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B-PMR
Business Partnership for Market Readiness
An IETA Initiative

Partnership for Market Readiness (PMR) - Business Partnership for Market Readiness (B-PMR)

CARBON MARKET READINESS TRAINING GUIDE

IETA
CLIMATE CHALLENGES
MARKET SOLUTIONS

Acknowledgements

This report was prepared for the World Bank's Partnership for Market Readiness (PMR) by Jeff Swartz, Stefano De Clara, Stephanie Olegario, Katie Kouchakji and Alessandro Vitelli from the IETA Secretariat.

The International Emissions Trading Association (IETA) launched the "Business Partnership for Market Readiness" (B-PMR) to enhance the potential for workable international carbon trading models to emerge around the world. IETA works in concert with PMR host governments, the World Bank and PMR donor countries on this initiative. Enhanced private sector preparedness and public-private dialogue is critical to PMR's mission which is to help countries prepare for and implement robust and sustainable carbon pricing policies.

The report includes comprehensive training material for companies on corporate preparation to carbon pricing which has been divided into 11 chapters. Each chapter was written by a representative from 10 IETA member companies with active carbon market participation. Each chapter focuses on a key aspect of preparing for compliance or involvement in a carbon market. Many of the examples are drawn from experiences with involvement in the Kyoto carbon markets (CDM, JI), the EU Emissions Trading System (ETS), and the California carbon market.

We would like to acknowledge the efforts and insights from our members who have contributed to this report: Bård Inge Hamre (Statoil), Bill Kyte (IETA Fellow), Bill Thompson (BP), Caspar Chiquet (South Pole Group), Eric Boonman (Statkraft), Francisco Grajales Cravioto (Vattenfall), Ingo Ramming (Commerzbank), Liv Rathe (Norsk Hydro), Judith Schroeter (ICIS), Maelle Durant (Veolia), Paul Curnow (Baker & McKenzie), Timo Schulz (EEX) and Ilona Millar (Baker & McKenzie).

The development of this report and its accompanying videos was made possible by the World Bank's Partnership for Market Readiness (PMR).

We would like to convey our sincere appreciation to the PMR for its strategic foresight in commissioning this report and its use in PMR countries. Our sincere thanks to Pierre Guigon and Adrien de Bassompierre of the PMR Secretariat.

The PMR has also developed case studies for how specific companies have prepared for carbon pricing. These case studies are available on the PMR's website here.

To date, IETA's BPMR initiative has held 7 industry-to-industry dialogues on emissions trading and carbon pricing best practices. These dialogues have taken place in China, Kazakhstan, Korea, Mexico, and South Africa. Materials from those dialogues and tips for carbon market preparation are available on the B-PMR website here.

Please direct any comments and questions about this work to the PMR Secretariat (pmrsecretariat@worldbank.org).

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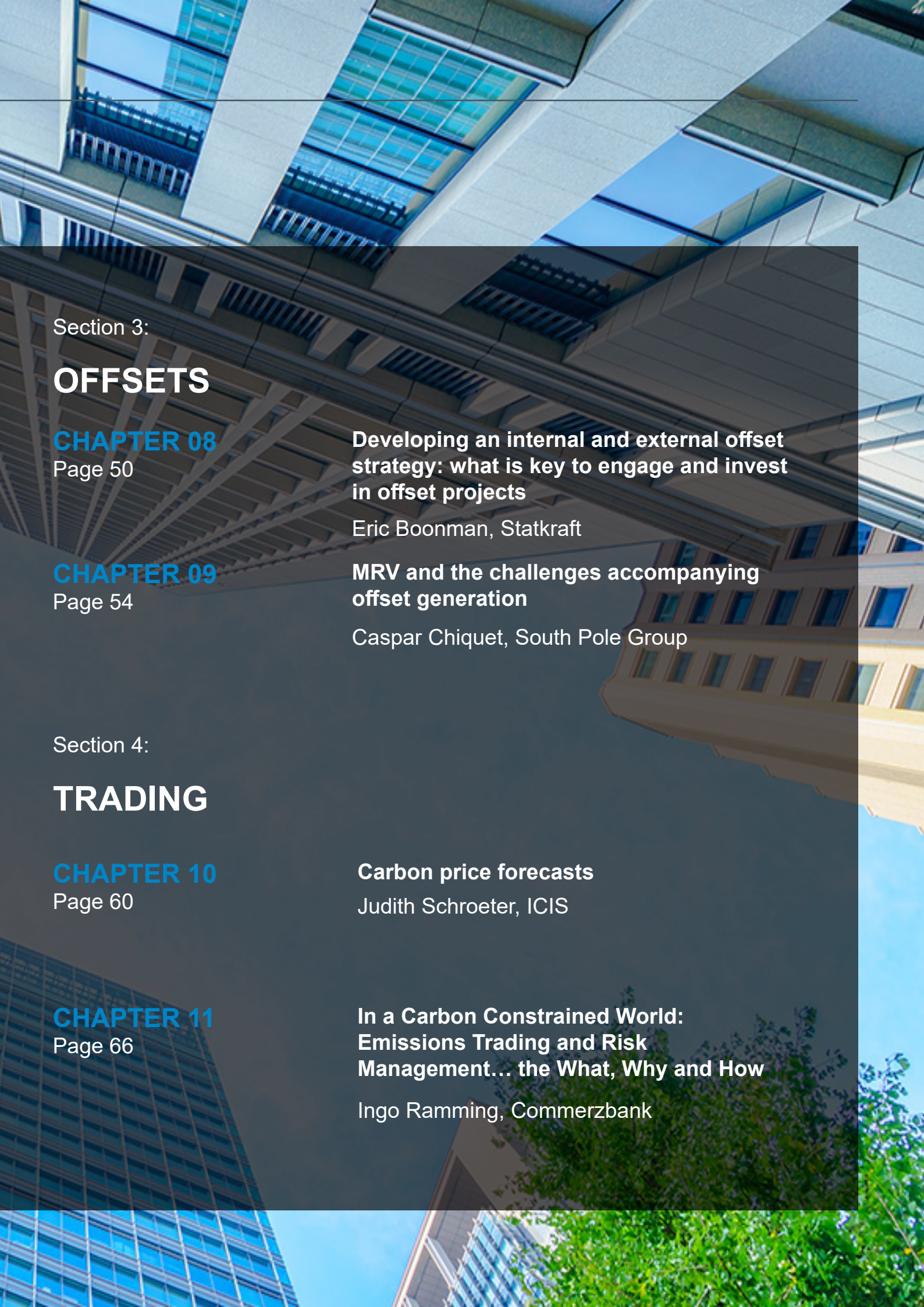
ALLOWANCES



Section 3:

OFFSETS

Section 4:

TRADING

The 'Golden Rules' - 10 Key Lessons on ETS Readiness

Dr. Bill Kyte

For any emissions trading system (ETS) to be successful it should meet certain criteria:

- **Environmental rationale** – the trading system must, and must be seen by all parties to be achieving a valid environmental objective.

- **Economic rationale** – the trading system must, and must be seen by all parties to be more flexible and cost-effective than other ways of achieving the environmental objective.

- **Credible** – the system must be credible since only credible systems succeed. Hence, the administrative procedures must be adequate to ensure compliance with the climate change goals. There must be an element of trust since in many cases pragmatic solutions to problems will be needed. Appropriate monitoring and verification will enhance credibility.

- **Simplicity** – simplicity is essential and deviations from simplicity should only be introduced when demonstrably necessary. Multitudes of academic and institutional studies, of ever increasing complexity, have been undertaken seeking illusionary perfection. No system will be perfect, and good simple, pragmatic solutions will succeed where more complex ones will fail.

- **Equity** – without perfect knowledge (in which case there would be no need for trading) any system will be inequitable particularly during the early years. In a successful system there will be something for everyone and inequities will rapidly diminish with time. Since the valuation of companies and their investment policies have been based on certain explicit and implicit rights it is important that any trading system does not introduce a step-change shock to the status-quo but enables the achievement of the desired objective.

- **Transparency** – the system must be transparent so that there is national and international confidence in the system. An imperfect system with good transparency is to be preferred to any system with poor transparency.

- **Certainty** – in order to inspire business confidence, and to encourage innovation and investment, there must be a high degree of certainty so that business can invest. This means that allocation must be as far into the future as possible and that permits must have long validity.

- **Inclusive** – the process should be as inclusive as possible in the long term, though some restrictions will be necessary in the short term.

The UK Emissions Trading Group (ETG) recommended to the UK government in October 1999 that these "golden rules" should form the basis of any ETS. These rules are still valid today.

First Steps

Getting a company ready to take part in an ETS can seem to be a daunting task and this Carbon Market Readiness Training Guide contains much needed help. Each of the chapters present detailed guidance on specific facets of an ETS.

However there are few preliminary steps that all companies should take as soon as possible in order to make the process of implementing an ETS as smooth as possible:

- Establish an inclusive forum where

companies, verifiers, market makers, regulators and government officials can discuss issues from all perspectives and then develop practical solutions to solve these issues. The UK ETG has provided this forum in the UK for the past two decades and has enabled the UK government to put forward constructive input into the reform of the EU ETS.

- Establish a structure within the company organization to manage the procedures required to operate within an ETS. It is recommended that this structure should be similar to other structures within the organization and thus able, where appropriate, to use existing company procedures and resources. Bolting on a template from outside will lead to inefficiencies as synergies will be lost.

- Ensure that all roles within the carbon management team are well defined and understood with no overlaps or ambiguities. Since an ETS sets a price/value on carbon it should be managed as carefully as other financial products.

- Ensure that the managing board takes a holistic view so that all aspects of carbon management are integrated fully into the company strategy.

- Ensure that the company obtains good data as soon as possible about its carbon emissions and the locations where these emissions come from. This will enable the company to formulate a robust carbon abatement and trading strategy.

- Ensure that all functions in the company are aware of the implications of carbon management and use their expertise whenever possible.

- Treat the ETS as an opportunity and not as a threat in order to gain competitive advantage.

These preliminary steps will help to make the more detailed steps set out in this report more manageable.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 1:

Carbon Pricing Preparation

CHAPTER 01

Maëlle Durant, Veolia

Corporate governance and organisation on emissions trading

An emissions trading system (ETS) creates new demands on a company, and it's important to consider at the outset how to respond to these additional obligations. Should carbon management and trading be outsourced, or should a new internal organisation be created to address the new regulations? This chapter will consider the initial steps a company can take towards compliance.

1. Organizing the carbon topic internally

Understand what emissions trading is: emissions trading is a market-based approach to controlling pollution by providing an economic incentive to achieve CO_2 emissions reductions. To succeed in managing such a cap-and-trade system, your company will need strategic, technical and financial skills.

Find the appropriate department to coordinate the organisation: emissions trading is linked to climate change strategy. Climate strategy often lies between the sustainable development and finance functions. Emissions trading is about financial management, but it also implies a deep understanding of regulation, CO_2 management strategy and a good technical knowledge of industrial installations which fall under the cap. Whichever the appropriate department is, the most important thing is to have a project manager. Start a working group: the working group should be able as a first step to define whether or not emissions trading could be managed internally or outsourced. A cost/benefit analysis should be carried out to evaluate the choice between delegating trading to a specialised broker or to carrying it out internally. Such an approach gives the opportunity to create a "CO_2 network" within the company.

2. Centralize versus decentralise

Assess possible optimisation among installations: if entities are spread geographically, a centralised option could be considered. For example, in the European emissions market it is often the case that installations of one company are spread across a number of member states. Local exchanges with local brokers co-exist with European CO_2 exchange platforms and may be able to offer more targeted solutions.

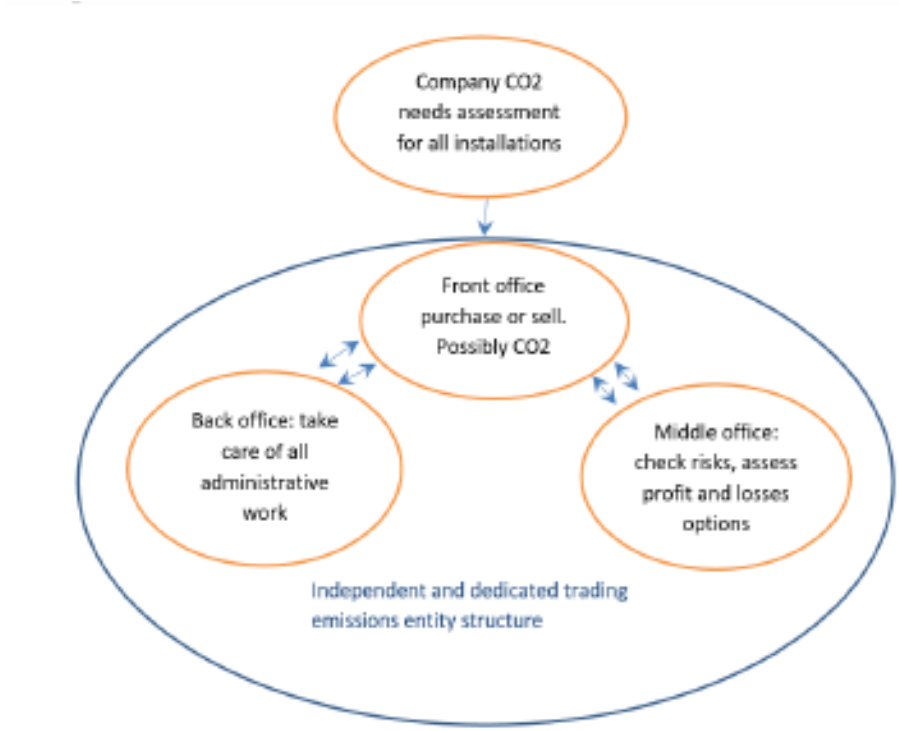
Companies frequently choose a centralised approach for several reasons:

- Centralised emissions allocation across many installations;
- Central management of emissions purchases or sales, which reduces external transactions costs;
- Managing risk exposure at a group level;
- Capitalising on relationships with counterparties;
- Ability to manage CO_2 data with one single software solution. All relevant data from each installation can be aggregated. That enables a company to build a single unified picture of emissions, to forecast emissions and evaluate different scenarios.

Such an approach enables full fleet management; linking of everyone working in the enterprise; site and energy managers to front office traders, and back office to middle office.

3. Establishing an internal carbon team

To enable a carbon team to succeed in emissions trading, companies require several functions.



The best option may be to create a dedicated entity for carbon trading. Having an independent structure enables key functions to be performed:

- **The front office** is the dealing room from where traders purchase or sell CO_2 allowances. The front office is responsible for managing the company's CO_2 position and establishing the best trading strategy;
- **The middle office** monitors the risk exposure of the company, ensures that deals negotiated by the front office are correctly recorded, processed and paid for, check traders' limits and positions, and track deals' profits and losses;
- **The back office** provides administrative and support services to front office. The back office team ensures that deal payments are made, takes care of deal confirmations, and can also manage margin calls with a clearing provider.

4. Decision-making processes

The dedicated CO_2 management entity must have a governance structure in place. It must have the authority to make all decisions related to the various transactions. A steering committee, composed of technical experts, the front office and the middle office, meeting every month can be the strategic decision-making body. The decision-making process can thus be structured as follows:

1. The sites are in charge of submitting their CO_2 emissions data to the front and the middle offices;
2. The front and the middle offices aggregate the data and identify the company's overall position before making proposals for a strategy of purchase or sale;
3. The Management Committee decides and adopts the strategy for managing the trading;
4. The front office executes the strategy.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 1:

Carbon Pricing Preparation

CHAPTER 01

Instructor's Guide

Corporate governance and organisation on emissions trading

To be used along with Chapter 1 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Carbon Pricing Preparation", please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are, in your experience, the key points for companies to prepare for carbon pricing. For example:**

   a. Assess possible optimisation among your installations: if entities are spread geographically, the centralised versus decentralised option could be raised. For example, in the EU ETS it may happen that installations of one company are spread around the 27 countries. Local exchanges with local brokers occur and co-exist with European CO_2 stock exchanges platforms.
   b. Establish an internal carbon team with a dedicated entity that allows to manage main functions: front office, middle office, back office
   c. Put in place a dedicated decision-making process including all persons concerned to centralise and optimise choices.

2. **Please explain what are, in your experience, the key challenges companies should consider when preparing for carbon pricing. Examples include:**

   a. Convince all sites that centralising the CO_2 decision-making and trading is the best option;
   b. Manage the CO_2 risk regarding the possible gap between your trading and your actual emissions;
   c. Manage the pass through rate towards your clients regarding CO_2 cost;
   d. Face potential low liquidity on the market and a high price volatility that makes your hedging harder.

3. **Case Study Carbon Pricing Preparation**

   Please list briefly an example of a fictitious company (eg, Nordic power Company) that successfully managed to prepare for carbon pricing compliance. What were the key success factors/decisions? For example:

   I. **<u>Establish a team</u>**
      a. *The French Utility Paris Saint Germain anticipated Phase I of the EU ETS by first establishing a team of expert from all the company's departments.*
      b. *This team discussed the launch of a steering committee about CO_2;*
      c. *They launched a CO_2 expert network to have representative on sites;*

II. **Analyse**
   a. *They invest in an appropriate software to deal and manage all CO_2 data*

III. **Start trading**
   a. *They launch a dedicated trading entity to start to trade enough time in advance their CO_2 allowances, to anticipate several years ahead their cost and to manage their risk*

Please list briefly an example of a fictitious company that unsuccessfully managed for carbon pricing compliance. What were the key factors that lead to an unsuccessful result? For example:

A car manufacturer chose inefficient software that led to incorrect emission numbers. Because the company management did not believe that the CO_2 price would increase, they did not manage and hedge their CO_2 risk through a dedicated structure.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

- *How to convince people that CO_2 price could impact business margins and reduce profitability if not well managed? (especially in markets where the price is zero and where companies are over allocated)*
- *Is it better to have your own emissions exchange?*

SECTION 1:

Carbon Pricing Preparation

CHAPTER 02

Ilona Millar and Paul Curnow, Baker & McKenzie

Carbon Accounts and Risk Management

1. Introduction

When participating in carbon pricing schemes, companies need to understand the legal requirements for capturing data about their carbon emissions and how that data then informs compliance obligations, for example to surrender carbon units corresponding to emissions. If a company has compliance obligations under a carbon pricing scheme and the regulated emissions are not appropriately captured and reported, possible ramifications include severe penalties and in some jurisdictions criminal prosecution or liability for breaching corporate governance requirements including director's fiduciary duties. The greatest risk of non-compliance with carbon pricing schemes is typically inaccurate data collection and emissions accounting. In order to accurately measure and report emissions data, companies should develop a sound understanding of regulations governing emissions accounting and reporting and put in place systems to accurately capture data.

2. Regulatory requirements for accounting

The first step in any risk management strategy is to understand the legal frameworks that govern the carbon pricing scheme and associated accounting requirements. In many cases, these obligations will be dispersed through a number of instruments. For example, Australia's former Carbon Pricing Mechanism (CPM) involved a suite of over 18 legislative instruments. In contrast both New Zealand[1] and the UK[2] have only one Act governing their carbon pricing regimes.

Many countries have either separate Acts and regulations, or detailed chapters of framework Acts that deal with carbon accounting. In Australia, the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) and its supporting regulations were introduced prior to the commencement of the CPM to ensure that there was sufficient accurate historical data about facility and corporate emissions and energy production and use prior to the CPM commencing. This data then underpinned the surrender obligations of facilities that were covered by the CPM. The NGER Act remains law in Australia and now informs compliance obligations under the Safeguard Mechanism.

Regulated companies need to ensure that they understand the scope of their accounting and reporting requirements, including:

- Whether their sector is required to report;
- Any applicable thresholds for reporting;
- Whether their emissions are covered (e.g. all or only some GHGs)
- Whether data is reported at the unit, facility or entity level;
- What types of data must be collected and in what units of measure (e.g. tonnes of CO2-e of emissions or Tj of energy);
- What calculation methodologies are required;
- What emission factors must be used;[3]

[1] *Climate Change Response (Emissions Trading) Amendment Act 2008 New Zealand.*
[2] *Climate Change Act 2008 UK.*
[3] *Some schemes may specify particular emissions factors while others utilise the Intergovernmental Panel on Climate Change default emissions factors.*

- What carbon contents and global warming potentials the regulations utilise;
- What verification and quality assurance or control approaches are required;
- Whether consistent GHG calculation methodologies are required across reports;
- How frequently data must be provided (e.g. quarterly or annually);
- Which staff should have access to data and reporting platforms;
- Whether any of the data collected is confidential and the laws, regulations and/or internal policies applicable (e.g. confidentiality or competition laws);[4] and
- Whether there are any amendments to the regulations pending or likely to be introduced in the near future that may affect reporting requirements.[5]

It is not uncommon for companies to have multiple overlapping reporting obligations for GHG emissions and energy consumption and production (e.g. under carbon, renewable energy and energy efficiency schemes). Where a company has regulatory obligations under multiple regimes with differing MRV rules, they should consider the extent of the variance and whether their internal data collection and reporting disciplines can be harmonised to minimise the compliance burden.

3. Risk management and legal compliance

Once the regulatory framework is accurately understood, companies need to ensure that any risks posed within the regulatory framework are effectively managed. Although the exact strategies to employ will depend upon the jurisdiction and the regulatory framework applicable, the following is a high-level approach to general risk management in carbon accounting:

3.1 Step One: Delineate responsibility

Decide who is responsible for data reporting at each of the facility level and corporate level – see Chapter 1 above for further details of this.

Companies should also consider also whether responsibility for reporting can be transferred to someone better placed to manage the accounting obligations, for example, within a corporate group, to another controlling entity, a joint venture partner or a material contactor. Reporting transfer mechanisms are available in some schemes (e.g. Australia) and can be effective to consolidate reporting for corporate groups with multiple facilities.

3.2 Step Two: Develop data collection systems

Develop data collection systems for GHG emissions that are robust, transparent and accurate. For example, in the EU companies must submit monitoring plans, annual emission reports, verification reports and improvement reports at regular intervals to ensure MRV integrity.[6] In Australia, records of activities must be adequate to enable the Regulator to ascertain whether a company has complied with its obligations under NGER Act and regulations. This will typically require information to verify the relevance, completeness, consistency, transparency and accuracy of data reported during an external audit. The Regulator also encourages reporting of both the decision making process and the details of the calculation and data analysis methods used.

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[4] *See further World Bank. 2015. "Guide for Designing Mandatory Greenhouse Gas Reporting Programs." Partnership for Market Readiness, World Bank, Washington DC. Chapter 3.*

[5] *See further World Bank. 2016. "Greenhouse Gas Data Management: Building Systems for Corporate/Facility-Level Reporting." Partnership for Market Readiness, World Bank, Washington DC. Part 2.2.*

[6] *See the Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions and the Commission Regulation (EU) No 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers.*

3.3 Step Three: Appoint representatives

Companies with compliance obligations should appoint nominated representatives with responsibilities sufficient to meet the obligations under the relevant scheme - see chapter 1 above for further details.

3.4 Step Four: Know the timeframes

It is essential that regulated entities understand the required timeframes under applicable legislation for reporting their emissions. These deadlines need to be worked into internal timelines which take account of the internal processes required to obtain audits and sign-offs from executive officers so that these are obtained in a timely manner. This can be done, for example, through matrices which set out key dates for reporting and surrender under all applicable schemes.

3.5 Step Five: Engage external auditors

To ensure the integrity of information being submitted to regulators, it is recommended that companies have their carbon accounts audited prior to submission for compliance purposes to confirm their processes are robust. Under some regulatory schemes, this will be a mandatory requirement, particularly for very large facilities or corporate groups. However, for others it can be a useful risk management tool, particularly where regulators have the power to conduct spot audits.

3.6 Step Six: Build relationships with key regulators

It is always useful to develop good working relationships with the key regulators of carbon accounting schemes. In some cases, relationship managers will be appointed to assist companies with queries they have about reporting and often technical working groups are established to address systemic issues that arise with measurement and data management across industries (e.g. fugitive emissions from coal mines).

3.7 Step Seven: Linking with carbon market compliance

In many instances, a carbon accounting and reporting obligation is linked to further compliance obligations under a carbon pricing mechanism. Once the emissions and energy profile of a facility is properly understood, the regulated entity can look at:

- whether it can reduce liable emissions at covered facilities and therefore reduce compliance costs;
- the number of eligible units it requires to surrender to offset all or part of its emissions;
- whether it is able to create offsets through activities at its own facilities or on land it owns or occupies; and
- whether it is able to pass through costs associated with its compliance with carbon schemes through its supply chain.

This is discussed further in Chapters 4 and 8.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 1:

Carbon Pricing Preparation

CHAPTER 02

Instructor's Guide

Carbon Accounts and Risk Management

To be used along with Chapter 2 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Carbon accounts and risk management", please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are in your experience, the key points for companies to address carbon risk management. For example:**

    a. Understand regulatory frameworks for carbon accounting, in particular how they address:
        i. Covered sectors and activities
        ii. Thresholds
        iii. Types of GHGs covered
        iv. Responsibility for accounting
        v. Extent of data collection required
        vi. MRV requirements
        vii. Timing for reporting
        viii. Penalties for non-compliance
    b. Delineate responsibility between corporate entities
    c. Develop data collection systems
    d. Appoint representatives
    e. Know the time frames
    f. Develop working relationships with regulators

2. **Please explain what are, in your experience, the key challenges companies should consider for carbon risk management. For example:**

    a. Insufficient understanding of regulatory ambit
    b. Accurate and robust data collection
    c. Timely and correct emissions reporting

3. **Case Study Carbon Pricing Preparation**

    Please list briefly an example of a fake company (eg, Nordic power company) that successfully managed to address/avoid [legal] risks for carbon. What were the key success factors/decisions? For example:

    A large mining company was able to ensure compliance with its carbon accounting reporting obligations by developing a process management tool linked to the legislative requirements of the carbon scheme; undertaking a thorough review of each of its facilities using the tool to determine

liability for accounting; developing a data collection platform that was rolled out to each of the facilities it operated; and appointing key representatives to manage compliance obligations at the facility and corporate level. The company undertook annual reviews of each of its facilities well in advance of when reports were due to assess changes to the business and ensure reports reflected accurate information.

Please list briefly an example of a fake company that unsuccessfully managed to address/ avoid [legal] risks for carbon. What were the key factors that lead to an unsuccessful result? For example.

A renewable energy company that had recently commissioned a new renewable energy facility failed to register and report under a carbon accounting scheme by the deadline for that financial year. The company was under a misplaced apprehension that the carbon accounting scheme only applied to greenhouse gas emissions (which it was well below the threshold for reporting) and not for energy generation (where it was above the threshold). If the company had fully understood the scope of the carbon scheme regulations, in particular the scope of matters to be accounted for, it would not have breached the scheme.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

   - *What types of data needs to be captured under carbon accounting schemes?*
   - *What usually determines whether a company has to report under carbon accounting schemes?*
   - *What are the implications if carbon accounts/reports are incomplete or inaccurate?*

SECTION 1:

Carbon Pricing Preparation

CHAPTER 03

Bård Inge Hamre, Statoil

Emissions Trading Compliance: key lessons on compliance and policy awareness

Statoil is one of the world's largest producers of oil and gas with a production of around 2 million barrels of oil equivalents/day. We are also a significant player in offshore wind, and have business operations in 36 countries around the world.

Statoil is a strong supporter of the EU ETS and carbon pricing and welcomes the new universal climate agreement.

Energy and industrial companies in Norway have been subject to a carbon tax for 25 years and in the European Union Emission trading Scheme (EU ETS) for more than 10 years.

Carbon pricing has contributed to a reduction of 800,000 tonnes of CO_2 at our oil and gas installations in Norway since 2009, achieved via energy efficiency measures. For those emissions that are not covered by carbon pricing, companies may choose to apply a "shadow" price (there are examples of prices as high as $50/tonne of CO_2 equivalent). This drives emissions reduction efforts and is an important tool for testing the resilience of energy companies' oil and gas portfolio in a low carbon future.

In addition, many have been involved in the Clean Development Mechanism (CDM), developing low-cost carbon reduction projects in developing countries, and earning carbon offsets (known as certified emission reductions, or CERs), in exchange for their investment.

Our experience is that by being an early mover and undertaking a "learning by doing" approach to carbon pricing gives companies a competitive advantage.

EU ETS and Compliance Trading

Pre-Kyoto

Before the entry into force of the Kyoto Protocol in 2005, Statoil and the Norwegian government joined a partnership of 16 other companies and five governments to invest in the Prototype Carbon Fund, managed by the World Bank. This first carbon fund, which became operational in 2000, was a pioneer in the CDM market.

In 2004, before the Kyoto Protocol was ratified, Statoil established a carbon treasury, a comprehensive project looking at everything related to CO_2: emissions, environment, trading and politics.

Norway, not being part of the European Union, established a mirror image of EU ETS – the Norwegian Emission Trading Scheme (NO ETS). The NO ETS had severe challenges, first because it was a hybrid of i) a trading system, ii) a CO_2 tax system and iii) a cooperative agreement, and second, because it was difficult to link the Norwegian system to the EU ETS system. In the NO ETS there were many small installations that had a small surplus of allowances and needed to sell, and Statoil – a large company with a big short position. It was too cumbersome for Statoil to set up Master Trading Agreements with each of the small installations that had a few allowances to sell. The result was that Statoil traded in the EU ETS bilaterally and on the Scandinavian electricity exchange NordPool and InterContinental Exchange (ICE) to cover its compliance needs.

NordPool was the first exchange to facilitate

trading of EU allowances (EUAs), in 2005 and Statoil transacted on NordPool both for EUAs and secondary CERs from 2007. The Scandinavian exchange was late in adopting extended opening hours, so the liquidity slowly went from NordPool to ICE and then to the bilateral market, where the more active parties in EU ETS set up trading units and established Master Trading Agreements.

The pre-Kyoto period was a chance for governments, companies and installations to prepare for Kyoto from 2008 to 20012.

As the market evolved and partly due to financial crises in 2007/2008, the emissions market went from a brokered and over-the-counter market to an exchange-traded and cleared market again. Thus, the bilateral market, with brokers and a lot of banks, slowly disappeared. Today, the liquidity is healthy and concentrated around a few exchanges and even fewer banks. It is also possible to trade EUA options.

Pre-Kyoto tasks included measuring and control of emissions, aggregating emissions data from different business areas and reporting it to set up well functioning back-, mid- and front office functions for the execution of emission transactions.

For the front office part of the business, networking with brokers and potential counterparties, establishing master trading agreements, and becoming members of exchanges were important tasks.

After setting up the trading desk at Statoil, including the back- and mid-offices, a few amendments have taken place. First, the trading function of EUAs and secondary CERs were separated from the functions of investing in and sourcing CERs. When trading was moved from Oil Supply and Trading to Natural Gas, one department was established for emissions trading.

Over time, Statoil has added internal control and audits, to verify correct setup and execution of emissions trading. In addition, the Licenses on the Norwegian Continental Shelf have had annual partner audits of the compliance and trading function.

Audits and proper risk management of the trading function and CER portfolio is very important. This has been, and still is a market with, from time to time, huge volatility and thus big profit and loss swings.

Statoil is mainly focusing on compliance trading, but it also has some internal customers related to hedging, as well as some external customers. For Statoil, as an operator on Norway's continental shelf, compliance trading is our main activity. Therefore, close cooperation and contact with the relevant business area is important as well as partner meetings and forums.

MRV and Carbon Markets

Since the introduction of a CO_2 tax in Norway from 1991, Statoil has been reporting CO_2 and methane emissions to the Norwegian Environment Agency and the Norwegian Petroleum Directorate. The Norwegian Environment Agency is also administrating climate quota regulations and the Norwegian Petroleum Directorate is administrating the CO_2 and NOx tax. Finally the Petroleum Safety Authorities is informed in case of large gas leakages.

Statoil's EU ETS emissions are reported according to the EU ETS Monitoring and Reporting and the Audit and Verification Regulation. Included in these reports are detailed requirements for accuracy in measurements of fuel gas, flare gas and diesel volumes, as well as weekly fuel gas sampling and modelling of flare gas characteristics in order to estimate relevant CO2 factors and emission volumes.

This data and working routines are verified by an independent, non-biased third party, and for Statoil the last couple of years audits have been conducted by KPMG.

The above is summarised in Statoil's Corporate Sustainability Report, that is released together with its Annual Report. Additionally, Statoil has been reporting to the Carbon Disclosure Project (CDP) for several years and achieved an A-rating in its 2016 survey.

Throughout this process, there is a positive and close dialogue between our industry and the authorities when new regulations come into force and during times when disagreement and formal complaints occur.

Learning points:

1. In the beginning, when setting up Master Trading Agreements, broker-, clearer- and exchange agreements, a legal department with available resources is important.
2. For back-, mid- and front office, cooperation and therefore proximity is important.
3. Risk management is important and therefore a proper understanding of the market is essential.
4. With any new market, proper understanding of the market and EU ETS and its politics is important if cases are to be presented and sanctioned.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 1:

Carbon Pricing Preparation

CHAPTER 03

Instructor's Guide

Emissions trading compliance: key lessons on compliance and policy awareness

To be used along with Chapter 3 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Emissions trading compliance: key lessons on compliance and policy awareness" please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are in your experience, the key points for companies to address ETS compliance. For example:**

   The first thing a company needs to do to ensure compliance with an emissions trading system is to focus on its actual emissions. This requires a detailed and comprehensive overview of emissions each year. For many companies this is a formidable task that may require both competence and time. Thus, it may be more cost-effective to outsource this process. Ultimately the emissions data needs to be verified by a third party. It is important to have good data for actual historic emissions.

   The company should estimate what its future emissions will be and how it may reduce emissions internally. The cost of reducing one tonne of emissions internally needs to be compared to the market price of an allowance. If allowances are needed and this is cost effective, infrastructure to set up a trading or procurement department needs to be compared to outsourcing the acquisition of the allowances from a third party.

   Being an early mover is always an advantage. Competence will be acquired and the cost of the above mentioned process can spread over many years.

2. **Case Study ETS Compliance**

   Please list briefly an example of a fake company (eg. Nordic power company) that successfully managed to address ETS compliance. What were the key success factors/decisions? For example:

   A company produces foundry products, and its Norway plant changed to more efficient processes. As a result of this investment, the company ended up using far less electricity AND reduced CO_2 emissions. The final result was less energy used and the company ended up being a net seller of allowances.

   Please list briefly an example of a fake company that unsuccessfully managed to address, or ignored ETS compliance. What were the key factors that lead to an unsuccessful result? For example:

Company waited until the last minute to surrender allowances, leading to a situation in which it faced a shortfall in allowances and needed to enter the market without a trading strategy in place. This resulted in higher costs for allowances which in turn increased the cost of compliance for the company.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

    - *How do you measure or estimate (actual) emissions on an annual basis?*
    - *How do you estimate future emissions?*
    - *What is the most effective way of reducing emissions, in a cost effective way?*

SECTION 2:

Allowances

CHAPTER 04

Francisco Grajales Cravioto, Vattenfall

All about allowances: carbon management strategies

Since 2005, the GHG emissions of a large number of companies in Europe have been regulated by the EU Emissions Trading System (ETS). The industries covered by the EU ETS are: power and heat generation, oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals, and commercial aviation.

One of the most affected sectors has been the power sector, which had to suddenly pay for the emissions released above their assigned cap. For most of the companies covered under the EU ETS, this new restriction on GHG emissions represented, at least at the beginning, a new cost in their operations. A common question for all these companies was: how do I comply with the new regulation in the most cost effective manner?

In the early days of the EU ETS, there was no professional expertise or even broad academic research on the subject of compliance under an ETS. Moreover, each company was affected differently. Therefore, companies started to address the issue empirically and individually. There was no cookie-cutter model for corporate carbon management and, in many cases, each individual facility had its own strategy even though it often belonged to the same conglomerate.

Throughout the years and based on each company's circumstances, carbon management evolved in different ways, and each company adopted gradually a strategy that would suit it best. For example, in some cases, complying with the EU ETS has always been a matter of cost reduction, while for other companies it became also a new business opportunity. After about 10 years of the EU ETS, even though there are several models and strategies for allowance management under a cap-and-trade system, it is possible to identify some important characteristics shared by most of the largest companies:

- The cost of emitting CO2 (or its avoidance) has become a cost of production and a part of the financial analyses for new investments.
- As such, companies have started calculating their economic exposure to carbon as basis for determining the best way to manage it (Figure 1).
- Initially, most companies adopted a bottom-up approach to carbon management due to: a) inertia b) the way the EU ETS was enforced (at installation level) and c) a lack of knowledge at higher management levels. Each individual facility had its own way of managing its position and allowances independent of its sister facilities.
- Because of the economic importance of carbon costs and the complexity of the EU ETS itself, corporations began to think more strategically and efficiently in terms of carbon, and started centralising their activities around carbon management. Some of the most important activities involved in carbon management are:
  - Managing the compliance position of allowances, which in the specific case of the EU ETS could be EUAs or offset credits such as CERs.
  - Procurement or sale (trading) of such allowances as needed and determined

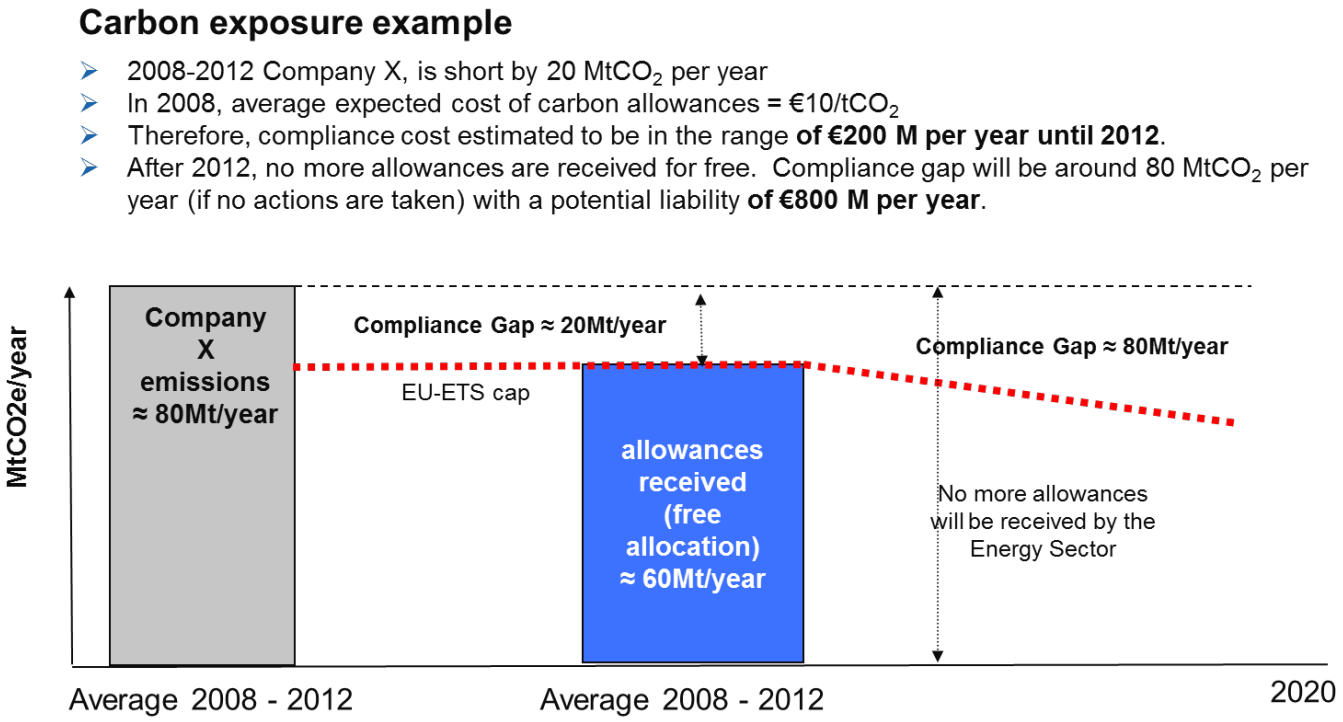

Figure 1. *Example of carbon exposure calculation*

by production levels and the company's own strategy. Depending on the size of its carbon exposure and because of the cost savings offered by CERs, some corporations even established a CDM origination team with the objective to directly invest in carbon offset projects.

- Continuous analysis of carbon policies and markets, and their implications on the company's operations.The centralisation of carbon activities gave corporations a better control of carbon assets and resulted in better hedging strategies. Depending on the case, some companies not only managed to reduce compliance costs considerably but also developed proper carbon management into an important source of revenue.

One big question when defining a carbon strategy is where in the organisation should carbon management be centralised? As mentioned previously, since carbon was seen in many cases as any other production cost, many corporations decided to centralise the management of allowances within their trading or procurement units, which already carried out very similar activities for other products. This allowed for companies not only to manage their exposure properly, but also to benefit from the market opportunities within certain risk boundaries. This meant that a corporation would centralise the analysis, compliance management and trading activities in one area, but final compliance and surrendering the allowances to the regulator would happen still at the installation level as it was mandated and set up by the EU ETS (Figure 2).

Conclusions

- Determining your potential carbon exposure before anything else is key in designing the proper carbon strategy. There is no one size fits all solution; each company is affected differently by an emissions trading system. The result of carbon exposure analysis will define

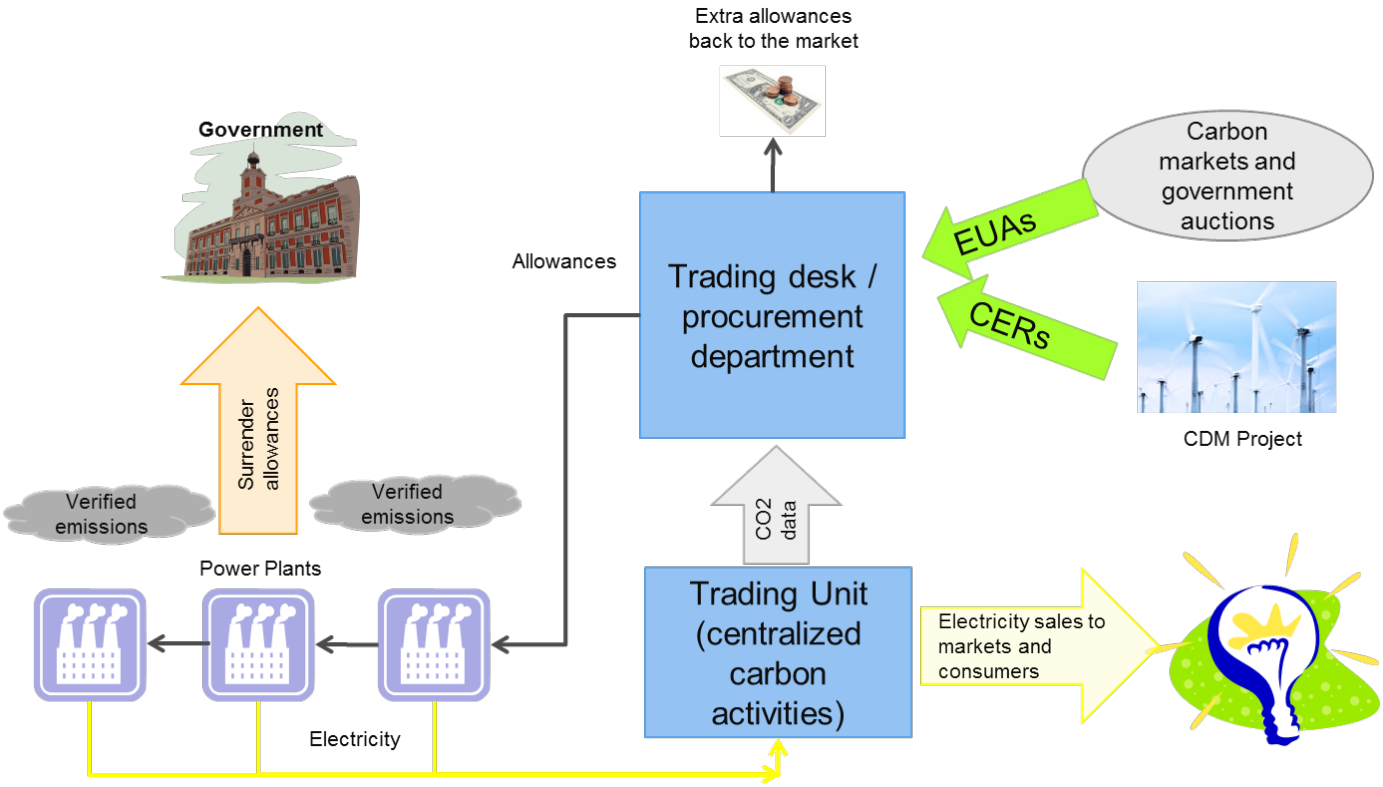

Figure2. *Example of allowance management settup*

the main objective of the strategy and the resources that will be need for its implementation.

- The best carbon management strategy is the one that will provide most operational certainty and lower compliance costs (or increase carbon revenues).
- When trading carbon allowances, nobody can predict exactly the direction of carbon prices in the future. Because carbon markets are highly influenced by political decisions, not even the best analysts can always get it right. Do your market analysis and create your own price scenarios.
- When centralising carbon activities, it is very important to assign clear roles and responsibilities and define boundaries between business units.
- Waiting for the last day before the compliance deadline to balance your carbon position is not a proper carbon management strategy.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 2:

Allowances

CHAPTER 04

Instructor's Guide

All about allowances: carbon management strategies

To be used along with Chapter 4 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Allowances Management", please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are in your experience, the key points for allowance managment. For example:**

   - Determining your exposure and designing an allowance management strategy based upon it
   - Defining clear roles and responsibilities

2. **Please explain what are, in your experience, the key challenges companies should consider for ETS compliance. For example:**

   - Lack of higher management buy in
   - Lack of intercompany coordination/communication around carbon management
   - Lack of experienced personnel in allowance management

3. **Case Study Allowance Management**

   Please list briefly an example of a fake company (eg, Nordic power company) that successfully managed its allowance obligation. What were the key success factors/decisions? For example:

   By establishing a group wide carbon and allowance management strategy, with clear roles and responsibilities, the company was not only able to reduce its carbon exposure considerably but was able to turn allowance trading into a revenue generating unit. Key success factors for this company was a corporate top down approach to central carbon management, with the highest levels of management supporting it.

   Please list briefly an example of a fake company that unsuccessfully managed its allowance obligation. What were the key factors that lead to an unsuccessful result? For example:

   A company that didn't define a clear strategy for carbon management and didn't assign clear roles and responsibilities within its units, led to increased costs of compliance. This was mainly due to duplication of activities and increased carbon trading transaction costs, which at the end resulted in the company's end product being more expensive. The company became less competitive in its sector.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

    - *How do I know if I should have a centralised carbon management?*
    - *In which business unit should I manage allowances?*
    - *How do we get higher management buy-in?*
    - *How do you incorporate/transfer the costs of carbon/allowance management within the company?*

SECTION 2:

Allowances

CHAPTER 05

Bill Thompson, BP

Allocation: how to navigate benchmarking

Key objectives for industry allocation:

In designing free allocation methodologies, key design principles that should be prioritised include:

- Collection and validation of installation emissions data, and if required, installation activity data.
- Providing sufficient free allocation, representing a full assistance so that an industry sector and its installations are not disadvantaged by carbon or investment leakage to competitors that are not subject to a price on emissions.
- Rewarding rather than penalising firms who have been 'early movers' in investing in lower GHG technologies and plan to expand their efficient business models in the future.

Starting out: Grandfathering allocation

An installation's financial exposure must be de-risked to avoid permanent economic damage due to financial exposure to a new and untested ETS market in contrast to non-exposed competitors. Since the market price, as a function of supply and demand and market participant behaviours, cannot be initially predicted in such a nascent market setting, a high percentage of free allocation is required to reduce installation exposure to an ETS. This is to avoid unintended and economically damaging consequences to installations and the wider economy. Lessening exposure to the market price gives participants time to gain confidence and learn from their experiences, without quitting the sector.

To give a rational basis to allocation in a new ETS, 'grandfathering' (ie, free allocation based on historic emissions) is a popular tool. Here, relevant historic emissions data is relatively uncontroversial and simple to access from installations and, going forward, for market transparency reasons must be publically available anyway. However, grandfathering free allocation has a downside in that it does not reward early GHG reduction actions: indeed it could result in withheld investment because of the perverse free allocation incentive to be gained by not reducing emissions in the baseline setting period. In spite of this problem, there is still an incentive to reduce emissions via fuel saving because the majority of GHG mitigation activity in an ETS is from combustion.

Why benchmarking in an ETS?

As a dynamic ETS matures, the total amount of free allocation and any auctioning must decline with any progressive reductions in the cap. But with auctioning (and its revenue stream) being ring-fenced for government use, the quantity of free allocation may be constrained. Because it is determined by historical data, there is likely to be a shortfall that must be addressed.

There are other emission trajectory scenarios that mean no shortfall: these include that emissions will decline as an economy becomes more energy efficient (impacting CO_2 emissions), that there are or can be overlapping policies and incentives that reduce emissions at installations in addition to an ETS (eg, renewable energy targets), or that a dip in economic activity results in lower emissions. But these scenarios cannot accurately be predicted in a modern and open internationally trading economy.

While revising the auction share is one policy solution, another is to use a common free allocation reduction factor to be applied across all installations. But under grandfathering allocation, there is no differentiation between carbon efficient and less carbon efficient production installations, as a reduction factor would apply across all allocation facilities.

One solution is to benchmark installations against sector best-in-class peers, as a way of further rewarding more carbon efficient producers. By focusing on a CO_2 efficiency of industrial production metric using peer installations, it can also drive better mitigation behaviours. Care must also be taken that, at the level of the benchmark, these best-in-class installations receive sufficient allocation to offset the risk of carbon leakage from outside the ETS. Finally, when done transparently, benchmarking can be used to quantify sector relevant GHG reduction benefits of new technologies and techniques, and allow comparisons with competitor installations beyond the ETS.

Choosing Benchmarking

In reality, demonstrating best-in-class performance is more difficult. It a balance of effort between defining sectors, and sourcing their relevant data vs allocation to less efficient installations (ie, avoiding a 'haircut' reduction for all installations in all sectors). If the same technology and standards of operation are employed homogeneously across a sector, then the best-in-class installations will have the same characteristics as the remainder of the sector. No point in benchmarking! But, in most sectors, there are well-known leaders and laggards – including on product production carbon efficiency! And until the sector data is collected and analysed, this point is difficult to predict.

Benchmarking in practice

Sector definition

An ETS with large stationary emitters (typically 25,000 tCO2e per annum) will capture almost all combustion installations in the electricity generation and energy intensive industry sectors such as cement production, iron and steel manufacture, mineral oil refining, the chemical industry, paper and pulp, non-ferrous metals, lime, ceramics, building materials, and glass manufacturing sectors. However, within these sectors there may be several different product sub-sectors. These need to be defined and assessed to ensure a sector benchmark is representative of the sector installations – not just one or two.

Defining sectors/sub-sectors is not always simple – there are sometimes different processes for manufacturing the same product, and products can be coproduced (eg, in the chemicals sector).

There is a trade-off to be struck between the quantity of sectors in the ETS, and the level of aggregation/sector populations. The balance is between reasonably and accurately describing a sector/sub-sector in terms of product commonality and data availability, while still keeping sufficient sector population for ease of administration.

If the benchmark is to be set by a best-in-class members of a sector/sub-sector, then these must be representative of the sector in terms of embodying emission characteristics (including technologies and production organisation techniques) which are replicable by other installations. This means that there must be a sufficient number of installations to form the benchmark, and special/unusual characteristics in benchmark installations must be defined and isolated.

Further issues occur when a sector's emissions by installation bear little relevance to their production. This typically occurs in mineral extraction sector where the resource base declines with reserve production whilst emissions remain constant or even increase with the increased difficulty of extraction. Here a sector benchmark would be difficult to define, thus a different approach is needed. Similarly, where a

sector is either too small or too heterogeneous for a sector benchmark to be set realistically, a fall-back approach to allocation must be employed to also encourage and incentivise improvement fairly in comparison with benchmarked sector installations.

Sector data to determine the benchmark

Sector data collection is key. It is unlikely that national administrations will have installation level production data coupled with emissions data. A sector survey is needed, and since the data will define free allocation, and thus determine financial benefit, some verification assurance will be required. Production data handling probably requires use of an external consultant to ensure the confidentiality of production data.

The baseline for determining production and emissions data is important – a longer period requires more data, but is more likely to average out issues that affect emissions. These include economic recession, installation production turnaround and capacity replacement/upgrading/debottlenecking, and the introduction of new technologies and techniques. However, while less representative, a shorter period allows benchmarking to start earlier with less onerous data sourcing requirements.

Finally, the level of the sector benchmark needs to be defined. Setting it at the sector average probably gives insufficient incentive for improvement for less efficient installations, and risks overallocation to the most efficient producers compared to their given emissions. However, a benchmark at the level of the first quartile or decile reduces the risk of overallocation, while still demonstrating increased ambition levels for a sector's performance. However these are relatively small adjustments – the overall aim of free allocation is to protect installations and sectors against the risk of carbon leakage.

Allocation and updating frequency

Output benchmarks are often set in terms of tonnes of CO2e per unit of product production over a baseline period. But free allocation still needs to be determined. If, under a benchmark, installation emissions data is updated frequently, then those installations that suffered a reduction in allocation (because of, for example, production gaps or other issues affecting production but not emissions), can apply the more recent data. This also serves to ensure that free allocation is given to protect against actual carbon leakage from recent emissions and not to installations that are simply shrinking production. On the other hand, the benefit of reducing emissions and selling allocation to provide additional installation investment funding is diminished by more regular allocation data updating.

It is possible to also update the data determining which installations form a benchmark. But the incremental change on a sector installation's allocation is likely to be small because installation emission profiles in energy intensive sectors don't radically change year-on-year, due to the capital intensive nature of industrial investment. So perhaps recalculating the data to determine which installations form the revised benchmark is best considered on a longer time horizon.

Benchmarking Sense Check

With data limitations, decisions on sector aggregation boundaries, and the CO2e emissions per unit of production characteristics of each sector to consider, benchmarking is not an exact science. So when benchmarks have been determined, there must be a sense check comparing allocation to installations in side each sector to prevent sector allocation bias. Does the sector have a benchmark based on installations otherwise recognised as best-in-class? Has the sector lagged behind or outperformed its competitors in other jurisdictions? Do installations at, for example, the sector mid-point in terms of tCO2e per unit of production get roughly the same level of allocation in each sector? If not, are there sector peculiarities that explain the degree of incline of benchmark performance curve plotting a sector's individual installations?

Some of the hard work on sector benchmarking

has already been done; both the EU and California have published benchmarks. This makes sense checking the sector values easier as precedents have been established.

Tools

One useful tool is to plot installations sequentially on a CO2e emissions vs production basis to look for anomalies. Should the relationship between separate installations be scalar and thus consistent, then a production vs emissions benchmark probably is possible. Such a chart also serves to identify outliers where data may be inconsistent, and/or different processes are involved.

One example is whether emissions associated with electricity generation should be considered in the sector benchmark. Because electricity generation is not usually associated with carbon leakage, some ETS programmes give no free allocation for it. If so, this feature should be embodied in the benchmark by excluding emissions associated with electricity generation. This allows sectors to compete on emissions vs production rather than site electricity generation efficiency - which is irrelevant for benchmarking when electricity is imported. The aim is to keep installation allocation neutral regardless of imports or auto-generation. Note that, for heat production, this is generally integrated into the installation via boilers, furnaces, heaters and/or CHP, and is often assessed using a fall back approach that looks at an efficiency standard across all sectors as the combustion equipment is generally not sector specific.

Simple vs complex benchmarks

Some sectors have detailed and verified data on emissions and production going back many years. These can be used to construct more sophisticated benchmarks that better represent component sections of a sector installation. In the EU ETS, the mineral oil refining and some petrochemical sectors use a carbon weighted tonne approach to address ‘complexity’, ie, weighting emissions from different product streams and degrees of processing between refineries.

Case Studies

EU ETS

From 2012, the EU ETS Directive required that benchmarks are based on tonnes CO2e per unit of production, and set at the level of average of the top 10% of a sector/sub-sector.

In the EU ETS, industrial sector thresholds were partially defined in Annex I of the Directive by way of entry thresholds. Further sectors were defined in conjunction with EU trade associations, leading to the publication of some 54 product benchmarks. For those sectors/sub-sectors which were too small, or lacked homogeneity, or where emissions fell outside the process boundary, simple fall back approaches of allowances per GJ of heat or fuel use or 97% of the historical process emissions were developed.

In Phase III (2013-20), when benchmarking was introduced, there was no free allocation for electricity generation, with these allowances being auctioned for the benefit of member states. With the ETS cap decreasing at 1.74% per annum, an artificial ceiling was imposed on free allocation to the non-electricity generation sectors, and enforced by way of a cross-sectorial correction factor (CSCF) reducing allocation to even top performing efficiency installations at the level of the sector benchmark; this, in spite of the majority of allowances being auctioned

for the benefit of member states.

Due to installation allocation baselines for emissions and allocation data being set prior to the 2008 global economic crisis, some installations received an overallocation compared to their more recent activity. Where overallocation was due to activity reduction, the requirement for free allocation quantities to protect against carbon leakage is diminished in proportion to emissions. Hence, there was not only overallocation in some sectors but others received a smaller allocation due to the shape of the sector benchmark performance curves which were not corrected between sectors. While there were corrections for installations that declined their activity below a 50% threshold, most were above this mark. Thus, an incentive to reduce activity and so emissions – whilst keeping the same allocation – was to be had. With overallocation causing the industrial cap to be breached, all installations had their allocation cut by a factor of 5.73%. New rules are being developed for Phase IV that hopefully will better align an installation's activity with allocation informed by recent data. This is to ensure the CSCF is only deployed as a last resort.

On data collection, because the EU's Eurostat statistical service data is not generally available at installation level, sectors have had to collect their own data and usually employ a consultant verify the data. Each sector produced a rule book that showed how benchmark levels were defined and determined while preserving anonymity at installations level.

California

In 2011, California developed an output-based benchmarking programme paired with its industry assistance policy to distribute allowances. Output-based benchmarking prevents windfall profits. Free allowances are distributed to covered facilities within the sector based on benchmarks that are set to recognise early action and energy efficiency.

The California benchmarks are based on California industry specific data and set at a higher level than average in order to incentivise higher performance. California adopted a refining benchmark similar to the EU's, called Complexity Weighted Barrel. The benchmark, industry assistance factor and the cap factor determine the free allowances an energy-intensive trade-exposed facility covered by the ETS receives. California began implementing the industry assistance and benchmarking programme in 2012.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 2:

Allowances

CHAPTER 05

Instructor's Guide

Allocation: how to navigate benchmarking

To be used along with Chapter 5 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Allocation: How to Navigate Benchmarking", please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are, in your experience, the key points for companies to address benchmarking allocation. For example:**

   Once a benchmarking approach to free allocation has been selected the key points are:
   - How will the company's installations be included in the benchmark?
     - Sector Boundaries
     - Use of NACE / NAICS codes to legally define sector?
     - Are there dual sector installations to be considered?
   - Are all emissions covered – or are there some covered by fall back approaches?
   - What is the baseline period (years) for determining the benchmark
   - What company data is requested to help determine the benchmark?
   - Is the data actually available?
     - Might be a new entrant, or the data may be unavailable in the required format
   - Does it require third party verification, as this takes more time

2. **Please explain what are, in your experience, the key challenges companies should consider for benchmarking allocation. For example:**

   a. Installations data availability
   b. Data verification requirements

3. **Case Study Benchmarking**

   Please list briefly an example of a fictitious company (eg, Nordic power company) that successfully managed to thrive under a benchmarking approach to allocation. What were the key success factors/decisions? For example:

   - *The company installation was a carbon efficient producer of products compared to its peer group, and most importantly, this was recognised in the benchmark allocation by a superior number of allowances.*
   - *Where a company installation was below the level of the sector benchmark, there was a clear investment project/organisation changes that, if implemented, could improve its allocation.*
   - *If the investment was made, then the allocation could be augmented – either by increased allocation via, eg, an external source of allocation such as a new entrant reserve, or by*

updating of installation's activity data to augment the level of benchmarked allocation under the benchmark scheme rules.

Please list briefly an example of a fictitious company that was set back/opposed to a benchmarking approach to allocation. What were the key factors that lead to an unsuccessful result? For example:

- *The company's installation was not as efficient as its sector peers*
- *The benchmark baseline setting year(s) data were unrepresentative of the installation's normal activity – eg, plant turnaround period, period of low activity*
- *If the sector product could be made by a number of alternative processes, and the installation's own process was less carbon efficient (but may have other environmentally beneficial characteristic such as less waste production).*

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

Q. Benchmarking is more complex than 100% auctioning. Why do it?
A. 100% auctioning does not resolve the issue of carbon leakage risk. To do so would require either border adjustment mechanisms on charge the additional carbon cost to imports or a financial compensation scheme, both of which pose their own challenges:

- Border adjustment mechanisms are politically divisive (inviting trade retaliations), and difficult to calibrate – what is the embodied CO_2 in say a tonne of steel, even if accurate importing data is available?
- Financial compensation schemes mean trying to proxy compensate for tonnes of CO_2 – if the market is variable in CO_2 price, what should the compensation price be?

Q. Why not continue with 'grandfathering' or historical allocation system?
A. Because if there has to be a reduction in free allocation to installations. For example, to ensure the cap is not exceeded, it makes sense to allocate based on an installation's carbon efficiency rather than its historical emissions with a cut back.

SECTION 2:

Allowances

CHAPTER 06

Liv Rathe, Norsk Hydro

Carbon leakage and competitiveness issues: How companies manage competition with carbon pricing

1. Asymmetric carbon regulation, carbon leakage and competition

There is a growing global momentum to tackle carbon emissions, but climate action is still led by individual national and subnational jurisdictions. Often these actions involve the use of carbon prices – established either through carbon taxes or cap-and-trade systems. Industries in particular support cap and trade due to its ability to achieve emissions reductions in a flexible and cost-efficient way.

The purpose of regulating greenhouse gas emissions is to encourage emissions reductions, to give competitive advantages to early movers and give incentives to low-carbon innovation. At the same time, however, the purpose of carbon leakage protection is to avoid relocation of economic growth and industries' investment and emissions – especially for those that are already at the best level of environmental performance.

Regional and national carbon regulations impose costs on companies' industrial production that many of their international competitors may not face. Such loss of competitiveness may encourage production and emissions to shift to jurisdictions without a carbon price, a consequence known as carbon leakage. The industries most vulnerable to carbon leakage competitive concerns are those sectors with commodities that are globally priced and traded, and which have a high energy and/or emission intensity.

The level of carbon leakage is defined in terms of the increase in emissions in the jurisdiction without a carbon price (or with a lower carbon price/less stringent regulation) expressed as a percentage of the decrease in emissions in the jurisdiction with a (higher) carbon price (or more stringent regulation).

Such changes in production or investments make carbon pricing policy environmentally ineffective with regards to reaching the global carbon reduction goal. It undermines the result of an ambitious carbon-pricing policy's environmental objective by causing emissions to shift to jurisdictions beyond the reach of the policy. Further, the risk of carbon leakage depends on the size of a company's direct emissions (coming from the production line) and indirect emissions (the CO_2 cost element in the power price, if any). Direct and indirect carbon costs have an equal material impact on competitiveness. By its design, an emissions trading system (ETS) is intended to change the relative competitiveness of individual firms in favor of those emitting less. This is how it "encourages" emission reductions. Therefore, to avoid carbon leakage, the design of an ETS should favour early movers, incentivise innovation, and punish firms with low-carbon and energy efficiency.

The most cost-effective emissions reduction policy would be a globally harmonised carbon pricing regime that imposes a uniform cost on emissions across all major emitting countries and sectors. Until such a system is in place, policymakers need to consider which sectors should be targeted (supported) and what form the leakage prevention mechanism should take. The leakage prevention should ensure that the firms with the lowest carbon intensity and

energy intensity are at a competitive advantage and that the demand-side abatement incentive is maintained. Such a solution gives long term climate relative competitiveness of individual firms in favor of those emitting at benchmark levels. And through such conditions, firms are ensured fair protection and have clear incentive for improving their carbon and emission intensity.

2. Industries' carbon leakage risk assessments

In our view, carbon price differentials will remain a challenge for international business in the mid- to long-term, in particular because of the slow process of establishing national emissions trading or carbon tax systems, and the difficulties of linking them. The Paris Agreement, with its voluntary national contribution levels but a clear temperature goal, has not contributed to any significant regulatory certainty for businesses.

At the same time, the introduction of national and regional carbon pricing regulations forces companies to take account of the full economic costs of greenhouse gas emissions associated with their production. It promotes the first step towards a level playing field between polluting activities that impose climate change adaptation costs compared to others with no such cost burdens. These new regulations lead to businesses having to reconsider the overall industrial production risk factors in their strategies, of which carbon regulation is an additional component.

The carbon cost becomes a part of these companies' financial reporting, as it represents a new variable cost associated with production. It influences the bottom line of the annual accounting profit. Due to all these new costs and risk elements, it is important to raise awareness throughout the organisation about the climate issue in general, with focus on carbon risk and costs from the business activity.

When assessing carbon risk and cost assessment, both direct and indirect carbon costs have to be considered. This is valid in either a cap-and-trade system or a carbon tax. Direct emissions costs are under the control of each production unit, whereas the indirect costs are decided by mechanisms governing the electricity market. Both costs are equally harmful to the production unit and influence its competitiveness and investments. Often, sectors are far more exposed to one than the other. The effectiveness of different national carbon leakage compensation solutions for the two types of costs become crucial for the most exposed sectors. If compensation solutions are sufficient, companies can focus on finding solutions to reduce their emissions intensity.
Industries' time horizon is long when it comes to investing in new production facilities, though with a large variation between sectors. From an industry point of view, carbon costs matter for investments in the long-term and in particular for those industries most exposed to carbon leakage. This is also the case for the best performers with regards to low carbon emission per unit produced. The need for correspondingly long-term horizons in measures to prevent carbon leakage is not taken sufficiently into account by unilateral climate policies. Therefore, it needs further attention by policymakers as part of ensuring "green" technology development agendas.

3. Tackling carbon leakage in a world with unequal carbon costs

The transformational economic impact of carbon prices may be skewed if the stringency of carbon price policy significantly differs between jurisdictions. Despite the well-recognised benefits that could arise from a globally harmonised approach to regulating emissions (especially through carbon pricing), we witness large divergences between policy instruments in place and the carbon cost they generate.

Based on the likelihood that we will see a multiplicity of political solutions, there would be a great advantage if some guiding principles

are developed with regards to national implementation of climate policies to address the competitiveness issue. These standards should follow the principle of how to create more symmetric carbon regulation and effective carbon leakage protection in the transition to a global low-carbon economy.

Risk of leakage is always one of the most controversial, dividing and important aspects when considering the design of carbon pricing mechanisms (and other carbon regulations). An equal global carbon cost on all emissions of greenhouse gases is the ultimate goal. Carbon leakage risk mitigation is only needed in a transitional period until all production units at whatever time face the same carbon cost.

Predictable and sufficient carbon leakage provisions need to be in place until comparable policies to reduce emissions are introduced among major trading partners, and until global product pricing can pass on adequate carbon costs.

An ideal protection method against the risk of carbon leakage should:

- Be as targeted, sufficient, predictable, fair and proportionate as possible; with equal mitigation of both direct and indirect costs;
- Encourage overall emission reductions by all traded sectors and ensure that the most efficient installations do not face undue carbon costs when compared to international competitors, and ensure that overcompensation does not take place;
- Not affect the goal of reducing emissions cost-effectively; nor affect the role of cap and trade to stimulate investment and innovation or put into question its functioning and its principles of efficiency - including liquidity, and cost-effectiveness;
- Be fully transparent and comprehensible, based on evidence rather than theory
- Be transitional: a temporary solution until a globally harmonised approach to carbon pricing is achieved;
- Be in accordance with each production unit's actual production: reflecting yearly production change including large growth, closure and new installations; and,
- Use sectors' direct emissions and energy efficiency as benchmarks: set standards per ton produced and energy efficiency standards for electricity consumed. Update and revise these benchmarks periodically based on actual performance data.

Last but not least, the later the transition to an equal global regulated carbon economy take place, the more complex the transition will be and, most likely, the longer the transition will take. It would be beneficial for the climate, for international competition concerns and also for the global cost of reducing emissions to facilitate the necessary steps to ensure that regulations develop in a more harmonised way. In this way, climate regulation would be more transparent, creating a more level playing field for industries and ensuring climate regulation is not a threat to industries.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 2:

Allowances

CHAPTER 06

Instructor's Guide

Carbon leakage and competitiveness issues: how companies manage competition with carbon pricing

To be used along with Chapter 6 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Carbon leakage and competitiveness issues", please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are, in your experience, the key points for companies to address carbon leakage and competitiveness concerns. For example:**

   Companies largely exposed to carbon leakage, due to international prices of commodities, do face large risks when new regional and national carbon policy regulations are introduced in areas they operate. This includes both new regulations and changes in existing regulations. The key issues are related to what the cost consequence for companies will be: the additional cost burden they might face which their competitors do not face. Based on this situation, governments' recognitions of the need for carbon cost mitigation, for the best performing sectors in terms of emissions per unit produced, is crucial for industries.

   Therefore, the level and predictability of compensation is of great importance to these companies. What will also matter is: what will trigger change in compensation level, annual certainty regarding receiving compensation and whether or not the indirect costs are compensated at the same level as direct emissions.

   This is particularly an issue when companies consider the carbon risk when both investing in new production facilities or increasing production. An additional carbon cost might impose a large additional cost that their competitors do not face and in particular becomes a competitive disadvantage on products that are globally priced.

   Carbon regulation must also be designed in a way so it both opens up for new investments and production growth in their areas. Otherwise the policy might induce changes in trade flows and investment decisions.

2. **Case Study Carbon Leakage Risks**

Please list briefly an example of a fake company (eg, Nordic industrial company) that successfully managed to avoid carbon leakage under an ETS. What were the key success factors/decisions? For example:

Innovation and public financing.
Developing a new production line to test new climate friendly technologies for metal production

requires a considerable amount of money. This was also the case for a European metal producer when they had a breakthrough technology which needed to be tested in a new pilot production line. The pilot showed positive results with regards to lowering the emissions and the technology represented world's benchmark of most energy efficient electrolysis cells with lowest CO2 footprint. The technology development and implementation was only enabled by support from the national authority's innovation fund. Based on expectations that existing carbon leakage compensation rules will be improved, both for indirect and direct emissions, the company assumed it will not face any additional carbon cost burden until their technology is not the benchmark technology anymore.

Please list briefly an example of a fake company that did not avoid carbon leakage. What were the key factors that lead to an unsuccessful result? For example:

Lack of carbon leakage compensation and closure of production activity.

- *A primary aluminium producer in Europe has no control over the CO_2 emissions costs in its electricity consumption. These emissions, and thereby the indirect costs they face, are in the hands of the power producer. In the EU ETS, the indirect compensation is partial, decreases to 75% of eligible costs of set benchmark level in 2020.*
- *Almost all of one aluminium producer's competitors are outside Europe, in areas where they do not face a similar CO_2 cost in the power price and where aluminium is globally priced. The indirect carbon cost is seven times greater than the direct costs for the primary aluminium producer. However, the present compensation scheme does not recognize that indirect cost is equally harmful for industries and only give partial compensation. With the possibility of a CO_2 price of €30/t, the carbon cost an aluminium producer faces in Europe represents 25% of its global priced commodity. Due to this large competitive disadvantage, many European primary aluminium factories have shut down, leading to a one-third reduction in Europe's aluminium production capacity since the EU ETS was introduced.*

3. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

- *Carbon leakage compensation solutions are meant to be a temporary and transitional solution until main trading partners face equal carbon costs. What are the principles for evaluating if equal global costs are in place?*
- *Should compensation levels differ between sectors reflecting both the sectors' ability to pass on cost to their consumers and the level of carbon cost they face?*
- *What are the minimum criteria of equal system requirements to be able to link national or regional emission trading schemes?*
- *Would benchmarking sectors' emissions per tonne produced be the way to go?*

SECTION 2:

Allowances

CHAPTER 07

Timo Schulz, European Energy Exchange

The exchange: how carbon is traded and the importance of liquidity

Not just keeping emissions under a pre-defined cap, but reducing them where it's most efficient, is the key promise of emissions trading. This is achieved through trading allowances in well-functioning markets, established in the EU Emissions Trading System (ETS) and other systems. Although often overlooked, liquidity is central to these markets and exchanges play the key role in organising them.

How is carbon traded?

There are **three ways to trade allowances** – bilateral trades, through over-the-counter (OTC) brokers, and on exchanges. Each of them has specific characteristics, and they differ on four main levels – liquidity, transparency, level of regulation and credit risk.

Bilateral trading is the simplest form of trading. It refers to a deal directly negotiated between buyer and seller without the involvement of a third party. It is most suitable when parties have a close and established business relationship, as transaction costs are rather high. Buyer and seller first have to find each other, and then establish all details of their trade. Most importantly, they need to be able to assess the financial stability of their counterpart to minimise credit risk. This in particular can be a challenge, and increases risk of the trade.

Use of a broker can reduce these high transaction costs. Brokers act as intermediaries between many different buyers and sellers. This means that they can pool different orders and facilitate trades. They can advise their clients and pass on information. This 'market talk' supports clients in making choices, and means they do not have to continuously monitor the market. As brokers pool different market players, they may also provide some degree of anonymity and may publish prices. Importantly, brokers by themselves do not cover the credit risk of a transaction which stays with buyer and seller. Brokered deals may however be cleared at a clearing bank to minimise credit risk.

OTC deals with brokers already show some of the characteristics of exchange trading. However, they're **much less regulated**. This may be beneficial, as it gives them more freedom for instance to offer tailor-made products and can decrease costs. Trading at exchanges however may offer additional benefits we'll look into next.

What's the role of exchanges in emissions trading?

The first characteristic of exchange trading is **transparency**. Exchanges are obliged to publish price data and volumes at all times for the public. This is highly beneficial for the market's development, as it establishes a 'fair market price' for a commodity. It also lowers entry barriers to the market, making it more accessible for participants from diverse backgrounds.

Second, an important characteristic is **standardisation**. Trading takes place under transparent rules and conditions, within clearly defined trading hours, and is defined by contract specifications (eg, quantity/quality, place of delivery and others) which are openly published. Standardisation also makes it possible for exchanges to pool a great number of market

participants, creating products with high liquidity which in turn are attractive for market participants to trade.

Third, exchanges offer increased **security of transactions**. All transactions are financially settled through a clearing bank. The bank acts as a central counterparty to both sides of the trade. Thorough assessment of companies and individual traders, and collateral, ensures the bank can reduce counterparty risk to the absolute minimum. The bank stepping in between buyer and seller guarantees anonymity of trading, adding an additional layer of security. Upon conclusion of a deal, the clearing bank initiates the transfer of allowances in the emissions registry.

Another building block for security is in-depth **market surveillance**. An extensive legal framework of rules and regulations governs this fundamental requirement of exchange trading applied to all transactions. Exchanges operate market surveillance departments which constantly monitor the market for any irregular behaviour. These teams are fully separate from the exchanges' other business activities, and report any findings directly to the relevant authorities. This general and direct surveillance by public authorities is a distinctive element of exchange trading.

Exchanges' membership base reflects the **diversity of the carbon market**. On EEX, a total of 95 market participants are admitted to trade carbon. They include power producers, compliance entities and financial players. Financial players may trade both on their own account and on behalf of firms outside the exchange. The scale of involvement in the carbon market, as well as the professionalisation of trading at a company determines whether they become a direct member. Trading in other commodities also makes it more attractive to join, as pooling trading in one marketplace means lower total collateral requirements. A company already trading power on the exchange can easily add carbon as an asset class.

How can market participants trade on the exchange?

There are two main forms of participation – **primary market auctions** and **continuous trading**. In the EU Emissions Trading System (ETS), more than 50% of new allowances are released into the market through auctions. Governments award contracts for the operation of auction platforms through competitive tenders. Twenty-seven EU member states and the European Commission have selected EEX as their auction platform, adding up to more than 90% market share. Participation in auctions is considered by some market players as the simplest way of buying allowances, and numerous provisions are in place to facilitate access for the diverse range of companies affected by the EU ETS, including small- and medium-sized enterprises.

Continuous trading on the other hand allows buying and selling of allowances. It consists of spot and derivatives markets. Spot trading refers to trading in the very short term ('on the spot'), for delivery within two days. Spot trades are relatively easy to handle, as they have lower margin requirements. However, immediate payment and delivery may not be most efficient strategy if allowances are only needed later on. This is when market participants can use the derivatives market, allowing trading up to six years ahead. Most market participants are active both on the spot and derivatives markets, combining long-term management of price risk with short-term optimisation of their portfolio.

In emissions markets, exchanges have always played an even more important role than in other commodities markets. In the EU ETS, **more than 60% of allowances are traded on exchanges**. The main reason for this is that EU emission allowances, as a fully standardised, electronic commodity, ideally lend themselves to trading and pooling of liquidity on exchanges.

Why is liquidity central to an efficient market?

We've mentioned liquidity several times as it's the key to an efficiently functioning market. It is the possibility to buy and **sell a commodity at any time, in any volume, without significant influence on price**. Liquid markets are attractive for participants, as they allow them to efficiently fulfil their hedging needs for the future and optimise their portfolio in the short term. This decreases both the cost to market participants and the system costs of the trading programme.

How can we design liquid carbon markets?

The fundamental principle for liquidity is **standardisation**. Identical specifications for emission allowances create one universal 'currency' for carbon, laying the groundwork for a liquid market. Ideally, there is just one type of credit that all companies use. In the EU ETS, emission allowances are identical, and entities only need to know what volume to surrender in a compliance period. Standardised credits in turn facilitate the development of standardised trading arrangements which further add to liquidity.

A **large market** combined with standardisation is the key to achieve **broad and diverse participation** in the carbon market. The EU ETS, covering a broad range of industrial sectors, has successfully attracted major liquidity providers from the financial and commodity industry. Diversity in turn increases liquidity, as different actors have different but complementary motivations to trade. As one example, financial players can offer long-term hedging opportunities to compliance entities.

Any **cooperation** between different emissions trading systems further promotes interest in the market and liquidity. Linking of systems is the most obvious example to be further encouraged, but interim steps are also valuable. As an example, market participants are often active in several different emissions trading systems. With direct exposure to several systems, they are able to compare them and provide valuable ideas for development. What's even more important, these companies become drivers for the simplification and harmonisation of rules in those systems. This facilitates further cooperation, lowers entry barriers for market participants, and makes it possible to broaden the range of market participants.

Auctioning of allowances also contributes to higher liquidity in the market. Through participation in auctions, compliance entities directly engage in the market and build up experience with trading. Auctioning also leads to price discovery and **transparency**, which further increases liquidity. On a more general level, **policy certainty** is fundamental for liquidity. Market participants have to trust the framework conditions under which they operate, in particular for them to engage in long-term hedging.

Exchanges and liquidity – central to the market

In short, successful emissions trading systems offer a large and diverse range of market participants different and complementary channels for trading. Exchanges play a central role by pooling trading in one marketplace, thereby creating liquidity. They contribute to the market's efficiency through transparency of price data and volumes, and are able to monetise new allowances efficiently via primary market auctions. Well-functioning, liquid markets are the basis for emissions trading to fulfil its key promise – not just keeping emissions under a cap, but reducing them where it is most efficient.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 2:

Allowances

CHAPTER 07

Instructor's Guide

The exchange: how carbon is traded and the importance of liquidity

To be used along with Chapter 7 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "The exchange: how carbon is traded and the importance of liquidity" please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are in your experience, the key points for companies to address membership and trading on an emissions exchange. For example:**

   Membership and trading on any exchange is governed by a framework of rules and regulations defined by both the exchange's rules and the legal framework. In the case of EEX, preconditions for admission as a trading participant are laid down in article 14 of the EEX Exchange Rules and in article 19 (4) of the German Exchange Act (BörsG). Admission can be applied for separately for the individual markets and products traded on the exchange. A company can only begin to trade on the EEX markets and register trades once it has been successfully admitted to the exchange. Proper settlement and collateralisation of transactions requires recognition as a trading participant by European Commodity Clearing AG (ECC), the EEX clearing house.

   Preconditions for admission are:
   - Proof of personal reliability and professional qualifications of the person/s holding management authority
   - Liable equity of at least € 50,000
   - Admission of at least one trader who has proven personal reliability and who has provided proof of the required professional qualification (by means of a trader examination)
   - Technical connection to the trading systems
   - Recognition as a trading participant by the clearing house of EEX, ECC

2. **Please explain what are, in your experience, the key challenges companies should consider for membership and trading on an emissions exchange. Examples include:**

   The main challenges to be considered by companies depend on their market, connectivity, location and nature. This is so because of the multiple factors that are required to be admitted. In our experience, issues like technical connection to the trading systems (just to mention one) have proven a bigger challenge than presenting the needed equity.

   Nevertheless, other key issues that can impose challenges (apart from the fulfillment of the admission requirements) are related to compliance rules imposed by article 19 of the German Exchange Act. Another factor to be considered is the different requirements that apply for different markets and products. This often leads to companies operating in different markets and different products having to follow particular steps depending on each market/product.

Another challenge when addressing membership is successful time-management when going through the procedure. A company that successfully fulfills all the pre-requisites is often one that has addressed all the fore-mentioned issues in a timely and coordinated manner.

3. Case Study Emissions Exchange

Please list briefly an example of a fake company (not real, eg, Nordic industrial company) that successfully managed to trade on an emissions exchange. What were the key success factors/ decisions? For example:

Nordic Industrial Company will be admitted to trade once it has successfully completed all steps above.

Please list briefly an example of a fake company (eg, Nordic power company) that unsuccessfully managed to trade on an exchange or participate. What were the key factors that lead to an unsuccessful result? For example:

The company will not be admitted to trade if it does not fully fulfil all criteria mentioned above.

SECTION 3:

Offsets

CHAPTER 08

Eric Boonman, Statkraft

Developing an internal and external offset strategy

Background

Carbon offset projects can generate carbon credits that can either be used for internal compliance with an emissions trading system (ETS), or sold via the market to other compliance entities. It is an important component of an ETS because it often offers a cheaper way to comply – but it also comes with certain challenges and risks. With the right offset strategy, a company could not only save significant costs but also generate considerable profits to complement its core business. It is therefore important for a company to determine whether or not carbon is looked upon as a pure cost and compliance center or whether it is regarded as a profit center. This decision significantly depends on the market price and the internal carbon abatement cost curve of a company. This article will highlight the key decisions, challenges and some best practices related to offset strategies.

Internal versus external offset

The first step when determining an offset strategy is to understand and decide whether to offset internally within your company, or to externally source offsets in the market. Input parameters are market prices, internal cost abatement potential and external offset prices.

All things being equal, the projects with the lowest unit cost should be invested in first. An efficient tool to help make such decision is the marginal abatement cost curve, which presents an overview of the extra (or 'marginal') costs and carbon reduction (or 'abatement') potential of these various projects in a sector, country or region.

If the most viable and cheapest projects are within the company, then internal offset projects are the most natural choice. If the most viable projects are outside the company, then the choice should be external offset projects. This can result in co-investing in projects with or without external partners or simply purchasing the offset credits directly via a unit contingent forward contract called Emission Reduction Purchase Agreement (ERPA). As the project only has an obligation to sell the actual reductions, the buyer is exposed to volumetric risk on the expected reductions.

To mitigate this risk, it is recommended to contract an independent technical party to assess the viability of the project and the likelihood of generating the expected reductions. It is also recommended to source from various different types of projects and in different stages of the project cycles. Finally, it is advisable to use a contractual agreement drawn up by a reputable law firm. There will be upfront costs involved but experience shows that this is definitely worth the effort, as it mitigates significant risks later in the process by actually clearly defining which party takes on what risk factors.

Managing the carbon value and assessing the risks

Whether a company internally invests in projects or purchases credits externally, it now has a stream of expected carbon credits that will be generated over time. There is an economic value attached to these credits, and these values are changing over time due to various risk factors. These risk factors include:

- **Regulatory risks**: which relate to impact on demand and supply due to rule changes such as changes to offset qualification

criteria and quotas (***eligibility risk***) or offset crediting mechanism changes (***methodology risk*** and ***approval risk***);

- **Project risks:** which relate to characteristics of offset projects requiring potentially large initial investments while the timing and the volumes of the future offsets generated can deviate from expectation (***volumetric risk*** and ***timing risk***);
- **Contractual risks**: which relate to risks of doing business with other companies such as ***credit risk***, ***reputation risk*** and ***counterparty risk***;
- **Market risks**: which relate to price fluctuations (***pricing risk***) and ***liquidity risk***.

Such uncertainty can of course present both risks and opportunities. A sound carbon offset strategy is one that seeks to maximise the carbon value within the acceptable risk tolerance over time.

Common practices from the EU ETS experiences

While the best practices are contingent to each company's objectives and risk appetite, the following practice has gradually evolved into common-practice among companies in the EU ETS.

- **Regulation awareness**: The supply and demand in an ETS and many important timelines are set by regulation. Continuous and up-to-date awareness of the relevant regulations is essential to implementing a successful carbon strategy in general. Remember that this market is created by regulations.
- **Project diversification**: While the performance of a single project can be volatile, the performance for a bundle of projects in a portfolio tends to be more stable, as variations in individual projects can be balanced out. This has led to the creation of multilateral or third-party managed carbon funds, whereby companies and governments buy a share in output of a portfolio, rather than contracting with individual projects themselves.
- **Robust contracting**: Since regulatory, market and project conditions can change over time, robust contracting can protect companies from unwanted risks and clearly define the responsibilities and required follow-up in adverse scenarios. Alignment of incentives both in an upward as well as a downward market is key and risks should be placed upon the counterparty who has the best ability to manage them in return for an appropriate reward.
- **Hedging and risk management**: Hedging is the locking in carbon values in the future or forward markets based on expectations from the offset projects. Hedging is an ongoing activity because companies don't lock in the full carbon value on day one and expectations will be updated as projects perform over time and new information becomes available. Today, most companies also employ independent risk departments next to commercial departments to ensure they act within the boundaries of acceptable risks. A risk department measures and reports risks such as market and credit risk, comparing them with limits set by the company's senior management.

To conclude, offset projects can offer a lower cost for compliance entities but they come with certain risks and challenges which one should not underestimate. Using independent third parties can reduce the volumetric uncertainty in offset projects and investing in a bundle of offset projects via for example a multilateral organisation helps to diversify the various risks. Alignment of incentives for seller and buyer in all scenarios further mitigates risk. My experience is that investing in offsets not only reduces compliance costs but can also generate profits.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 3:
Offsets

CHAPTER 08
Instructor's Guide

Developing an internal and external offset strategy

To be used along with Chapter 8 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Developing an internal and external offset strategy", please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are, in your experience, the key points for companies to address setting up an offset strategy and building an offset portfolio. For example:**

   It is important for a company to determine whether or not carbon should be looked upon as a pure cost and compliance centre or whether it should be regarded as a profit centre. This decision significantly depends on the market price and the internal carbon abatement cost curve of a company. Furthermore, it is advisable to hire a technical consultant who can assess the viability of the project and likelihood of generating the expected carbon reductions. To diversify project risk a company may invest in a multilateral fund where it commits to buy a certain percentage of the reductions from a portfolio of projects.

2. **Please explain what are, in your experience, the key challenges companies should consider when setting up an offset strategy and building an offset portfolio. For example:**

   Offsets are an important part of an ETS because they often offer a cheaper way to comply; but they also come with certain challenges and risks. With the right offset strategy a company could not only save significant costs but also generate considerable profits to complement its core business. Key challenges are attracting the right people to manage the offset portfolio and embed it into the reporting functions within the company. A proper risk and hedging framework should be defined taking market, credit, project and regulatory risks into account. Robust contracting is key to mitigate many risk and it is advisable to hire a reputable law firm to draft a template. Risk should be allocated to the party who is best capable of handling them.

3. **Case Study Offset Strategy**

   Please list briefly an example of a fictitious company (eg, Nordic industrial company) that successfully managed to set up an offset strategy and commercial offset portfolio. What were the key success factors/decisions? For example:

   Large offset project in China where technical engineers were hired to assess the project plan and especially the likelihood of achieving the expected reductions within the timetable. Part of the project construction risk was mitigated to the supplier in the form of a guarantee. Initial investments were paid by buyers via escrow agent and based upon certain milestones. Buyers received a significant discount on market price in return for upfront investment. Project achieved

close to 98% of anticipated reductions, and both the seller and buyers have benefited from project. Risks on the project itself were allocated to seller due to its ability to properly manage them. Market and regulatory risk and pre payments were allocated to the buyers. Another key to success was to hire a local company affiliated with sector.

Please list briefly an example of a fictitious company that unsuccessfully managed to set up an offset strategy and commercial offset portfolio. What were the key factors that lead to an unsuccessful result? For example:

A company invested in offset projects but did not hedge its expected volume in the market when the deal was closed. The market prices then collapsed, but the buyer still had to pay high fixed prices and made significant losses.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

    - Why would a company invest into offsets as it seems complicated?
    - How to incorporate risk management in the daily activities?
    - How can you protect your project from regulatory risks?
    - Why would you invest in funds or portfolios of offsets?

SECTION 3:
Offsets

CHAPTER 09

Caspar Chiquet, South Pole Group

MRV and the challenges accompanying offset generation

Monitoring, reporting and verification (MRV) of greenhouse gas (GHG) emissions represents the bedrock of compliance management strategy for every emitter. It plays an equally important role in the generation of offsets for compliance use. Offset projects are a common element of most current and upcoming emission trading systems (ETSs), lowering compliance costs by unlocking low-cost abatement opportunities outside of the scope of the programme. To that end, regulators issue a set of rules governing offset generation and their application towards compliance. To a large extent, such offset rules share core elements that have emerged as best practice in GHG quantification, codified in international standards overseen by bodies such as the UN Framework Convention on Climate Change secretariat, the Intergovernmental Panel on Climate Change or ISO.

The importance of a monitoring plan for generating offsets

To date, the largest existing offset mechanism is still the Clean Development Mechanism (CDM), which is a flexible compliance mechanism designed for use under the Kyoto Protocol. As such, it has heavily influenced many offset systems, including voluntary offset programmes such as the Verified Carbon Standard (VCS) and the Gold Standard, as well as domestic compliance offset programmes such as the Chinese CCER system. Borrowing from the CDM, offset methodologies or protocols typically define a standardised monitoring procedure, sometimes complemented by a project-specific monitoring plan further specifying details about the monitoring approach. This set of requirements is mostly static and checked by a third party auditor prior to certifying the offset project with the relevant standard or organisation. Monitoring plans can also be submitted after registration of a project, but this has the disadvantage that the operator is not aware of all monitoring requirements without a specific plan, which may result in a data gap for the time between registration and submission of the monitoring plan.

A well-designed, feasible and efficient monitoring approach is therefore crucial for ensuring a successful issuance of offsets throughout the lifetime of an emission reduction project. Deviations from the pre-approved monitoring approach and/or requirements in the methodology are time-consuming and costly in the best case, and might be rejected by the regulator in the worst case. There are many registered and operating offset projects that have never issued even a single carbon credit, all due to a irreconcilable discrepancy between actual monitoring setup and the originally envisioned approach.

In order to prevent such complications, it is very important to ensure frequent communication between the teams responsible for the design, construction and operation of an installation, and internal or external specialists who take care of the offset project registration. The ideal monitoring plan is as general as permitted by the methodology or protocol to accommodate for a variety of different implementation approaches. At the same time, the plant operator needs to inform its personnel about the importance of keeping the approved monitoring setup unchanged over the project lifetime, as accommodating changes may jeopardise the generation of offsets.

- The monitoring procedures for an offset project should be defined in close collaboration between all stakeholders.
- The ideal monitoring plan is as general as permitted by the methodology or protocol to accommodate for a variety of different implementation approaches.
- Personnel need to be properly trained and made aware that monitoring procedures cannot be changed easily.

Recognising carbon specific monitoring requirements

Another frequent challenge for operators of offset projects is the failure to recognise the importance of certain carbon-specific monitoring parameters. MRV of renewable energy projects is very straightforward and completely aligned with the quantification required for the commercial operation of a grid-connected installation. The same electricity meter that is used to invoice the grid operator for delivered net electricity delivers the necessary operational data to calculate emission reductions.

In other cases, however, the specific requirements for issuing carbon offsets go far beyond the scope of measurement required for safe and efficient operation of an installation. A typical example that has resulted in countless lost offset certificates over the last decade is the mandatory monitoring of flaring mechanisms for tail gases. Projects involving methane often flare it, reducing the GHG impact by breaking it down into CO2. The resulting emission reduction can be claimed as offsets, but only if the flare is properly monitored according to stringent requirements. For a typical operator, monitoring a tail gas flare is an alien concept, since the tail gas does not have any direct commercial value or impact on the performance of the facility. When they neglect the proper monitoring of the flare, resulting in data gaps, offset methodologies apply the conservativeness principle and assume the flare has not been operating for those periods lacking data, resulting in fewer or no claimable offsets.

For many of the more complex methodologies in energy efficiency, biomass, biogas or destruction of industrial gases, the same challenge applies: how to safeguard that the operating personnel properly maintains the required, but unfamiliar, monitoring regime for issuing offsets. Targeted training, incentive mechanisms and integrated, IT-supported monitoring systems are ways to safeguard proper MRV of relevant parameters.

- Operators need to be trained to understand the importance of carbon-related monitoring parameters, including the financial relevance of offset sales.
- If possible, staff can be incentivised to maximise offset generation.
- IT-supported monitoring systems allow real-time supervision of offset projects with automated warnings in case of data gaps or meter malfunctions that could result in loss of offsets.

Minimising MRV and issuance risks for projects operated by third parties

A common approach for large emitters to lower their compliance cost is the acquisition of a portfolio of options or futures on offset projects from third parties. By participating in the risk associated with the generation of future offsets, these emitters can acquire offsets at a significant discount versus the spot price for already issued offsets. Part of building up, managing and supervising such an offset portfolio is the

assessment and minimisation of MRV related risks in potential and contracted projects. Portfolio managers will assess the monitoring plan, actual monitoring implementation, and the MRV management capacity and readiness of a plant operator when they price the risk of a potential addition to their contracted offset supply.

For contracted projects, offset buyers can implement a reporting system to keep track of offset generation performance of individual projects in their portfolio. For large offset projects with integrated, IT-based MRV setups, automatic data sharing can be implemented so that project performance can be supervised in real time. The ultimate goal is to improve MRV supervision, being able to spot deficiencies and data gaps early to minimise associated losses of offsets, and to have an accurate forecast of resulting future offsets from a portfolio to inform complementary measures an emitter may be undertaking to hedge its compliance position under an ETS.

- Assessment of MRV related risks should be part of the due diligence process when contracting offset projects from third parties.
- IT-based MRV systems allow operators to share real time data with buyers of their generated offsets.
- An accurate forecast of future offset generation from contracted projects is essential to inform the overall carbon management strategy of an emitter.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 3:
Offsets

CHAPTER 09
Instructor's Guide

MRV and the challenges accompanying offset generation

To be used along with Chapter 9 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "MRV and the challenges accompanying offset generation" please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are in your experience, the key points for companies to address MRV and offset assessments/building an offset portfolio. For example:**

    - Ensuring consistency of documented monitoring approach with physical project implementation and operation procedures; keeping MRV consistent over time.
    - Safeguarding proper monitoring of parameters without any additional business value for the operator beyond carbon.
    - Correctly identifying MRV related risks when contracting future offsets generated by projects from third parties; mitigating such risks throughout the project cycle of an offset project.

2. **Please explain what are in your experience, the key challenges companies should consider for MRV and offset assessments/building an offset portfolio. For example:**

    - Stringent, inflexible monitoring requirements dictated by offset standards/protocols.
    - The requirement to monitor parameters that are without any value for commercial operation of the underlying project apart from generating offsets.
    - Accommodating changes occurring after successful registration of an offset project which have not been foreseen in the monitoring plan.
    - Obtaining baseline data which may come from sources beyond the project boundary.
    - Sampling, testing, calibration and data quality requirements that exceed the requirements for safe and commercial operation of the underlying project.

3. **Case Study MRV and Offsets**

    Please list briefly an example of a fake company (eg, Nordic industrial company) that successfully managed to address MRV in building its offset portfolio. What were the key success factors/ decisions? For example:

    Company A successfully contracted a considerable portfolio of offset projects to cover most of their compliance needs at low costs. They contracted projects at an early stage, locking in low prices by participating in the risks associated with the generation of offsets. However, based on a strict due diligence as well as a pre-defined set of selection criteria, they only contracted projects with minimal MRV-related risks, focusing on technologies with straightforward monitoring

requirements such as renewable energy.

Following contract signature, they hired experts examining proposed MRV approaches of their portfolio projects, identifying potential gaps and correcting them prior to registration with the relevant standard. They performed early verifications shortly after registration of a project at their own cost, using the opportunity to identify potential problems with MRV as early as possible, thus minimising potential losses of offsets.

Please list briefly an example of a fake company that unsuccessfully managed to address MRV in building its offset portfolio. What were the key factors that lead to an unsuccessful result? For example:

Company B contracted an even higher number of projects into their offset portfolio, looking to profit from low-cost offsets that could be sold to other compliance companies in the future. Their sourcing was based mostly on price, selecting those projects with the lowest unit costs and minimal upfront costs. Management of their portfolio projects was outsourced to numerous intermediaries, allowing them to rapidly grow the number of projects in their portfolio.

When it came to registration and issuance, they realised that a large fraction of their projects delivered substantially less than what had been forecast in project design documents. Most of their projects also generated offsets much later than originally planned. They encountered problems with third party auditors when they realised that meters had not been calibrated properly, that lab samples had been mishandled, and that equipment had been switched out or replaced with different specifications. In the end, only a small number of offsets resulted from their portfolio, and much later than anticipated, forcing Company B to cover their shortfall on the market at spot prices.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

    - What's the most important factor in minimising MRV-related risks?
    - What are examples of some successful IT-based MRV systems?
    - What's the impact of monitoring problems on overall generation of offsets (eg, under the CDM)?
    - Can you rank different technologies in terms of complexity of their required MRV?

SECTION 4:

Trading

CHAPTER 10

Carbon price forecasts

Judith Schroeter, ICIS

Market participants in carbon markets use forward curves and price forecasts to get a sense of future price developments. This information is important in particular for compliance companies to estimate their financial exposure to the carbon market in the future and needed to develop a compliance strategy. The special characteristics of carbon markets, however, limit the usability of forward curves for internal processes and add another layer of complexity to price forecasting.

This article will first explain what makes carbon markets special and then show how this is visible on typical forward curves in carbon markets. It then introduces carbon price forecasting and explains how the ICIS Timing Impact Model is able to take account of the special characteristics of carbon markets and thus able to predict price developments more precisely. Finally, this article shows how these forecasts should be used internally by market participants.

Carbon markets solely exist on political will. Without a regulation requiring companies to hand in allowance for their carbon emissions, carbon markets would not exist. Carbon allowances only exist virtually and have the characteristics of a commodity as well as of a financial product. Like a commodity, carbon allowances are needed as an input factor for production. But in contrast to other commodities, carbon allowances do not have any transportation or direct storage costs. This allows carbon allowances to be traded more flexibly than other commodities.

In particular, the timing of allowance purchases can deviate significantly from their consumption. Companies can buy allowances significantly ahead of use, as there are no storage costs and allowances do not lose any value in the sense that they will always allow the emission of one tonne of CO2, irrespective of how old they are. Furthermore, compliance companies can even buy allowances after production, as they only actually need to own them at the compliance deadline. Depending on the regulation, this could be as much as a couple of years after the actual emissions.

This flexibility in timing impacts market prices as well as forward curves in carbon markets. In “normal” commodity markets, forward curves also represent to some extent expected price developments in the future. In carbon markets, however, most forward curves are in contango (that is, prices rise as you go forward in time) which only represents the cost of carry. Forward curves in backwardation (ie, where prices fall further out in time) or super-contango would imply arbitrage opportunities.

In the case of backwardation, for example, traders could sell their allowances in the spot markets and buy them back at lower prices in the futures market. Forward curves in backwardation in the carbon market are very unlikely, though it can happen in tight markets that do not allow the borrowing of allowances from future compliance years, such as in the California cap-and trade programme. In the theoretical case, when the current compliance period is short and the next compliance period is long, prices for this compliance period could be higher than for the next. Conversely, restrictions on banking allowances between periods could lead to significantly higher prices for future vintages, but again this is a theoretical scenario as most systems allow unlimited banking.

Given the limited value of forward curves for future price developments, price forecasting in carbon markets is of particular importance. In its proprietary Timing Impact Model (TIM), ICIS models carbon markets in a unique way by taking into account the special characteristics of carbon as a commodity. This mainly refers to the timing imbalance between emitting and purchasing, so companies can purchase their allowances at a different time than actually emitting CO2.

As in every commodity market, carbon prices are driven by supply and demand. The main part of supply in carbon markets is given by the regulation, which sets annual allocation and auction volumes. To forecast future supply, policy developments have to be taken into account as regulators are constantly working on improving their carbon markets.

Demand in carbon markets is significantly more complicated to model and consists of two steps. First, future emissions need to be modelled. Emissions are generally impacted by the greening of the energy sector, demand developments for power and products from carbon-intensive industries such as steel, efficiency improvements and general economic developments.

Second, the purchasing strategies of companies in the market need to be modelled. They define, based on the emissions forecast, when the demand for allowances actually enters the market. These strategies can be very different: some utilities apply very sophisticated hedging strategies that involve buying emission rights up to four years prior to the emission of the tonne of CO2. Other companies hedge in a shorter horizon, or companies buy allowances only shortly before the compliance deadline, which can be up to three years after the actual emissions. The actual demand, or “traded demand” in the market at a certain time, is then calculated from a combination of all strategies.

Furthermore, companies that received higher allocation volumes than they actually need have the choice between banking their surplus to subsequent years to either sell at higher prices, or use for future compliance. Once companies sell banked allowances, these allowances become part of the traded supply, but if they bank the surplus allowances, they are reducing supply at this time. This could lead to a shortage of allowances in the short term, despite a fundamental oversupply in the market.

An additional source of supply is offsets. Offsets’ eligibility and limits are set by the regulators in each market. To forecast the impact of offsets on the price, three things need to be taken into account: the supply of offsets, the expected usage of offsets, and the time at which offsets will be used.

A short term forecast for the next days or week can mainly be used for speculation. Price developments in the short term are also strongly driven by the general price developments for energy commodities, market sentiment and policy developments. Given the high volatility in many carbon markets, prices tend to react quickly to policy announcements, despite the fact that the fundamental impact of regulatory changes are usually only felt several years later. Mid-term forecasts for the next few quarters are mostly driven by market participants’ trading strategies and can be used to optimise the compliance trading of companies.

Long-term price forecasts that usually look out to around 2030 should be used as one of many inputs for investment decisions. In particular, they are useful to understand the potential value of an abatement project or efficiency measure within the company in the long term. These forecasts are strongly influenced by changes in regulation and economic developments. As it is impossible at this point in time to foresee future technological and economic developments,

long-term price forecasts should be seen as an indication how prices could develop in a world without major (unforeseen) changes.
Since forward curves in carbon markets cannot provide the indications of future price movements that market participants need, price forecasts are important for the management of carbon positions and carbon trading. Experience shows that carbon price forecasts can be much better if a timing impact approach is used, as this approach captures the very specific characteristics of carbon markets.

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

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CHAPTER 10

Instructor's Guide

Carbon price forecasts and forward curves: how to do it

To be used along with Chapter 10 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Carbon price forecasts and forward curves: how to do it", please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are in your experience, the key points for companies to address carbon price curves and forecasts. For example:**

    a. Risk management
    b. Investment decisions
    c. Portfolio optimisation
    d. Trading decisions
    e. Compliance strategy

2. **Please explain what are in your experience, the key challenges companies should consider when examining/taking into consideration carbon price curves and forecasts. For example:**

    a. Carbon forward curves to not represent future price developments
    b. Economic growth and technical developments have a large impact on carbon price developments in the mid-and long-term. Assumptions always represent the current expectation, sudden changes are therefore not integrated in most forecasts
    c. Carbon allowances are traded differently than other commodities as the timing of allowance purchases can deviate significantly from their consumption. Valuable price forecasts for carbon allowances should take this aspect into account.

3. **Case Study Carbon Price Curves and Forecasts**

    Please list briefly an example of a fake company (eg, Nordic industrial company) that successfully managed to integrate a carbon price curve into its emissions trading compliance process. What were the key success factors/decisions? For example:

    A Western European Utility that uses carbon prices and carbon price forecasts generally as input for all decisions within the company, trading decision as well as long-term investment decisions. This company would also use the carbon forward curves to optimise their power hedging over the next years.

    Please list briefly an example of a fake company that unsuccessfully managed to integrate a carbon price curve into its emissions trading compliance process. What were the key factors that

lead to an unsuccessful result? For example:

Overallocated mid-size industrial that sees carbon mainly from the compliance purpose and not as a trading opportunity. Those companies would not try to find carbon reduction potential based on current or future price of carbon, and therefore they would lose potential income from the selling of allowances. The market would also lose cost-effective reduction potential.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

    - Why are forward curves different in carbon markets?
    - What are important factors to carbon price forecast?
    - Are carbon forecasts reliable?

SECTION 4:

Trading

CHAPTER 11

Ingo Ramming, Commerzbank

In a carbon constrained world: emissions trading and risk management… the what, why and how[1]

Best practice for emissions trading and risk management

Climate and carbon risks are increasingly important to regulators, rating agencies and discussions on carbon budgets or carbon bubbles have moved into investment committees of pension funds as well as institutional investors. Furthermore, around 40 national jurisdictions and over 20 cities, states, and regions are currently putting a price on carbon. These include among others the EU Emissions Trading System (EU ETS), the Regional Greenhouse Gas Initiative (RGGI), the New Zealand Emissions Trading Scheme, the Korea Emissions Trading Scheme, California and Québec.[2] China is expected to launch a national ETS in the second half of 2017. This will have a significant impact not only on Chinese companies but globally as well, as estimates show that global emissions covered by carbon pricing initiatives could increase from 13% percent to between 20-25 %. This development is important for companies and requires preparations to increasingly operate and compete in a carbon constrained world. This article will outline the latest in best practice for emissions trading and risk management.

The establishment of a national or regional emissions trading system (ETS) creates new obligations and challenges for companies. They need to monitor, report and verify (MRV) their emissions and surrender allowances in line with their verified emissions to achieve technical as well as operational compliance with the ETS rules.

Typically a company receives at the beginning of each year an amount of allowances, the (free) allocation – if the system still has free allocation. Each allowance represents 1 tonne of CO2e. At the beginning of the following year, all operators need to demonstrate compliance by surrendering allowances equal to the verified emissions of the previous year.

In case a company has a surplus of allowances, ie its actual emissions are below the (free) allocation, the management needs to decide if they want to sell the surplus, keep the allowances for compliance in the future or to sell at a later stage. If a company faces a compliance deficit, ie the verified emissions are above the (free) allocation, it needs to cover the shortfall and purchase allowances in the market.

Before starting to trade, it is important to understand the legal nature of the respective carbon credits or allowances: what are the ownership rights? Are they freely transferable or are there any restrictions? What are the registry and account opening rules, and under which law are these? Furthermore, are there any regulatory reporting requirements, and what is the treatment under applicable tax and accounting rules?

Next is to identify the business impact, both the risks as well as the opportunities of the new legislation. These need to be quantified and prioritised: how big are they in absolute terms? What is the potential volume and price risk? How pivotal are they in terms of the success of

1 Views expressed in this article are those of the author and do not necessarily reflect the opinion of Commerzbank or IETA.
2 Source World Bank

individual transactions, parts of the company as well as the entire company and the group?

More strategically, it is about “make or buy”. Is it possible to reduce CO_2 emissions? What is the cost of abatement? Is it cheaper to invest in low-carbon technologies than to purchase allowances?

Carbon risk should not be looked at and managed in isolation. Rather, companies should put it in context with the enterprise-wide approach and philosophy towards risk. We would recommend a systematic approach aligned with the business impact. In this context, it is important to note that trading is not a goal in itself but a means to achieve specific targets, namely, to guarantee the company has sufficient allowances before the surrender deadline to be able to comply with the rules and avoid fines, in order to minimise costs and maximise opportunities.

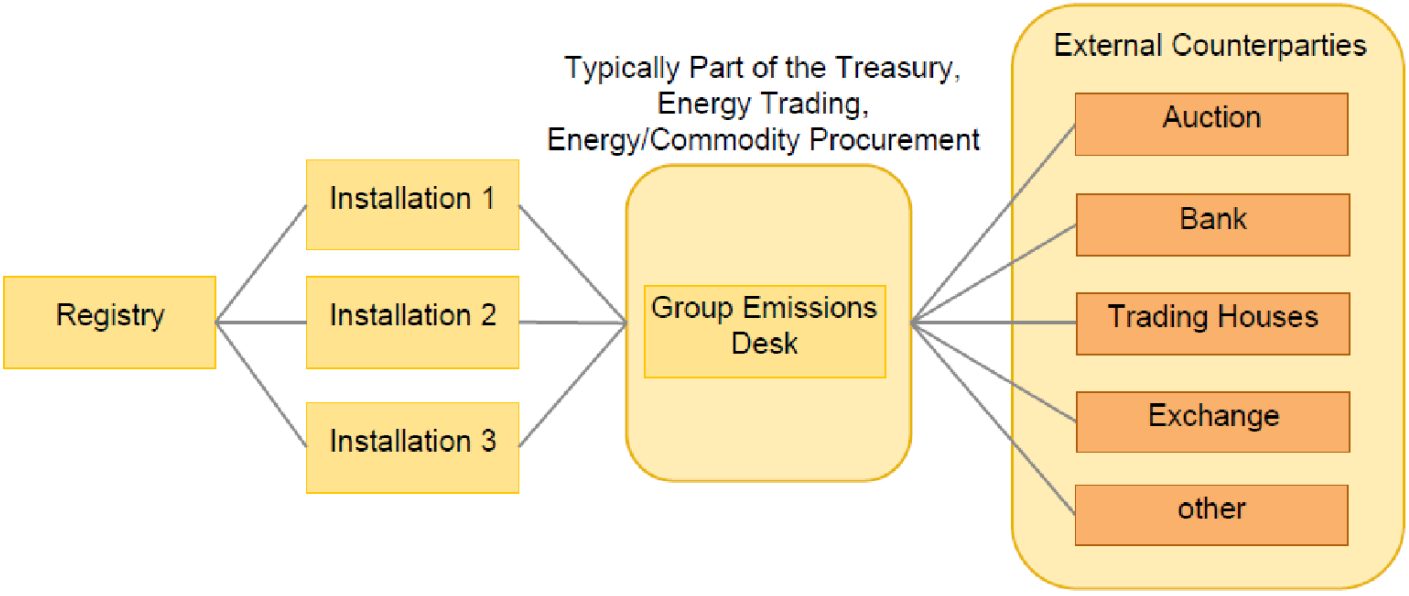
Many companies already actively manage their interest rate, foreign exchange and commodity risks. The requirements for carbon are often similar and it might make sense to align the carbon strategy with the general risk management of a company.

After a decision, if the necessary expertise and resources are available or if additional resources or external advice is required, it needs to be defined which entity (location), department and persons are responsible for:

- the monitoring and external verification of annual emissions volumes, internal and external submission of the data, the regular update of emission forecast;
- the submission of verified emissions data and allowances/offsets;
- the external carbon trading (in line with the trading policy, trading and counterparty limits), timing of the trades, execution, confirmation and settlement of trades; and,
- the reconciliation of allowances and offset credits against registry accounts, as well as offsets for ETS eligibility.

This decision is key and should be agreed formally in a “Carbon Strategy” and be approved in line with the company’s procedures.

Centralised approach in managing a company’s carbon exposure enhances the efficiency



Trading

A risk management strategy which includes the purchase of allowances and credits needs to be implemented. Companies need to decide how active the trading strategy should be. We would recommend putting it into context with the general approach in other areas, philosophy of the firm, peers, and actual risk.

- Passive strategy, where the deficit will be covered shortly before surrender deadline and surpluses will be carried over.
- Tactical and active carbon trading, taking into account market conditions and opportunities
- Hedging programme (for example monthly or quarterly "build up"), tailored to specifics of the entity and similar to fuel hedging strategies.
- Integrated commodity risk management approach (ie, joint fuel/carbon-hedge programme)

A key part of the hedging strategy is of course the availability of (financial) instruments to hedge the carbon exposure and purchase allowances. The availability will depend on the jurisdiction but also the liquidity of the market. In most markets, spot and forward are available. Furthermore, once exchanges are established, companies can use futures to manage their exposure.

- Spot transaction: Price agreed today for immediate delivery of a specified quantity and type of credits or allowances. Settlement is typically two business days after the trade date and payment is in general provided five business days after the delivery date.
- Forward: Price agreed today for future delivery of a specified quantity and type of credit or allowance.
- Future: A carbon futures contract is a standardised contract between two parties to buy or sell a specified carbon asset, of standardised quantity and quality at a specified future date at a price agreed today. Carbon contracts are traded on a futures exchange.

Companies increasingly need to operate and compete in a carbon constrained world. A proactive approach is required to manage carbon related risks, reduce the cost of compliance as well as maximise opportunities. To be able to identify climate and carbon-related risks, it is essential to understand the current legal framework as well as policy developments or as Benjamin Franklin put it: "By failing to prepare, you are preparing to fail."

For more information and a short video related to this topic, please see www.ieta.org/Carbon-Market-Readiness-Training-Guide

SECTION 4:

Trading

CHAPTER 11

Instructor's Guide

Carbon Trading Best Practices

To be used along with Chapter 11 of the PMR-BPMR Carbon Market Readiness Trading Guide

In your presentation or training on "Carbon trading best practices" please make sure to cover the topics below and address the relevant questions.

1. **Please explain what are in your experience, the key points for companies to employ with carbon trading. For example:**

    - Be prepared and avoid any last minute activities as non-compliance with the rules might lead to fines
    - Understand the regulatory framework, identify risks and quantify exposures
    - Put the potential risk in context with other risks and manage carbon risks accordingly
    - Risk management strategy and trading should be fit for purpose. Keep it simple and avoid over-complicated processes.
    - Avoid overlap and misunderstanding by defining responsibilities for MRV, surrender of allowances, purchasing, trading authorities and risk limits in a "Carbon Strategy" document, which should be approved in line with company's procedure.
    - Work with trusted partners

2. **Please explain what are in your experience, the key challenges companies should consider for carbon trading. For example:**

    - Carbon prices are volatile and many factors influence the price development. This provides opportunities but creates as well significant risks. Companies need to incorporate this in their "Carbon Strategy"
    - Many areas need to work together among others MRV emissions, forecast exposures, purchase and surrender allowances; responsibilities need to be defined to avoid issues
    - Potential changes in the legislative framework

3. **Case Study Carbon Trading Best Practices**

    Please list briefly an example of a fake company (eg, Nordic industrial company) that successfully managed to trade carbon at a lower cost than it anticipated. What were the key success factors/ decisions? For example:

    Companies participating in the EU ETS were allowed to use UN offset credits for compliance. We advised a company on the use of the offsets and entered into a swap where we exchanged allowances against eligible offsets.

Case:
1) Strategic Purchases
In a discussion with a client they presented us their expected compliance position (approx. 1 million tonnes per year). The client asked for advice on the hedging strategy. First we analysed the impact of potential price moves on the budget and overall profitability of the firm.

Taking into account the general philosophy of the company towards risk, risk management and trading, we advised the client to enter into an average swap where they purchase allowances at the average price of the compliance year.

This helps the company to reduce volatility on the procurement side and avoid timing mistakes, ie purchasing allowances at the top of the market.

2) Use of offsets
Using CERs and ERUs can help companies with obligations under the EU ETS to reduce their cost of compliance and generate additional (carbon) revenues.

At the beginning of Phase 3, we analysed the compliance position of a client and the use of the offset quota. We found that the client still had the chance to use approximately 2 million CERs during Phase 3 of the EU ETS.

At that time, EU allowances were trading at €5 while offsets were trading around €0.30. We entered into a swap with the client, where they delivered 2 million EU Allowances against 2 million CERs. In addition the company received a payment of approx. EUR 10 million. This was a significant opportunity and the company generated a profit of approximately €10 million without any additional obligations.

Please list briefly an example of a fake company that unsuccessfully managed to trade carbon at low cost and spent more resources than necessary at ETS compliance. What were the key factors that lead to an unsuccessful result? For example:

Use of UN offsets, the pitfalls being not aware of regulatory changes

The EU introduced in Phase 3 qualitative restrictions for the use of UN offsets. With the new rules, CERs from HFC projects were no longer eligible for the EU ETS.
A company had purchased offset credits from a third party, but was not informed that eligibility requirements were about to change.
When the company wanted to exchange the CERs into EU allowances, they were no longer eligible and the company faced a significant loss.

4. **Please keep in mind that the audience might be interested in the Frequently Asked Questions below.**

    - How does trading work?
    - How do I open a carbon account? How can I transfer and receive allowances?
    - Where and how do I purchase allowances and enter into a carbon agreement?
    - How do I organize trading and risk management

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