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Developing criteria to align investments with 2°C compatible pathways

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Disclaimer

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Executive Summary

The German government, through the German Federal Environment Agency, commissioned a consortium consisting of NewClimate Institute, Germanwatch, and the 2° Investing Initiative to explore criteria to measure the alignment of investment and financing with the 2°C limit. The project focuses in particular on development finance institutions.

The project serves as a starting point for a more long-term initiative to develop metrics and tools to inform on the alignment of investment and financing decisions with international climate policy objectives. It builds on and links to on-going related research activities and investor actions, which seek to understand climate performance and current and future climate risks.

Financial institutions and climate objectives are connected both from a financial risk and climate change impact perspective. 2° investing criteria can inform this link and increase financial sector transparency and accountability.

- **Financial risk:** Climate goals will lead to changes in the real economy. These changes will likely be associated with both value creation and value destruction, which in turn may create financial risk and opportunity for both public and private financial institutions.
- **Climate change objective:** Realizing climate goals will require significant investments in low-carbon and climate-resilient technologies and a reduction of investments in high-carbon technologies and infrastructure. The finance sector can be a huge source of capital for realizing these investments. The finance sector may thus be a key driver behind achieving climate goals.

2° investing criteria can help inform both aspects. Measuring the compatibility of an investment or financing with the 2°C limit may inform on financial risk and the contribution to the 2°C limit.

Current investment and financing flows are mis-aligned with the 2°C limit. Financial institutions can play a prominent role in contributing to aligning these flows. A particular focus of this project is on the role of national and international development finance institutions.

Aligning investment and financing flows with the 2°C limit requires a shifting of capital to climate-friendly investments and a reduction in high-carbon investment. This investment relies to a significant degree on financing from financial institutions, and in particular public financial institutions. Public financial institutions account for roughly one-third of what is today classified as climate finance in 2013 (CPI 2014). Hence, these institutions can play a vital role in introducing, incentivizing and catalysing a process of transformation that swiftly and significantly lowers CO_2 levels across all economies. They can stop providing financing for high carbon projects, both in their credit operations and as part of the risk guarantees, and increase investments in low carbon technologies and infrastructure. Many public financial institutions have either explicit or implicit mandates to contribute to financing the transition to a low-carbon economy. Given the long lifetime of physical assets, and the urgency of decarbonizing over the next decades, aligning the financing decisions of financial institutions today with long-term climate goals is crucial to limiting global warming to a maximum of 2°C and avoiding financial risk.

The majority of development finance institutions have started integrating climate-related criteria into their financing decision. The existing landscape of criteria however does not ensure an alignment of these financing decisions with the 2°C limit.

National and international development finance institutions employ climate-related criteria at sector- and technology level. These criteria can be classified as positive/negative lists (e.g. involving the exclusion or explicit inclusion of certain assets, usually classified by technology), quantitative criteria (e.g. energy efficiency reductions, GHG-emissions), qualitative criteria (e.g. a review of the financing decision with regard to national climate policies), and the use of carbon shadow pricing. These criteria are increasingly sophisticated. At the same time, none of these criteria act as a 'silver bullet'. While they inform on climate benefits, in particular when used in complementary fashion, they do not allow for an assessment of the financing decision vis-à-vis its alignment with the 2°C limit.

Using the long-term perspective provided in 2°C scenarios as a starting point, 2° investing criteria can be developed on the basis of 2°C decarbonisation, technology, and investment roadmaps.

A number of research organisations have started exploring ways to assess the alignment of investments at physical asset, financial asset, and financial portfolio level with the 2°C limit. These initiatives all take the 2°C roadmaps as their starting point. A review of these roadmaps shows that investment can be classified as 2°C compatible, conditional (e.g. depending on the level of ambition), controversial (e.g. depending on the roadmap), and 2°C incompatible (e.g. incompatible across all roadmaps). Developing these criteria can involve the use of a 2°C roadmap as a benchmark, the definition of the combination of eligible and ineligible investments, and the use of criteria to inform on the alignment with these benchmarks. The application of more stringent criteria can contribute to steering investments towards achieving the global climate goal.

Further research and consultations with investment practitioners are needed to define processes and criteria that ensure 2°C compatible investment. Such a process would benefit from broad support by G7 and other governments and participation of a broad set of public financial institutions.

The next phase of this project will involve the development of first indicators and specific guidance , including illustrative criteria for a number of key investment areas. For this guidance to be relevant and useful in practice, this phase of the project will include extensive consultation with development banks, other public financial institutions and relevant stakeholders. The G7 governments have repeatedly endorsed the 2°C limit. In line with this commitment, they could show continued leadership by encouraging their own public financial institutions to participate in the development of 2°C investment criteria. The complexity of the issue at hand and the time critical nature of the problem calls for pragmatic approaches and solutions that build on the inputs and feedback from investment practitioners. A key challenge is to find the right balance between sufficiently detailed and robust criteria and limiting the administrative burden for financial institutions to ensure widespread implementation.

More work is also necessary on processes and criteria applicable to private banks and private investors as well as to financial assets and portfolios. While the focus of this research project is on public financial institutions financing physical assets, next steps could look at a broader set of investors and types of investments. Such further work could build on on-going processes. Moreover, the focus of this project on mitigation needs to be complemented with similar research on criteria to make investments climate resilient. In some cases, for example for infrastructure, such criteria can go hand in hand with criteria for 2°C compatibility.

1. Introduction

The German government, through the German Federal Environment Agency, commissioned a consortium consisting of NewClimate Institute, Germanwatch and the 2° Investing Initiative to study the issue of criteria and guidance for 2°C-compatible investments.

This short-term research project is meant to serve as a starting point for a much deeper debate on tools to guide investment decisions to align with international climate policy objectives. It builds on and links to on-going related research activities and investor actions, which seek to understand climate performance and current and future climate risks.

The project connects the dots between climate goals and financial institutions. Financial institutions and climate objectives are connected both from a financial risk and climate change impact perspective.

- **Financial risk:** Climate goals will lead to changes in the real economy. These changes will likely be associated with both value creation and value destruction, which in turn may create financial risk and opportunity for both public and private financial institutions.
- **Climate change objective:** Realizing climate goals will require significant investment in low-carbon and climate-resilient technologies and a reduction of investments in high-carbon technologies and infrastructure. The finance sector can be a huge source of capital for realizing these investments. The finance sector may thus be a key driver behind achieving climate goals.

Understanding the connection between financial institutions and climate goals requires climate-related metrics.

The project focuses on how metrics can be designed, in particular for public financial institutions, to measure the alignment of their investments in physical assets with the 2°C limit.

A common challenge with regard to financial risk and climate change objectives, both from a policy makers and financial institutions perspective, is the issue of measurement. Financial institutions often lack the necessary tools and models to measure and manage their exposure to climate change-related risks. Similarly, neither public nor private financial institutions are currently in a position to measure the alignment of their investment decisions with climate objectives, such as the 2°C limit.

The project focuses on public financial institutions and investors. They sometimes have an explicit climate mandate - but even those who do not can be assumed to have an implicit responsibility to align their actions with a global policy goal all governments have agreed to, such as the 2°C limit. The focus of this research is on project and infrastructure finance, i.e. physical assets, given their prominence in public financial institutions lending practices and their relevance for climate protection. In this respect, it focuses on reducing greenhouse gas emissions, i.e. mitigating climate change. The important aspects of climate resilience and adaptation to climate change are not part of this particular research effort, but need to be equally addressed by future research.

The point of departure of this report is the current landscape of climate-related metrics, designed to measure *climate benefits* of an investment decisions relative to no investment. A measurement of climate benefits however does not automatically inform on whether investments are compatible with a 2°C economy in terms of the scale of their impact. The ability for 2° investing criteria to act as a benchmark informing on this compatibility is their defining feature, both from the perspective of financial risk and climate change.

This report summarises the main lines of thinking on the need, development and use of 2°C-compatible investment criteria, as well as the relevance of the investment community for the achievement of climate policy goals.

A growing number of financial institutions account and report climate-related criteria. Public financial institutions are leading in this respect, but some private financial institutions have also started integrating these criteria into investment decisions. Section 3 looks at existing criteria and approaches used by public banks to guide investment decisions today and assesses their appropriateness with respect to the 2°C objective. This is followed by an analysis on how 2°C model scenarios can be used as a basis to develop 2°C investment criteria and to understand not only whether an investment is climate friendly, but also to which extent it may be compatible with the agreed 2°C limit (section 4). Lastly, the report provides some considerations on the particular role that public financial institutions could play to drive and steer markets, as well as the role of governments to support the 2°C compatible investment agenda. The concluding outlook will highlight key questions to be addressed by this and future research which are intended to stimulate further debate and engagement on this important topic.

2. The need for 2° investing criteria

In order to limit global temperature increase to 2°C, global greenhouse gas (GHG) emissions will have to be reduced significantly.

The international community has agreed to limit global temperature increase to a maximum of 2°C above pre-industrial levels. An increase beyond this limit would have deep and unpredictable impacts on our communities, eco systems and the global economy. The IPCC suggests that for a likely chance of meeting the 2°C limit, global emissions of *all* greenhouse gases need to be reduced to net zero or below by 2100 (full range over all scenarios is 18% below zero to 22% above zero as a percentage of 2010 emissions). For full decarbonization, emissions of CO_2 from fossil fuels, industry and land use will have to decline to around zero earlier, i.e. during the second half of the century, in order to be compatible with the 2°C limit (example scenario in Figure 1).

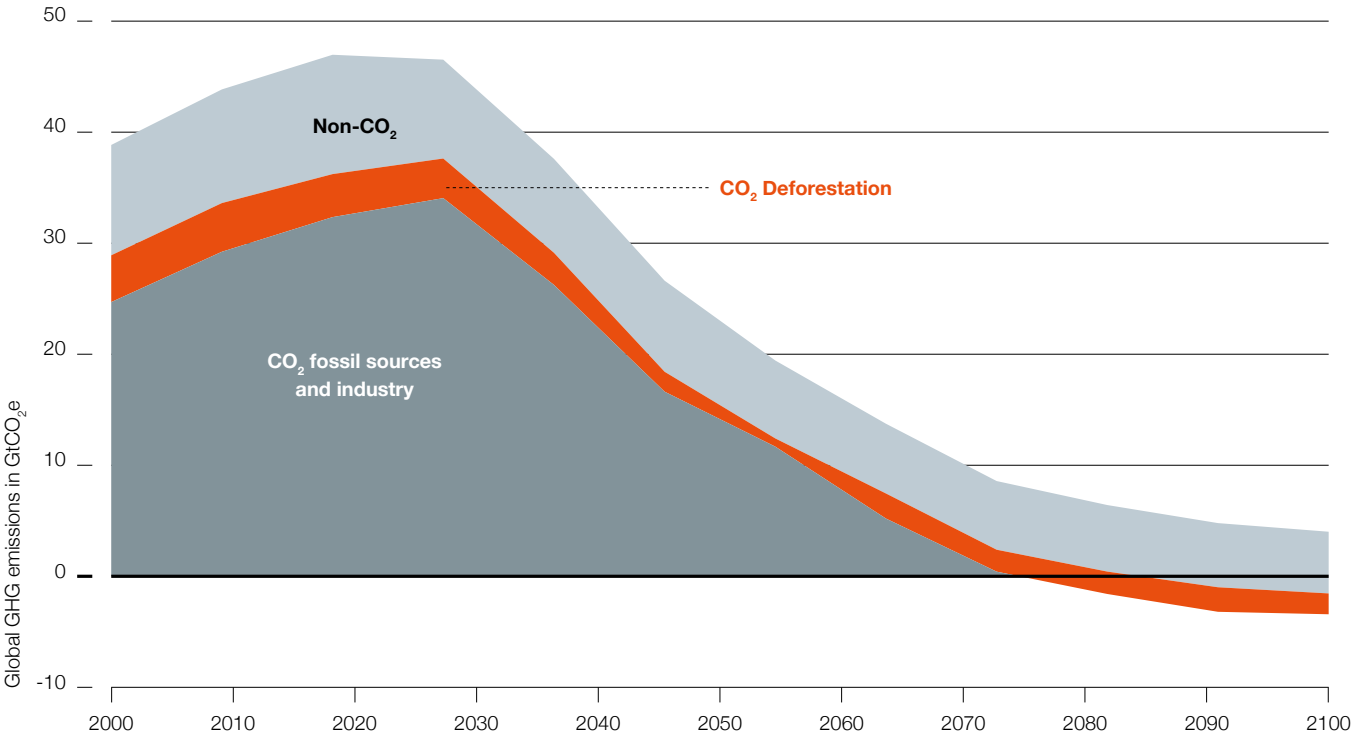


Figure 1
Illustrative 2°C scenario

Data source:
marker scenario RCP 2.6 of the IPCC (IIASA, 2015)

Current investment flows are misaligned with the 2°C limit. Aligning these flows requires a reallocation of capital from high-carbon to climate-friendly investments.

Investment and financing decisions today will have a large impact on the ability to achieve the required deep cuts in GHG-emissions. The New Climate Economy report estimates that total investments in a 2°C compatible scenario are only marginally higher than total investments in a reference case, but structured differently. The 2°C limit has two implications for investment and financing:

- **Shifting of capital to climate-friendly investments:** The International Energy Agency (IEA 2014a) estimates that limit global warming to 2°C requires an additional annual investment of $1 trillion by 2050, relative to current levels.
- **Reducing high-carbon investment:** Limiting global warming to 2°C will require a gradual decrease in investments in technologies involving unabated GHG-emissions. For example, the IEA estimates a reduction of $2 trillion in investment until 2035 in the oil & gas sector in a 2°C compatible scenario ("450") relative to investment levels under the "New Policy Scenario" (e.g. the IEA business-as-usual scenario) as shown in Figure 2 below.

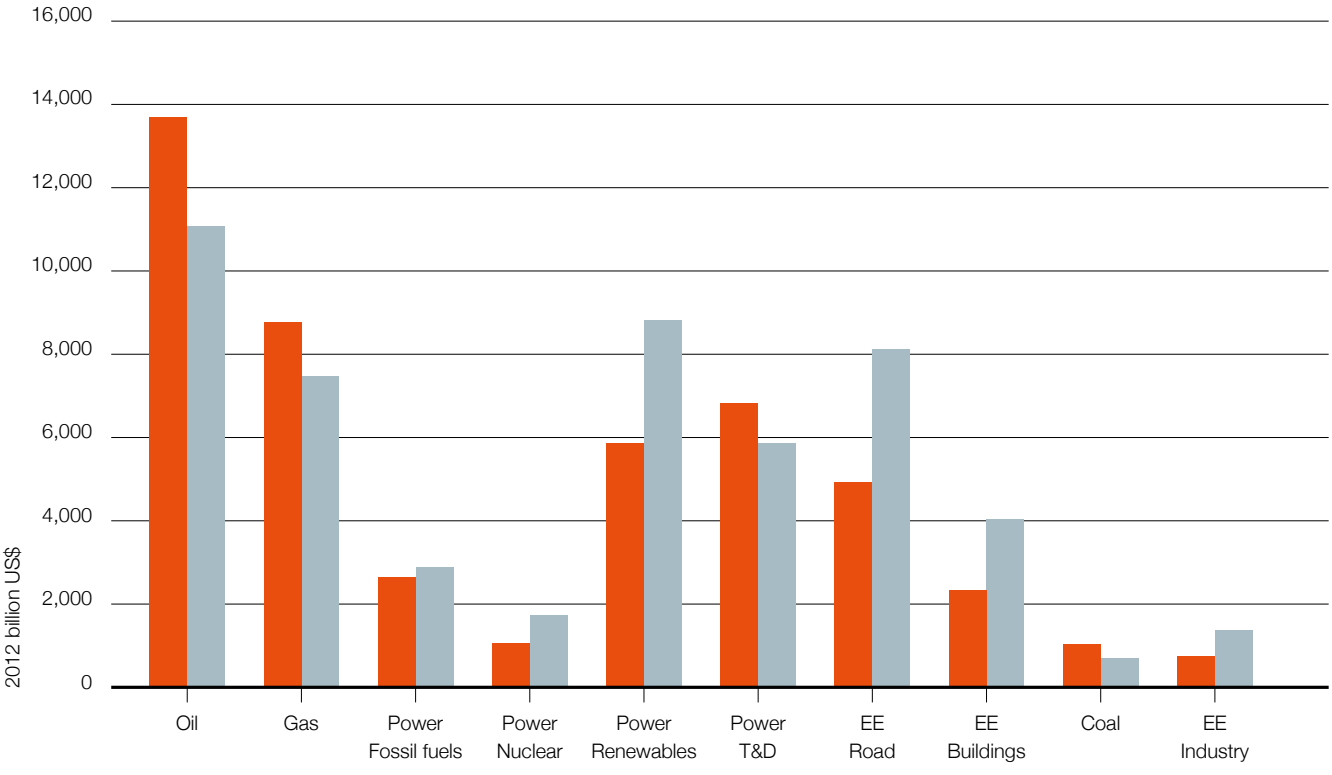


Figure 2
Investments in key sector under different scenarios (IEA, 2014a)

Public and private financial institutions are a key source of financing for realizing the capital mobilization and allocation challenge.

Climate-related investment relies to a significant degree on financing from financial institutions. The Climate Policy Initiative (CPI) estimated in the 2014 Climate Finance Landscape report that external financing accounted for nearly half of all climate mitigation investment in 2013 (Buchner et al, 2014). In terms of both high-carbon and low-carbon investments, the IEA estimated in the 2014 World Energy Investment Outlook (IEA 2014a) that debt and equity financing provided over 40% of the project finance of OECD publicly listed power companies. Public and private financial institutions influence investment decisions in the real economy. They determine both the access to capital and its cost. When public and private financial institutions discriminate between high-carbon and low-carbon investment, they can influence the relative profitability of projects and the ultimate investment decision.

Public financial institutions play a particularly prominent role for climate friendly investment. They account for roughly one-third of global climate finance in 2013 (Buchner et al, 2014). Many public financial institutions have either explicit or implicit mandates to contribute to financing the transition to a low-carbon economy (see section 3). For example, the Coverage Areas and Activity Specific Sub Criteria of the Investment Framework of the Green Climate Fund directly reference the 2°C limit (GCF, 2015). In France, the Banque Publique d'Investissement (Public Investment Bank), created in 2012, has a specific mandate to finance the "ecological transition" (Art. 1). The German KfW has a similar mandate focused more broadly on the environment (KfW, 2013, Art. 2.1). The United Kingdom created a national Green Investment Bank (GIB) in 2012 with a specific climate and environmental mandate. Beginning in 2015, the GIB will also invest internationally.

Private institutional investors are also demonstrating increased engagement, for example by announcing carbon footprinting and 'decarbonization' pledges.

Both high-carbon and climate-friendly investments frequently have an expected lifetime of >30 years. The full transition to a low carbon economy with development and deployment of new technologies takes decades. Aligning the financing decisions of financial institutions today with long-term climate goals is thus crucial to limiting global warming to a maximum of 2°C and avoiding financial risk.

Both high-carbon and climate-friendly investments frequently involve infrastructure with a long expected lifetime. Long lifetimes can lock-in certain infrastructure that may, in the long-term, be misaligned with climate objectives. The time horizon of these investments implies that it is to a significant degree today's investment decisions that will determine the nature of our infrastructure and associated greenhouse gas emissions in 20, 30, or 40 years. Understanding whether an investment is compatible with limiting global temperature increase to below 2°C thus requires assessing the climate impact over the lifetime of the project. Two examples may help illustrate this point:

- **Electric vehicles:** Electric vehicles are powered by electricity, which in most countries is still generated to a large extent by fossil fuels. Even if electric vehicles are still 'high-carbon' today, they are essential for a 2°C compatible future when the electricity sector decarbonizes. The technology needs to be supported today, so that it is available at large scale in the near future.
- **Combined-cycle gas turbine (CCGT) power plant:** GHG-emissions generated by CCGT power plants may still be compatible with a 2°C decarbonisation pathway today. The compatibility of the power plant over its expected lifetime (>40 years) however likely depends on the extent to which it can be retrofitted to allow for GHG-emissions abatement or the mothballing of other high-carbon power plants as part of the decarbonisation of the electricity sector.

Developing 2°C investing criteria is key to responding to the challenge of aligning investment with the 2°C limit. They help increase the transparency and accountability of public banks in terms of their role in contributing to climate goals.

2°C investing criteria are a key tool for measuring the alignment of investment and financing decisions with the 2°C limit. The consultations with public financial institutions in the course of this project demonstrated that it is still unclear how climate mandates can be operationalized in line with the 2°C limit. Developing 2°C investing criteria in partnership with public financial institutions, in particular public development banks, can create transparency around these mandates and increase accountability.

Developing 2°C investing criteria can also contribute to mobilizing private capital, through improving climate accounting standards of institutional investors and private sector banks, as well as increasing transparency around financial risk.

Beyond public banks, 2°C investing criteria may also be material for institutional investors and private sector banks. Over 40 institutional investors have signed the Montreal Carbon Pledge, committing to reporting the carbon footprint of segments of their portfolio. This commitment can be strengthened through reporting on the alignment of financial portfolios with the 2°C limit.

A sub-set of these investors are public pension funds. In some cases, these public pension funds also have an explicit environmental, and by extension climate, mandate. The French Pension Fund Act from 2000 (Art. 135) explicitly requires the French Pension Fund (Fonds de Réserve pour les Retraites, FRR) "to report on the way the general guidelines of the Fund's investment policy took into account social, environmental and ethical considerations." The Swedish Pension Fund Act from 2000 mandates that the Swedish AP funds must take environmental and ethical issues into account, albeit without compromising the goal of best possible return. 2° investing criteria can help institutional investors report in response to these mandates.

As outlined above, institutional investors and private sector banks are increasingly looking to measure the financial risk and economic opportunity possibly associated with the transition to a low-carbon economy. 2° investing criteria informing on the compatibility of projects, financial assets, and financial portfolios with climate goals can be one tool to help understand, measure, and manage this risk.

This section highlighted the extent to which current investment flows are misaligned with the goal of limiting global warming to 2°C and the prominent role of financial institutions as a source of financing for aligning these investment flows. Both public and private financial institutions are currently not in a position to assess whether their financing decisions are aligned with the 2°C limit. The following section will review in further detail the climate-related financing criteria of public financial institutions for project and infrastructure finance.

3. Current use of climate related criteria by international financial institutions

Overview

Development finance institutions and climate funds are the largest intermediary of climate finance, a result of their explicit or implicit mandate. At the same time, many of these institutions are still involved in some form in GHG-intensive financing activities.

All public international financial institutions (IFIs) reviewed as part of this project identify, define and incorporate climate-related aspects in their investment decision-making. As outlined above, for some of these institutions this is part of an explicit legal mandate. For others, the focus on climate finance is part of an implicit mandate or a specific policy objective defined by the institutions' governance institutions. While IFIs place a particular emphasis on low-carbon financing, most public financial institutions still are involved, at least in some form, in financing GHG-intensive activities such as fossil fuel financing.

The present findings, drawn from desk research and expert consultation, suggest that while climate considerations may play a role before or during project appraisal, there is no uniform standard for assessing the 2°C compatibility of projects and integrating this assessment into a financing decision.

There is no uniform standard across IFIs, nor across the private sector financial institutions reviewed, for assessing the alignment of investments and financing decisions with climate goals, such as the 2°C limit. Currently, there is a plethora of indicators and tools on the market. The United Nations Environment Programme - Finance Initiative and GHG-Protocol identified over 200 variants of climate-related indicators among a sample of both public and private investors and banks. The IFIs reviewed as part of this project exhibited a similar diversity in practices.

This diversity applies both to the types of criteria used, as well as to the way these criteria were integrated into the broader financing decision-making framework. This includes integrating climate criteria into an assessment of the commercial viability of the project, a review of other, non-climate environmental and social standards, and additional factors influencing the financing decision (including environmental risk assessment). This is well illustrated by the example of The World Bank Group, which states it aims to balance the priorities of cost-effectiveness and climate protection when assessing project proposals (World Bank 2013: 13). Another example is the European Bank for Reconstruction and Development, which includes issues related to energy security and affordability in the project assessment and weighs these factors against environmental considerations (EBRD 2013: 34).

Landscape of existing IFI criteria

IFIs apply climate criteria at the general, sector, and technology-specific level. At each level, they employ a set of criteria that can be categorised as positive, negative, quantitative, and qualitative.

In fact, some IFIs adopt a technology-neutral approach and do not allocate funds a priori to specific sectors, as is the case with the Clean Technology Fund (CTF/TFC 2009: 4). In general, relevant environmental and climate criteria can be categorised according to their *scope of application*:

- **General funding level criteria** are applicable across all funding areas.
- **Sector-specific level criteria** are applied only for specific sectors.
- **Technology-specific level criteria** are only applied for investments in specific technology.

In addition, four *types of criteria* can be distinguished:

- **Positive lists** determine clear investment priorities. They involve creating a category of low-emission technologies, industries, or sectors. Examples include solar PV, wind power, and electric vehicles.
- **Qualitative conditions** determine conditions under which projects with (potentially) adverse effects on the climate may still receive financing.
- **Quantitative conditions** include indicators that usually refer to baseline or other numeric values and similarly determine conditions under which projects with (potentially) adverse effects on the climate may still receive financing.
- **Negative lists** determine technologies, industries, or sectors excluded from financing, as inconsistent with the bank's guiding principles.

Table 1
Selection of climate relevant criteria used by examined banks

Positive lists	Qualitative conditions	Quantitative conditions	Negative list
⟩⟩ Funding for renewable energy	⟩⟩ Best available technology ⟩⟩ Contribution to energy access ⟩⟩ Embedded in national climate strategy ⟩⟩ Ready to use carbon capture and storage	⟩⟩ Carbon intensity (550 tCO_2eq./MWh) ⟩⟩ Marginal cost of reducing a tonne of CO_2-eq. not to exceed US$200 ⟩⟩ Project size ⟩⟩ Including a shadow carbon price in the profitability calculation of the project ⟩⟩ Net present value of energy efficiency projects vis-à-vis projected costs over lifetime	⟩⟩ No funding for greenfield coal fired power plants

General funding criteria

General funding criteria are used to assess the effectiveness and robustness of operations and centre on the objective of commercial soundness above all. Those criteria apply to all proposed projects and can include *exclusion* or *negative lists* – only the types of projects that have been included in an exclusion list (e.g. weapons, alcohol, tobacco, see IFC 2007) do not receive finance – as well as a set of *qualitative conditions* (e.g. best available technology approach), as is the case with the European Investment Bank (EIB 2013a: 2-3).

IFC Project Exclusion List: The list defines the types of projects the IFC does not finance. The list includes "production or trade in any product or activity deemed illegal (...) or subject to international bans (...), (...) weapons and munitions, (...) alcoholic beverages (...), (...) tobacco, gambling (...), (...) radioactive materials (...)". However, the IFC states that "[a] reasonableness test will be applied when the activities of the project company would have a significant development impact (...)." (IFC 2007)

Sector-specific criteria

IFIs design sector-specific criteria to guide lending decisions on a sector-by-sector basis. In general, IFIs incorporate climate aspects in the cost-benefit analysis of financing operations. That is, low-carbon projects have to compete with high-carbon projects on the basis of costs. To this end, financial institutions assess the environmental externalities and carbon costs associated with pollutants in the overall cost analysis. Depending on the assumptions made regarding shadow carbon prices (see below) or technology learning curves, such approach can help incentivise financing for low-carbon alternatives and rule out projects that are neither economically nor environmentally justified. In addition, some financial institutions also assess the CO_2-reduction potential of projects and set this in relation with baseline values or GHG emission trajectories, as is the case with the Clean Technology Fund (CTF/TFC 2009: 4-7). Other metrics considered include development impact, energy supply and access, technology diffusion potential and relevant principles, standards and regulation if applicable. A potentially powerful instrument is to introduce a carbon intensity cap for one or more fossil-fuel insensitive technologies that effectively restricts financing for high-carbon projects.

European Investment Bank (quantitative criterion): The European Investment Bank has defined an "Emission Performance Standard" (EIB 2013b) of 550gCO_2/kWh, which applies to all power sector projects and rules out financing for projects exceeding the benchmark. In 2010, the bank has also introduced a shadow economic price of carbon, which was €25 per tonne of carbon dioxide equivalent, plus a high and low estimate of the damages associated with emissions of €40 and €10 respectively, and has increased €1 each year ever since. Thus, by 2030 emissions under the central estimate will cost €45 per tonne of carbon dioxide equivalent (EIB 2013c: 25).

Technology-specific criteria

A number of IFIs have defined technology-specific criteria. For example, the World Bank Group has defined "Criteria for Screening Coal Projects under the Strategic Framework for Development and Climate Change" (World Bank 2010). Those sets of criteria include metrics and indicators specifically applying to coal projects, including development impact, energy access, energy efficiency potential, environmental externalities. The World Bank Group also assesses switching prices (World Bank 2010: 9). The criteria applied can be different; both in terms of scope and depth, for single bank subsidiaries and vary depending on project type (e.g. greenfield or brownfield), as is the case with the KfW.

KfW (negative list/qualitative criteria): The German bank KfW has recently updated its coal financing guidelines. The new guideline state that "[i]n order to further strengthen the transformational nature of energy projects in German development cooperation, development policy will cease to promote the new construction of coal-fired power stations and the modernisation of decommissioned coal-fired power stations in partner countries"[1] (BMWi 2014: 4). This applies for financing operations supported by KfW Development Bank. In contrast, KfW IPEX, the export financing subsidiary, states it will continue financing coal-fired power plants "only (…) in countries which have a national climate mitigation policy and strategy which is supported by a targeted policy to expand renewables and/or to enhance energy efficiency. The projects must be compatible with this climate mitigation policy"[2] (BMWi 2014: 3). In addition, the project must comply with EU regulation IED-RL 2012/75/EU (Industrial Emissions Directive defining best available technologies, BAT). Furthermore, additional criteria apply for coal greenfield projects, which vary depending

1 Original quote: „Um den transformativen Charakter von Energievorhaben in der deutschen Entwicklungszusammenarbeit weiter zu stärken, werden in Partnerländern der Entwicklungspolitik künftig keinerlei Neubauten von Kohlekraftwerken sowie auch keine Ertüchtigung bereits stillgelegter Kohlekraftwerke mehr unterstützt."

2 Original quote: „Vorhaben werden nur in Ländern verfolgt, die über eine nationale Klimaschutzpolitik und Klimaschutzstrategie verfügen, die von einer gezielten Politik zum Ausbau erneuerbarer Energien bzw. zur Steigerung der Energieeffizienz flankiert wird. Die Vorhaben müssen mit dieser Klimaschutzpolitik kohärent sein."

on project characteristics including power output (less or more than 500 MW), type (lignite or hard coal), technology (conventional vs. cogeneration), and carbon sequestration readiness (with or without CCS) (BMWi 2014: 3). In the case of KfW Development Bank, additional criteria apply for coal brownfield financing operations (modernisation) (BMWi 2014: 4).

Figure 3 provides an overview of technology-specific criteria currently used by financial institutions as well as examples of existing or emerging research and standards. While data are inconclusive and information is imperfect, the present findings suggest that only for few technologies have banks developed specific lending criteria – the exception is coal.

Technology	Financial institutions						Research / standards (examples)
	WB	EIB	KfW	ADB	ExIm	CTF	
Coal fired power plants	↑ ●	↑ ●	↑ ● N	↑	↑ ●	↑ ●	OECD-criteria for ECAs
Natural gas	P	↑		P		●	EPA regulation
Transmission & distribution		P				P	
RE feedstock (bioenergy)	↑ ●	↑ ●					
Fossil fuel production					↑ ●		Carbon tracker initiative
Buildings HVAC/EE		↑	●				Climate Bonds Initiative; building standards
Industry efficiency (steel)	↑	↑		↑	↑		
Transport infrastructure	P	P				P	BRT Climate Bonds Initiative
Transport energy efficiency							Vehicle standards
Agriculture (palm oil [1]/forestry [2])	↑ ● [1]		P N [2]				

P Positive list
↑ Qualitative benchmark
● Quantitive benchmark
N Negative list

Figure 3
Climate relevant criteria currently applied by financial institutions

Landscape of emerging non-IFI criteria

In addition, the review identified three notable initiatives on climate performance of financial assets or portfolios that explicitly address the question of "2°C investing criteria":

- **SEI Metrics/2° Investing Initiative:**[5] The 2° Investing Initiative is a non-profit think tank leading a research consortium working on developing metrics that enable financial institutions to measure the alignment of their financial portfolios or loan books with climate goals. The Advisory Committee of the project includes the European Investment Bank, AFD, and KfW. The project focuses on metrics for listed equities, corporate bonds, and at financial portfolio level. In the medium-term, the initiative may help public and private financial institutions to perform a climate assessment both for financial assets and at portfolio level.
- **Climate Bonds Taxonomy/Climate Bonds Initiative:** The Climate Bonds Initiative (CBI) is creating industry taxonomies to define assets that are aligned with the 2°C limit. CBI is partly developing these standards in the context of the SEI metrics research project defined above. Taxonomies have been developed for the wind and solar sector and are currently being developed for Bus Rapid Transit, Water, Agriculture & Forestry and Green Buildings. Standards are developed with industry experts and financial market stakeholders. Although they are focused on defining the assets' eligibility for bonds, the taxonomy could also be applied to project finance. IFIs have to date not applied the Climate Bonds Taxonomy. The National Australia Bank was the first bank to certify a bond (AUD 300 million) in December 2014 using the Climate Bonds Standard.
- **Carbon Supply Cost Curves/Carbon Tracker Initiative:** The Carbon Tracker Initiative is developing carbon supply cost curves for the oil, gas and coal sector. While the analysis focuses on risk, these carbon supply cost curves can be adapted to define price thresholds associated with a 2°C roadmap. These price scenarios could then be used to define high-carbon investments misaligned with climate goals. The potential for the application of these models in this way is currently being explored. This approach is currently not applied by financial institutions, although institutional investors have started referencing it as part of shareholder engagement activities.

Assessing existing IFI criteria

While a plethora of rules and procedures apply, both before and during project appraisal, they differ substantially in terms of scope and depth, as well as across banks. Furthermore, although some suggest that environmental criteria have been vital *"in allowing companies to access international credit markets"* (Rojas &Pratt 2010: 2) little can be said about the actual climate impact of any of the criteria used as long as they are not directly linked to an underlying climate goal, i.e. the 2°C limit.

In particular, there are a number of challenges associated with the climate-related conditions and criteria currently applied:

- **Example negative list:** None of the products or activities excluded from financing as outlined in the IFC exclusion list, a key reference point for IFIs, are climate relevant (e.g. weapons, alcohol, tobacco, gambling, radioactive materials). What is more, even in cases where financing restrictions are introduced exceptions may apply.
- **Example carbon intensity cap:** As is the case with the European Investment Bank, a carbon intensity cap generally will lead to an exclusion of coal financing, but given the GHG-intensity of efficient gas-fired power plants with an average carbon intensity of 350gCO_2/kWh (Davidson et al. 2013: 2), for example, it is unlikely that this tool will have an impact on gas as well as on other carbon-intensive technologies or sectors.

3 The 2° Investing Initiative is a research partner in this research project.

- **Example national climate policy:** This criterion seems insufficiently qualified and would therefore need to be linked to an internally agreed 2° scenario or pathway, as well as to a decarbonisation target, i.e. full decarbonisation by 2050.
- **Example balancing priorities:** Climate considerations may be weighed against other objectives, which can result in high-carbon projects being realised. In fact, banks such as the Asian Development Bank continue financing high-carbon projects such as coal for the purpose of enhancing energy access, which may explain why the "primary reason for ADB's intervention is to help start commercialization of the coal sector [in the DMC]" (ADB 2009: 29).

The internalisation of external costs, for example through (shadow) carbon pricing is a comprehensive approach but needs to be complemented by additional criteria. The price of carbon is the most intuitive tool to link climate change with economic and financial considerations. Its value today and its forecasted value can be used in risk and opportunity assessment assuming different conditions.

Across the globe, political leaders do support the 2° limit. Thus, in theory, the market price should reflect the marginal cost of mitigating a tonne of CO_2 under the condition that an emission cap applies, which is compatible with a 2° scenario and economic growth projections. In practice, however, an emission trading scheme that is working effectively is lacking. In fact, the marginal cost of abatement is not an important driver of today's carbon price.

In the absence of a global carbon price, some financial institutions (e.g. European Investment Bank, see above) operate with shadow carbon prices so as to incorporate climate objectives in investment decisions. Also, a number of companies have started to introduce an internal "shadow price" of carbon in their decision-making process, either at the project level or at the business planning level. This voluntary approach can be seen as a strategic tool for risk and opportunity assessment in the context of a transition to a low-carbon economy.

There are, however, shortcomings to this instrument. The first question is whether shadow carbon prices are set at a sufficiently high level. For example, in 2013, 29 US companies disclosed to CDP that they use an internal price on carbon in their business planning, varying from $6 to $60 per metric ton (Carbon Disclosure Project 2013). This – particularly with regard to the low shadow price – is clearly not in line with a necessary 2°C-investment strategy.

The second question that arises is whether this approach is applicable to all relevant sectors. In practice it may work for some sectors (e.g. power plants), but it is clearly not sufficient for all investments needed for a 2°C compatible pathway. For example, in sectors where split incentives occur (e.g. building sector) or for investments in enabling infrastructure (e.g. a smart grid/supergrid or IT-infrastructure) that does not in itself have a carbon impact. Generally, it can be questioned whether a shadow carbon price can send the right signal for or against necessary infrastructure. The reason is that it sends a price signal for the relevant project but not for the embedding system, which may be either low- or high-carbon. In this case a carbon shadow price cannot send a signal that informs whether or not to invest in a highway. A highway can either be low-carbon (if cars run with green electricity and are well interconnected with other low carbon transport structure) or high-carbon.

Lastly, investment decisions are made not only on the basis of cost but also on the basis of risks. Additional instruments may be necessary in order to limit the risks associated with necessary investments in a 2° scenario.

The range of current practice suggests that there are many options for climate-related criteria for IFIs. Each of these has unique advantages and challenges.

Table 2 provides an overview of the key advantages and challenges associated with each type of criterion and the associated approach. The existing landscape of climate related investing criteria already allows for a relatively sophisticated integration of climate objectives into investment and financing decisions. At the same time, none of the existing criteria are currently applied in a way that they inform on the alignment of the investment and financing decision with the 2°C limit.

For example, while positive/negative lists can intuitively be linked to 2° technology scenarios (e.g. solar PV is 2°C compatible), large shares of investments are needed in areas that are less black and white, in buildings for example. In this case, quantitative criteria provide an interesting alternative, allowing for a 'sliding' assessment, as will be outlined in the case study on buildings (Box 1 in section 4). Challenges associated with quantitative criteria however relate to the higher effort in measuring quantitative alignment. Moreover, it is generally more challenging to connect these criteria to the 2°C limit. Both qualitative and carbon shadow pricing indicators used by IFIs today can be complementary in this regard.

The discussion suggests that none of the types of criteria identified act as a 'silver bullet'. They can be complementary.

Current climate-related criteria are either limited to certain sectors, associated with technical challenges, or subject to issues around data and accountability. Bank experts consulted during the conception of the present report share this view. At the same time, flagging these types of criteria as complementary can overcome a number of these challenges already today. Jointly, these types of criteria can inform on the climate-related performance associated with a financing decision. Then, the question arise how these types of criteria can form the basis for 2° investing criteria. This question will be discussed in the next chapter.

Table 2
Advantages and challenges to the existing landscape of climate-related metrics

		Quantitative conditions		
	Positive / Negative lists	**Sector specific**	**Carbon shadow pricing**	**Qualitative conditions**
Advantages	Act as intuitive, "low-cost" criteria, which are relatively easily connected to 2°C technology roadmaps	Allow for a high-level of granularity between different projects and can be applied across sectors.	Allow for a comparison between financing and policy frameworks	Can account for non-quantifiable aspects related to climate change.
Challenges	Cannot easily be applied across all industries. Do not distinguish 'shades' of climate friendliness.	Lead to more challenging, cost-intensive application than mere positive/negative criteria. Creates challenges around defining 2°C compatibility.	Cannot be applied to all sectors.	Do not allow for a direct tracking of the compatibility of the project with climate goals. Can lead to lower accountability

This section assessed climate related criteria and due diligence processes currently used by financial institutions as well as on-going research in this area. It concludes that while there are a range of climate relevant criteria and processes being applied in daily investment decisions, including the use of (shadow) carbon pricing, these are insufficient to allow financial institutions to align their investment with the 2°C limit. How specific 2°C investing criteria can be developed and what these may look like is discussed in the next section of the report.

4. Development of 2°C investing criteria

The existing landscape of climate criteria informs financial institutions on *climate benefits* relative to no investment, but is not connected to the 2°C limit.

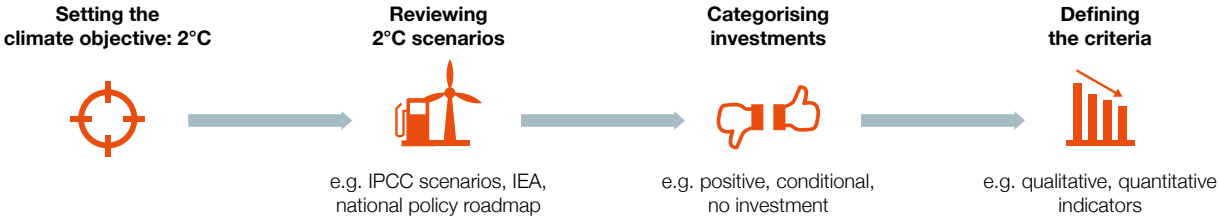
A focus on climate benefits is part of the mainstream practice of many public financial institutions. The existing landscape of climate-related criteria generally informs on these climate benefits, in particular when used in complementary fashion. At the same time, these criteria only measure the climate benefit relative to no investment. They do not ensure alignment of the investment with the 2°C limit. In other words, investment criteria start from the assumption of 'no activities' and then seek to measure the positive benefits or use categorization to determine whether an investment is 'better' or 'worse' than no activity. The approach of 2° investing criteria in turn seeks to assess whether an investment does not just involve *climate benefits* but whether these climate benefits are aligned with the 2°C limit in terms of the scale of their impact.

The distinction between existing criteria and 2° investing criteria is key both from the perspective of financial risk and the accountability and transparency around the contributions to climate objectives.

2° investing criteria allow a financial institution to measure the link between their investment and financing decision, and climate goals. This allows them to inform on financial risk. Investments involving *climate benefits*, if not compatible with a 2°C economy, may still be exposed to financial risk in the context of such an economy. Similarly, given the long lifetime of assets and the urgency of decarbonization, investments misaligned with climate goals, even if they involve *climate benefits*, may lock-in benefits that create barriers to achieving the 2°C limit. As highlighted during the expert consultations process, there is a larger number of investments that merely involve climate benefits than investments that are aligned with the 2°C limit. The role of 2°C investing criteria in this context may also involve serving as a benchmark to understand the degree to which investments are incompatible, both in terms of high-carbon and low-carbon industries and technologies. This section maps the pathways to defining 2° investing criteria.

Several methods exist to define 2°C compatible *emission pathways* for countries, regions, cities or companies. In essence these translate *global* emission pathways to smaller entities and determine the speed of the necessary reductions from the present emission level.

Even if such emission pathways are not directly applicable to investment criteria for individual assets they provide a structured view on the relevance of different technologies and sectors for limiting global warming to a maximum of 2°C. The scenarios systematically show where investments should and should not flow if the climate goal of a 2°C limit is to be achieved and can thus be used as a basis for defining 2°C criteria. This chapter outlines how 2°C scenarios have been used for the purpose of this research to categorize and prioritize investment areas according to their 2°C relevance. It further illustrates how criteria may be defined and highlights key aspects that need to be considered in the process.



Reviewing 2°C scenarios

Very different technological pathways could be perceived that are compatible with the 2°C limit.

It is in essence the cumulative CO_2 emissions over the lifetime of all investments that must not exceed the remaining carbon budget. This cumulative limit could in theory be reached using technological and behavioural options (e.g. using less energy services, using less energy for the same services or using more low carbon energy sources) to varying extents. Despite the fact that there are hundreds of scenarios in the literature, the degree of freedom is limited, as the remaining carbon budget is already exhausted to a large extent.

As a first step to derive 2°C compatible investment criteria the approach involved a comprehensive review of available 2°C model scenarios to capture the full range of different perspectives and assumptions on potential low carbon trajectories. These included in particular:

- Scenarios from **Integrated Assessment Models** which are based on cost optimisation over a broad scope of sectors but which lack resolution on energy demand options, assume large amounts of Bioenergy CCS (BECCS) and Land Use Land Use Change and Forestry (LULUCF), e.g. as in the IPCC report;
- **Energy sector models** such as those by the IEA which include option level details but still lack resolution on certain technologies;
- **Renewables and efficiency scenarios** use value judgments to restrict input assumption as they focus on certain technologies and exclude others (esp. CCS and nuclear), e.g. WWF Energy Report, Greenpeace Energy (R)evolution;
- **Sector specific bottom up scenarios** such as the IPCC Working Group 3 report, which provide detailed analysis of mitigation potentials and costs but lack the integral approach across sectors.

The analysis of 2°C scenarios focussed on four elements in particular:

- **Contribution to emission reductions** – which describes the sector where most emission reductions are needed under 2°C scenarios
- **Asset lock-in** – defines the lock-in potential of the technology considering lifetime as well as value of investment. This may include negative carbon lock-in but also positive lock-in in climate friendly technologies.
- **Value of future investments** – describes where investments needs to flow according to available 2°C scenarios
- **Regional hotspots** – combines the sector perspective with a view on where in the world major reductions will be necessary

Table 3 shows the results from the scenario analysis. The different investment options are rated as high (red) medium (orange/yellow) and low (green) in terms of materiality. In some cases, the lack of granularity of available data prevented a more detailed view, for example, on the role of individual technologies under a 2°C scenario or future investments needs for individual options. Especially for the waste and agriculture sectors data availability is poor.

As can be seen in the table, the energy sector shows the highest contribution to emission reductions under the 2°C scenarios. Of key relevance for the achievement of the 2°C limit are also efficiency in buildings, industry and transport. Unsurprisingly, infrastructure related investments show the highest lock-in risk, and in particular energy and transport are the two sectors where most investments need to flow. The analysis of regional hotspots shows very similar patterns for most investment areas – mainly China, the USA and India as well as the EU for buildings. This is a reflection of the size of the economies.

Table 3
Results from the scenario analysis and investment categorisation

Investment options	Emission reductions		Asset lock-in risk (positive and negative)	Future investments		Regional hotspots
	% emission reductions of total	Role under 2°C scenarios		Per sector	Per indiv. option	
Renewables	29% – 65%	High	Medium	High	High	China, United States, India
Coal		Low – Medium	Medium – high		Low – Medium	
Natural gas		Low – Medium	Medium		Low – Medium	
Bio energy CCS		Low – Medium	Medium		Low – Medium	
Nuclear		Low – Medium	Medium – High		Low – Medium	
Energy transmission infrastructure			High		Medium – High	
Energy storage			Medium – High		Medium	
Energy supply manufacturing			High			
Biofuels feedstock			Low			
Fossil fuel production			Medium			
Building energy efficiency	2% – 9%	Medium	Medium	Medium	Medium – High	China, European Union, United States
Building renewables		Medium	Low		Medium	
Building appliances		High	Low – Medium		Medium	
District heating			High			
Buildings appliances manufacturing			Medium – High			
Industry Energy efficiency	11% – 24%	High	Medium – High	Low	Low – Medium	China, India, United States
Industry renewables		Medium	Low – Medium		Low	
Industry manufacturing			High			
Industry process emissions		Medium	Medium – High		Low – Medium	
Industry non-CO_2			Medium			
Transport infrastructure	8% – 22%		High	High		China, United States, India
Transport fuel infrastructure			Medium		High	
Transport energy efficiency		High	Low		High	
Transport renewables		Medium	Low			
Transport hybrid and electric		Medium	Low			
Transport urban planning		Medium	Medium			
Waste management		Medium – High	Medium			
Waste other			Medium			
Agriculture		Medium – High	Medium			
Forestry		Medium – High	*Medium*			

Categorising investments

Each investment area can be categorised into one of four investment groups, 2°C compatible, conditional, controversial and misaligned – always from the perspective of alignment with the 2°C pathway.

The category of "2°C compatible" describes all investment areas/technologies which are in line with the 2°C limit in all scenarios. On the other end of the spectrum are those technologies which are consistently misaligned with the 2°C limit. The majority of investment options fall in the category of conditional or controversial where "conditional" investments are 2°C aligned in all scenarios under certain conditions and "controversial" are aligned in some but not in others. The conditional and controversial categories reflect the fact that multiple pathways can lead to 2°C assuming different technology choices. Also some scenarios exclude certain technologies on the ground of other considerations (e.g. sustainability issues). A summary of the categorisation of investment areas is show in Table 4.

For the purpose of this research, the ten most relevant investment areas and technologies for limiting global warming to a maximum of 2°C were selected for further analysis and development of detailed investment criteria. The selection was based on the scores of each area in the scenario analysis in relation to its relevance for achieving the 2°C limit, in particular mitigation potential and lock-in risk. The priority areas are highlighted in red in Table 4.

Table 4
Summary of categorisation of investment areas and technologies

2°C compatible	Conditional	Controversial	Misaligned
Fully aligned with 2°C consistently over all scenarios	2°C aligned only under certain conditions in all scenarios	2°C aligned in some scenarios, but not in others	Consistently misaligned with 2°C in all scenarios
	⟩⟩ Due to the fact that multiple pathways can lead to 2°C (e.g. more renewables and less efficiency or the other way around) ⟩⟩ Due to different assumptions on technological development ⟩⟩ Due to considerations of other sustainability factors		
⟩⟩ Renewable energy ⟩⟩ Energy storage ⟩⟩ Low carbon transport fuel infrastructure ⟩⟩ Low carbon vehicles	⟩⟩ Gas fired power plants ⟩⟩ Energy transmission and distribution infrastructure ⟩⟩ Energy efficiency in heating and cooling of buildings ⟩⟩ Efficiency in industry ⟩⟩ Transport infrastructure ⟩⟩ Transport efficiency ⟩⟩ Agriculture and forestry ⟩⟩ Building appliances	⟩⟩ Coal fired power plants ⟩⟩ Biofuels ⟩⟩ Fossil fuel production ⟩⟩ Large hydropower ⟩⟩ Bio energy carbon capture and storage ⟩⟩ Nuclear	⟩⟩ New unabated coal fired power plants in OECD countries

Defining criteria

For the categories "2°C compatible" and "misaligned", no specific investment criteria need to be developed as these categories can effectively be translated into positive/negative lists. For conditional and controversial categories, more specific guidance is needed.

Existing criteria and standards used by financial institutions provide a useful starting point. As shown in section 3 of this report many investors are familiar with the use of criteria and benchmarks to guide investment decisions, albeit not yet directly related to specific climate goals. Aside from positive/negative lists mentioned above, criteria may fall into two main categories:

- **Quantitative benchmarks** may include minimum benchmarks as well as dynamic benchmarks with detailed calculation methodologies.
- **Qualitative guidance** is based on a process rather than quantitative values and may also include decision trees as well as scoring methodologies.

As an illustration Box 1 provides an example of how detailed criteria for the building sector may be formulated.

Box 1
Example 2°C investing criteria for energy use in buildings

Developing 2°C investing criteria for buildings

The contribution of the building sector towards achieving 2°C compatible pathways varies significantly among 2°C scenarios. While a number of integrated assessment models suggest that the contribution is relatively small (as low as 6% reduction below reference scenarios in 2050), a number of sectoral models suggest that there is a large potential in reducing final energy demand in buildings, as high as a 46% reduction below reference (Lucon et al., 2014, p. 712). According to the sectoral models, especially the heating, cooling and hot water demand can be reduced by between 66% and 75% below the reference scenario in 2050. Investment lock-in is high with lifetimes of buildings of between 25 years and more than 100 years.

The research concluded that to date no institution has developed 2°C compatible criteria specific to the building sector. Existing criteria often focus on generic requirements for energy efficiency, such as the requirement to use best available technologies. None of these however make specific reference to 2°C, nor do they seem to be detailed specifically for the building sector. The Climate Bonds Initiative is currently developing a set of criteria for the building sector, however at the time of writing, these were not available publically.

On the other hand, a large number of sources exists that could be used as a basis for the development of 2°C investing criteria. First, many countries have implemented buildings codes, most of which are however not necessarily 2°C compatible. An exception is the target under the European Energy Performance of Buildings Directive (EPBD) to require new buildings to be near zero energy building from 2020 onwards (European Commission, 2010). Second, a large number of building labels and certificates exist that could be used as a starting point. They are very diverse and often only have a secondary focus on GHG-emissions. For heating and cooling appliances, country or region specific standards as well as unified labelling systems exists that could be used to benchmark investments, however they are mostly not necessarily 2°C compatible.

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Potential 2°C investment criteria

The above described labels standards and codes could be used as a basis for defining 2°C compatible criteria. As outlined, however they are very diverse in nature and often not stringent enough to be 2°C compatible. We here propose to use benchmarks of energy performance of buildings. In the building sector, these benchmarks could be relatively easily defined, based on the energy use per m^2. However an important distinction that would have to be made is that between different climatic conditions as these will determine the heating and cooling demand. Table 5 provides an overview of proposed criteria.

Table 5
Illustrative set of possible criteria for 2 degree compatible development in the building sector

Sub-sector	2°C compatible	Conditional		Misaligned
		Qualitative conditions	Quantitative conditions	
Integrated measures aiming at the building envelope	⟩⟩ (Near) zero emission buildings	⟩⟩ Building codes in countries are in line with x kWh/m^2 and compliance is ensured ⟩⟩ Integration with national climate strategy ⟩⟩ Use of building labels/ certificates that are in line with x kWh/m^2	⟩⟩ New buildings: Energy use per floor space (x kWh/m^2), differentiated by climate zone ⟩⟩ Renovation: Investment in line with building roadmap to reach energy use of x kWh/m^2 differentiated by climate zone	
Individual technology measures	⟩⟩ Solar hot water heaters ⟩⟩ Solar PV	⟩⟩ Standards in countries that are x kWh/appliance (esp. for heating, ventilation and air conditioning appliances and heaters)	⟩⟩ Energy use standards per appliance type (x kWh/ appliance)	⟩⟩ Coal based heating systems

A critical element is the level of the quantitative conditions provided. Figure 4 highlights a possible approach to setting this level – in this case for the year 2050 – by using the intensity indicator kWh/m^2. Investments at the left end of the scale are unambiguously 2°C compatible: these include nearly zero energy buildings which use 10 kWh/m^2 or less. In the building sector, these are already state of the art and have often only little or sometimes even negative additional costs compared to conventional buildings (Lucon et al., 2014). Investments at the right end of the scale are misaligned with 2°C. Our calculation based on IPCC scenarios for 2050 suggests that the average building stock in 2050 should use between app. 100 and 150 kWh/m^2. All buildings that are above the upper end of this range in 2050 are therefore clearly misaligned or need to be overcompensated by more efficient buildings or other measures.

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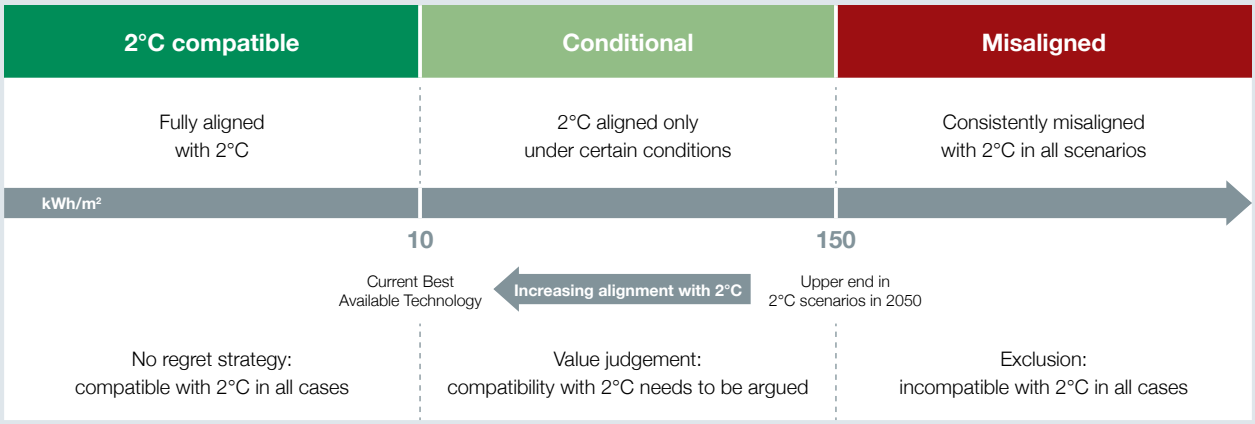

Figure 4
Illustrative categorization of buildings energy efficiency for 2050

The majority of investments will likely take place in the middle section (conditional). The degree to which an investment is aligned with 2°C increases from the right to the left. An investor wanting to ensure that his investments are 2°C compatible with a high degree of certainty will only invest in buildings with a specific energy use close to 10 kWh/m². Complying with such low benchmarks by itself will be sufficient to ensure that the investment is 2 °C compatible. On the contrary, if an investor decides to invest into buildings that have a specific energy use of close to 150 kWh/m², he needs to clearly demonstrate how this investment is still 2°C compatible. This is especially important as the specific number presented here represents the average energy use of the building stock, thus including buildings as old as 100 year or more. An investor could demonstrate overall 2°C compatibility, for instance across his investment portfolio including measures leading to significant emission reductions in other sectors.

Key challenges

Climate-criteria involve a trade-off between complexity and practicability.

The challenge here is to balance the need for sufficiently robust and detailed guidance and criteria, which take account of the variety of investment contexts, and at the same time produce guidance which can be feasibly implemented by financial institutions. Having a single due diligence process in place and setting out criteria that are easy to apply to all projects reduces complexity and makes it easier for financial institutions to incorporate these into their lending practices. Also, the scope of political influence on the overall project may be significantly reduced when criteria apply, which are binding and strict. At the same time, universally applicable and strict criteria may not sufficiently take account of specific circumstances or potentially competing investment priorities and objectives.

For instance, defining climate criteria for the building sector may not only require outlining indicators regarding the type and age of any given building but also taking account of factors such as climate zones, urban environments, local regulations and even entire individual renovation plans. Furthermore, rebound effects resulting from certain investments may need to be considered in the analysis.

Some situations may require informed judgements together with 2° investing criteria.

Criteria may vary according to the circumstances, but also for different financial institutions, given their mandate. For instance, as illustrated in Figure 4, investing only on the left side and not the right hand side of the scale (i.e. only into buildings of zero up to 10kWh energy use per square meter) constitutes a "no regret strategy" that is 2°C compatible in every case.

The largest share of investments however will be located between the two extremes of "no regret" and "exclusion", i.e. for the building sector example between 10 and 150 kWh/m², and may require informed judgements at which level they are 2°C compatible. The further up on the scale, the stronger the arguments that have to be provided, for why this investment is 2°C compatible. Investors may need to make well informed and reasoned judgments for themselves on:

- **Trade-offs of reductions between sectors:** An investor that chooses to rely on less mitigation actions in the buildings sector might simultaneously invest in other options such as bio energy carbon capture and storage to ensure that the overall portfolio is 2°C compatible and consistent with the vision of a 2°C compatible world. Caution has to be applied however as this "pick and choose" approach could lead to inconsistent strategies.
- **Regional differences:** Some regions may require more support and different investments with economic and social benefits due to their status of development. If such exceptions are made they need to be compensated for in another region; for certain regions particular circumstances may apply, responding to specific development priorities.
- **Climate mandate:** An investor with a strong climate mandate may choose to be more on the "safe side" of the scale, while an investor that has multiple objectives may choose to be further on the right side of the scale.

The alignment of investments with the 2°C limit involves scientific criteria. At the same time, the application of these criteria is likely to be specific for different types of financial institution.

2° investing criteria for physical assets can inform lending decisions related to project and infrastructure finance in particular. Public financial institutions place a particular emphasis on this type of financing. Equally, project finance constitutes 1–2% of the average institutional investor's portfolio (Towers & Watson, 2014). 2° investing criteria for physical assets then need to be adapted for other types of financial assets, notably equities and bonds, and for a cross-asset portfolio. While 2° investing criteria can be defined as science-based, their implementation will depend on the structure of the financial institution.

5. Initial conclusions and outlook

Initial conclusions

Current investment and financing flows are mis-aligned with the 2°C limit. Financial institutions can play a prominent role in contributing to aligning these flows.

Aligning investment and financing flows with the 2°C limit requires a shifting of capital to climate-friendly investments and a reduction in high-carbon investment. This investment relies to a significant degree on financing from financial institutions, and in particular public financial institutions. They account for roughly one-third of what is today classified as climate finance in 2013 (CPI 2014). Many public financial institutions have either explicit or implicit mandates to contribute to financing the transition to a low-carbon economy. In this context, banks are familiar with positive list and exclusions as well as the application of qualitative and quantitative criteria in their due diligence processes. This suggests that 2°C investing criteria could build on and be incorporated into existing processes. Given the long lifetime of physical assets, and the urgency of decarbonizing over the next decades, aligning the financing decisions of financial institutions today with long-term climate goals is crucial to limiting global warming to a maximum of 2°C and avoiding financial risk.

2° specific criteria that steer investments towards achieving the global climate goal can support the efforts by policymakers to create a policy and institutional environment which is conducive to investments in low carbon technologies and which levels the playing field between high and low carbon choices.

Outlook

Further research and consultations with investment practitioners are needed to define processes and criteria that ensure 2°C compatible investment.

In the next phase of this research project, more specific guidance will be developed in consultation with relevant stakeholders, including illustrative criteria for a number of key investment areas, particularly those that fall in the "controversial" and "conditional" categories (section 4), using some of the core principles suggested in this report. For this guidance to be relevant and useful in practice, this phase of the project will include extensive consultation with development banks, other public financial institutions and relevant stakeholders. The resulting guidance and criteria would enable public banks to ensure that all lending and investing activities are in line with the agreed global policy objective that is the 2°C limit. The application of these criteria is material both from the perspective of climate performance and carbon risk. Investments misaligned with climate objectives and policies, as well as associated decarbonization roadmaps, are likely to be associated with assets that may become "stranded" in a 2°C economy.

Such a process would benefit from broad support by G7 and other governments and participation of a broad set of public financial institutions.

The G7 governments have repeatedly endorsed the 2°C limit. In line with this commitment, they could show continued leadership by encouraging their own public financial institutions to participate in

the development of 2°C investment criteria. The participation of additional financial institutions from additional countries would be beneficial. The complexity of the issue at hand and the time critical nature of the problem calls for pragmatic approaches and solutions that build on the inputs and feedback from investment practitioners. A key challenge is to find the right balance between sufficiently detailed and robust criteria and limiting the administrative burden for financial institutions to ensure widespread implementation. The participation of practitioners from a broad range of institutions – national, bilateral, regional and bilateral development banks, export credit agencies and guarantee providers, as well as investment funds – in the development of criteria can help ensure they appropriately reflect the differences in mandate, regional scope etc.

More work is also necessary on processes and criteria applicable to private banks and private investors as well as to financial assets and portfolios. While the focus of this research project is on public financial institutions financing physical assets, next steps could look at a broader set of investors and types of investments. Such further work could build on on-going processes, such as the ones mentioned in the section on non-IFI criteria above (section 3).

Aligning investments with the requirements of a climate-constrained world will require developing criteria for adaptation and resilience. The focus of this project on mitigation needs to be complemented with similar research on criteria to make investments climate resilient. In some cases, for example for infrastructure, such criteria can go hand in hand with criteria for 2°C compatibility.

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The following institutions have been consulted at workshops or individually as part of the expert consultation process during the conception of the present report:

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- Agence Française de Développement
- Allianz Climate Solutions
- Caisse des Dépôts, cdc climat
- Climate Analytics
- Climate Policy Initiative
- Development Bank of Southern Africa
- European Bank for Reconstruction and Development
- European Climate Foundation
- Fraunhofer ISI
- Global Climate Forum
- Green Climate Fund
- Green Investment Bank
- ING
- Inter-American Development Bank
- Kreditanstalt für Wiederaufbau
- MCC Berlin
- MSCI
- Munich Re
- Nordea
- Overseas Development Institute
- PIK Potsdam
- responsAbility
- South Pole Carbon
- The CO-Firm
- UNEP Inquiry
- World Resources Institute
- World Wildlife Fund

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