MRV in Turkey: Implications and Opportunities for Turkish Financial Institutions

An application note for financial institutions

1. Introduction

The European Bank for Reconstruction and Development (EBRD) is promoting the acceleration and scaling-up of sustainable energy investments in Turkey. Through MidSEFF, EBRD provides over EUR 1.5 billion in credit lines[1] to finance mid-size investments in renewable energy, waste-to-energy and industrial resource efficiency. As part of the facility, a dedicated carbon finance programme was launched. The aim of this programme is to promote new financing mechanisms through the expansion and development of the carbon market in Turkey and to encourage the participation of Turkish banks and companies in engaging in the carbon market.

The objective of this application note is to inform financial institutions on the implications of adopting greenhouse gas (GHG) monitoring, reporting and verification (MRV) procedures at the institutional level. This is the general term describing the process of determining GHG emissions from an activity, company or mitigation action (monitoring), compiling data and reporting on these GHG emission information to internal or external stakeholders (reporting), and then subjecting the reported data to a third-party review and verification (verification).

The urgency to adopt these measures is triggered by several developments, including both (i) international uses for institutional MRV in the context of GHG accounting and climate change, for example linked to the introduction of climate change disclosure guidelines or opportunities to commercialise GHG reduction impacts under international markets; and (ii) the specific introduction of national MRV requirements in certain sectors of Turkey's economy triggered by the MRV legislation adopted by the government in 2012. In both the national and international contexts, understanding the implications of institutional MRV serves a dual purpose of managing the risk-side of a bank's operations as well as a tool to identify new business opportunities and enter new markets.

1.1 Climate change and the global financial sector

The momentum for climate action is strengthening across the financial sector, with banks, insurance companies, and asset managers starting to embed climate change impacts into mainstream finance activities and investment decisions. Managing exposure to the various risks associated with climate change is a key motivation for financial institutions to adopt strategies, programmes and operations that prioritise climate.

Climate related risks

Regulatory risks

On the one hand, the financial industry is reacting to carbon pricing regulations, which exposes investments in fossil-fuel companies and other carbon-intensive industries to previously unforeseen costs. As of today, over 46 countries and 31 subnational jurisdictions have introduced some form of carbon pricing regulation, either in the form of a cap and trade system or through carbon taxing.[2] The adoption of the Paris Agreement in 2015 has further strengthened the momentum for carbon pricing policies, meaning that

[1] EUR 1.6 billion is available in total, which includes €400 million provided by the EIB.
[2] See: https://carbonpricingdashboard.worldbank.org/

the global financial value at risk of being impacted by these developments is continuously growing.

Transition risks

The onset of more stringent environmental regulation and the urgency to de-couple economic growth from GHG emissions in turn leads to transition risks in the global economy. One example of the implications of this risk is the threat of 'stranded assets' – estimates points towards 60% to 80% of existing coal, oil and gas reserves of publicly listed companies to be 'unburnable' if we are to achieve the 2°C target stipulated in the Paris Agreement, highlighting the long-term investment risk associated with these assets if the necessary transition is realised.

Physical risks

Furthermore, the recognition that physical climate change impacts are becoming a systemic risk across the broader economy makes powerful stakeholder groups, risk departments and valuation teams more attentive to the link between a changing climate and asset value. Not only extreme weather events (acute physical risks), but also longer-term shifts in climate patterns (chronic physical risks) such as lower precipitation, lead to value at risk. One study on the application of such 'climate value at risk' quantifies the risk at 3% of global financial assets assuming a business-as-usual emissions path, equivalent to USD 4.2 trillion.[3] Associated with this, knock-on effects (e.g. resource shortages, supply chain disruption), liability risks (insurance claims and legal damages), and reputational risks also weigh-in, further highlighting the need to manage climate risk. To date, over 1,300 climate related litigation cases have been filed, predominantly in the United States, followed by Australia, the United Kingdom, the European Union, New Zealand, and Canada.[4]

Disclosure requirements

Financial sector reform introducing the need to disclose climate change related risks by corporates is increasingly being advocated or required by regulators. In 2013, the UK became the first country to make it compulsory for publicly listed companies to disclose emissions data in their annual reports. In 2016, the Financial Stability Board released recommendations through its Task Force on Climate-related Financial Disclosures (the Task Force) on climate-related financial disclosures applicable to organisations across sectors and jurisdictions (see text box 1). In 2016 France became the first country to enact legislation (Article 173), which introduces mandatory climate change-related reporting for institutional investors.

Text box 1: Task Force on Climate-related Financial Disclosures

[3] The Economist Intelligence Unit. The cost of inaction: Recognising the value at risk from climate change. 2015

[4] Norton Rose Fulbright. Climate change litigation update. 2019

The Task Force on Climate-related Financial Disclosures covers four key recommendations that are sector agnostic and applicable to a variety of organisations. It also provides supplemental guidance for financial sector actors, including banks, in some of these areas.

Governance. Organisations are recommended to disclose the governance structures around assessing climate-related risks and opportunities, and how related Boards, committees, and the management teams provide oversight, assessment, and management of these risks.

Strategy. Organisations are recommended to disclose how actual and potential risks of climate change impact business, strategy, and financial planning in the short, medium, and long-term. This includes disclosing the resiliency of any strategy under 2˚C or lower scenarios. For banks, disclosure includes transition and physical risks in lending and reporting on credit exposure to carbon assets.

Risk Management. Organisations disclose how they identify, assess, and manage climate-related risks, including how it is integrated into the organizations' overall risk management framework. Banks may consider how to integrate these risks into their operations, including the context of credit risk, market risks, liquidity risks, and operational risks.

Metrics and Targets. Organizations disclose the metrics and targets used to assess and manage climate-related risk, including Scope 1, Scope 2, and Scope 3 GHG emissions. For banks and financial institutions, metrics and targets may be broken down by industry, geography, credit quality, and average tenor and reporting on the relative holdings of carbon-related assets

Source: *FSB. Recommendations of the Task Force on Climate-Related Financial Disclosures. 2017*

Climate related opportunities

Annual investment needed to finance the transition

While changes associated with a transition to a lower-carbon economy create exposure to risks, they also create significant opportunities for financial institutions active in the financing of climate change mitigation and adaptation investments. According to the International Energy Agency, realising this transition will require annual investments of USD 1 trillion[5], translating both in new business development opportunities as well as new forms of capital markets that will finance them.

Investment opportunities
Taking GHG intensity data into the investment decision making process can serve to help identify investment opportunities that can increase the efficiency of the clients' operations and lead to strengthened working capital positions and improved debt service capacities. Examples of such investments include improving efficiency across production processes, office buildings, and distribution/transport.

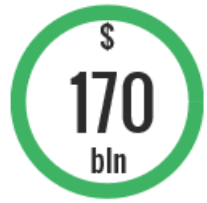
The FSB's Task Force furthermore stresses that a move towards resource efficiency and clean energy generation will result in the development of new products and services and open up new markets for banks to engage in. meeting the ambitions of the Paris Agreement, global investments in alternatives such as hydro, solar, wind geothermal and biofuels will need to be scaled-up considerably, and with rapidly declining costs these technologies are starting to overtake investments in conventional energy sources. It is also expected that consumer awareness will push service

[5] FSB. Recommendations of the Task Force on Climate-related Financial Disclosures. 2017

providers globally to shift towards more low-impact solutions, presenting new investment opportunities and opening up new markets.

Capital market opportunities

A material shift to low-carbon or clean energy will only be possible if global capital markets can leverage the necessary flows for these investments. For financial institutions there are two key implications of this.



Green bond issuance in 2018

First, banks can develop new business by underwriting loans and bonds dedicated to financing green investments. Increasingly more investment banks are already participating in the rapidly growing market of green bonds, either by selling their own bonds or by acting as underwriters to help other borrowers market their debt to investors. According to the Green Bonds Initiative (CBI), in 2018 almost USD 170 billion in green bonds was issued, consisting of mostly corporate bonds and to a lesser extent sovereign and municipal bonds.[6]

Second, banks can gain access to new partners and unlock new financing structures by collaborating with national or international development banks and dedicated climate funds to help (less developed) countries shift to a lower-carbon, more resilient economy. These funders are mandated to take on more risk than commercial players and can claim subordinated stakes in or provide guarantees to investments that would otherwise not be viable if funded through commercial channels only. The applicability of international climate finance – concessional funding for the purpose of climate change mitigation and adaptation – is one particular category of capital that financial institutions could apply for when setting up blended finance credit lines or facilities.

1.2 Climate action developments in Turkey

Installations covered under MRV law

The Turkish government has progressed with the implementation of MRV activities in a number of industry sectors. In 2012, the Ministry of Environment and Urbanisation issued the Turkish Regulation on Monitoring, Reporting, Verification of GHG Emissions (MRV Regulation)[7]. This regulation entered into force in 2014 and obliges installations with defined thresholds in the energy and industry sectors to monitor and report their GHG emissions to the government on an annual basis. About 582 installations are currently covered under this regulation, generating data that gives the government valuable insights into the current carbon-intensity of the Turkish economy[8].

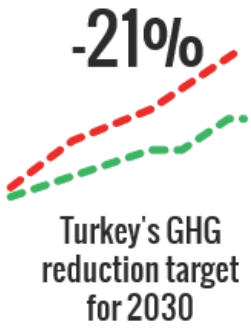
Text box 2: MRV Regulation in Turkey: Facts and Figures

In May 2014 the Turkish MRV regulation entered in to force. This regulation places an obligation on installations in sectors, such as energy (installations exceeding 20 MW in installed capacity), refinery, aluminium, iron and steel, clinker, lime, bricks, glass, ceramics, pulp, chemicals and fertiliser to report on their GHG emissions. This includes 582 installations, which generate 52% of Turkey's total GHG emissions, a total of approximately 260 million tonnes of CO_2 emissions. These installations will need to report on their GHG emissions under scope 1 and 2 (see chapter 2) in a calendar year by April of the following year.

The current sectoral MRV system delivers the basis for economy-wide intervention, as could be achieved through the implementation of an

[6] Climate Bonds Initiative. 2018 Green Bond Market Highlights. 2019. Available here
[7] See the Turkish MRV Regulation at www.resmigazete.gov.tr/eskiler/2014/05/20140517-3.htm
[8] See more on the Turkish MRV Regulation at: www.karem.org.tr/images/galeri/4.pdf

emissions trading scheme similar to that of the EU Emissions Trading Scheme (EU ETS). In its effort to contribute to the overall goals of the Paris Agreement, Turkey submitted its Intended Nationally Determined Contribution (INDC), which stipulates the government's climate action plan for the period 2021 – 2030. The pledge – which has not yet been approved by the government – would commit Turkey to reduce its national GHG emissions by 21% against its business-as-usual trajectory. Turkish banks, being the leading financiers of domestic infrastructure investments, will have a critical role in transitioning the Turkish economy to this low-carbon development pathway. The government's ambitions to de-carbonise the Turkish economy presents both risks and opportunities for domestic financial institutions.



On the risk side, more stringent domestic regulation in the field of climate change such as the possibility of the introduction of a domestic ETS imply that banks need to map the sectors that are at risk of being impacted by such regulation, and quantify the value at risk. Several Turkish banks are already engaged in financing renewable energy and energy efficiency investments across Turkey, yet still maintain exposure to more carbon-intensive industries and corporates that are directly or indirectly impacted by carbon pricing legislation.

On the opportunity side, Turkish banks could benefit from the international cooperation mechanisms established under the Paris Agreement, namely international climate finance flows that can be a source of concessional co-finance as well as carbon offset generation possibilities under Article 6 of the Paris Agreement. The latter deals with new market mechanisms that allow countries to transfer GHG mitigation outcomes for compliance purposes, in a similar way that the voluntary carbon markets are currently operating in Turkey.

Financial institutions in Turkey are closely following international and domestic developments in the area of climate policy and regulation, and are evaluating available approaches to scrutinise their portfolio exposures to climate risks, reallocate assets to more climate-friendly investments, divest from assets at risk of becoming stranded, and introduce tools such as internal carbon pricing to inform future investment decision making. The foundation for implementing these various strategies effectively is the adoption of robust monitoring and reporting procedures at the institutional level so that financial institutions are able to map the carbon footprint of its operations and financed portfolios.

2. MRV Principles

Whereas the chosen priority objective for collecting GHG data on a company or portfolio level will determine the precise methodology for measuring this exposure, there are some key general principles that define the scope of Monitoring, Reporting and Verification. This chapter introduces the key elements of MRV in the contact of GHG accounting, distinguishing between the different areas of emissions attributed to an organisation's activities (i.e. 'scopes') as well as presenting an overview of leading international GHG reporting initiatives relevant for the financial industry. Where relevant, we also specify links to the sectoral MRV requirements currently stipulated under Turkish MRV law.

According to the GHG Protocol[9] – a leading, globally accepted accounting and reporting standard – effective MRV need to be:

- *Relevant:* Maintaining the GHG inventory in line with the GHG emissions of the company and ensuring the GHG inventory supports the decision-making needs of users internal and external to the company.
- *Complete:* Defining an inventory boundary and reporting on all GHG emission sources and activities within those boundaries. Any exclusions from the boundaries should be disclosed and justified.
- *Consistent:* Ensuring consistency in the methodologies used such that emissions can be compared over time. Any changes in the data, inventory boundary, methods, or any other relevant factors in the time series should be transparently documented.
- *Transparent:* Ensuring all matters of relevance are addressed in a factual and coherent manner based on clear audit trails. Relevant assumptions should be duly disclosed while maintaining references to the used accounting and calculation methodologies as well as sources for the data used.
- *Accurate:* Systematically quantifying the GHG emissions such that, as far as can be judged, they are neither over nor below actual emissions and uncertainties are reduced as far as practicable. Ensuring sufficient accuracy to enable users to make decisions and maintaining confidence about reported information's integrity.

To streamline GHG accounting and reporting approaches of companies, the GHG Protocol has developed a standard to measure the GHG emissions of companies using three Scopes (see Figure 3).

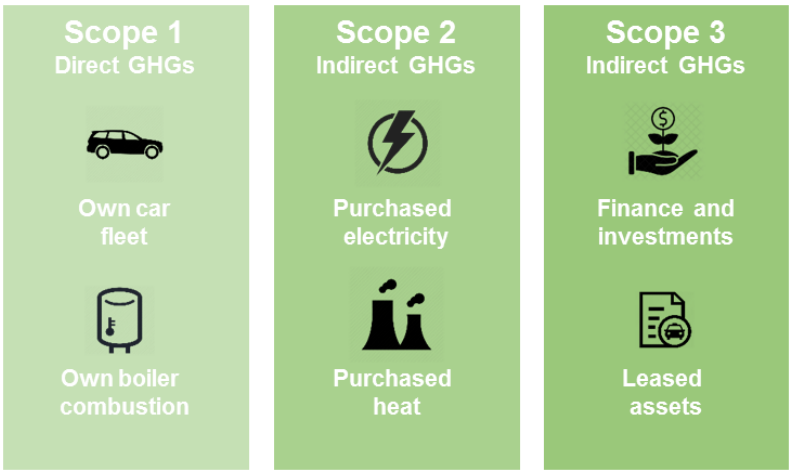
- *Scope 1* emissions include direct emission from sources owned and controlled by a company. In case of banks, these primarily are linked to emissions from fuel use by the company's fleet of cars.

- *Scope 2* emissions cover indirect GHG emissions from the generation of electricity that is purchased by a company and used for operations, heating and cooling. Companies have the options of adopting two alternative methods for accounting for scope 2 emissions: a location-based method and a market-based method. These methods affect the choice of emission factors applied when calculating on-site energy usage. For banks, scope 2 emissions generally concern the use of electricity and gas in their offices.

[9] For more information, refer to: https://ghgprotocol.org/

- *Scope 3* emissions are a consequence of the activities of a company, but occur from sources not owned or controlled by the company. The GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard offers 15 reporting categories in scope 3 with the aim to offer companies a systematic framework to measure, manage, and reduce emissions up-stream and downstream the corporate value chain. The significance of emissions from this scope should not be underestimated as scope 3 emissions can often be orders of magnitude higher than scope 1 and 2 emissions. For banks, reporting category 15 (Investments) will be the largest source of indirect emissions. To attribute exposure, the GHG Protocol presents specific guidelines for equity and debt investments, project finance, and managed investments.

Figure 1: Examples of the three scopes as per the GHG Protocol



The GHG Protocol has been the most widely used standard in response to voluntary and compliance GHG reporting requirements. One such notable reporting initiative is the CDP (formerly the Carbon Disclosure Project, see Text box 2), which as of 2019 compiles the GHG carbon foot-printing data of over 7,000 companies worldwide. Another relevant reporting initiative that was launched in the aftermath of the adoption of the Paris Agreement is the Science-based-Targets, which calls for companies to adopt targets for GHG emissions reduction that are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement (i.e. to limit global warming to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C). It currently includes ±570 companies that are taking science-based climate action of which ±40 are from the financial sector (see Text box 3).

The CDP is a London-based, not-for-profit, voluntary initiative which aims to study the implications of climate change for the major publicly traded companies globally. It is the largest climate change-focused data collection and assessment programme and offers the only global system for companies and cities to measure, disclose, manage and share key environmental information. As of 2019, CDP represented over 525 institutional investors with an investment base of more than US$96 trillion.

Customers or investors can ask companies to participate in the CDP and also companies can choose to self-report. Annually, the CDP requests information by means of questionnaires covering greenhouse gas emissions, energy use and climate change risks and opportunities from companies worldwide. Reporting is carried out on a yearly basis via an online system and CDP offers support and guidance materials. Then, CDP evaluates and scores submissions and publishes them in the public domain to enable benchmarking and to increase transparency. Moreover, disclosure between companies and stakeholders encourages sharing information on climate change and on the associated business risks.

In 2018, CDP requested the largest 100 companies from Borsa Istanbul 100 Index (BIST-100) and companies with high environmental impact in Turkey to disclose their environmental information. 18 of those companies operated in the financial sector. About half of the companies responded. 84% of the respondents indicated to have some sort of target in place for reducing emissions, but approaches to measuring and reporting exposure varied considerably.

Source: CDP. Climate Change and Water Report 2018. Turkey edition. 2019. Available here

Text box 3: Science Based Targets initiative (SBTi)

The Science Based Targets initiative (SBTi) is a joint initiative by CDP, the UN Global Compact (UNGC), the World Resources Institute (WRI) and WWF. It is intended to increase corporate ambition on climate action by mobilising companies to voluntarily set greenhouse gas emission reduction targets consistent with the level of decarbonisation required by science to limit warming to less than 1.5ºC / 2°C compared to preindustrial temperatures.
The initiative defines and promotes best practice in science-based target setting and independently assesses and approves companies' targets.

To set a science-based target the company submits a commitment letter and is thus recognised as a "committed" company. Once an institution has signed the commitment letter, it has up to 24 months to develop and submit the targets for official validation. Upon confirmation that the target meets the SBTi criteria the company and its target will be showcased on the Science Based Targets website.

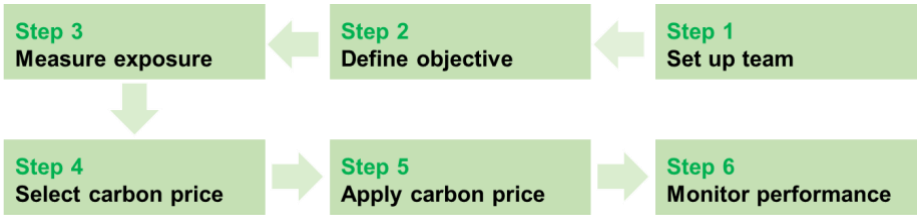
Currently, 568 companies are taking science-based climate action and 222 companies have approved science-based targets. Six out of those 568 companies are based in Turkey and are "committed", with half of representing a financial institution.

Source: https://www.mainstreamingclimate.org/sbti/

3. Roadmap for MRV Application

The following section presents a roadmap to assist banks with the implementation of MRV at the institutional level. The objective of this roadmap is primarily to support the decision-making process by structuring the rationale for engagement in MRV and outlining the activities that need to be realised to achieve the desired outputs. As such, the presented framework serves to kick-start internal discussions within the bank and can act as a management tool to help guide the implementation process across various departments within a bank. It can also assist in the formulation of risk management processes linked to the bank's traditional risk categories, including credit risk, liquidity risk and operational risk. Detailed technical guidance on conducting measurement of GHG emissions is outside the scope of this summary note, as this will ultimately depend on the selected objective(s) for conducting MRV and the applied reporting standard.

Figure 2: Roadmap for application of MRV



Step 1: Set up a governance team

Successful application of monitoring and reporting of GHG emissions in the context of financial institutions and their investment portfolios requires a carefully designed platform. Setting up a team that is responsible for the implementation of MRV is the first step. Typically, this task is taken up by members of the Sustainability or the Corporate Social Responsibility department, as the function requires regular interactions with stakeholders and external communication will be an important element of the work.

The governance team will need to have the full support of management to ensure adequate internal budgets are made available, the activities are timely implemented, and the envisaged outputs can be achieved at the institutional level. In addition to a dedicated team that oversees the process of MRV implementation within the organisation, it is also important to create a cross-functional team and invite representatives from core parts of the bank to ensure commitment across the various relevant departments to partake in the governance team. Especially in the context of scope 3 emissions where a bank's loan portfolio GHG emissions are evaluated, buy-in from corporate banking divisions and asset managers will be vital. Strengthening such commitment across the organisation could over time be achieved by for example introducing compensation schemes partially linked to GHG emissions targets.

Step 2: Define the objective

The second step in the implementation roadmap is for management and the selected governance team to agree on the objectives behind introducing MRV. A clear understanding of the sought end-goal will (i) help select the approach or type of standard to be used for quantifying exposure to emissions; (ii) agree on internal processes across bank divisions; and (iii) enable the adoption of a strategy for how to act on the findings. For example,

if the primary objective is to reduce future exposure to regulatory risk, the specific methodology to quantifying exposure is likely to differ than when disclosure for communication reasons is the primary concern or when MRV is being used to identify new business opportunities. Some key examples of objectives related to the implementation of GHG monitoring and reporting are presented in the table below. In many cases, banks select more than just one objective.

Table 1: Overview of key objectives linked to GHG monitoring and reporting at FIs

Objective	Description
Identifying risks	Climate related risks can be divided in a number of major risk categories, which include risks related to (i) regulatory risks; (ii) the transition to a low carbon economy; and (iii) physical risks due to climate change. Exposure to regulatory risks is already apparent in the current environment, as increasingly more countries introduce carbon pricing legislation, placing valuations in targeted sectors at risk. The risk related to the transition to a lower carbon economy as well as physical risks may be less observable in the short term, but are expected to impact FIs over a longer-term horizon.
Identifying opportunities	Mapping of exposure to GHG emissions can serve to help identify investment opportunities that can increase the efficiency of the clients' operations and lead to strengthened working capital positions and improved debt service capacities. Furthermore, such assessment can also help identify new market segments for FIs where exposure to climate-related risks is lower and long-term risk-return characteristics may be more attractive. Finally, GHG mapping can also serve to attract financing that is linked to environmental performance, such as green bonds.
Meeting reporting requirements	Banks can also pursue GHG monitoring and reporting activities with the primary aim of meeting voluntary or compliance reporting requirements. For example, these could be linked to the Task Force recommendations of climate-related risks reporting.

Step 3: Measure exposure to GHG emissions

The next step is the operationalisation of the monitoring and reporting activities within the bank. Given the variety of approaches for doing so, and their technical nature, a detailed description of this step is outside the scope of this summary note. General technical guidance and support notes on the measurement of GHG emissions at institutional level can be found on the GHG Protocol website.

The approach for implementing MRV will revolve around the main principles outlined in the previous section. The three scopes of the GHG Protocol is the most commonly adopted approach to quantifying an organisation's carbon footprint, and initiatives like the CDP[10] or the Science Based Targets recommend the use of this standard to evidence compliance. Of particular importance is the need to go beyond a bank's own operational emissions and establish a process for quantifying downstream exposure related to clients and investees. This will likely impact the type of information requested from clients. The need for disclosures specifically linked to GHG emissions will need to be communicated in advance to give clients time to measure and report the requested data.

As described in the sections below, MRV is recommended to be initially tested on a smaller scale before rolling it out on an institutional level. Such testing could be carried out targeting a specific sector, a particular set of

[10] More than 90% of the Fortune 500 companies reporting to CDP use the GHG Protocol.

clients, an individual investment portfolio or fund, or involve a particular financial product.

Step 4: Determine internal carbon price

Once the objectives are clear and the bank has succeeded in testing the implementation of MRV, one effective approach to quantify and value the exposure to GHG emissions is through the application of an internal carbon price.

The concept of carbon pricing within the financial sector serves to determine a price for an attribute that is currently not appropriately reflected in a bank's valuation models – exposure to GHG emissions or carbon intensity. Carbon pricing relates to valuation of these GHG emissions to allow for the inclusion of the negative externality into economic analyses.

There are various price components that can inform the determination of an internal carbon price, including social pricing, regulatory pricing, marginal abatement cost pricing, and peer pricing. The selection, discounting and weighting of the presented price elements will depend on the designated end-use of the internal carbon price, and banks may adopt uniform pricing (i.e. one price that is used independent of the type of client, product, sector or geography) or apply differentiated pricing.

Social cost pricing

On the highest level of ambition, an internal price could reflect the value society places on the environmental quality of avoided GHGs. Uncontrolled release of GHGs contributes to global climate change, and society can reflect this by internalising the full future cost associated with such damage. As such, the damage cost method is the most holistic approach to assigning a price to carbon dioxide emissions, and represents a way to compensate for the adverse effects GHG emissions are expected to have on welfare over time. According to the IPCC, more than one hundred estimates of the social cost of carbon are available, reflecting the difficulty in quantifying this impact. These range from USD 10 to USD 350+ per tCO_2.[11]

Regulatory pricing

The most direct, transparent and implicit price component of a carbon price is the value existing environmental regulation places on a tonne of CO_2. Regulatory carbon pricing can be categorised into two broad categories: cap and trade systems and carbon tax schemes. As of 2019, 46 national jurisdictions were covered by some form of carbon pricing scheme, representing 20% of global GHG emissions.[12] These schemes provide important pricing data on a tonne of CO_2, which can be used (in part) by a financial institution when benchmarking its internal carbon price. Current carbon pricing schemes apply prices ranging between less than USD 1 to USD 130 per tonne.

Marginal abatement cost pricing

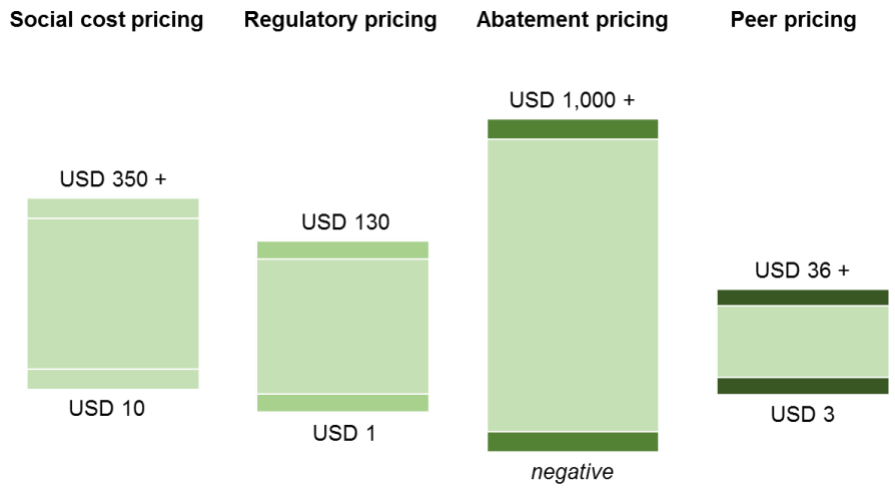
An alternative approach to pricing carbon is through the use of the marginal abatement cost curves, or MAC curves. The MAC curve sets the basis for the application of the abatement cost approach. The curve reflects the costs associated with one additional unit of mitigation across a range of possible GHG mitigation options. These options could be represented by technologies (such as wind power or solar photovoltaic systems) or processes (including waste heat recovery or carbon capture and storage). Application of the

[11] IPCC. IPCC Fourth Assessment Report: Climate Change 2007. 2007
[12] World Bank. Carbon Pricing Dashboard. 2019. Available here

information reflected by such curves are most useful when determining carbon price in order to reach a specific emission reduction target, and can be determined on a country, sectoral or portfolio level. Given the large pool of potential interventions, marginal abatement costs can range from negative values to several thousands of USD per one tonne of CO_2.

Peer pricing
Independent from the valuation approach used to identify an appropriate carbon price, it is imperative for a corporate to benchmark its valuation against the pricing levels applied by peers and competitors. According to data by CDP, in 2017, nearly 1,400 companies disclosed that they are currently using, or planning to implement, an internal carbon price within two years. The use of carbon pricing is also growing within the financial sector. In 2017, 69 financial institutions reported using an internal carbon price; this number is expected to reach close to 150 in 2019. Based on a selected sample of banks that have publicly disclosed the value of their applied carbon price, the mean price is USD 18.35 per tCO_2. Some organisations update their internal carbon prices regularly, while others opt to apply a fixed price over time.

Figure 3: Overview of possible internal carbon price components, and ranges of applied prices



Step 5: Apply the internal carbon price

When the pricing method has been selected and an internal carbon price is adopted, application of the price will need to be tested first before expanding its use across the organisation. When using the internal carbon price in support of the credit allocation process, initially limiting implementation to a selected sector, type of investment, or size of the loan will help to test the concept before scaling up across a wider portfolio of assets. Alternatively, a bank may initially only apply carbon pricing at the operational level (i.e. scopes 1 and 2).

Readiness of the bank's clients to cooperate and degree of access to GHG emissions data by these organisations should be key factors to consider when selecting a sector or portfolio to test the internal carbon price. For example, loans allocated to the utility sector may be easier to link to GHG intensity, given the standardised GHG accounting methodologies available for this sector. GHG exposure in other sectors, such as transport, infrastructure or real estate, will be more challenging to quantify and could therefore be considered as candidates for inclusion at a later stage.

Once successfully trialled, the governance team should devise a strategy for implementing carbon pricing on a broader portfolio level. This strategy should allow for a degree of flexibility, keeping in mind that the availability of emissions data will likely differ per sector, geography, or client type.

Additional resources will need to be made available by management at this stage to support the integration of internal carbon prices into existing practices and protocols, including environmental impact assessment, project review and approval, risk analysis guidance, and reporting.

Step 6: Monitor performance and act

Any significant organisational change must be monitored for effectiveness. The governance team should evaluate this effectiveness by monitoring key performance indicators (KPIs) that are linked to the overarching objective. For instance, if the primary objective of MRV is to reduce exposure to regulatory risk, KPIs could focus on the share of the bank's assets that are exposed to sectors that are already covered under a carbon pricing regulation, or are expected to become covered at some point during the weighted-average maturity of a basket of amortising loans or bonds. If, on the other hand, the goal is to comply with an initiative like the Science Based Targets, KPIs should be adjusted to reflect progress on achieving a defined voluntary GHG reduction target.

To enable progress in the right direction, the bank will need to engage in a financial planning exercise that links potential financial impacts of the identified climate-related risks and opportunities to the bank's business and services. This includes adopting procedures concerning the management of particularly high credit exposure to carbon-related assets and other climate-related risks (such as transition and physical) in the company's lending activities. On a strategic level, the bank will also need to devise a strategy for entering new markets (by sector or geography) where green or low carbon lending or investment opportunities are present, including the consideration of introducing new financial products (such as green bonds or green mortgages) to facilitate such business expansion.

Finally, the applied internal carbon price will need to be reviewed periodically to reflect changing market and policy conditions. The pricing of each one of the four price elements will change over time. Technological innovation will impact the marginal abatement costs of existing and new climate solutions, increased international ambition is likely to result in the introduction of higher carbon prices, and peers are likely to adjust their internal pricing accordingly to reflect the changes in the market. Furthermore, the bank's strategy may change over time and the objective of implementing MRV can evolve, thereby requiring an adjusted approach to evaluating exposure to GHG emissions and climate change risks.