 2017 on the latter).



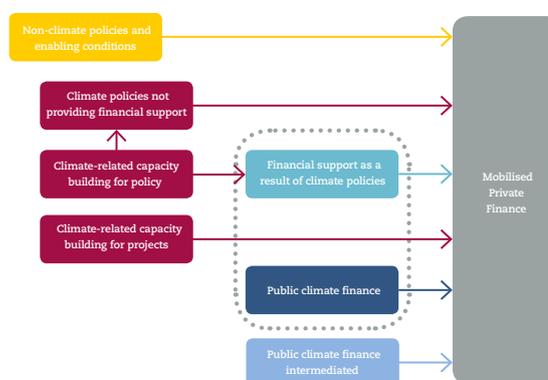
# 3 Estimating the effect of capacity building and policies on private finance

This section summarises the state of play and remaining data and methodological gaps for estimating and reporting the effects that capacity building and policy interventions have on private finance for climate action in developing countries. The scope here is limited to approaches that have been tested for specifically estimating the effects of climate-related capacity building and policy interventions on volumes of private investment. To date, three types of approaches fall into that category. They are respectively based on cash flow analyses (“INVEST”), consultations (“CONSULT”), and econometrics techniques (“ECON”). Approaches that consider non-monetary indicators are not considered as they pertain to the measurement of impacts, results and effectiveness beyond private finance mobilisation.

## CASH FLOW-BASED APPROACH: THE INVESTOR-PERSPECTIVE

### General description and key features

The investor perspective (INVEST) considers public interventions that positively affect project-level expected cash flows over the lifespan of projects. As such, INVEST seeks to estimate the effect on private finance of all public interventions that can be translated into activity-level financial support. In addition to project-level public co-finance, such interventions include project-level



financial support resulting from targeted public policies (or programmes) e.g. tax incentives and subsidies. INVEST relies on the availability of data for project-level financial structures and on the value of financial support provided by targeted policies. INVEST addresses core methodological decision points as summarised in Table 2.

**Table 2. Core methodological characteristics of cash flow-based approaches**

Decision point	Methodological characteristic
Type of public interventions and instruments	Project-level public co-finance and public policies resulting in financial support for individual projects.
Valuation of public interventions	Face value for project-level co-finance and for public policies providing one-off financial support; discounted present value for public policies providing recurring financial support over time.
Accounting boundaries of private finance	Private finance involved within the financial close of projects that benefit from public co-finance and/or financial support provided by policies.
Causality assumptions	Assumption that private finance is mobilised by the combination of project-level public co-finance and financial support provided through policies.
Attribution of private finance	Pro-rating based on volume.

## State of development and illustration of results

INVEST was initially developed and piloted in the context of a study of publicly-mobilised private finance for climate action in South Africa (McNicoll et al., 2017), with a focus on energy efficiency and renewable energy. As shown in Figure 4, domestic financial support through climate policies mobilised 80% of private finance in South Africa's renewable energy sector between 2010 and 2015. In this case, domestic financial support through climate policies consists mainly in a reverse auction system that provides 20-year guaranteed power purchase agreements for commercial installations. International financial support resulting from climate policies, which mobilised 3% of private finance, relates to the value of certified emission reductions (CERs) derived by projects registered under the Clean Development Mechanism (CDM).<sup>1</sup>

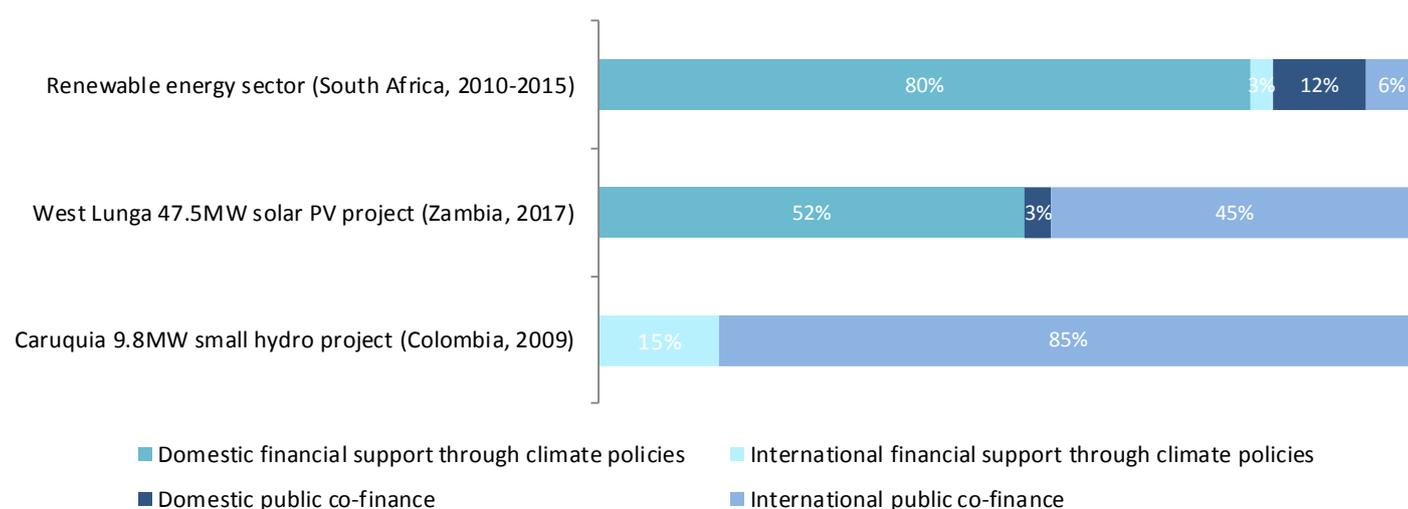
Based on this trial, the approach was conceptualised and tested in different sectors and countries (McNicoll and Jachnik, 2017). Doing so underlines that results vary greatly depending on the project, country context and sector, as illustrated by the two project-level examples included in Figure 4. On the one hand, domestic financial support through climate policies (a power purchase agreement) is estimated to have mobilised over half of private finance involved in a 47.5MW solar



photovoltaic project in Zambia in 2017. On the other hand, international public co-finance (multilateral loans) is estimated to have mobilised 85% of private finance involved in a 9.8MW small hydro project in Colombia in 2009.

Such variations in the respective shares of mobilised private finance attributed to different public interventions and actors imply that results from a given analysis cannot be generalised or transferred. INVEST requires a project-level analysis, which can then be aggregated to the desired level of results e.g. sub-sector, time period, etc. Further, it should be noted that INVEST does not explicitly account for the indirect mobilisation effect of capacity building, policies that do not result in financial support, nor for the catalytic effect of broader enabling conditions.

**Figure 4. Share of mobilised private finance attributed to public interventions according to volume-based pro-rating under the investor perspective**



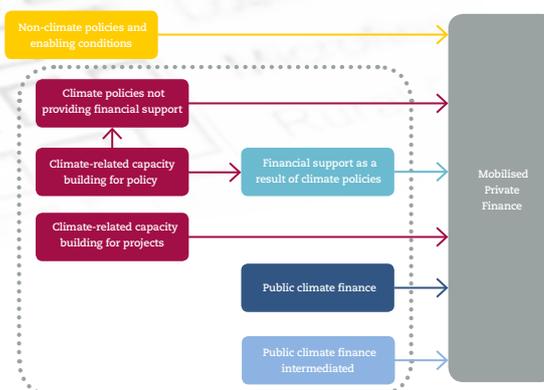
Source: Adapted from McNicoll et al. (2017) and McNicoll and Jachnik (2017).

1. Mobilisation of private finance is attributed to the CDM as an international climate policy, not to the individual entities or countries having purchased the CERs. CERs themselves are only valued for the purpose of attributing mobilised private finance. The value of CERs is, however, not accounted for as climate finance, thereby avoiding double counting between climate finance and mitigation accounting.

# CONSULTATION-BASED APPROACHES

## General description and key features

Consultation-based approaches (CONSULT) rely on the perception that individual respondents have of the respective roles played by different factors in mobilising or catalysing private finance. Consultation questions can be both open- and closed-ended, the latter typically making use of pre-defined scales. Answers are usually collected through online questionnaires and interviews. In principle, CONSULT provides analysts with the flexibility to cover the full range of relevant public interventions. In practice, incorporating many factors can dissuade targeted respondents from participating due to the length and complexity of the questionnaire. Results and their interpretation are further constrained and influenced significantly by the level of awareness and natural bias of respondents. CONSULT addresses core methodological decision points as summarised in Table 3.



## State of development and illustration of results

A number of studies have used online consultations and interviews as the core methodological approach for estimating the effect that capacity building (Brown et al., 2015; Stadelmann and Falconer, 2015) and policy interventions (Green and Westphal, 2017) have on private finance. This was trialled at the level of individual climate-relevant projects and programmes, by asking respondents to associate public interventions with predefined causal ranges or percentage thresholds. The relative subjectivity and context-specificity of the approach have, however, prevented any attempt to scale it up at the level of e.g. sector or sub-sector.

**Table 3. Core methodological characteristics of consultation-based approaches**

Decision point	Methodological characteristic
Type of public interventions and instruments	Can in principle include up to the full range of relevant public finance, capacity building and policy interventions
Valuation of public interventions	Valued according to the predefined causal ranges or percentage thresholds that are assigned by respondents to the consultation
Accounting boundaries of private finance	Varies depending on the scope covered by the consultation, though typically at project-, programme- or sector-level.
Causality assumptions	Assumption that the combined effect of public co-finance, public policies and enabling conditions within the scope of analysis resulted in private investment.
Attribution of private finance	Based on individual opinions expressed by consultees, which are collated and, depending on the method chosen, weighted and normalised.

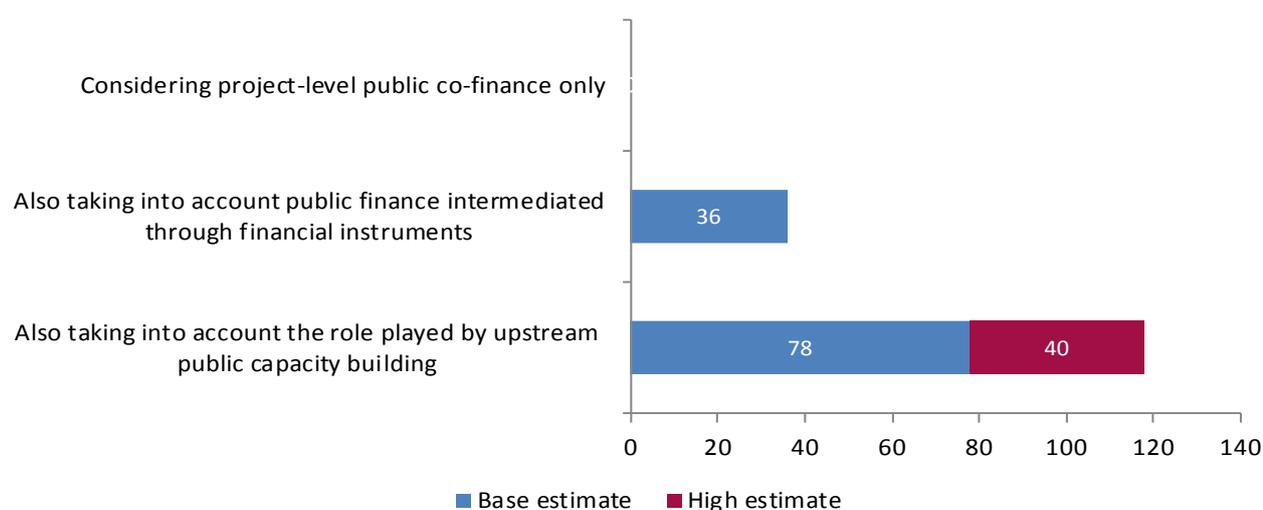
Research by Green and Westphal (2017) attempted to attribute mobilised private finance between project-level co-finance (domestic and international) and policies, based on a consultation with a limited number of stakeholders. This was trialled for projects in Uruguay (wind power), Kenya (geothermal) and Brazil (sustainable urban transport). Results show very significant differences in the relative share attributed to respective types of public interventions. Further, a large share is attributed to other (unidentified) enabling factors, which is in part the result of methodological choices by the authors, coupled with the difficulty that consultees have in quantifying the catalytic effects of such factors.

This analysis did not explicitly map and account for the indirect mobilisation effect of upstream capacity building and technical assistance, due to the aforementioned practical difficulty of incorporating many factors and the issue of time lags. A separate study by Brown et al. (2015) explored options to address this gap by viewing a range of scenarios, as illustrated in Figure 5 for a climate smart agribusiness programme in Uganda. The results highlight that indicative ranges of mobilised private finance should

be considered rather than single estimates, as confirmed by another study (Stadelmann and Falconer, 2015). However, it is here the role of public policies that was not accounted for in order for the approach to remain practical.

Overall, CONSULT can, on the basis of project- and programme-level case studies, provide indications of the likely effects that capacity building activities and public policies have had on private investment. Well-designed questionnaires and a large number of consultees can contribute towards reducing potential biases in the assessment made by consultees. The inherent subjectivity and context-specificity of the approach, along with the knowledge gap typically faced by consultees in relation to the factors they are asked to rate, however, preclude using it to produce precise and more aggregate-level estimates. CONSULT can, nevertheless, provide valuable insights that can complement and help nuance results from more quantitative analyses, as was done for INVEST (McNicoll et al., 2017) and ECON (Ang, Röttgers and Burli, 2017).

**Figure 5. Illustration of the range of consultation-based estimates of mobilised private finance attributable to developed countries' public interventions: Example of the NU-TEC climate smart agribusiness programme in Uganda (USD million)**



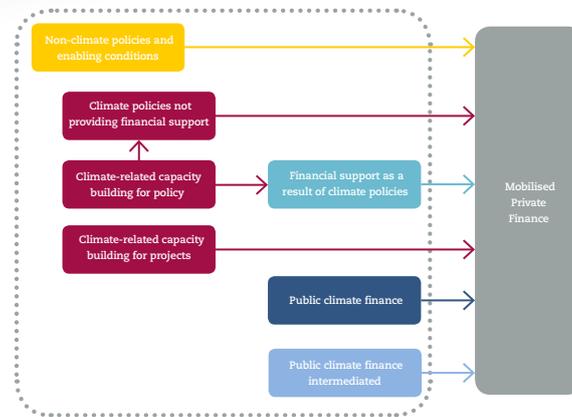
Source: Adapted from Brown et al., 2015.



## ECONOMETRICS-BASED APPROACHES

### General description and key features

Econometrics (ECON) relies on mathematical and statistical techniques in order to model and quantify economic phenomena. This makes it possible to analyse the relationship between private finance and a wide range of public finance and policy interventions, while controlling for other factors that might affect private finance such as broader policy frameworks and enabling conditions. More than other approaches, ECON is, however, limited by the availability and quality of comparable data across years, sectors and countries, as well as sample size-related constraints. ECON addresses core methodological decision points as summarised in Table 4.



### State of development and illustration of results

The use of ECON for the purpose of estimating the effect of public interventions and enabling conditions on climate-related investment has been tested for renewable energy at the level of groups of countries e.g. developed and developing (Hascic, et al., 2015), and G20 economies (Ang, Röttgers and Burli, 2017). Data availability is currently insufficient for running such analysis for other climate-relevant sectors, while sample size constrains the use of ECON at the level of individual public actors, policy and finance instruments, or countries.

**Table 4. Core methodological characteristics of econometrics-based approaches**

Decision point	Methodological characteristic
Type of public interventions and instruments	Econometric techniques allow for the estimation of partial correlations between private finance and a range of factors relating to public interventions as well as market and country conditions.
Valuation of public interventions	Financial value for public co-finance and policies expressed in monetary terms where underlying data is available; physical units or binary values (indicating presence or absence) for other variables.
Accounting boundaries of private finance	All private finance, for which data is available during the time period considered in the analysis, including private investments made in the absence of public co-finance and financial support.
Causality assumptions	As a starting point, there are no assumptions on the combined effects of public co-finance, public policies and enabling conditions that result in private investment. The analysis tests for the correlation of a range of relevant factors with private finance. Advanced econometric methodologies can be employed to test for causality.
Attribution of private finance	No attribution as such; factors are computed that provide an indication of the relation between each explanatory variable and private finance; the possibility of attributing actual percentages to each factor based on simulations could, however, be explored.

Table 5 provides an illustration of the ability of ECON to establish relationships between volumes of investment (private and public combined) in renewable power generation and a range of both targeted public interventions (here, climate mitigation policies such as explicit carbon prices, feed-in tariffs or public tenders) and broader investment conditions (Ang, Röttgers and Burli, 2017).

The possibility of further building simulations of the actual effect of categories of public interventions on volumes of private investment has been trialled for renewable energy projects in developing countries that reached financial close during 2000-2011 (see Hascic, et al., 2015). Results indicate that only a low share of private finance can be explained by the level of domestic policy support compared to the estimated role played by public finance, which likely relates to the fact that developing countries featured, on average, low levels of support policies during the period considered. A similar simulation for developed countries indicates that public policies have a greater

mobilisation impact than public finance. However, such results should be considered as illustrative since this remains an area of exploratory work.

At this stage, results from ECON can provide guidance on the average effects for groups of countries of broadly-defined and widely-applicable public interventions (e.g. loans and feed-in tariffs in generic terms), but cannot do so for public interventions that have been less frequently used or are highly context-specific. Further, in contrast to INVEST (and to a lesser extent CONSULT), ECON does not, at this stage of methodological development, result in actual estimates of volumes of private finance mobilised or catalysed by public interventions. This would require significant time and effort to investigate causality, and doing so implies finding a way of accounting for the possibility that public finance, public policies and private finance are simultaneously determined e.g. the level of public finance could depend in part on the level of private finance (see Cárdenas Rodríguez et al., 2014).

**Table 5. Illustration of relationships established from an econometric analysis of investment (private and public) in renewable power across OECD and G20 countries: Selected drivers and deterrents, country grouping and renewables sub-sectors**

Factors		OECD and G20	Advanced countries	Emerging economies	EU	Non-EU	Solar power	Wind power
Climate-mitigation policies	Feed-in tariffs	+	+	NS	+	+	+	NS
	Renewable energy certificates	+	+	NS	NS	NS	+	+
	Public tenders	+	NS	+	NS	NS	NS	+
	Explicit carbon prices	NS	NS	+	+	NS	+	NS
	Energy taxation in power sector	NS	NS	NS	NS	NS	+	-
Investment conditions	Ease of Doing Business	NS	NS	+	NS	+	NS	NS
	Corruption perception	n/a	n/a	n/a	n/a	n/a	-	n/a
	Regulatory quality	n/a	n/a	n/a	n/a	n/a	+	n/a
	Registering property	+	+	NS	NS	+	+	n/a
	Licenses and permit system	n/a	n/a	n/a	n/a	n/a	+	-
	Direct control of the state over enterprises	+	+	NS	NS	NS	+	+
	Sovereign credit rating	+	+	NS	NS	NS	NS	NS
	Domestic credit to private sector	+	+	NS	NS	NS	n/a	n/a

Source: Adapted from Ang, Röttgers and Burli (2017).

Note1: "+" Indicates that the variable had a statistically significant and positive effect on investment; "-" Indicates that the variable had a statistically significant and negative effect on investment; "n/a" indicates that the variable was not selected; "NS" indicates that results were not statistically significant and could thus not be interpreted. Note2: A country is defined as advanced if it belongs to the list of OECD or G20 countries (including EU member countries) and listed as a "high income" country in the World Bank's List of Economies. A country is defined as an emerging economy if it belongs to the list of OECD or G20 countries (including EU member countries) and is listed as "lower middle income" or "upper middle income" country in the World Bank's List.

## SUMMARY ACROSS APPROACHES

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Four criteria have been identified as relevant to the design and implementation of robust and credible methodologies for estimating publicly-mobilised private finance for climate action, and can be used to assess the three approaches described in this section. They relate to the accuracy, practicality, potential for standardisation, and incentives provided by each of the approaches (see Jachnik, Caruso and Srivastava, 2015).

On accuracy of results, INVEST is the only one of the three approaches that results in a single estimate of attributed mobilised private finance, using a causality assumption and attribution methodology that are practical yet defensible. Due to the subjectivity of survey responses, it is more realistic for an analysis using CONSULT to result in a range of attributed mobilised private finance. There is also a higher risk of double counting using CONSULT compared to INVEST or ECON since results depend on the respondents' interpretation of the inter-relatedness of various public interventions. On the other hand, ECON tests relationships between volumes of finance and public interventions but cannot result in an estimate of mobilisation since causality is not necessarily assumed, and an attribution is not performed.

In terms of practicality and standardisation potential, both CONSULT and INVEST can be applied to individual projects, while the latter can also be used for analysis at sector-level within a country. It would, however, be challenging to standardise and apply INVEST at a more aggregated level (such as for groups of countries) since this would imply collecting detailed project-level information on financial support resulting from policies which is typically not centralised. On the other hand, ECON is applicable only at a more aggregate-level due to sample size constraints. Out of the three approaches, the data burden is highest for ECON and current availability means analysis can only be performed for parts of the renewable energy sector for groups of countries.

Since INVEST estimates mobilisation only by public co-finance and financial support resulting from policies,



it provides little incentive for the use of other public interventions, such as capacity building. However, using INVEST to better understand which policies have contributed to mobilising private finance in a given country or sector could help inform where to direct future capacity building support. For CONSULT and ECON, which can incorporate up to the full range of public interventions, the incentives provided for each intervention are arguably more balanced. However, ECON is better able to incorporate the role of broader enabling conditions in the recipient country.

## NEXT STEPS

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### Addressing data gaps on private finance

Records of activity level private investments are indispensable for improving the ability to comprehensively estimate the effects of capacity building and public policy interventions. Public entities designing and implementing such interventions have a key role to play in improving data availability. Confidentiality restrictions can be addressed before making financial data available, for instance by anonymising information about the identity of individual beneficiaries of the support.

**Providers of capacity building support should explore possibilities of collecting data about private investment occurring over time within the scope of the project, programme, sector or policy they have contributed to supporting.** In practice, the ability to collect such information will vary greatly. On the one hand, support for project demonstration and implementation is most often only one step and a limited amount of time away

from subsequent private investment, which should make it feasible to collect at least partial data. On the other hand, providers of support for policy development and implementation will have to rely on relevant public entities in the recipient country to collect data on private investment resulting from the policy.

**National as well as sub-national authorities in charge of policy design and implementation should strengthen efforts to collect comprehensive and granular data on private investments resulting from policies.** Such data is likely to be most readily available (e.g. from national treasuries and tax authorities) for policies that result in public financial support, such as subsidy schemes and tax incentives. Public authorities could also put in place reporting requirements to encourage relevant professional associations or groups of actors within the private financial industry to disclose more granular information on volumes of finance in support of climate action in developing countries.

## Conducting further methodological work

Pending the above-outlined improvements in data availability, a number of steps could be taken to further develop and test approaches to estimate the effects of capacity building and policies on private investment. This section provides three examples of possible work areas. One major recurring challenge is how to ensure coherent accounting boundaries and the same level of information between different actors, both of which are necessary to avoid double-counting.

**Interested countries could, with the support of researchers, run INVEST-based pilots.** In addition to providing valuable tracking and policy evidence for the individual countries concerned, such pilots could facilitate the identification of common trends and variances across different policy mixes and sectors. Results from CONSULT-based and ECON-based analyses with equivalent country and sectoral coverage can

be used to put INVEST-based results into perspective. However, implementing INVEST requires that relevant public climate policies providing financial support have been in place for at least a couple of years.

**Researchers could test the use of ECON-correlations to construct factors at the level of sectors and groups of countries to adjust estimates of private finance mobilised by public finance.** The range of factors would correspond to varying strengths of policy and investment environments that are more or less conducive of private investment for climate action. The implementation of such factors could potentially be trialled on the basis of estimates of private finance mobilised by public climate finance available from the OECD-DAC as well as international and domestic public finance providers.

**Where data and methodological constraints as well as risks of double counting persist, alternatives to estimating and attributing volumes of private finance mobilised per se have to be sought.** Future work may seek to identify or develop indicators of the effects that capacity building and policies have on private finance. Monetary indicators would be of most relevance. They could for example consist of estimates of total private investment within a given timeframe and climate-related sector, which specific capacity building and policies can assert to have contributed to, though without claiming a specific share. Possible information sources include data and statistics on domestic and international investment, as well as sales data of relevant technologies, products and services e.g. energy efficient appliances, electrical cars. Considering non-monetary indicators pertains to the measurement of impacts, results and effectiveness beyond private finance mobilisation.



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