Final carbon market options report

ICP SEMED project

Task 6.1 Carbon market options report

Developing and transacting an up scaled CDM-based carbon credit approach in SEMED

Contract number: **C33569/1450/7594**

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Acronyms and abbreviations

ACR	American Carbon Registry
ANME	National Agency for Energy Management (in French)
AUD	Australian Dollar
BAU	Business-As-Usual
BMU	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BUR	Biennial Updated Report
CAPA	Centre for Aviation
CAT	Climate Action Tracker
CAR	Climate Action Reserve
CCF	Climate Cent Foundation
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CIA	Central Intelligence Agency
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COP	Conference of Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
4C	Climate Change Competence Centre of Morocco
EBRD	European Bank for Reconstruction and Development
EEA	European Economic Area
EEAA	Egyptian Environmental Affairs Agency
EETC	Egyptian Electricity Transmission Company
EGTT	Expert Group on Technology Transfer
ERPA	Emission Reduction Purchase Agreement
ETS	Emissions trading scheme
EU	European Union
EU-ETS	European Union Emissions Trading Scheme
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEFF	Green Economy Financing Facility

GHG	Greenhouse gas
GHG-IS	Greenhouse Gas Inventory System
GNI	Gross National Income
$GtCO_2$	Giga tonne of carbon dioxide
HFCs	Hydrofluorocarbons
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ICP	Integrated Carbon Programme
ICROA	International Carbon Reduction and Offset Alliance
IETA	International Emissions Trading Association
IMF	International Monetary Fund
IRENA	International Renewable Energy Agency
ITMO	Internationally Transferred Mitigation Outcomes
IPCC	Intergovernmental Panel on Climate Change
ISIC	International Standard Industrial Classification of all Economic Activities
JI	Joint Implementation
JCM	Joint Crediting Mechanism
KliK	Klik Foundation
LDC	Least Developed Countries
LLDC	Landlocked Developing Countries
LSE	London School of Economics and Political Science
LULUCF	Land-use, land-use change and forestry
MALE	Ministry of Local Affairs and Environment
MASEN	Moroccan Agency for Sustainable Energy
MBIs	Market-based instruments
MDB	Multilateral Development Bank
MO	Mitigation outcome
MOPA	Mitigation Outcome Purchase Agreement
MRV	Monitoring, reporting and verification
$MtCO_2$	Million tonne of carbon dioxide
MW	Mega watt
NC	National Communication
NCCC	National Committee on Climate Change
NCCP	National Climate Change Policy
NEEAP	National Energy Efficiency Action Plan
NIC	National Inventory Commission
NIS-GHG	National Greenhouse Gas Inventory System
NDA	National Designated Authority

NDCs	Nationally Determined Contributions
NEFCO	Nordic Environment Finance Corporation
NSDS	National Sustainable Development Strategy
N_2O	Nitrous oxide
PMI	Partnership for Market Implementation
PMR	Partnership for Market Readiness
PoA	Programme of Activities
RES4MED	Renewable Energy Solutions for the Mediterranean
RRGI	Regional Greenhouse Gas Initiative
SAF	Sustainable alternative fuel
SEMED	Southern and Eastern Mediterranean
SIDS	Small Island Developing States
SIE	Energy Investment Society (in French)
SME	Small and Medium Enterprises
SSSD	Secretariat in charge of Sustainable Development
t	Tonne
tCO_2	Tonne of carbon dioxide
tCO_2e	Tonne of carbon dioxide equivalent
TCAF	Transformative Carbon Asset Facility
TWh	Terawatt hour
UN	United Nations
UNEP DTU	United Nations Environment Programme Denmark Technical University
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VCS	Verified Carbon Standard
VCU	Verified carbon unit
VER	Verified emission reduction
WCI	Western Carbon Initiative

Executive summary

Since September 2012, the EBRD has been investing particularly in Southern and Eastern Mediterranean (SEMED) countries to increase competitiveness, resilience, trigger the participation of the private sector and to promote a policy dialogue. For each of the SEMED countries there are carbon market opportunities to participate in over the next decade. These opportunities include SEMED countries selling emission reductions under Article 6 of the Paris Agreement, Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and the international voluntary carbon markets, as well as SEMED countries setting up their own domestic carbon markets to help achieve the current and future targets of their Nationally Determined Contributions (NDCs).

There are no current active Article 6 pilots in any of the SEMED countries, despite the various initiatives spearheading Article 6 development, as this report outlines.

Article 6 of the Paris Agreement, which is the foundation for new market mechanisms, would in part under the Article 6.4 be an evolution of the Clean Development Mechanism's (CDM) modalities and procedures. Article 6.2 of the Paris Agreement is another opportunity for climate finance to flow to SEMED countries, but the process to establish bilateral cooperation between SEMED countries and Internationally Transferred Mitigation Outcome (ITMO) buyer countries is to be developed. SEMED countries would like the transition from the CDM to the Article 6.4 mechanism to be as smooth as possible grounded in their experience with more than 50 CDM projects located in the region. These projects would be the basis for a continued and scaled-up effort, and resulting units could potentially transfer to an Article 6 mechanism and/or be used by Parties to meet their NDC targets, including SEMED countries for their own NDC targets, or be sold for compliance purposes under CORSIA and/or in the international voluntary carbon market.

In addition to Article 6, CORSIA represents a new opportunity for SEMED countries to benefit from climate finance flows. CORSIA is also the first time a company based in a SEMED country will be able to participate in a compliance carbon market, which will occur as soon as 2021 for two 'fifth freedom flights' operated by SEMED national air carriers. The cumulative annual emissions of the four national carriers of the SEMED countries in 2019 stood at more than 3 million tonnes CO_2, representing a cumulative demand of close to 17 million tonnes CO_2 under CORSIA for SEMED national air carriers until 2035, reflecting the anticipated impacts of Covid-19 crisis on airline industry and the changes to CORSIA baseline definition approved in 2020.

Although no SEMED country has a carbon market or other carbon pricing mechanism in place as of 2019, each SEMED country has participated in various programmes focused on carbon market activities led by multilateral development banks. These programmes have focused on helping SEMED countries to develop an emissions trading scheme, including monitoring, reporting and verification (MRV) systems, greenhouse gas (GHG) inventories and registries, institutional structures and regulatory frameworks. Each country is on its own journey towards implementing carbon pricing, with a wide variety of ongoing activities and initiatives. The next two to three years will be critical for SEMED countries to put in place a carbon pricing system as it culminates with the start of their NDC period. This report provides several recommendations for how SEMED countries could lay the foundation for domestic carbon market activity including removing energy subsidies, developing robust MRV systems and establishing regulations on transparent NDC accounting systems.

SEMED countries could also benefit from the growth in demand for voluntary carbon credits, if they have robust accounting systems in place to ensure that any carbon credits that are generated in a SEMED country are used towards the NDC of another Party under Article 6, or that those used by a non-state actor in the international voluntary markets are not also counted towards the NDC inventory of the host SEMED country. In short the environmental integrity needs to be assured.

Finally, an alliance composed of Morocco, Egypt, Jordan and Tunisia for carbon market promotion could provide additional political support for the implementation of SEMED countries' NDCs and

a greater understanding of how carbon markets can be advanced in the region. A SEMED alliance could create a cooperative space to enhance mitigation ambition and drive climate action. Such an alliance could be modelled, for example, after the Pacific Alliance and/or the West African Alliance on carbon markets and climate finance.

This report is largely based on study and analysis done before the Covid-19 crisis hit. Whilst the crisis is still unfolding, the key concepts laid out in this report are deemed to remain valid and appropriate. The report could be of use, when policy makers consider their recovery plans. The crisis offers an opportunity to increase emission reduction targets, and use the establishment of carbon markets to steer investments into a more green recovery than in previous economic restructuring efforts.

1 Introduction

This report provides a more detailed analysis of the readiness of the Southern and Eastern Mediterranean (SEMED) region countries included in the Integrated Carbon Programme (ICP) supported by the European Bank for Reconstruction and Development (EBRD) and the Spanish government.

The main objective of the project, 'Developing and transacting an up scaled CDM-based carbon credit approach in SEMED', is piloting new developments to support international and domestic post-2020 mitigation efforts the SEMED region.

The objective of this report is to take stock of current carbon market developments. The report is structured in several chapters including:

1) a **global context of carbon markets**, including Article 6 of the Paris Agreement, the CORSIA offsetting scheme, the outlook beyond 2020, potential linkage of carbon markets and the future role of the voluntary carbon markets;
2) a **readiness section of SEMED countries for carbon market development,** including an analysis of their Nationally Determined Contributions (NDCs), country profiles, an analysis of their readiness and an overview of country alliances;
3) a **carbon market options** section analysing the potential of Article 6 in more detail, including Internationally Transferred Mitigation Outcome (ITMO) forecasting for the region and price-setting mechanisms for ITMOs, the important role of intermediaries in carbon market development and facilitation and technology transfer; and
4) **a final chapter on recommendations**.

2 Global context of carbon markets

Market mechanisms are complementary measures to achieve ambitious mitigation goals at the lowest possible cost. These mechanisms can target specific greenhouse gases (GHGs), cover different sectors of the economy and be implemented at a regional, national or subnational level. The Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Kyoto Protocol in 1997, aiming for the stabilisation of GHG emissions in the atmosphere. The protocol included binding targets to reduce GHG emissions by developed countries (Annex I countries); however, it did not impose any binding objective for emission reductions by developing countries.

The Kyoto Protocol introduced three flexibility mechanisms to help countries reduce their emission levels: the Emissions Trading, the Clean Development Mechanism (CDM) and Joint Implementation (JI). These facilitated the achievement of the emission reduction objectives and reduced the financial burden for the Parties. The CDM and JI are project-based mechanisms, where emission reductions are the result of investment in green projects. On the other hand, the emissions trading is a so-called cap-and-trade mechanism that limits the total of emissions from all regulated entities to a certain amount.

Market instruments are more attractive than command and control mechanisms as they incentivise entrepreneurship among entities to develop mitigation actions, generate or buy carbon credits allowing them to internalise the cost of their emissions by paying a price for them. The Kyoto Protocol emissions trading was replicated on a larger scale by the European Union in 2005, creating the largest regional carbon market, the European Union Emissions Trading Scheme (EU-ETS). The EU-ETS was followed by other subnational schemes in California, British Columbia and Quebec. New Zealand and Saitama in Japan are among other jurisdictions with an ETS in place.

After the end of the Kyoto Protocol in 2020, the Paris Agreement seeks to provide continuity for the use of market mechanisms. Market-based instruments have also been considered within the provisions of the Paris Agreement, as they have the potential to generate financial resources to support national and international climate goals. According to the High-Level Commission on Carbon Prices, a carbon price level aligned with the temperature goal of the Paris Agreement should be around USD 40-80/tCO_2 by 2020 and USD 50-100/tCO_2 by 2030 (High-Level Commission on Carbon Prices, 2017). However, a carbon price must be supported by other policy interventions and sustained climate finance. Nowadays, the carbon price range among the countries implementing a market scheme is between USD 1-119 per tCO_2e with almost half of the covered emissions priced at less than USD 10 per tCO_2e (State Trends Carbon Pricing, 2020).

ETSs can be linked to create carbon markets, which enables emission allowances resulting from caps to be traded among linked entities. The larger the market, the more emission mitigation options available to buyers and the higher the potential for prices to be lowered (Santikarn, M., L. Li, S. La Hoz Theuer, 2018). By participating in a carbon market, sellers can benefit by generating revenue, while buyers can cover their emissions by purchasing allowances at a potentially lower cost. Carbon markets are therefore seen as a means to meet carbon reduction targets and Nationally Determined Contributions (NDC) commitments.

Thirty one ETSs covering nearly 17% of global GHG emissions have been implemented or are scheduled for implementation (World Bank, 2020). Nevertheless, these schemes vary depending on the sector coverage, price, rules and national emission reduction targets. To date, 23 countries have indicated in their NDCs the intention to use market-based mechanisms to meet part of their NDC targets (NDC Explorer, 2019).

These market mechanisms are likely to become operational under Article 6 of the Paris Agreement. Article 6 will allow countries to cooperate for the development of mitigation activities that will result in the transference of mitigation outcomes and work collaboratively with the private sector.

2.1 Article 6 of the Paris Agreement

The 21st Conference of the Parties (COP21) took place in Paris during December of 2015. At this meeting, the UNFCCC parties reached an agreement to tackle climate change and launch and accelerate activities and investments to set global economies on a low-carbon pathway and generate co-benefits for the communities in the implementation countries. This agreement marked the first time that all parties agreed that efforts are needed to combat and adapt to climate change.

The Paris Agreement established a new international framework for addressing climate change rooted in a bottom-up process relying on national action. Parties establish short-term domestic goals (i.e., through 2030) in NDCs and report their progress through a transparency framework (IETA, 2019b). Each Party (i.e. country) must report its achievements every five years so that UNFCCC can assess individual and collective progress towards achieving the temperature goal of the Paris Agreement.

The Paris Agreement encourages countries to cooperate for the implementation of mitigation activities that allow for greater ambition. Article 6 establishes three mechanisms to support countries in the achievement of their mitigation targets and to foster sustainable development: (i) cooperative approaches through the use of ITMOs (Article 6.2); (ii) a new market mechanism or 'sustainable development mechanism' (Article 6.4); and (iii) a non-market mechanism (Article 6.8). Mitigation activities under the umbrella of Article 6 have to guarantee environmental integrity, transparency and robust accountability to assure that emissions reductions are real, measurable and verifiable, and compatible with the enhanced transparency framework included in Article 13 of the Agreement.

For the Paris Agreement to be operational, specific guidance for the implementation of the provisions has to be provided and approved. Negotiations to operationalise the Paris Agreement initiated immediately after its entry into force in 2016 and have continued over the last few years. During the COP 24 in Katowice, negotiators concluded the discussions and reached consensus on the 'Katowice Climate Package', which contains the guidelines and procedures for the implementation of the Paris Agreement on transparency, accounting and reporting and climate finance, among others; however, no agreement was reached on Article 6 specifically.

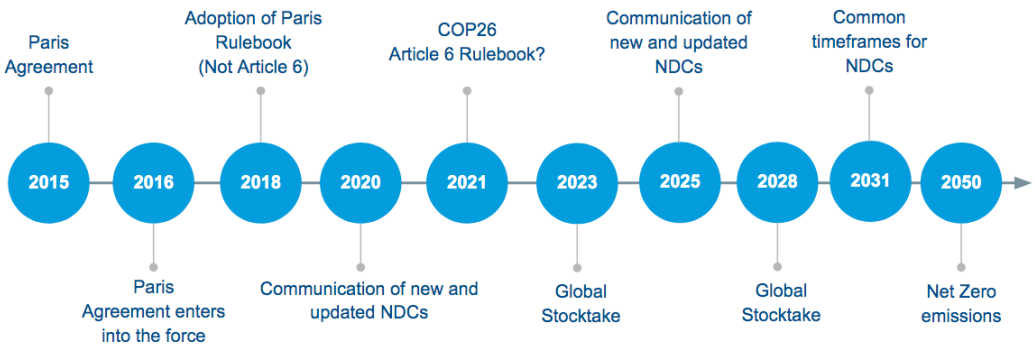

Figure 1: Timeline of the Paris Agreement milestones

(Source: South Pole, 2020)

Guidelines on voluntary cooperation processes and market mechanisms have not yet been agreed and were expected to be finalised at COP25. However in spite of deep negotiations no result was achieved, and the matter was postponed to COP26. Due to the Covid-19 crisis, COP26 will now take place in Glasgow, UK, in 2021. Figure 1 shows a timeline of how the main negotiating milestones have progressed over time and what is expected in the future. The result is that in 2020 and for most of 2021, the Parties will determine their further NDC ambition lacking clarity on the use of the mechanisms under the Paris Agreement.

To date, negotiations on Article 6 have not been finalised, especially on new market mechanisms. This negotiation bottleneck is mainly due to a disagreement between countries seeking the acceptance of CDM credits in this new market mechanism and those that believe that this aim does not increase ambition or achieve the goals set out in the Agreement. However, the countries interested in these mechanisms, both the purchasing countries and those that will generate ITMOs, are advancing their understanding of the potential of this mechanism and are preparing, both technically and legally, to embrace emission reduction transactions.

SEMED countries support the transition of CDM credits to the new Article 6 market mechanism. They argue that registered projects have significant mitigation potential and that this transition would build credibility in the new mechanism (Article 6.4) by respecting existing investments (UNFCCC, 2017). Their view is that the transition can be facilitated by applying rules and methodologies similar to those used in CDM and developing a simple eligibility checklist for CDM projects and programmes to avoid the necessity of going through revalidation, ensuring a smooth transition from one mechanism to the other. The reported oversupply of CDM credits compared to market demand is however a concern which needs to be mitigated, so as to ensure that further emission reduction targets would be met by additional mitigation effort. For instance, one way of addressing the above concern could be through application of a “discount factor” to the amount of CDM credits transitioned to the new market mechanism of the Article 6.4.

In terms of Article 6.2, the position of SEMED countries is that domestic efforts should be the main tool to meet NDCs and that ITMOs can be used to supplement these efforts (UNFCCC, 2017). They seek inclusive participation on a voluntary basis, the acceptance of all types of NDCs and sustainable development priorities and the preservation of national prerogatives through a bottom-up approach.

2.1.1 Potential market value of Article 6

In a new study published in 2019, IETA and the University of Maryland investigated the global economic potential and possible environmental benefits that would result from the implementation of Article 6 – the impact and benefits are different for all countries in the model. Similarly, in another study, IETA and Climate Focus investigated the economic and environmental outcomes of Article 6 in EBRD countries of operation and the overall implications on climate policy.

According to IETA and the University of Maryland (2019), the value of the potential carbon market is estimated to reach approximately USD 167 billion per year in 2030, increasing up to USD 347 billion by 2050 and achieving USD 1.2 trillion in 2100 if all countries pursued their current NDC goals (IETA, 2019b). However, the size of such a virtual market decreases without the participation of the United States as a result of its withdrawal from the Paris Agreement, as shown in Figure 2.

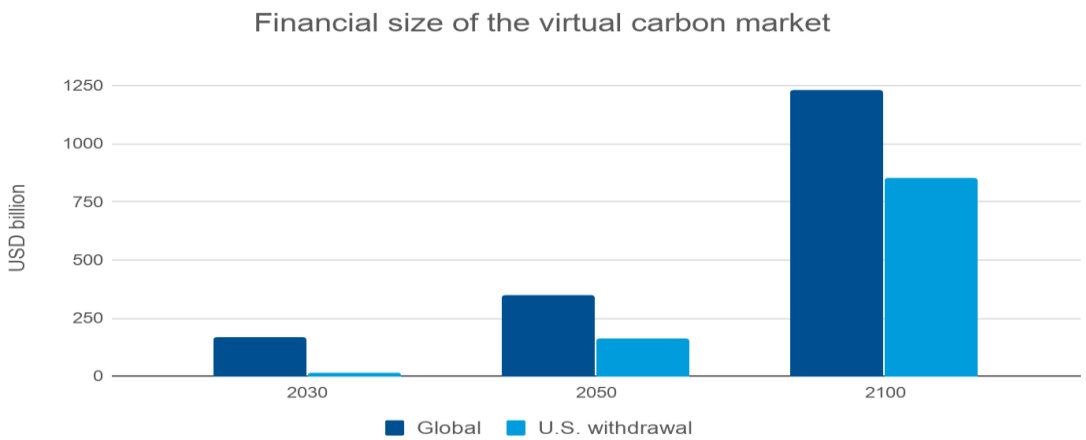

Figure 2: Estimated financial size of the virtual carbon market (USD billion)

(Source: South Pole based on IETA, 2019)

These estimations were modelled using two scenarios of NDC compliance across 32 regions. The first scenario (I-NDC) assumes the implementation of the NDCs goals independently and the second (C-NDC) considers cooperation between countries for the implementation of the NDC goals, including the transaction of ITMOs in the context of Article 6 of the Paris Agreement. Both scenarios consider the fulfilment of all NDC goals.

This study included a third scenario (E-NDC) to model the emissions mitigation potential in the event that countries achieve emission reductions through enhanced ambition compared to a scenario where countries achieve reductions cooperatively. C-NDC scenario reduces costs by 63% in 2030, 41% in 2050 and 30% by the end of the century compared to the I-NDC projections. Conversely, the enhanced ambition mitigation scenario enables 50% more mitigation than in the I-NDC (IETA, 2019b).

The scenarios presented above considered only mitigation potential focused on global CO_2 emissions from fossil fuels and the industrial sector. In a further analysis, the mitigation potential from nature-based solutions was also included. The economic potential of the implementation of Article 6 when including land-use change contributes to a cost reduction of nearly 28% by 2030 and 1 $GtCO_2$ of increased ambition annually (Table 1). Nevertheless, the inclusion of land-use change is acknowledged to pose a remarkable challenge.

Table 1: Potential Article 6 cost reductions by 2030

Sector	Cost reduction (USD billion/2015)	Increased ambition (annually)
Fossil fuels	250	5 $GtCO_2$
Land-use	70	4 $GtCO_2$
Combined	**320**	**9 $GtCO_2$**

(Source: IETA, 2019)

As shown in Figure 3, industrialised countries such as the United States, Canada, Japan and those of the European Union are expected to act as buyers of ITMOs, whereas Latin American countries, China, India and African countries will remain the sellers of such units by 2030. According to the analysis of IETA and the University of Maryland (2019), the trend of the current sellers is projected to shift by the end of the century as these countries become buyers.

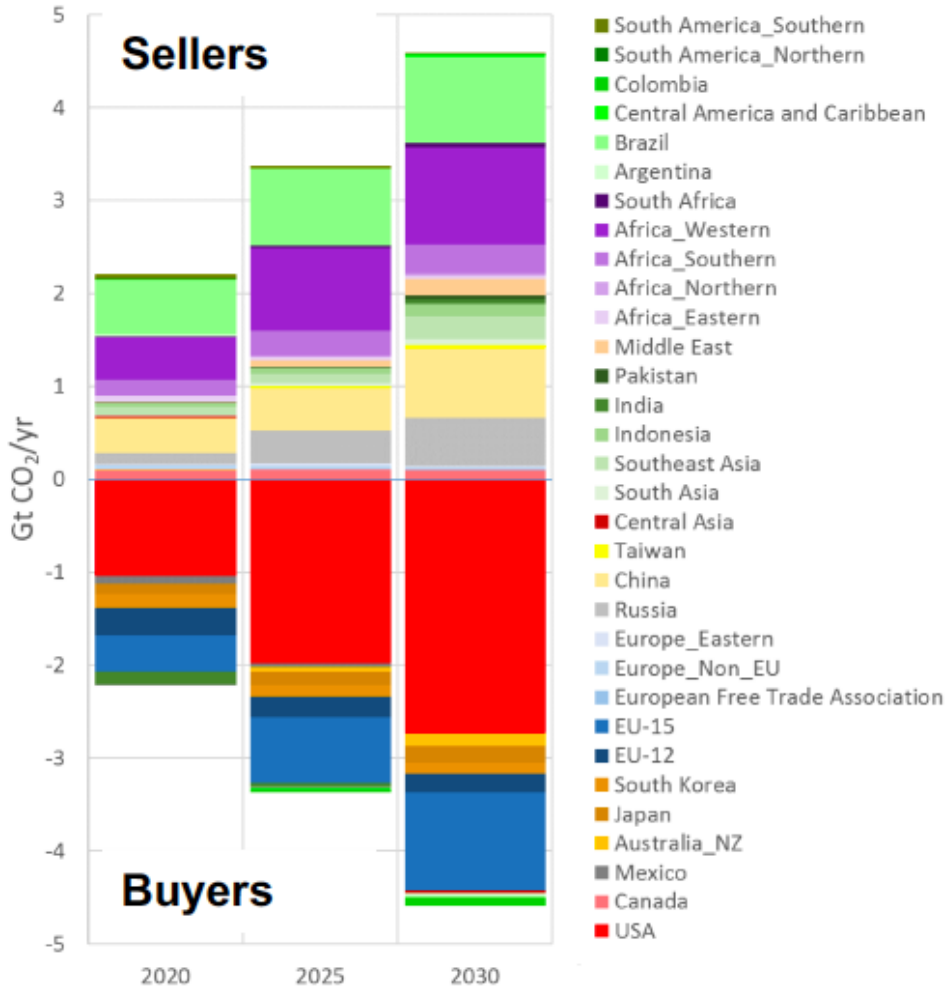

Figure 3: Buyers and sellers under Article 6 (including nature-based solutions) by 2030

(Source: IETA, 2019)

This transition from sellers to buyers is also applicable to Northern African countries, which partially overlaps with the EBRD SEMED region. According to IETA and Climate Focus (2019), in a scenario where NDCs are implemented independently, the region is a net-seller by 2020; however, by the second half of the century, the region becomes a net-buyer. If these countries were to implement their NDC independently (I-NDC), the abatement costs would be lower between the period 2020-2035 but are estimated to increase by 2070. In an enhanced ambition scenario, abatement costs follow the same trend; however, by 2050, the costs are considerably higher than the I-NDC projections (IETA and Climate Focus, 2019).

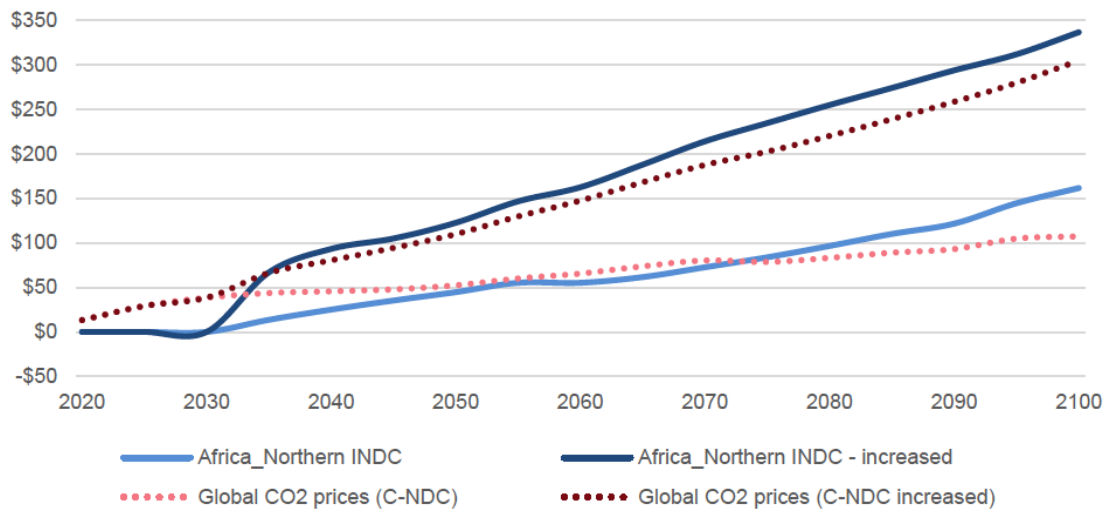

Figure 4: Average shadow price over time for the region (USD 2015/tCO_2)

(Source: IETA and Climate Focus, 2019)

Figure above, shows the regional average shadow price compared to the global shadow price points between 2020 and 2100. The costs of emission reductions in 2020 until 2030 appear to be lower than in the second half of the century. In the I-NDC scenario, the shadow price increases to 161 USD/tCO_2, 50% more than the global estimated shadow price by 2100. Conversely, for the NDC enhanced ambition scenario, the regional shadow price rises remarkably from 122 USD/tCO_2 in 2050 to 336 USD/tCO_2 in 2100.

This increase demonstrates that, in both scenarios, the mitigation activities implemented during the first period 2020-2035 would represent savings for seller countries, leading to stronger emission reduction actions. Conversely, towards 2050, such savings turn into costs as these countries become buyers of ITMOs, potentially limiting their emission reduction ambition.

As for the carbon market size, it is estimated that the Northern African region would be able to sell a total of 99 $MtCO_2$/year by 2030 and 111 $MtCO_2$/year by 2050 and is expected to become a net-buyer of 139 $MtCO_2$ annually by the end of the century. For the North African region, the size of the virtual market is modelled to be USD 6 billion per year by 2050 and USD 15 billion by 2100.

2.1.2 Article 6.2: ITMO forecasting in the region

As part of the cooperative approaches included in Article 6.2 of the Paris Agreement, estimating the availability of ITMOs that would be subject to transactions is complex and uncertain. The number of ITMOs a country would be able to generate, and trade depends on the emissions reduction targets under a host country's NDC, the sectors / regions, the timing of transfers, payments and investment, and the spin-off / acceleration effect such investments leveraged by Article 6 may have, and the activities and sectors included in the national targets. This is uncertain, as there is no precedent for such transactions in the SEMED region, although a numbers of in-transition economies have experience with Green Investment Schemes, which could be similar to ITMO transactions. Completion of the Paris Agreement Rulebook on Article 6 would also help to provide further clarity as to how Article 6.2 would work.

Guidelines on cooperative approaches should clarify crucial elements such as the metrics and scope of ITMOs, if these transactions will occur within the Parties NDC and most importantly the rules for accounting and to guarantee corresponding adjustments. Once these basic rules have been agreed, the host countries or ITMO generating countries will have to decide the sectors in which mitigation activities must take place, the amount of emission reduction they are willing to

trade and whether they will have an approximation for these reductions of PoAs or a crediting policy (emission reductions resulting from the implementation of a policy, regulation or legislation). The number of ITMOs that can be traded by each country will then also depend on the characteristics of each country, including their NDC, technical capacities for the implementation of emission reductions and institutional capacity related to carbon markets.

The countries that are willing to generate ITMOs have begun to take early action on the sectors subject to be included in these types of transactions. In several of the pilots being developed around the world, the energy sector is the most popular because countries can generate emission reductions for their NDCs quickly and at a lower cost. However, it is likely that host countries will offer projects or emission reductions from sectors in which they do not have the capability to develop projects either because of the cost of the projects, lack of access to finance or the lack of technology available. The selection of sectors or types of projects will directly influence ITMO prices and availability.

Despite the uncertainty, potential ITMO buyers, such as Switzerland, Norway and Sweden, have expressed their interest in exploring purchase opportunities of emission reductions in developing countries and emerging economies. On the other hand, countries such as Peru have welcomed the possibility of emission trading within this new market mechanism. Climate Focus (2019) identified more than 20 initiatives around the world that explore the possibilities for ITMO transactions under Article 6 of the Paris Agreement, as shown in Figure 5Figure 5.

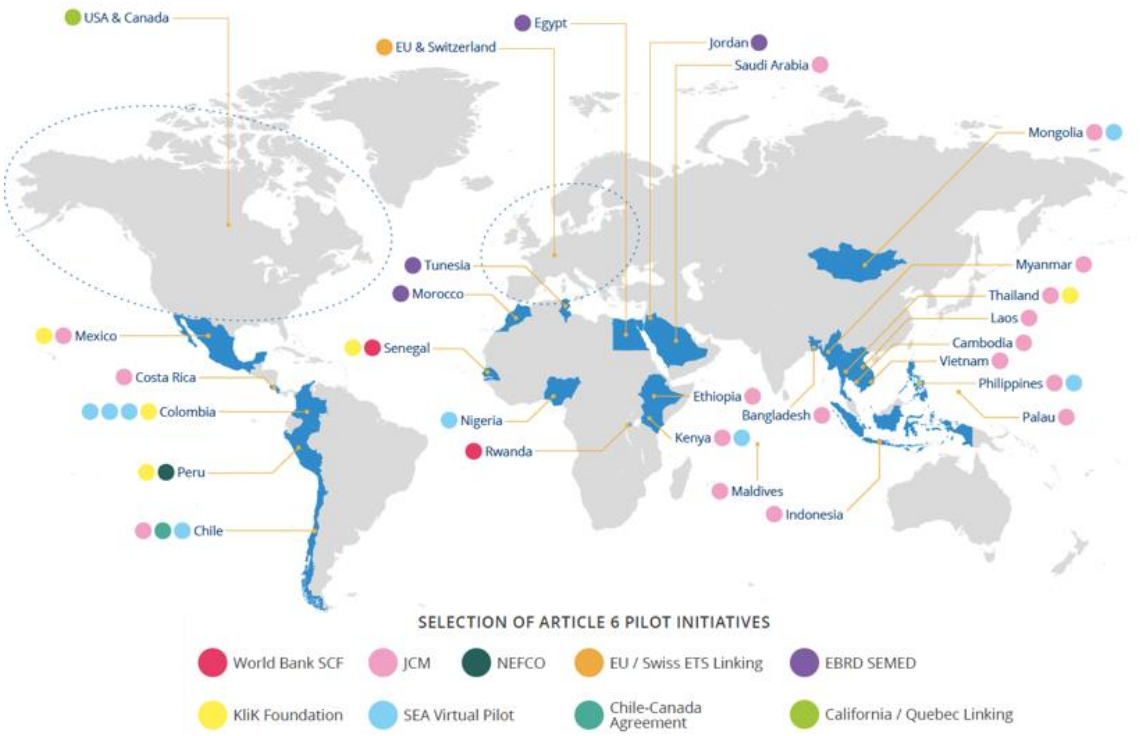

Figure 5: Different Article 6 initiatives around the world

Source: (Climate Focus & Perspectives, 2019)

For these pilots to become a reality and for SEMED countries to be able to participate in the Article 6 market mechanisms, it is necessary for them to be prepared for carbon markets or at least be developing actions to eventually enter such markets. Another factor to consider is the international trading situation of the host countries, as their relationship with the purchasing countries will be important at the time of establishing bilateral agreements for ITMO transactions under Article 6.2.

Table 2 presents the general adjustments to be developed by countries looking to participate in these new market mechanisms. Both host countries and purchasing countries will need to prepare themselves technically and administratively to comply with what is currently established in Article 6 and the guidelines that are expected to be defined at COP26 in 2021. Preparations for this market will depend on countries' progress in carbon markets and their MRV systems. In this context, a robust MRV system is an essential part as well as a critical step for robust and effective accountability of international transfers of emission reductions to avoid double counting, but also to facilitate decision-making, the national planning, building trust and enhancing transparency, to increase ambition at national and international levels, to generate comparable information, and to also increase the likelihood of gaining international support for mitigation actions.

Table 2: Adjustments countries need to make to enter market mechanisms from Article 6

Host Parties	Acquiring Parties
Decide whether to participate in the market mechanism and communicate it publicly	Express interest in participating in the market mechanism and the sectors of interest from which they will purchase emission reductions
Define internally which sectors and/or sub-sectors will be available for market mechanisms	Identify the quantities of mitigation outcomes they are willing to purchase
Establish the necessary institutional arrangements for ITMO transactions (national registry, responsible entities, monitoring systems, point of contact, etc.)	Define the Designated National Authority or the entity that will perform ITMO negotiations
Define the rules for project developers and intermediaries[1]	Establish the type of relationship they will have with intermediaries
Implement corresponding adjustments to their NDC to ensure that ITMOs will not be accounted for in national inventories	Implement corresponding adjustments to their NDC to ensure that ITMOs will not be accounted for in national inventories
Define ITMO prices according to the existing additional funding for these types of projects	Define the maximum price for ITMOs
Strengthen the national MRV system to allow for transparent monitoring of mitigation outcome transactions and emission reductions generated in the country	Establish national MRV systems to account for emission reductions generated in the country and those purchased internationally

(Source: South Pole, 2019)

Since ITMO transactions involve supply and demand, it is also important to understand what buyer countries are looking for. The countries that are currently most active in the development of Article 6-related pilots are Switzerland and Sweden, followed by Germany and other multilateral organisations such as the EBRD and the World Bank. Below is a summary of the activities of some of these potential buyers.

1) **KLIK Foundation** is looking for 54 million tonnes of CO_2 between 2021 and 2030. They have shown interest in developing countries that have made advances in carbon markets. Their main interest is in the solid waste and energy sector. They do not accept forest sector projects, especially REDD+ projects. A letter of intent from the host country confirming bilateral cooperation and a willingness to perform a corresponding adjustment is required to successfully submit activities.
2) **Swedish Energy Agency** has developed virtual pilots that seek to generate guidance and insights based on real emission reduction projects and resolve challenges that occur

[1] Project owners, project developers or coordinating and managing entities.

with the implementation projects that can generate ITMOs. Its focus is mainly on the energy sector to date.

3) **Germany**, through the *Deutsche Emissionshandelsstelle* (DEHSt) and the Ministry of Environment has shown interest in different sectors, especially the transport sector. They have classifications for the countries with which they are exploring future agreements. The countries that may be selected for the transaction of ITMOs, should be advanced in the implementation of GHG reduction activities and have experience in carbon markets.

As mentioned previously, more than 20 initiatives related to the implementation of Article 6 are currently under development. Approximately 18 of these initiatives are conceptual exercises for exploring the implementation of Article 6 in the host countries. The majority are focused on the energy sector and activities within the NDC scope; the other sectors are waste, food and transport (Climate Focus, 2019). The number of initiatives is updated constantly based on the approval of new Article 6 pilots.[2]

In addition to these emerging pilots, other existing initiatives could be aligned to Article 6, such as the linkage between the EU-ETS and the Swiss ETS, as well as the linkage of subnational cap and trade initiatives such as California and Quebec. The initiatives under this category were established prior to the entry into force of the Paris Agreement; however, these can serve as a methodological basis for the cooperative approaches provision under Article 6. Some other initiatives led by multilateral institutions were created to support countries in enhancing capacity building to participate in the new market provisions of the Paris Agreement. The World Bank through the PMR, PMI, the Transformative Carbon Asset Facility (TCAF) and the Climate Warehouse Facility are examples of this category.

Price setting mechanisms for ITMO

The price of ITMOs is another issue to be defined either in the guidelines for Article 6 or by SEMED countries when engaging in bilateral negotiations for ITMO transactions. The final price of these emission reductions could be influenced by three different conditions:

(i) those determined by the market, such as sustainable development benefits, technology availability and existing co-financing statutory and project-related conditions;
(ii) statutory conditions determined by the Paris Agreement, such as additionality; and
(iii) project-related conditions comprising the size and location of the project, project cost and price coverage.

[2] According to the Article 6 pipeline, nine initiatives are about to be implemented by the Klik Foundation. Three proposals have been selected and six are being edited.

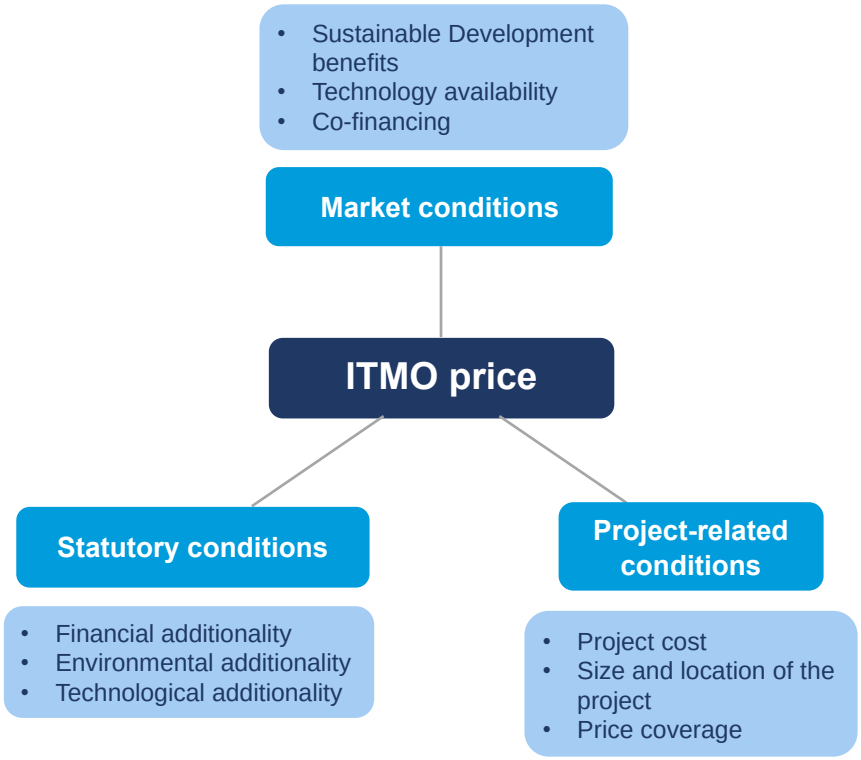

Figure 6: ITMO price setting

(Source: South Pole, 2019)

1) **Sustainable Development benefits**: the implementation of a project should create environmental, social and economic benefits that support sustainable development in a SEMED host country.
2) **Technology availability**: this can positively or negatively impact the development of the project. The deployment of the best available technology could lead to lower implementation costs; however, the potential lack of technical capabilities in a SEMED host country could increase the final price of the unit.
3) **Existing co-financing**: if host countries have resources available for the implementation of such projects, then the necessary funding for kickstarting project development to generate ITMOs would be lower and a project proponent could have a higher starting ITMO sales price.
4) **Additionality**: refers to environmental, financial and technological additionality where mitigation activities, profitability and the deployment of technology would not have occurred without the external support. Mitigation activities deemed additional will have higher project and certification costs (Get2c, 2016).
5) **Project cost**: consider the cost of implementing the project to ensure viability and continuity, as well as the certification costs.
6) **Size and location of the project**: the scale and location of the project determine the price of the units. For example, small-scale projects tend to have higher costs per carbon credit, forcing them to increase the price of credits to achieve a similar profit margin to larger-scale projects.
7) **Price coverage**: if buyer countries are expected to pay for the entire project (design, implementation, technology, carbon project, etc.), then the aggregate ITMO price will likely be much lower, as the buyer can negotiate to lower the sales price as upfront investment will be flowing into the project activity. If the ITMO price only covers the costs of the generation of carbon units, then the price will potentially be higher. The variation of these prices can represent differences of up to 200%. In the commercial model

generated for the projects, it can also be decided whether the ITMO covers the whole project or only a part of it, influencing the final price of the emission reduction.

In accordance with the provisions of the Paris Agreement, the ultimate objective of cooperative market mechanisms is to achieve financing for climate change mitigation or adaptation activities by allowing the SEMED host countries to increase its ambition to reduce emissions and contributing to mitigation and sustainable development activities. To ensure sustainable development benefits are met, as well as minimising the risks of non-NDC compliance, some existing Article 6 pilots, such as NEFCO-Peru Conceptual Pilot and the SEA-Nigeria Virtual Pilot, have established a conditional sale of ITMO's to ensure a mitigation outcome is only transacted if certain sectoral conditions for emission reductions have been met. This means that the acquiring country would is not allowed to claim the emissions reductions generated until those conditions are satisfied. However, on the other side, the buyer has the right to purchase a certain amount of emission reductions at a pre-defined price agreed with the host country (Climate Focus & Perspectives, 2019).

2.1.3 Options for the transition of Kyoto units, projects and mechanisms and the corresponding effects on SEMED countries

During the Kyoto Protocol, the CDM attracted several investments for the development of mitigation projects. This mechanism contributed to the creation of a market that attracted the attention of private investors in different countries. The collapse of Certified Emission Reduction (CER) prices due to oversupply and lack of sufficient demand, halted the issuance of CERs from those projects already registered. It is estimated that the transition from the CDM to the Paris Agreement could create a greater demand for CERs in the coming years, thus enabling the reactivation of financing flows for various mitigation activities even before the rules of Article 6 are approved. This would send a positive signal to the private sector for reactivating its involvement in mitigation activities (Perspectives Climate Group, 2019).

Methodologies under the CDM could be replicated for the implementation of the Paris Agreement, reducing the knowledge gap and the associated costs from new requirements and the need for capacity building. However, the credibility of existing CDM mitigation activities such as large hydropower plants, industrial gases or large coal-based projects has been questioned due to social and environmental concerns or their lack of contribution to sustainable development.

The recognition of all CERs generated by the Kyoto Protocol under the Paris Agreement market mechanisms has been a contentious issue among Parties to the UNFCCC. While some argue for a full transition of CDM, others prefer a CDM transition with certain limitations and ad hoc considerations based on the NDC of the host countries. Although the rules for operationalising Article 6 of the Paris Agreement are not yet ready, countries and the private sector could begin to participate in the development of pilot activities to gain experience in transactions that will result from this new market mechanism.

If the transition of CERs to Article 6 was allowed without restrictions (Pathway A), approximately 15.4 billion CERs would be available (Perspectives Climate Group, 2019). In another scenario (Pathway B) where CERs were restricted to only those generated from activities registered after the second commitment period of the Kyoto Protocol, excluding activities involving hydrofluorocarbons (HFCs), nitrous oxide (N_2O) abatement from adipic acid and large-scale hydropower (15 MW), the volume of available CERs would be 0.89 billion.

In a third scenario, where CERs are restricted to those generated after the Paris Agreement's entry into force, the supply of CERs is reduced to 128 million. This is mainly the result of applying stringent restrictions not only to the eligible activities but also to the supplying countries. In this scenario, only activities from LDCs and SIDS are considered. A fourth scenario could be considered, where all CERs are restricted and projects have to undergo a new registration process under the Sustainable Development Mechanism (Article 6.4) of the Paris Agreement.

This process would have a cost for investors, however, will ensure that the underlying CDM activities are aligned to the new requirements, hence safeguarding environmental integrity and ensuring market liquidity of the transaction.

Following the analysis of Perspectives Climate Group (2019), the volume of CERs available from SEMED countries was calculated using the first two of the scenarios mentioned above considering both CDM projects and Programme of Activities (PoAs). Pathway A considers a full transition and Pathway B considers only activities registered after 1 January 2013 and excludes HFCs, N_2O and large-scale hydropower.[3]

According to Pathway A, the total potential supply of CERs post-2020 is around 55.40 million (Table 3). In this scenario, Egypt and Morocco have the largest availability of CERs from registered projects. The largest availability of CERs post-2020 is from mitigation activities related to renewable energy, N_2O abatement, biomass energy and landfill gas (Figure 7).

Table 3: Total potential supply of CERs for Pathway A (projects and PoAs)

Number of projects	Egypt	Morocco	Jordan	Tunisia	Total
Eligible CDM projects	20	16	4	6	**46**
Eligible PoAs	2	3	0	1	**6**
Total potential CER generation post-2020 (million CERs)	28.53	16.46	5.14	5.26	**55.40**

(Source: South Pole based on UNEP DTU, 2019)

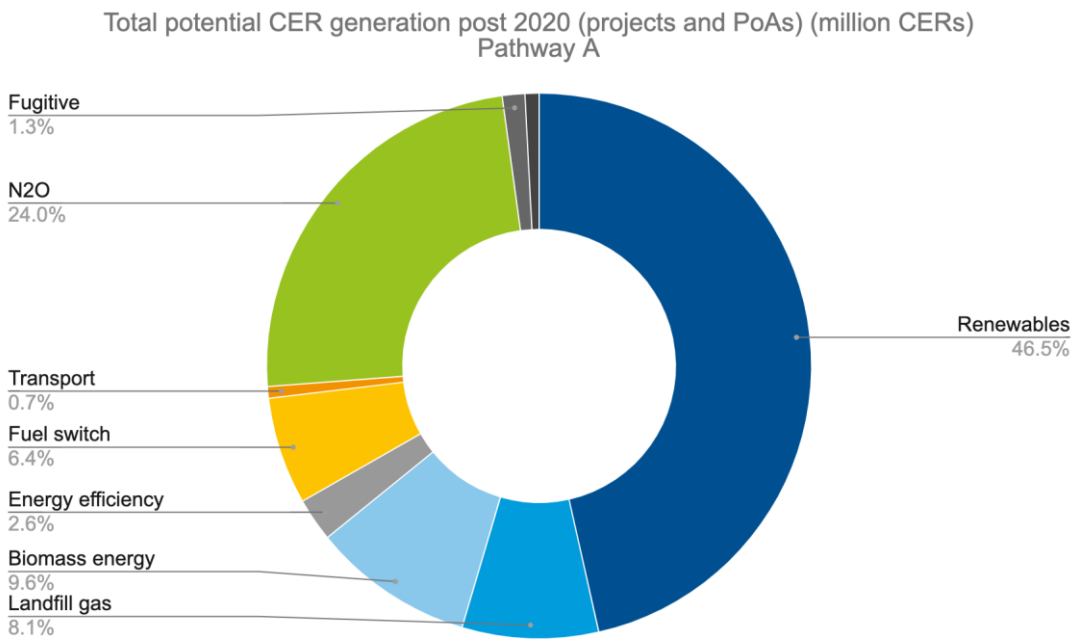

Figure 7: Total potential CER generation post-2020 for Pathway A (million CERs)

(Source: South Pole based on UNEP DTU, 2019)

[3] A third scenario (Pathway C) was not modelled for the SEMED countries as it refers to the supply of CERs from LDCs and SIDS.

In a second scenario, by applying the restrictions considered by Brescia et. al, (2019) the potential supply of CERs in Pathway B is considerably lower for the SEMED countries. In total, six projects are eligible resulting in only 2.21 million CERs available post-2020 (Table 4) – a decrease of nearly 93% compared to Pathway A (Perspectives Climate Group, 2019). In this scenario, the supply of CERs would be restricted to activities related to fugitive gases, biomass energy, landfill gas and methane avoidance (Figure 8).

Table 4: Total potential supply of CERs in Pathway B (projects and PoAs)

Number of projects	Egypt	Morocco	Jordan	Tunisia	Total
Eligible CDM projects	3	2	0	1	**6**
Eligible PoAs	0	0	0	0	**0**
Total potential CER generation post-2020 (million CERs)	0.79	0.83	0	1.05	**2.21**

(Source: South Pole based on UNEP DTU, 2019)

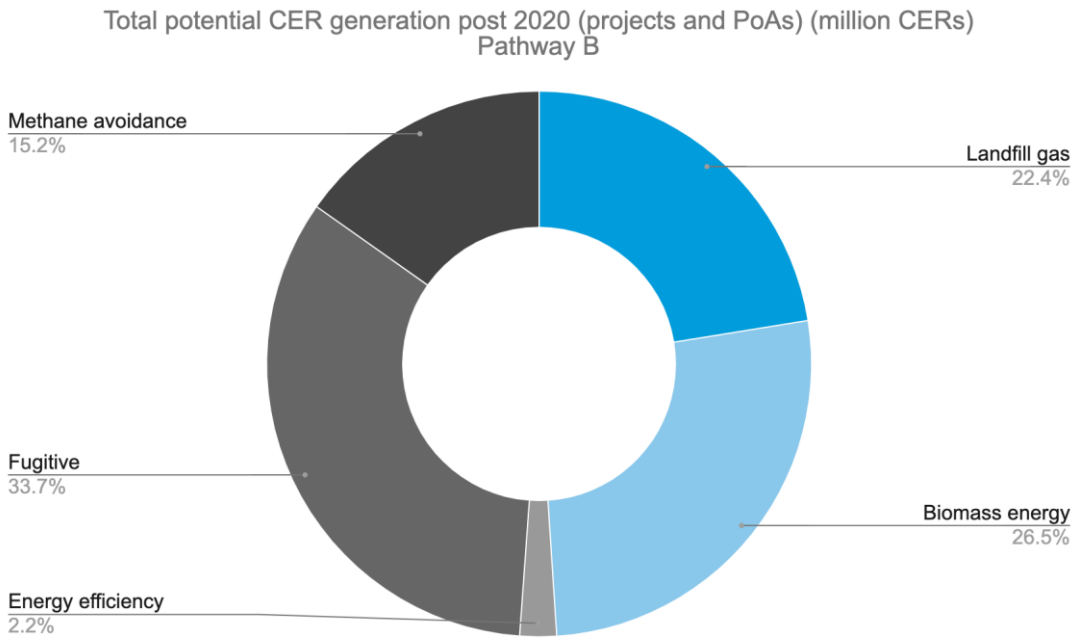

Figure 8: Total potential CER generation post-2020 for Pathway B (million CERs)

(Source: South Pole based on UNEP DTU, 2019)

As presented above, the supply of CERs from the SEMED countries is limited. If discussions under the UNFCCC conclude with a stringent transition where registration dates and activities are restricted, the volume of CERs available to support the implementation of Article 6 will be drastically reduced. SEMED countries rely largely on the support of the private sector to implement mitigation activities to meet their targets; such limitations could undermine potential long-term investments or impact the quality of the CERs available.

On the other hand, although a full transition would be beneficial for SEMED countries to position their accumulated CERs in the market or to reactivate investments of the CDM projects, this could lead to a surplus of CERs that would undermine the integrity of a new market mechanism under Article 6.4. Defining the criteria for the transition from the Kyoto Protocol to the Paris Agreement is crucial.

This transition could potentially impact the behaviour of other market-based mechanisms. Along those under the Kyoto Protocol and the Paris Agreement, other schemes outside the UNFCCC were created to contribute to global carbon emission reductions, such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and the existing voluntary markets. These non-UNFCCC mechanisms and the implications on SEMED countries will be explained in the following sections.

2.2 Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

At the 39th Assembly of the International Civil Aviation Organisation (ICAO) in October 2016, CORSIA was adopted by ICAO member states, setting the stage for a global market-based mechanism for carbon offsetting and reduction within the aviation sector. One of the goals of CORSIA is to accomplish carbon-neutral growth in aviation from 2020 onward, with the average of 2019 and 2020 emissions initially designed to serve as the baseline. In light of the negative Covid-19 impacts on economic activity in the aviation industry in 2020, the ICAO Council on 30 June 2020 agreed to implement a safeguard adjustment to the 2021-2023 pilot phase of CORSIA whereby the emissions baseline is to be calculated using only 2019 emissions, rather than average of 2019 and 2020 emissions.[4] Participation in CORSIA is separated into three implementation periods, as shown in Figure 9.

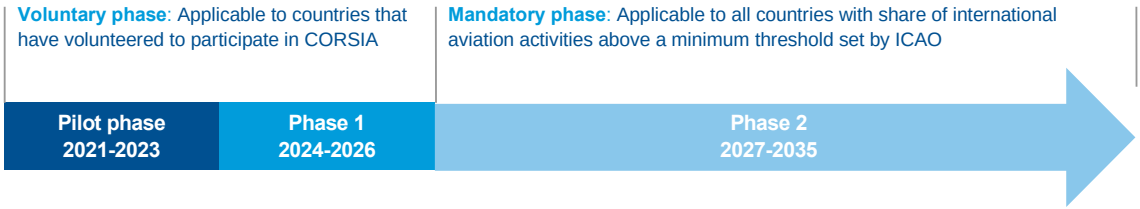

Figure 9: Timeline of CORSIA phases

(Source: South Pole, 2019)

To determine the flights covered under the CORSIA scheme, ICAO has adopted a route-based approach. A route is covered by the scheme if both countries connecting the route are participating in the scheme; a route is not included if one or both countries connecting the route are not participating in the scheme. Therefore, airlines based in countries that have not volunteered to participate under the CORSIA scheme but operate fifth freedom flights[5] between volunteering countries will still be subject to CORSIA requirements.

As of July 2020, 88 countries representing around 80% of international aviation activity have volunteered to participate in CORSIA from its outset (ICAO, 2020a). So far, none of the SEMED countries presented in this report – Morocco, Jordan, Egypt and Tunisia – have opted into the voluntary pilot phase. Despite this, there are certain airlines based in the SEMED countries that are operating fifth freedom flights between volunteering countries, and hence, will have offsetting requirements in the Pilot phase and Phase 1. At the time of writing this report at the end of 2019, there were two routes operated by airlines from Jordan and Morocco that are covered in these phases, as shown in

[4] Adjustments to the baseline approach and other potential changes to be applied in subsequent phases of CORSIA could form part of a periodic review of the system beginning in 2022.
[5] Flights between foreign countries that are flown as part of a connecting service to the airline's own country.

Table 5.

Table 5: Routes operated by airlines with offsetting requirements in CORSIA's voluntary phases

Route	Airline operating this route	Estimated baseline emissions in 2019	Remarks
Bangkok, Thailand to Kuala Lumpur, Malaysia	Royal Jordanian	8,375 tCO_2	Thailand, Malaysia, Gabon and Equatorial Guinea have volunteered to participate in CORSIA
Libreville, Gabon to Malabo, Equatorial Guinea	Royal Air Maroc	1,474 tCO_2	

Note: estimated baseline emissions correspond to the pre-Covid-19 annual emissions in 2019 and were calculated using the ICAO CORSIA CO_2 Estimation and Reporting Tool.
(Source: South Pole, 2020)

The amount of carbon offsetting required depends on the baseline set and the growth rate of emissions in the aviation sector each year, which will be calculated by ICAO annually based on data reported by airlines. As this data is not yet available, this report has used the pre-Covid-19 forecasted growth rates in passenger traffic from the International Air Transport Association's (IATA) 20-year Air Passenger Forecast (IATA, 2018), as shown in Table 6. However, based on IATA's forecast[6] that international airline traffic will not recover to 2019 levels until 2023, a zero-growth rate has been assumed between 2019 and 2023.

Three different growth rates are forecasted based on different growth scenarios in the aviation sector.

Table 6: IATA's 20-year Air Passenger Forecast growth rate scenarios

Scenario	Annual growth rate
High growth: liberalised policy environment leads to increased connectivity	5.5%
Medium growth: unchanged policy framework	3.5%
Low growth: reverse globalisation leads to reduced economic activity	2.4%

(Source: IATA, 2018)

Based on the assumed zero growth rate until 2023, the above pre-Covid-19 growth rates thereafter, and the estimated emissions, Figure 10 shows the CORSIA offsetting requirements for the analysed SEMED countries during the voluntary compliance period. Between 2021 and 2026, the expected cumulative carbon credit demand based on the emissions from Royal Jordanian and Royal Air Maroc would be between 1,450 and 3,370 tCO_2, as shown in the figure below. As there are only two CORSIA-eligible routes in the voluntary phase, the offsetting requirements are very low and will have a negligible impact on the carbon markets.

[6] IATA (2020), Recovery Delayed as International Travel Remains Locked Down. Retrieved from: https://www.iata.org/en/pressroom/pr/2020-07-28-02/

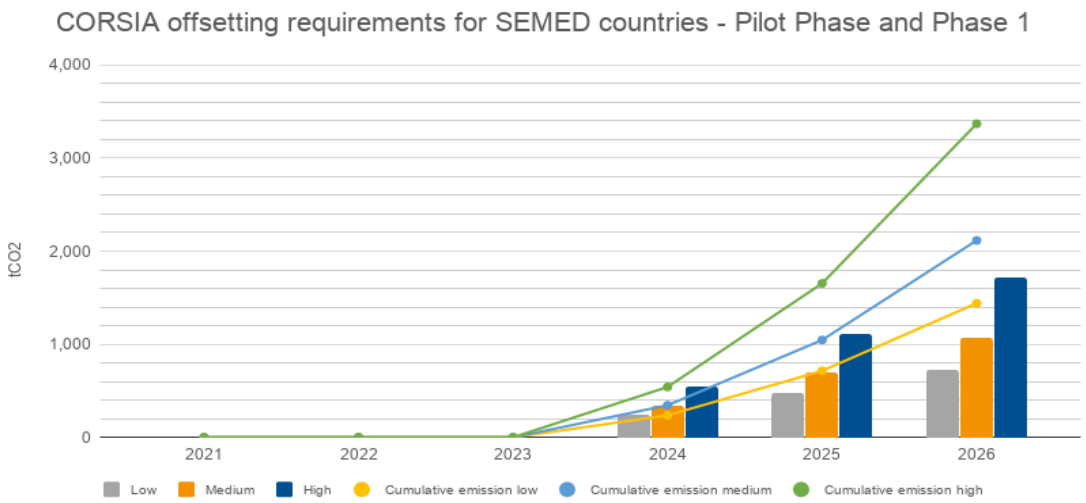

Figure 10: CORSIA offsetting requirements for SEMED countries during the voluntary phase

(Source: South Pole, 2020)

In Phase 2 (i.e. the mandatory phase starting in 2027), all international flights will be subject to CORSIA offsetting requirements, with the exception of a small number of flights to and from Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs). Therefore, the CORSIA offsetting requirements in this phase will be much more stringent for SEMED countries compared to the voluntary phase.

To determine the offsetting requirements in this mandatory phase, Table 7 shows the assumptions considered and how emissions have been calculated. Baseline scenario emissions have been defined using the assumption that pre-Covid-19 aviation activity levels will not be recovered until 2023 (IATA, 2020), and calculations consider only 2019 baseline year emissions rather than the average of 2019 and 2020 emissions from international aviation activity. These emissions have been calculated for each country using the overall methodology from the ICAO Assembly Resolution 39.3 Clause 11 (ICAO, 2016), as shown below.

Emissions in a country in a given year (tCO_2)	=	Jet fuel consumption (tonne of fuel)	X	Emission factor (tCO_2/tonne)	X	% of international flights in each country	X	% of market share of locally registered airlines

Where:

- **Jet fuel consumption is based on 2016 data** obtained from the U.S. Energy Information Administration[7]
- Emission factor = **1 tonne of jet fuel, which translates into 3.15 tCO_2**[8]
- **% of international flights in each country** is based on the percentage of international flights vs. the domestic flights from each country's flag carrier

[7] Retrieved from: https://www.eia.gov/opendata/qb.php?category=2135044
[8] IATA Carbon Offset Program. Retrieved from: https://www.iata.org/whatwedo/environment/PublishingImages/ICOP%20FAQ%20general%20for%20airline%20participants%20jan%202016.pdf

Note: as the percentage of international and domestic aviation activity within each country is not available, this percentage refers to the international vs. domestic flights from each country's flag carrier.[9] No other airlines – apart from those flag carriers – were considered in the calculations.

- **% of market share of locally registered airlines** is based on the percentage of the market share of the flag carrier.

The table below shows the data used and the total emissions in the aviation sector from international activities in the SEMED countries. Calculations are based on the assumption that pre-Covid-19 aviation activity levels will not be recovered until 2023 and the IATA's 20-year Air Passenger Forecast growth rate scenarios.

Table 7: Data used to calculate total aviation sector emissions from international activities

Country		Egypt	Jordan	Morocco	Tunisia
Flag carrier		Egyptair	Royal Jordanian	Royal Air Maroc	Tunisair
Baseline emissions (2019) (tCO_2)	High growth (5.5%)	1,688,046	506,523	933,380	443,863
	Medium growth (3.5%)	1,593,851	478,259	881,296	419,095
	Low growth (2.4%)	1,543,571	463,172	853,495	405,874
2016 jet fuel consumption (tonnes)		1,107,692[10]	369,231[11]	646,154[12]	230,769[13]
Emission factor (tCO_2/tonne fuel)		**3.15**			
Total 2016 aviation sector emissions (tCO_2)		**3,489,230**	**1,163,078**	**2,035,385**	**726,922**
Percentage of international vs. domestic flights from flag carrier		82.4%	97.6%	79.7%	100%
Percentage of market share of flag carrier		50%[14]	38%[15]	49%[16]	52%[17]
Total 2016 flag carrier emissions (tCO_2)		**1,437,563**	**431,362**	**794,879**	**378,000**

[9] This information is obtained from CAPA data published in its online news website Blue Swan Daily: https://blueswandaily.com/tag/airline-insight/
[10] Annual jet fuel consumption, Egypt. Retrieved from: https://www.eia.gov/opendata/qb.php?category=2135044&sdid=INTL.63-2-EGY-MT.A
[11] Annual jet fuel consumption, Jordan. Retrieved from: https://www.eia.gov/opendata/qb.php?category=2135044&sdid=INTL.63-2-JOR-MT.A
[12] Annual jet fuel consumption, Morocco. Retrieved from: https://www.eia.gov/opendata/qb.php?category=2135044&sdid=INTL.63-2-MAR-MT.A
[13] Annual jet fuel consumption, Tunisia. Retrieved from: https://www.eia.gov/opendata/qb.php?category=2135044&sdid=INTL.63-2-TUN-MT.A
[14] Based on 'Egyptair's market share is about 50 percent for international flights and more than 90 percent domestically'. Retrieved from: https://www.amcham.org.eg/publications/business-Monthly/issues/192/december-2011/2770/aviation-sector-navigates-economic-turbulence
[15] Based on 'Royal Jordanian's market share has dropped by 22pts over the past decade: from approximately 60% in 2008 to 38% in 2018'. Retrieved from: https://centreforaviation.com/analysis/reports/royal-jordanian-airlines-narrowbody-fleet-renewal-market-share-down-482600
[16] Based on 'Air Arabia Maroc sits behind Royal Air Maroc (49% of monthly seat capacity) and Ryanair (13%), but ahead of Jetairfly (4.6%) and easyJet (3.3%)'. Retrieved from: https://www.anna.aero/2017/01/25/air-arabia-maroc-moroccos-third-largest-carrier-6-7-seat-capacity-casablanca-remains-1-four-new-airports-join-network/
[17] Based on 'Tunisair is the largest operator in Tunisia with an approximate 52% share of scheduled seat capacity when factoring in the capacity produced by its fully owned regional subsidiary Tunisair express'. Retrieved from: https://centreforaviation.com/analysis/reports/tunisairs-sluggish-attitude-towards-change-makes-it-ill-prepared-for-open-skies-80772

(Source: South Pole, based on U.S. Energy Information Administration, 2019; Blue Swan Daily, 2018; IATA, 2016; American Chamber of Commerce in Egypt, 2011; CAPA – Centre for Aviation, 2019; Airline Network News & Analysis, 2017; and CAPA - Centre for Aviation, 2012)

Once the 2016 emissions data for each country is obtained, the emissions in subsequent years are calculated using the pre-Covid-19 assumed annual growth rate, as shown in Table 6. The emissions for the baseline period (2019) as well as the compliance periods (2027-2035) were calculated for the high, medium and low growth scenarios. Finally, the offsetting requirement for each year is calculated as the difference between the expected emissions in that year and the baseline emissions. Results are shown in Figure 11, where, in 2035, at the end of the compliance phase, the carbon offset demand can range from 1.1 to 3.3 $MtCO_2$ depending on the emissions growth rate applied.

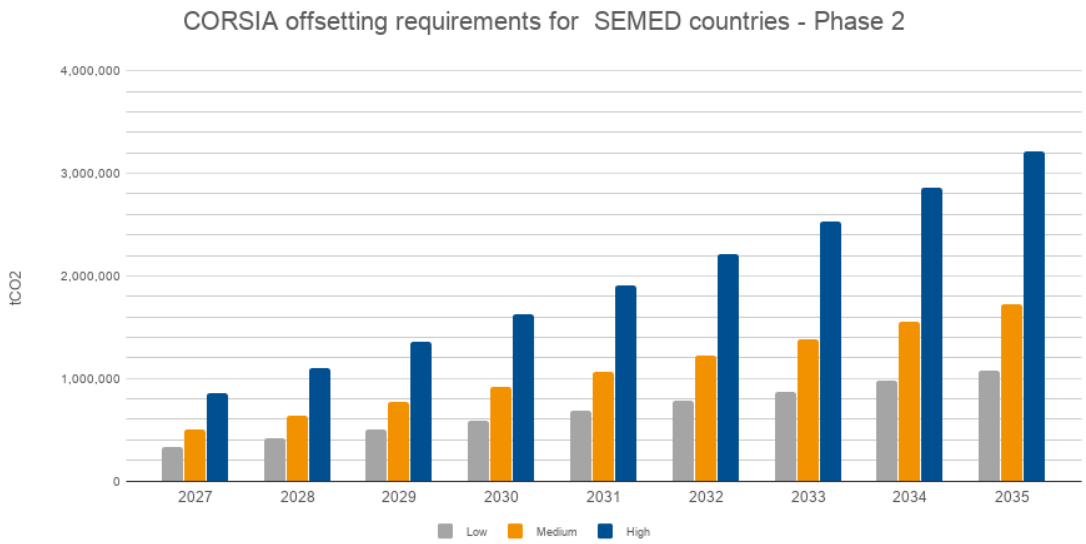

Figure 11: CORSIA offsetting requirements for SEMED countries during the mandatory phase

(Source: South Pole, 2020)

Cumulatively, based on zero growth rate of aviation operations in 2019-2023 and pre-Covid-19 assumptions on growth scenarios for 2024-2035, CORSIA could lead to a carbon offset demand from SEMED country airlines of up to 17.7 $MtCO_2$ during 2021-2035, as shown below in Figure 12. Even though the voluntary phases (2021-2026) will have a negligible impact on SEMED, the total demand of 6.2-17.7 $MtCO_2$ from 2027 to 2035 means that CORSIA could have a significant influence on carbon markets in the region.

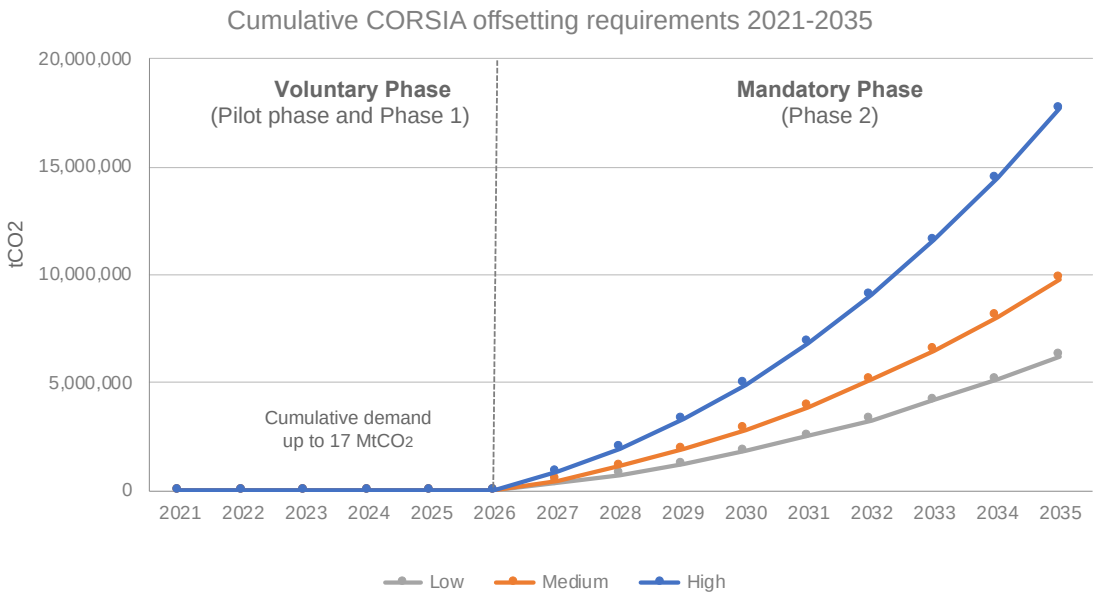

Figure 12: Cumulative CORSIA offsetting requirements for SEMED countries in 2021-2035

(Source: South Pole, 2020)

However, it must be noted that although CORSIA is an international market and there are no requirements for airlines to purchase domestic credits from their country of registration, many have shown interest in sourcing offsets based on their global route network. While this implies that airlines in the SEMED region are free to purchase offsets elsewhere, SEMED countries can encourage their national airlines to source offsets locally. In addition, other foreign carriers, particularly Middle Eastern and European carriers with a strong aviation presence in the SEMED region, may also be interested in sourcing credits from this region. Building on the pre-Covid-19 assumptions of international aviation operations growth, IATA forecast that CORSIA would create demand for around 2.5 billion tCO_2 in offset credits between 2021 and 2035 (IATA, 2019). This estimate is on the conservative side, as industry discussions after publication of IATA report have shown other factors would need to be factored in, such as Covid-19 impacts, use of biodiesel, full uptake of new technologies in the sector. This represents a huge economic opportunity that can result in additional foreign and domestic investment in the SEMED region. None of the flag carriers analysed in the SEMED countries are currently investing in sustainable alternative fuels (SAFs). However, other major CORSIA carriers are exploring its use, which could send the right market signal to SAF producers to scale their production, making such alternative fuels available to major carriers and enabling them to reduce their emissions and offsetting amounts.

Not all carbon standards and project types are eligible for use under CORSIA. In March 2020, the ICAO Council approved the following six standards and programmes which will be able to supply CORSIA Eligible Emissions Units for compliance use during the pilot phase[18].

[18] As of August 2020, 10 further programmes were being assessed by the Technical Advisory Board (TAB), with recommendations expected for CORSIA Council consideration in November 2020.

Figure 13: Carbon offset programmes and standards approved to be CORSIA-eligible

(Source: ICAO, 2020)

Prior to the Covid-19 crisis which has significantly depressed international airline industry operations, it was widely expected that the prices of CORSIA eligible units would rise quickly as airlines would race to secure the available credits. While this demand may have been dampened by the economic impacts of the Covid-19 pandemic on the airline industry in the near term and the adjustment of the baseline approach for the pilot phase, the CORSIA scheme is a large-scale global compliance-based market mechanism that is certain to make an impact on the demand and price of carbon offsets around the world in the medium- to long-term.

To ensure that the CORSIA scheme leads to emission reductions that are additional to those from other commitments, such as domestic NDCs, carbon offset programmes participating in CORSIA are required to follow a set of rules and guidelines to avoid the double counting of emission reductions. Double counting can happen in three main ways (ADC Working Group, 2019):

- **double issuance of emission reduction units** under two different programmes for the same emission reduction project;
- **double use of the same offset units** by the same airline for two different compliance periods; and
- **double claiming of the same units** by an airline participating in the CORSIA scheme and the country in which the emission reduction originates. This can occur when the offset unit falls under the scope of the country's domestic NDC.

A variety of protocols have been proposed, such as specifying clear eligibility criteria and verification methods to ensure emission reduction units from more than one programme are used only once, creating a registry system that tags each unit with a unique serial number containing all of that unit's transaction record, and obtaining a letter of authorisation from a country stating that it will not use this particular unit towards its own target or will make the necessary corresponding adjustments prior to the airline receiving approval to use the unit for its CORSIA offset. SEMED countries should ensure their readiness to address these issues by taking various actions, including streamlining the process in which project owners can apply for the letter of authorisation and developing a credible mechanism for corresponding adjustments.

CORSIA includes a provision to review – every three years starting in 2022 – its implementation and make adjustments if needed, to contribute to the sustainable development of the international aviation sector and to the effectiveness of the scheme.

2.2.1 CDM implications for CORSIA

The CDM is one of the programmes that has been approved as eligible to supply CORSIA units. The rules on eligible activities, double counting and vintage restrictions play a significant role in determining the amount of current and future CERs that will be available for CORSIA offsetting. Some pre-Covid-19 estimations stated that up to 14.9 billion CERs could be issued for emission reductions between 2013 to 2035 from existing projects (that are either already registered, currently in the validation stage or in the CDM pipeline) and used for CORSIA compliance, assuming there were no restrictions other than the emission reduction vintage of 2013 onwards (NewClimate Institute; Stockholm Environment Institute & La Hoz Theuer, 2019). Various restrictions, shown in Table 8, have been implemented by CORSIA to prevent this scenario.

Table 8: CORSIA eligibility restrictions to ensure its carbon neutral growth objective

Restriction	Rationale
Vintage	CORSIA has limited CERs eligibility for CORSIA compliance to CERs issued for activities whose crediting period started from 1 January 2016 with vintages through to 2020 for use during the pilot phase (2021-2023)
Double counting	All eligible programmes and standards approved by CORSIA, including CDM, are required to demonstrate that host countries apply corresponding adjustments, thus ensuring that the offsets applied by airlines under CORSIA will not be double claimed by the host countries in their NDCs.
Type of activities	While the only CERs excluded from CORSIA eligibility are CERs issued to Afforestation and Reforestation activities, further restrictions have been implemented by CORSIA on the types of activities eligible under other programmes and standards: for instance, management and abatement of N2O, Carbon Capture, Utilisation and Storage, management of agricultural and fertiliser operations are excluded from scope of CORSIA eligibility under China's GHG Voluntary Emission Reduction Programme.

(Source: South Pole, based on ICAO Document "CORSIA Eligible Emissions Units", August 2020)

Figure 14 shows the potential CORSIA supply of CERs from existing projects based on various restriction scenarios reflecting pre-Covid-19 assumptions on baseline and aviation industry emissions. With the offset project crediting start dates limited to 2016 as per the actual eligibility rules approved by CORSIA in 2020, there would be room for new projects to supply CORSIA eligible units, however, the actual scale of this demand would be determined to a large extent by the pace of post-Covid-19 recovery of international airline industry and potential enhancements to CORSIA rules as part of its first review in 2022.

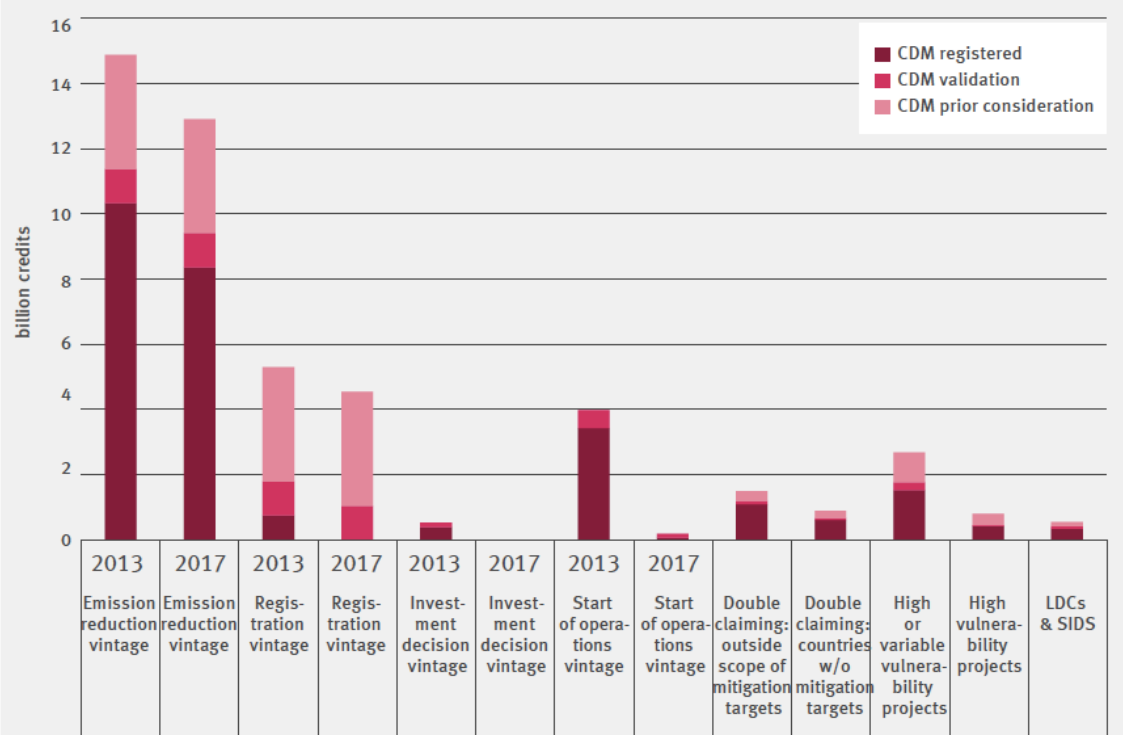

Figure 14: Potential CORSIA supply from CERs based on different restriction scenarios

(Source: NewClimate Institute; Stockholm Environment Institute & La Hoz Theuer, S. 2019)

2.3 Role of voluntary carbon markets

Voluntary carbon markets are key to promote action under NDCs and increase ambition. According to the Ecosystem Marketplace in their 'Voluntary Carbon Markets Insights: 2018 Outlook and First Quarter Trends' (Hamrick & Gallant, 2018) report, since 2005, there are 83 countries with voluntary carbon projects issuing offsets under voluntary carbon standards. The private sector provides carbon finance through the purchase of voluntary carbon credits which can help close the ambition, finance and time gaps of implementing the Paris Agreement. Demand for voluntary action from non-state actors is growing strongly, as outlined in the Ecosystem Marketplace report, and non-state actors are increasing their interest in helping achieve the goals of the Paris Agreement. Many organisations are already putting together their carbon neutral/net zero strategies until 2030, which will likely be met through the purchase of voluntary carbon credits. Many organisations active in the voluntary carbon markets believe that voluntary purchases of carbon credits should be used to help the world set net zero emissions targets and helping reduce the financial burdens that governments face in decarbonising their economies.

Figure 15 below shows projects that have issued offsets through voluntary carbon standards such as the American Carbon Registry, Climate Action Reserve (CAR), the Gold Standard, Plan Vivo and Verra's Verified Carbon Standard (VCS) from 2008 to April 2018.

From the SEMED countries analysed, Egypt and Morocco have voluntary carbon projects (Verra, 2019 and Gold Standard 2018).

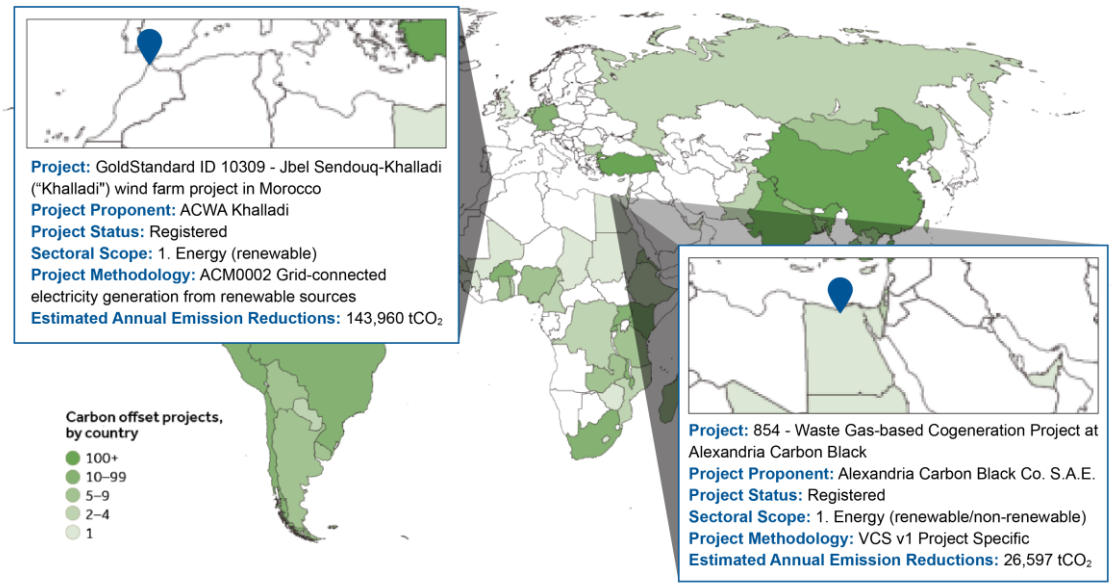

Figure 15: Locations of voluntary carbon offset projects (2008-2018)

(Source: South Pole, based on Hamrick & Gallant, 2018)

In 2017, voluntary carbon markets issued 62.9 $MtCO_2e$, its highest number compared to past years (Hamrick & Gallant, 2018). While this figure is the highest since the voluntary carbon markets started back in 2005, this could be due to many factors, one of them being the awareness of businesses that new commitments must be made to reduce emissions since the Paris Agreement has entered into force.

Over the years, voluntary carbon projects have helped reduce over 435.7 $MtCO_2e$ (Hamrick & Gallant, 2018) and provided additional benefits to the communities and ecosystems in which they operate. It is worth mentioning that not all the offsets issued by voluntary standards are ultimately used on the voluntary market. Some may be used for compliance purposes such as in California's Cap and Trade Programme or Colombia's fuel tax.

Future of voluntary carbon markets

The voluntary carbon markets are another important source of demand and supply for mitigation outcomes. Voluntary carbon markets will continue to grow alongside the implementation of the Paris Agreement as companies will only be using claims from voluntary carbon projects towards their corporate carbon neutrality or emission reduction commitments.

With the increasing number of initiatives around the world to mitigate emissions and the Paris Agreement requiring participating countries to reduce their emissions, avoiding double counting will be an important issue to tackle for the voluntary carbon market. Emission reductions from voluntary carbon market projects will only be counted once – by the host country – for use under the Articles 6.2 and 6.4 of the Paris Agreement. Furthermore, some sectors will not be counted by the host country at all if the scope is not covered under NDC targets or if not covered/overlapped by any other national/regional scheme. For some sectors, such risks might not even be applicable.

Ensuring the additionality of voluntary action

According to the International Carbon Reduction and Offset Alliance (ICROA) position on scaling private sector voluntary action post-2020 (ICROA & IETA, 2019), voluntary action can be maintained in the Paris Agreement era by ensuring its continued environmental integrity and the positive impacts that corporates will have on climate leadership by voluntarily achieving carbon neutrality and communicate this success to customers, investors and employees.

For entities taking voluntary action, additionality is assured when mitigation initiatives are validated and verified by credible third-party carbon standards. Private sector entities can claim carbon credits/mitigation outcomes when carbon standard registries are used to record and transact uniquely identified emission reductions from validated and verified mitigation activities.

Table 9 shows some of the most frequently asked questions about the future of voluntary carbon markets.

Table 9: Voluntary carbon markets – frequently asked questions

Topic	FAQs	Responses
Future of voluntary market	● Can you still use voluntary carbon credits after 2020?	The voluntary carbon market will continue to grow alongside the implementation of the Paris Agreement as companies will only be using claims from voluntary carbon projects towards their corporate carbon neutrality or emission reduction commitments.
	● What happens to the voluntary carbon market after 2020?	From 2020 onwards, it is difficult to project the supply and demand for the voluntary market. More and more countries plan to introduce domestic carbon market schemes and participate in international carbon markets across their borders to meet their carbon reduction commitments under the Paris Agreement. There is no doubt that this will impact the voluntary carbon market, as countries will use voluntary standards to issue credits for both domestic and international carbon pricing schemes.
Voluntary claims and national reporting process	● Can companies still use voluntary carbon credits for carbon neutrality under the Paris Agreement?	Emissions from voluntary carbon market projects will only be counted once – by the host country – for use under the Paris Agreement. Furthermore, some sectors will not be counted by the host country at all if the scope is not covered under NDC targets or if not covered/overlapped by any other national/regional scheme. For some sectors, such risks might not even be applicable.
How will Article 6 and the voluntary market coexist?	● Can voluntary carbon market projects be used for Article 6?	Voluntary carbon market projects (those using Gold Standard or VCS) can issue verified emission reductions (VERs)/verified carbon units (VCUs) as normal, and then these VERs/VCUs could be bought by another country to use it for its NDC considering performing corresponding adjustments. At the point in which the VCUs are transferred from the project owner to the host country, they become ITMOs that will be retired as VERs/VCUs.

(Source: South Pole, 2019)

Only emissions coming from a list of industrial energy/carbon-intensive sectors and sub-sectors are usually included in national GHG inventories. Some sectors are not reported in these national inventories. However, national GHG accounts as reported to the UN do not count the voluntary use of emission reductions from other jurisdictions to compensate for a corporate's in-country emissions. Therefore, emission reductions delivered through the voluntary purchase and retirement of carbon credits are counted just once at the UN level – by the country that hosts the mitigation activity that gave rise to the carbon credits. As private sector entities have no reporting requirements to the UN, their voluntary actions are not double counted in the UN's global inventory. The claims that voluntary buyers have from voluntary projects are that the credits the buyers finance directly help those buyers become carbon or climate neutral. With ever more increasing attention being placed on companies by consumers, there is an unprecedented level of interest in voluntary carbon credits. Host countries should carefully consider if not allowing these units to be used for non-NDC purposes in the voluntary market would be cutting off a vital source of project finance. While the credits bought by voluntary actors for non-NDC use does not lead to double counting, some argue that it does lead to double claiming. One potential solution

to addressing this perception of double claiming is requiring corresponding adjustments to be performed for any credits being used for non-NDC purposes.

The culmination of Article 6 of the Paris Agreement and increased private sector-led climate and sustainability action provides several opportunities for the SEMED countries to benefit from potential increased climate finance opportunities through the generation and sale of carbon credits. Both opportunities present potentially greater levels of demand for carbon credits than during the Kyoto Protocol, as long as both governments and the private sector increase their overall support for meeting the goals of the Paris Agreement. SEMED countries could benefit from both opportunities, subject to the right enabling frameworks that would allow for new carbon market activities to flourish. Both Article 6 and international voluntary markets will need host country political support and guarantees that no double counting of emission reductions will occur. This will require SEMED countries to have robust accounting systems in place to ensure that any carbon credits generated in a SEMED country are used towards the NDC of another Party under Article 6, or that those used by a non-state actor in the international voluntary markets are not also counted towards the NDC inventory of the host SEMED country.

Article 6 provides the opportunity for SEMED countries to benefit from international climate finance through the transfer of mitigation outcomes to another Party for use towards the achievement or enhancement of its NDC. Currently, there are several Parties pursuing mitigation outcomes for the current NDC period including Switzerland, Japan, Sweden and Canada. These mitigation outcomes will depend on the willingness of the host country to perform a corresponding adjustment of its NDC inventory and have a robust NDC with a sufficient level of ambition towards addressing climate change. These Parties are seeking mitigation outcomes from a wide range of jurisdictions and technologies and are employing a variety of additionality approaches and carbon credit standards. Article 6 presents a wide-open opportunity for SEMED countries if they are interested in following the terms and approaches set by potential buyer countries.

International voluntary carbon markets have grown tremendously over the past few years, as the private sector has taken up the challenge of meeting the goals of the Paris Agreement and outpacing shareholder and consumer pressure to offer carbon-neutral goods and services. This is most acute in Europe where companies have been offsetting their emissions for several years, although this trend is now increasing in North America, Australia and many other locations around the world. Companies will continue to offset all or a part of their emissions in the future as this helps them differentiate themselves from their competitors while simultaneously enabling them to market their goods and services as 'carbon neutral' or 'climate neutral'. Most companies that are voluntarily offsetting their emissions do so using offsets that have been generated by the VCS, Gold Standard and CDM standards. SEMED countries could benefit from voluntary markets by creating an enabling legal framework which ensures that any use of carbon credits generated in the countries for non-state actors would not compromise the achievement of their NDC and these credits would not be used by the host SEMED country towards meeting its NDC targets under the Paris Agreement. Allowing the export of credits from voluntary projects for non-NDC use could provide a critical source of carbon finance to continue flowing to projects which were developed by the voluntary market in the absence of government regulation. SEMED countries should consider excluding certain voluntary project activities from their NDC accounting systems to continue allowing carbon finance to flow to voluntary projects. Alternatively, they could allow the existing and future credits from existing voluntary projects to be transferred and not be counted towards their NDC targets and perform corresponding adjustments only for new voluntary carbon market project activities. This would require the SEMED host country to have a registry or tracking system in place to ensure that all projects registered by a credible international voluntary market standard are recorded by the host country and checked against the separate emission reduction activities that the host country plans to use towards achieving its NDC. SEMED countries could also import carbon credits from other jurisdictions for the achievement of their NDC targets under Article 6 of the Paris Agreement, as this report has outlined already. If a SEMED country were to authorise a company or other non-state actor to import carbon credits from another jurisdiction to assist in the fulfilment of the SEMED country NDC, then these units would ultimately be

categorised as ITMOs and corresponding adjustments would be performed by both the SEMED country and the seller country.

3 Readiness of SEMED countries for carbon market development

3.1 Nationally Determined Contributions

The current emissions reduction pledges submitted by Parties to the Paris Agreement are insufficient to meet the temperature goal of the Paris Agreement. According to Climate Action Tracker (CAT), global temperatures will rise up to 3.2ºC by 2100 with the policies currently in place. It is also expected that temperatures will exceed 1.5ºC by 2035 and 2ºC around 2053 (CAT, 2019). Even if countries achieve their commitments, temperatures are likely to rise to 2.5ºC.

The Paris Agreement specifies that updates to the NDCs must be communicated to the UNFCCC every five years and a country can enhance the ambition of its NDC at any time. According to the UN, 75 nations representing 37% of global GHG emissions are planning to enhance their mitigation and adaptation efforts and 37 countries have disclosed their plans to update their NDC (UNDP, 2019).

Among the countries analysed by CAT, Morocco is the only country in the SEMED region whose pledges and targets are aligned with the 1.5ºC goal of the Paris Agreement[19]. Countries should submit an updated NDC by 2020, and to date, 41 countries accounting for 10.1% of global emissions have communicated their intention to update their NDC by next year (Climate Watch, 2018). SEMED countries have not disclosed any intention of increasing their ambition with regard to their mitigation and adaptation goals. In the case of communicating an update of their NDCs, the level of ambition in the NDCs should reflect the national circumstances of each country. Fulfilling these requirements will imply effort amongst Parties to ensure that they fully comply with the UNFCCC NDC process in addition to implementing domestic mitigation policies and measures.

Table 10: Summary of NDCs in the SEMED countries

Country	Mitigation target			Position towards market-based mechanisms
	Total target	Unconditional	Conditional	
Morocco	Reduce GHG emissions by **42% below business as usual (BAU) by 2030**	17% below BAU by 2030	25% below BAU by 2030	Use of market mechanisms towards NDC
Jordan	Reduce GHG emissions by **14% below BAU by 2030**	1.5% below BAU by 2030	12.5% below BAU by 2030	Intention to use market mechanisms
Egypt	Provide appropriate foundations for the development of low carbon energy systems	Policies and actions	Policies and actions	Intention to use market mechanisms
Tunisia	Reduce GHG emissions by **41% below 2010 levels by 2030**	13% below 2010 levels by 2030	28% below 2010 levels by 2030	Use of market mechanisms towards NDC

(Source: South Pole, 2019)

[19] Morocco is the only country from the countries covered in this report that was analysed by CAT.

3.2 Country profiles

This section provides an introduction of each SEMED country profile and carbon policy development. Specific sections on climate change plans, policies and strategies, GHG country profiles, and NDC is presented in the Annex.

3.2.1 Morocco

Given its geographic location, Morocco is highly vulnerable to the effects of climate change. According to the Intergovernmental Panel on Climate Change (IPCC) (Niang et al., 2014), a decrease in rainfall over Northern Africa, coupled with a rise in temperatures, is likely to result in reduced water availability, impacting agriculture and potentially increasing the presence of disease. The sectors that Morocco has identified as most sensitive to the impacts of climate change are water, agriculture, fishing, forestry, health and tourism (Kingdom of Morocco, 2016).

Morocco relies on fossil fuel imports to satisfy its energy needs. In 2015, Morocco's dependency on external fossil energy sources represented 93.6% of imports (Kingdom of Morocco, 2017). Current levels remain around 93%, and even though this represents a decrease compared to 98% in 2008 (Morocco Ministry of Energy, Mining, and the Environment, 2019), reliance on external energy sources continues to be significant.

Recognising the need to strengthen the country's energy security and adapt to and mitigate the impacts of climate change, the Moroccan government has set the stage for an energy transition. To advance this transition, it has undertaken a series of actions geared towards strengthening institutional and legal frameworks, developing national policies and strategies that integrate sustainable development, informing the elaboration or modification of laws to ensure alignment with national objectives, establishing aggressive GHG emission reduction targets and exploring options to participate in a carbon market.

Carbon market developments

In its NDC, Morocco considers the use of international mechanisms to meet its targets. In 2015, a project was launched with financial support from the World Bank and the Partnership for Market Readiness (PMR), to assist the Moroccan government in developing a carbon credit mechanism. The project's objective was to identify market-based instruments (MBIs) that could be implemented in the country and define a national strategy for Morocco to join the carbon market based on Article 6 of the Paris Agreement.

A number of studies were conducted, which included workshops and consultations with key stakeholders, that focused on the improvement of the data management of GHG emissions and on MRV systems across three key sectors – electricity, cement and phosphate – with the goal of piloting an MRV system for GHG emissions (PMR, 2018a).

Based on the PMR report issued in 2018 (PMR, 2018), a feasibility study of the MBIs that would be suitable for Morocco was also undertaken. It examined the legal and institutional framework that would make a credit mechanism viable. Morocco presented the results of this study during COP23 in Bonn, including two preliminary recommendations: the introduction of a carbon tax in the short term and the introduction of an ETS linked to the EU-ETS in the long term (IEA, 2019).

Nonetheless, the project was shut down in 2018, before capacity building activities and the MRV pilot could take place, due to project management issues (PMR, 2019a).

Morocco is also receiving support from the EBRD in four main areas, as per the EBRD's country strategy approved in 2015 (EBRD, 2015): entrepreneurial initiatives, social inclusion and gender equality, technical assistance for the commercialisation of public services and infrastructure and the development of capital markets. The country is also part of the project 'Developing and transacting an up scaled CDM-based carbon credit approach in SEMED', under the Integrated Carbon Programme (ICP) funded jointly by the EBRD and the Spanish government. The project aims to design and implement a crediting mechanism to be piloted under Article 6.

3.2.2 Jordan

Jordan is one of the most water-stressed countries in the world, with less than 100 m^3 of water available per person annually. Increasing demand is putting pressure on water availability – an issue that is expected to be aggravated by climate change through a rise in the frequency of droughts and a decrease in annual precipitation (Ministry of Water and Irrigation Jordan, 2016).

Possessing limited oil and natural gas sources, 97% of Jordan's energy needs are met by fossil fuel imports (Ministry of Environment, UNDP, GEF & Royal Scientific Society, 2017). Demand for energy continues to grow due to accelerated population growth sparked by conflict in the region that has led to an influx of refugees from Syria, in particular. Jordan's energy strategy, therefore, focuses on reducing its dependency on energy imports and increasing its reliance on renewable energy and oil shale (Ministry of Environment, n.d.), as well as improving energy efficiency across various sectors.

Even though Jordan's GHG emissions represented only 0.06% of global emissions as of 2010 (Hashemite Kingdom of Jordan, 2016), the country has signalled its commitment to fighting climate change by integrating adaptation and mitigation measures into its policies, laws and strategies.

Carbon market developments

Jordan's 2013-2020 National Climate Change Policy (NCCP) stated that, in the short-term, the country was not ready to develop a carbon market mechanism as an ETS did not fit its circumstances and there were no plans to set caps on emissions (Ministry of Environment, 2013). Nonetheless, Jordan has made significant progress since, as indicated by its NDC (2016):

"The diverse package of national climate change legal documents, climate change-aligned sectoral strategies and policies and related action plans, the vigorously accelerated number of GHGs cut-oriented projects being developed in many sectors and the development of Energy Services Company (ESCOs), for which legislative and regulatory framework as well as certification mechanism are under development to organise their operations, all reflect the seriousness of the country in combating climate change and increasing the level of involvement in carbon market business" (Hashemite Kingdom of Jordan, 2016 p.10).

PMR is currently supporting the Jordanian government in piloting an MRV framework in key sectors, as well as in building the capacity of stakeholders to implement the MRV and identify a potential MBI. As of February 2019, the MRV system had been piloted for the environment, energy and water sectors and training was taking place, with plans to expand it to the waste, transport, industrial processes and agricultural sectors by the second half of 2020 (PMR, 2019b).

Another component of the project involves adding a registry to the MRV that is designed to make linkages to international transaction platforms possible and facilitate the future sale of credits or ITMOs (PMR, 2019b p.4). This is supported by the bylaw related to the Climate Change System No. 79 that went into effect in June 2019, which gives the central bank the responsibility of studying green finance instruments in order to apply and scale them; authorities are charged with designing and developing market-specific financial instruments to achieve the objectives of the NCCP (Ministry of Environment, 2019).

Regarding the development of MBIs, the PMR is assisting Jordan with two main projects (PMR, 2019b p.4):

1) improving energy efficiency in residential buildings and developing an energy efficiency certification scheme; and
2) developing a carbon crediting program for Amman's Climate Action Plan, submitted to the Carbon Partnership Facility, which includes a GHG inventory.

Significant progress has been made in the development of MBIs, showing Jordan's commitment to participating in a carbon market.

In addition to PMR support, Jordan is part of the EBRD project 'Developing and transacting an up scaled CDM-based carbon credit approach in SEMED', and also receives EBRD support in three core areas: energy sustainability and efficiency, promoting private sector-led inclusive growth and increasing the commercialisation of public infrastructure and the participation of the private sector (EBRD, 2014).

3.2.3 Egypt

Egypt's population and economic activity rely on the Nile River, the country's main water source. Its water is used for agriculture, industry, power generation, mining and oil and gas, among other uses (Arab Republic of Egypt, 2017). But this vital source is threatened by climate change due to projected rises in sea level and a decrease in rainfall in certain areas of the country (Arab Republic of Egypt, 2017).

With an abundant supply of oil and gas, Egypt is Africa's largest oil producer outside of the Organization of the Petroleum Exporting Countries. It is also the continent's third-largest natural gas producer (IEA, 2018), generating enough gas to meet its domestic demand in 2018 (Egypt Today 2019, Mar 8). The government aims to achieve petroleum self-sufficiency in 2023, with plans for further exploration and production activities and refinery expansions in the coming years (Egypt Oil & Gas Newspaper, 2019, Jun. 16).

Egypt has identified several sectors that will be affected by climate change impacts and is therefore in the process of integrating climate change into its strategies.

Carbon market developments

Egypt has been working to improve its data collection and data quality systems for GHG inventories. For instance, Egypt worked with MRV Africa, a project supported by the European Commission, to develop and implement an MRV system for the waste sector, including improved data collection methods for its GHG inventory and capacity building. The application of new methods was expected to take place in 2018 (MRV Africa, n.d.). In addition, Egypt participated in a GIZ funded project in 2017 to improve capacity in the development of NCs and BURs (BMU, 2018). However, no specific progress in the development of MBIs has yet been reported.

Egypt's first NDC states that a national carbon market may be established and further developed into a regional market in the Arab and African region. However, the Egyptian Environmental Affairs Agency (EEAA) has acknowledged that capacity building and policy reforms are needed for new climate finance mechanisms to leverage private sector capital for climate change mitigation, including the establishment of a national carbon market. Egypt is part of the EBRD project 'Developing and transacting an up scaled CDM-based carbon credit approach in SEMED', which seeks to address some of these gaps. It is also part of an EBRD strategy adopted in 2017 (EBRD, 2017) that aims to increase competitiveness of the private sector by strengthening value chains, improving access to finance from small and medium enterprises (SMEs), promoting economic opportunities for women and young people, improving public utilities, supporting the transition to a green economy and improving governance.

3.2.4 Tunisia

With over 1,300 km of coastline along the north and east of the country, Tunisia is highly vulnerable to climate change. The majority of the population lives along the coastline and is therefore susceptible to a rise in sea level, which could also affect Tunisia's water supply due to salinization (MALE, GEF, & UNDP, 2019). A projected decrease in rainfall would worsen the situation, further reducing the amount of water available for human consumption and agriculture.

Virtually all of Tunisia's energy mix is based on fossil fuels (99%), of which 57% corresponds to natural gas and 42% to oil (Government of Tunisia, 2019). The country's energy needs are largely met by fossil fuel imports, putting pressure on an already fragile economy through price volatility and energy subsidies.

In recognition of the impacts that climate change could have on the country and on the need to decrease dependence on fossil fuel imports, Tunisia has committed to implementing climate change adaptation and mitigation measures, with a focus on the energy sector. Tunisia is also exploring carbon pricing instruments.

Carbon market developments

In its First NDC, Tunisia mentions the use of carbon market mechanisms to financially support mitigation programmes, including the Tunisian Solar Plan, mitigation in the cement and other industrial sectors and energy efficiency and renewable energy in the building sector. Carbon pricing mechanisms are expected to play a role, for example, in the achievement of quantitative GHG mitigation commitments in the cement sector. However, for the electricity sector, key barriers to carbon markets remain, including:

- the current subsidies on natural gas, making investment in renewable energy less attractive;
- the lack of an independent power regulator and a monopoly by the national electricity gas company *Société Tunisienne de l'Electricité et du Gaz*, which owns 91% of Tunisia's electricity generation, limiting renewable energy investment; and
- high investment risks making it difficult for investors to access funding.

In 2018, the Tunisian government announced its decision to remove energy subsidies by 2022, introduce an energy tax and amend the renewable energy law No. 12-2015, allowing for the production of renewable energy for self-consumption and sale through the creation of a limited liability company, when operating in the industry, agricultural or tertiary sectors (PMR, 2019c). These changes will significantly decrease barriers to carbon instruments in the electricity sector.

Another barrier to Tunisia's implementation of carbon pricing instruments involves the lack of institutional capacity and transparency processes. According to Tunisia's TNC:

"There is still no assigned representative to coordinate the discussions and work of different sectors to ensure an effective and consistent implementation of the UNFCCC and to prepare the future implementation of the Paris Agreement. Moreover, a complete, permanent and formalized MRV system needs to be set up, to allow the monitoring and evaluation of all components of mitigation and adaptation actions carried out at a national level and in all sectors." (MALE, GEF, & UNDP, 2019, p. 33)

To address this, Tunisia has partnered with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) on a Global Carbon Market project (2018 to 2021) to develop its expertise in carbon markets. Pilot projects have so far been identified for the cement industry (GIZ, n.d.).

Tunisia is also part of the EBRD project 'Developing and Transacting an Up Scaled CDM-based Carbon Credit Approach in SEMED', in addition to receiving EBRD support to open markets and strengthen competition; promote the economic inclusion of women, young people and people living in rural areas; enhance access to finance; and transition to a green economy (EBRD, 2018).

Finally, in 2018, Tunisia received support from PMR to develop and implement carbon pricing instruments (PMR, 2019c). The revision of mitigation targets for the energy and electricity sectors, as well as the design of an MRV system for electricity generation and training on the use of ETS for the cement sector, are included as part of the project.

3.3 SEMED countries' readiness for setting up carbon market instruments

Readiness to adopt carbon pricing mechanisms

For SEMED countries to create or join a carbon market, it is first important to analyse their readiness to adopt carbon pricing mechanisms. Should SEMED countries consider the implementation of one of two schemes of carbon pricing, a carbon tax or an ETS, economic and political factors could influence their ability to do so in the short term and long term.

Skovgaard, Sacks Ferrari and Knaggård (2019) conducted a study to identify patterns in the adoption of carbon pricing policies among political entities. Cluster analysis was used to determine trends and traits and to create groups or clusters based on commonalities. The study looked at domestic and international variables and their potential influence on carbon pricing decision-making based on four categories, shown in Table 11, below.

Table 11: Categories used for cluster analysis in Skovgaard et al. (2019) study

Categories	Assumptions
Economic	The state of the economy could influence the adoption of carbon pricing policies, as measured by the level of income, gross domestic product (GDP), account imbalances and competitiveness.
Carbon intensity	Carbon intensity could be a factor in encouraging or discouraging the adoption of carbon pricing policies, based on CO_2 emissions per capita, CO_2 emissions per GDP unit and energy consumption.
Politics	Government support for environmental policies, as determined by institutional and administrative capacity, can facilitate the adoption of carbon pricing policies.
Policy diffusion	International cooperation and capacity building initiatives, access to climate finance, knowledge sharing and geographical proximity to carbon pricing adopters can influence domestic decision-making.

(Source: South Pole, based on Skovgaard, Sacks Ferrari & Knaggård, 2019)

The study concluded that there are differences in terms of the variables that lead to the implementation of carbon pricing instruments in early adopters (i.e. European countries in the 1990s) and recent adopters (i.e. Latin America, Asia and North America). Although economic factors such as economic or fiscal crises can play a role (as they did for early adopters), the current international policy environment seems to be a significant driver in the implementation of carbon pricing instruments for recent adopters.

Table 12 provides an overview of some of the factors used by Skovgaard, Sacks Ferrari & Knaggård (2019), adapted to each of the SEMED countries for this analysis. The analysis identified current conditions and similarities that might influence or hinder the adoption of carbon pricing instruments in these countries – certain variables have been removed or added for this analysis.

Table 12: Political, economic, carbon intensity and policy diffusion characteristics of SEMED countries

Factors	Egypt	Jordan	Morocco	Tunisia
Economic characteristics				
Income level*	Lower middle-income	Upper middle-income	Lower middle-income	Lower middle-income
Agriculture, hunting, forestry and fishing (% of GDP)	11.7	5.8	14	10.2
Mining, manufacturing and utilities (% of GDP)	28.6	26	23.2	20.4
Construction (% of GDP)	5.7	3.2	6.3	4.3
Wholesale, retail trade, restaurants and hotels (% of GDP)	15.8	10.2	11.8	14.8
Transport storage and communication (% of GDP)	9.1	9	6.6	11.7
Other Activities** (% of GDP)	29.1	45.8	38.1	38.7
Account balance*** (USD billions)	-9,301	-3,104	-5,297	-4,042
Carbon intensity				
CO2 emissions (kg per Purchasing Power Parity $ of GDP, 2014)	0.2	0.3	0.2	0.2
CO_2 emissions (metric tonnes per capita, 2014)	2.2	3.0	1.8	2.6
Electricity production from oil, gas and coal (% of total, 2015)	91.7	99	81.5	96.1
Political characteristics				
Existence of environmental/climate change ministry	Yes	Yes	Yes	Yes
Presence of a green party	Yes	Yes	Yes (one seat in parliament since 2016)	Yes

Factors	Egypt	Jordan	Morocco	Tunisia
Rule of Law Index score** (range from 0 to 1, with 1 indicating the strongest adherence)	0.36	0.57	0.50	0.53
Diffusion of policies				
Climate change commitment or pledge	Yes	Yes	Yes	Yes
Recipient of climate finance/policy programme	Yes	Yes	Yes	Yes

* Low-income economies have a gross national income per person (GNI per capita) of USD 1,025 or less in 2018, lower middle-income economies have a GNI per capita between USD 1,026 and USD 3,995, high middle-income economies have a GNI per capita between USD 3,996 and USD 12,375 and high-income economies have a GNI per capita of USD 12,376 or more (Prydz & Wadhwa, 2019).

** Other economic activities include: financial intermediaries; real estate, renting and business activities; public administration and defence compulsory social security; education; health and social work; other community, social and personal services activities; activities of private households as employers and undifferentiated production activities of private households (ISIC, 2002)

*** Includes balance of payments for exports and imports, income and transfers between country residents and non-residents (IMF, 2019)

**** The Rule of Law Index measures eight factors: constraints on government powers, absence of corruption, open government, fundamental rights, order and security, regulatory enforcement, civil justice and criminal justice (World Justice Project, 2019).

(Source: South Pole, based on CIA, 2019; Garba, 2016; IMF, 2019; Skovgaard, Sacks Ferrari, & Knaggård, 2019; The World Bank, 2019; UN Statistics Division, 2018)

SEMED countries share similar economic, political and environmental policy characteristics. All countries are categorised as lower middle-income, except for Jordan, which is an upper middle-income country.

For all SEMED countries, the economic activity with the highest value added[20], following other activities, is mining, manufacturing and utilities (including electricity, gas and water supply), representing 28.6% of GDP in Egypt, 26% in Jordan, 23.2% in Morocco and 20.4% in Tunisia.

In Morocco, agriculture, hunting, forestry and fishing is the third economic activity with the highest value added at 14%; followed by wholesale, retail trade and restaurants and hotels with 11.8%; transport, storage and communication with 6.6%; and construction with 6.3%.

In Egypt, Jordan and Tunisia, the economic activity with the third-highest value added is wholesale, retail trade, restaurants and hotels, representing 15.8% of GDP, 10.2% and 14.8% respectively. Agriculture, hunting, forestry and fishing represents 11.7% of GDP, 5.8% and 10.2% respectively, followed by transport storage and communication with 9.1%, 9% and 11.7% respectively, and construction with 5.7% of GDP, 3.2%, and 4.3% respectively.

As seen in the GHG emissions country profiles (section 3.2), the sectors with the highest GHG emissions are energy and industrial processes. Within the energy sector, the subsector with the highest emissions is electricity and heat, where electricity is mainly produced from fossil fuels. The electricity and heat subsector are followed by transportation and manufacturing and construction. Therefore, the value-added economic activities in SEMED countries with the highest share of emissions would be mining, manufacturing and utilities, which also represents the second-highest value-added percentage share of the countries' GDP, as previously mentioned.

The implementation of a carbon pricing mechanism in energy production and/or industrial processes, a carbon tax in particular, could generate opposition from certain sectors of the economy as it would increase costs for producers and reduce profit. As stated by Dolphin et al. (2016), "the larger the share of electricity produced from fossil-fuelled power plants, the higher the potential profit decreases and capital losses and, hence, the less politically feasible carbon pricing regulation will be" (Dolphin et al., 2016 p.15). Decarbonising energy generation, which is a step that SEMED countries are already taking to varying degrees, would therefore be a pre-requisite for the implementation of carbon pricing mechanisms.

In terms of account balances, SEMED countries, which are oil importers, present deficits mainly due to low growth and high public debt, driven in part by the Arab spring uprisings that took place in 2011(IMF, 2019b). One way in which SEMED countries have sought to decrease spending has been through the removal of energy subsidies, but other structural reforms and external support are needed to reduce deficits and ensure inclusive growth and good governance (IMF, 2019b). In 2019, planned structural reforms and policy changes were postponed in Tunisia and Jordan due to social unrest (IMF, 2019b).

Readiness to set-up or access carbon markets

After deciding on the most suitable carbon pricing options for each specific case, countries that have the objective of joining or creating a carbon market must define the sectors that will participate, ensure the robustness of their GHG registries and MRV systems, have the management capacity and skills in place to comply with requirements, have a quantitative GHG emissions reduction target and define the institutional and legal frameworks for proper implementation.

Table 13, below, shows SEMED countries' progress in fulfilling ETS and carbon market requirements.

[20] Value added corresponds to the subtraction of intermediate inputs from the net output of a sector.

Table 13: SEMED countries progress in setting up the necessary conditions to develop carbon market mechanisms

Carbon market requirements	Morocco	Jordan	Egypt	Tunisia
Definition of key participating sectors	Three key sectors identified: cement, electricity and phosphate production	Environment, energy and water sectors, with plans to also include transportation, industrial processes and agriculture.	N/A	ETS for the cement sector and carbon tax being explored
Robust GHG inventories and registries	Work in progress. Decree 2-18-74 strengthens data collection and analysis requirements.	MRV framework developed for GHG emissions in key sectors	In progress	In progress
MRV systems	PMR project ended before the launch of MRV pilots	MRV system piloted for the environment, energy and water sectors and training taking place to expand MRV to the waste, transport, industrial processes and agricultural sectors	Waste sector as part of the MRV Africa project	PMR project considers the implementation of an electricity generation MRV system, as well as training on the use of an ETS for the cement sector. Pilots for the cement sector identified under a BMU project
NDC targets	Economy-wide, relative	Economy-wide, relative	Economy-wide actions; policies and actions	Carbon intensity target
Management capacity	Capacity building needed (PMR project ended before activities took place)	Capacity-building activities taking place for MRV implementation	Capacity building needed	Capacity building taking place
Institutional and legal framework	Decree 2-18-74 sets up the institutional and legal framework to strengthen the GHG-IS and tracking for compliance with UNFCCC.	Climate Change Bylaw integrates MRV system and ITMO and establishes an institutional framework for climate change action.	To be strengthened	To be strengthened.

(Source: South Pole, 2019)

As shown in Table 13, capacity building is identified as a recurrent need for all countries, as well as strengthening institutions and improving transparency for robust GHG accounting and inventories. Attention also needs to be paid to NDC target types given that ETS caps are usually expressed in absolute GHG emissions and NDC targets might be expressed in different terms (Schneider et al., 2018; p. 6). For instance, Morocco's and Jordan's targets are relative, while Tunisia's consists of an intensity target. Egypt does not have quantitative targets in place, which would be necessary for developing an ETS and linking it to other ETSs in the future.

Tänzler, Groß, & Li, (2019) conducted a study on the current capacities of several countries for the future negotiation process of ITMOs. The study included Morocco, Tunisia, Jordan and Egypt. According to this study, the following classification was reached:

- Tunisia: medium capacity
- Morocco, Jordan and Egypt: early capacity

This classification is explained in Figure 16, below.

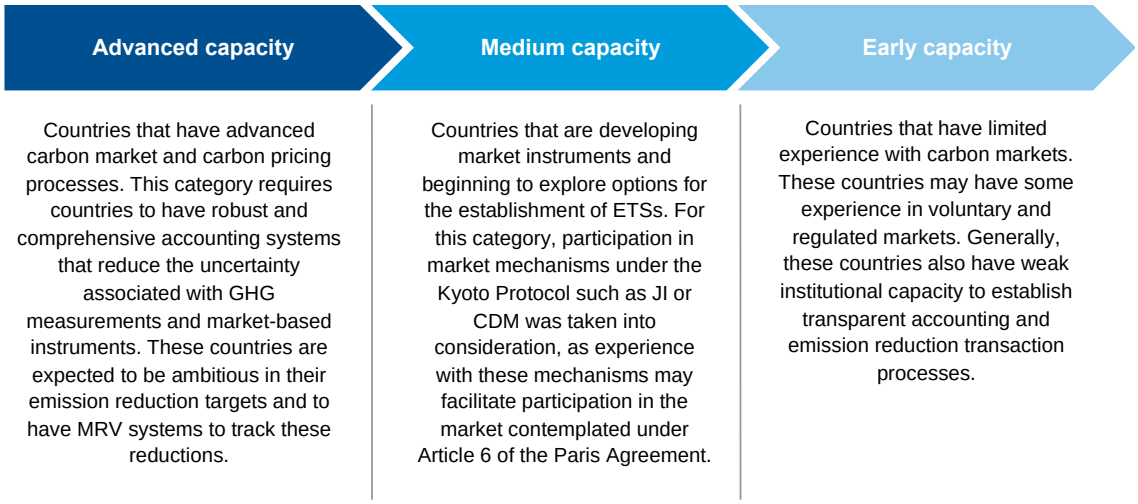

Figure 16: SEMED countries capacity for ITMO negotiation

(Source: South Pole, based on BMU, 2018)

In light of the progress Jordan has made since 2018, as reflected by the introduction of the Climate Change Bylaw and support received by PMR, its category could be adjusted to 'medium capacity'. Morocco could also be considered as having 'medium capacity', given the introduction of the GHG-NIS decree and the support received by PMR to develop MRV systems and explore market-based instruments for specific sectors.

Based on the categories shown in Figure 16, the SEMED countries have a long way to go before initiating ITMO transaction processes, or even bilateral negotiations with potential buyers.

SEMED countries would need to first remove energy subsidies, for those that have not done so, and decide on a carbon pricing mechanism designed with potential linkage in mind. Successful implementation of the carbon mechanism will depend on the level of transparency in all systems and processes, robust accounting and traceability of emission reductions and the government capacity to administer and verify compliance with policies, laws and regulations.

Should SEMED countries achieve the necessary conditions to eventually link their respective carbon pricing mechanisms under a single SEMED carbon market, NDC targets will need to be revised and strengthened prior to linkage to ensure market credibility. Progress in these areas is largely dictated by domestic economic, social and political circumstances, which can hinder the implementation of a carbon mechanism if not addressed effectively.

Even though SEMED countries are working to make improvements in the above-mentioned aspects, work remains to be done. SEMED countries are at different stages in their journey to creating carbon market mechanisms, making it difficult to establish a SEMED carbon market in the short-term.

4 Options for enhancing carbon markets in the SEMED region

4.1 Potential for linkage of carbon markets

ETSs can be linked to create an overarching carbon market (Santikarn, M., L. Li, S. La Hoz Theuer, 2018). By joining or creating carbon markets, parties can benefit from purchasing allowances at a lower cost to meet domestic emission reduction commitments. Carbon markets can be international, regional, national or subnational, and linkages can be bilateral or multilateral, involving allowance transfers between systems (full or restricted linking) or unilateral (one-way linking) where one system purchases allowances from another (Ecologic, 2015). These types of linkages are direct. Indirect linkages can take place when a system (A) is linked to another system (B), linked in turn to a third system (C), creating an indirect link between A and C, as shown in Figure 17. This means that each system can be affected by changes in the other even if no direct linking is in place (Ecologic, 2015). In terms of restricted linkages, these can be implemented through transfer quotas, exchange or discount rates or one-way linking.

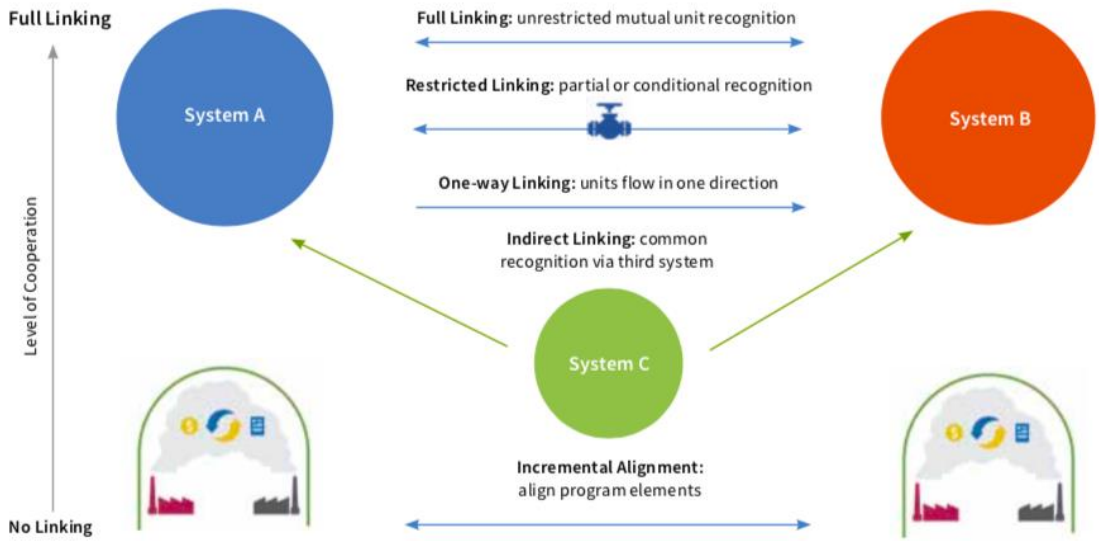

Figure 17: Types of linkages

(Source: Santikarn, M., L. Li, S. La Hoz Theuer, 2018)

Table 14, below, shows carbon market examples under different types of linkages.

Table 14: Carbon markets and types of linkages

Carbon market	Type	Description
Regional Greenhouse Gas Initiative (RGGI)	Multilateral	Began in 2009 and links nine states in the United States. It covers CO_2 emissions from the power sector and was designed and launched as a linked market from inception. A full link is in place.
California-Quebec	Bilateral	Fully linked in 2014 through the Western Climate Initiative (WCI). It is operated by two subnational governments in different countries and includes: ● industries and electricity producers emitting 25,000 tCO_2e/year or more; and ● fuel distributors.
EU-ETS	Multilateral	Set up in 2005, it was designed as a linked market from the beginning, consisting of a full link.

Carbon market	Type	Description
		It includes 28 EU member states and covers: • CO_2 emissions from power and heat generation, energy-intensive industries and commercial aviation; • N_2O from nitric, adipic and glyoxylic acids and glyoxal production; and • perfluorocarbons from aluminium production.
EU-ETS/ Switzerland	Bilateral	An agreement to fully link ETS was signed in November 2017. The Swiss parliament approved the agreement in March 2019, and in November 2019, an amended Ordinance on the Reduction of CO_2 Emissions was approved. The agreement will enter into force on 1 January 2020.
EU-ETS/European Economic Area	Multilateral	Linked since 2008, it includes Iceland, Liechtenstein and Norway. It consists of a full link.
EU-ETS/Australia	Unilateral (abandoned)	Set to start in July 2015 but was abandoned after the 2013 elections took place in Australia, due to opposition and changes in legislation. One-way linking had been planned, with a long-term intention for full linking.
Tokyo ETS/ Saitama ETS	Bilateral	Saitama's ETS was created and linked to Tokyo's ETS in 2011. It covers emissions from large offices and factories. Linkage was initially restricted, excluding offset credits. Systems are now fully linked and credits from Tokyo and Saitama can be traded.

(Source: South Pole, based on Ecologic, 2015; European Union, 2019; ICAP, 2019; Lazarus, Schneider, Lee, & Van Asselt, 2015; Lomas, 2019)

The potential benefits of ETS or carbon market linkages include (Santikarn, M., L. Li, S. La Hoz Theuer, 2018):

- stability in carbon prices;
- improved market liquidity due to increased supply and demand; and
- accessibility of allowances preventing the relocation of production (i.e. 'carbon leakage'). This allows for emission cuts at reduced costs, which in turn can translate into the development of more ambitious emission reduction targets, climate leadership and increased cooperation for climate action at a larger scale.

Linking ETSs comes with certain risks. For instance, changes in the political and economic climate in one jurisdiction or at the international level can generate shocks to the market affecting those linked to it. In addition, where an ETS is not as robust as the others, a lack of credibility in the stringency of the cap can threaten the effectiveness and transparency of the market.

This is more common in smaller ETSs or bilateral links, as the system with the lowest carbon price can benefit from an increase in allowances sold, and therefore, in capital flows, until prices stabilise (Haites, 2014).

Low carbon prices can also lead to less ambitious emission reduction targets. The EU-ETS is an example of this, as a surplus in emission allowances, driven by the economic crisis, led to lower carbon prices and, consequently, to weaker emission reduction incentives; an issue that is being corrected through the postponement of allowance auctions and the creation of a market stability reserve designed to balance supply and demand and limit price volatility (Comission, 2019).

ETS linkages can also affect certain industries or sectors, particularly those that produce or rely on emission-intensive goods, through increases in production costs, which can reduce their competitiveness and lead to political opposition (Haites, 2014; Santikarn, M., L. Li, S. La Hoz Theuer, 2018). In Australia, political opposition led to the cancellation of EU-ETS linkage plans due to concerns over the termination of a price floor that would have led to a reduction in fiscal revenue of AUD 3-5 billion annually and would have directed financial flows to the EU (Tänzler et al., 2018).

Risks can be mitigated through restricted linking and participation in carbon clubs. Figure 18 below summarises the benefits and risks of carbon linkage.

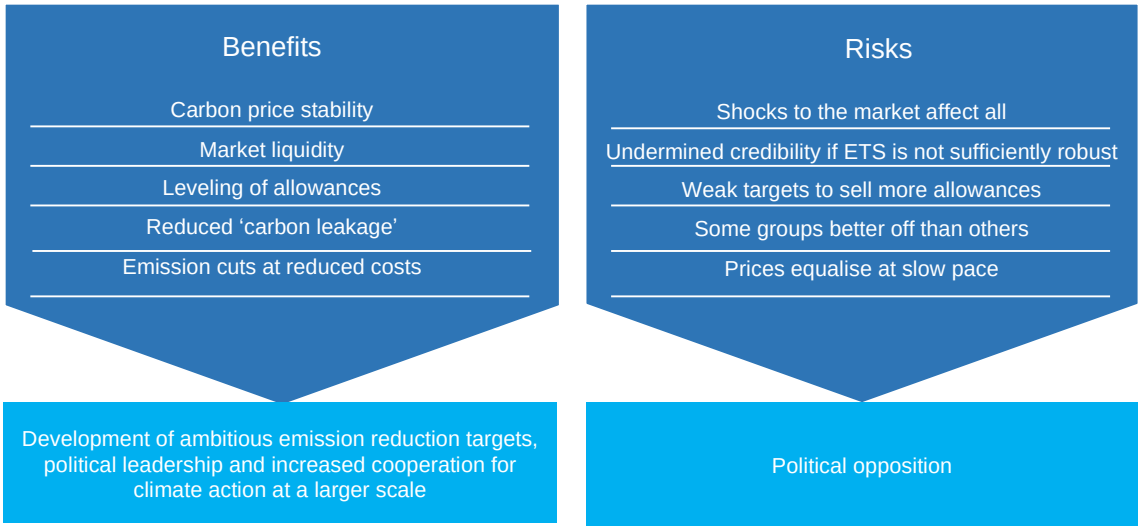

Figure 18: Benefits and risks of ETS and carbon market linkage

(Source: South Pole, based on Santikarn, M., L. Li, S. La Hoz Theuer, 2018)

The creation of a carbon market or a linkage of carbon markets requires a linking agreement, involving negotiations on the type of linkage and the objectives required for the market to operate effectively. Given that carbon markets involve the trade of allowances, certain elements need to be considered when exploring linking options:

- parties interested in creating or joining a carbon market should have a similar ETS design in place with similar ways to measure emission reductions and comparable reduction targets to ensure the alignment of systems;
- robust GHG accounting methods and registries, MRV systems and stringent provisions must be in place to promote credibility within the carbon market;
- technical and capital capacity to ensure the robustness of the ETS are necessary for compliance with the agreement;
- institutional and legal frameworks should be strengthened or developed to meet linking agreement commitments; and
- the type of linkage should be agreed upon based on the benefits and risks identified.

In addition to the above, a supportive domestic political context is essential for linkage to occur. Political support and climate change leadership provide positive market signals, resulting in policies and regulations that favour compliance with linking agreements. On the other hand, an unsupportive political environment can lead to legal action or to the termination of a linking agreement, as exemplified by the EU ETS/Australia case and the suit launched against the state of California where, according to the US federal government, the state does not have the faculty to be part of an international agreement (IETA, 2019a). Stakeholder engagement during the

negotiation stage is therefore key to addressing concerns early on and building trust throughout the negotiation process.

Current climate change policy and regulatory uncertainty at the international level poses difficulties in terms of the design and creation of new ETS and carbon markets, as a changing environment needs to be factored into the design. However, carbon markets are also seen as a means to achieve countries' NDCs, which has led to increased interest in carbon markets and the creation of carbon clubs.

Carbon clubs provide access to and established infrastructure and common standards, as well as capacity building for members, facilitating transaction processes and linkages (Nachtigall, 2019). The WCI and RGGI are examples of carbon clubs. The World Bank has also launched an initiative, the Warehouse Facility, to link pricing systems under an Article 6 pilot and facilitate the transfer of mitigation outcomes, primarily from World Bank-funded projects (Climate Focus & Perspectives, 2019). The project would operate as a database of mitigation activities that is available to potential buyers. The World Bank is also interested in supporting the formation of a club that groups governments to further advance the implementation of Article 6.

It is important to note that, because what constitutes an ITMO has not yet been defined, the relationship between ETSs and ITMOs under Article 6 remains unclear (Schneider, Cludius, La, & Theuer, 2018).

In the case of SEMED countries, none of them have an ETS in place yet but all have included in the intention to use carbon markets for mitigation efforts in their NDCs and are working on the conditions necessary to develop an ETS, such as MRV systems, GHG inventories and registries, institutional structures and regulatory frameworks.

4.2 A possible alliance for carbon market promotion in the SEMED countries

An alliance for carbon market promotion could support the implementation of SEMED countries' NDCs and provide a greater understanding of how carbon markets can be advanced in the region. A SEMED alliance could create a space to cooperate to enhance mitigation ambition and drive climate action.

There are several examples of alliances and cooperation initiatives, including the **East African Alliance on Carbon Markets and Climate Finance**, which launched in June 2019 with the aim of fostering sub-regional cooperation to leverage the strengths of individual countries with regard to carbon market approaches and climate finance; the **Collaborative Instruments for Ambitious Climate Action** is an initiative implemented by the UNFCCC through its Regional Collaboration Centres to assist countries in the development of domestic climate policies instruments with strong MRV components; and the **Carbon Pricing Leadership Coalition**, which is seen as a key instrument in mitigating climate change. Other compelling alliances are presented in the section below.

4.2.1 Case study: regional alliances

West African Alliance: A case study for carbon market development

The West African Alliance on carbon market and climate finance[21] is a group of countries that includes Benin, Cape Verde, Burkina Faso, Côte d'Ivoire, The Gambia, Guinea, Guinea Bissau, Mali, Mauritania, Niger, Nigeria, Senegal and Togo, with the objective of enhancing the long-term position of West African countries to participate in international carbon markets, benefit from technology transfer and access results-based climate finance for NDC implementation.

The West African Alliance was launched at COP22 in Marrakech, in November 2016, after West African countries signalled an increased need to actively shape the negotiations on cooperative approaches and the new market mechanisms, as well as handle existing CDM capacities. The Alliance builds on the positive experience of the World Bank's CDM Reform Working Group.

The Alliance is a sub-regional initiative anchored in institutions that already serve the West African region with regards to carbon markets, technology transfer and climate finance. The regional structure has the Secretariat in Dakar and consists of donors, a steering committee that provides the strategic guidance, an implementation coordination team, thematic groups and technical partners.

The Alliance is working in several activities including the development of technical papers, tools and webinars, providing expert support to countries, assistance for Article 6 Paris Agreement pilots and exploring interdependency between Articles 6 and 13. Their overall mandate is to:

- foster active participation by West African delegates in the UNFCCC negotiations on market mechanisms, transparency and climate finance;
- promote access to market mechanisms and climate finance on a national and regional level;
- manage the transition of CDM-related capacities and activities into the Paris Agreement context through local pilot projects; and
- support Article 6 pilot experiences in the region while sharing implementation knowledge in the negotiations and vice versa.

In February 2018, the West African Alliance steering committee launched a call for submissions for its in-country readiness support programme. Nigeria and Togo are the first countries to receive tailored support. Nigeria's support focuses on its priority sectors and carbon market capacities, while Togo aims to strengthen its MRV system capacities.

[21] More information available at www.westafricaclimatealliance.org

Pacific Alliance:
A case study on cooperation and capacity building

The Pacific Alliance was created in 2012 as a regional initiative for trade integration between Chile, Colombia, Mexico and Peru. This alliance seeks to articulate and link political and economic cooperation and integration in the movement of goods, services, capital and people.

It has 26 technical groups focused on various work areas, including a Technical Group on Environment and Green Growth. This Technical Group emerged from the need to strengthen green growth and sustainable development among member countries. In 2017, the presidents of the Pacific Alliance countries signed the Cali Declaration committing to promote a green growth strategy to address climate change and agreed to "intensify efforts in monitoring, evaluation and verification in each country to identify possible voluntary market mechanisms in the region".

This pledge was supported by multilateral organisations such as the PMR, the Interamerican Development Bank and other countries, such as Canada, through bilateral cooperation agreements (García & Braden, 2019).

The Alliance's Technical Group on Environment and Green Growth is responsible for coordinating the development of activities to strengthen MRV systems in the region. Member countries have prioritised the main areas in which the Alliance needs support to fulfil the mandate of the Cali Declaration, as shown in the figure below.

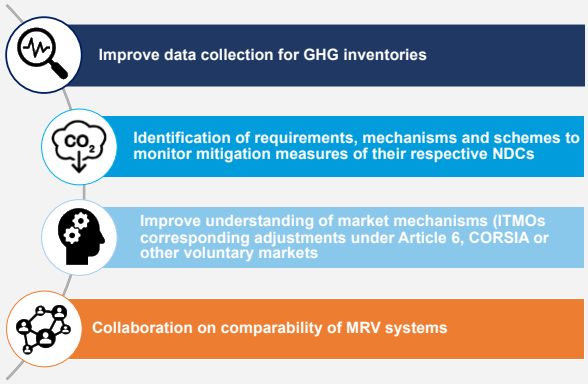

Figure 19: Main areas of interest to the Pacific Alliance

Countries have shown particular interest in deepening their knowledge for the implementation of Article 6 and other voluntary markets. Although collaboration between member countries has been mostly through knowledge sharing and south-south cooperation, the main outcomes have been also shared with other regional platforms, such as the Carbon Pricing in the Americas and the Carbon Pricing Leadership Coalition, in which some Pacific Alliance Countries participate.

4.3 Role of intermediaries in carbon market development and facilitation

Developing countries currently have various funding channels available to access the climate finance they may need to make progress towards their Paris Agreement goals and NDC targets. Multilateral climate finance initiatives often come from governance structures dominated by contributor countries, providing the governments of developing countries with stronger decision-making capabilities.

Until now, Multilateral Development Banks' (MDBs) climate finance strategy consisted of dedicating the maximum volume of finance to support developing countries in their mitigation and adaptation actions. However, the Paris Agreement goals need further support from MDBs that not only mobilises climate finance but also aligns it with the rest of their investments relevant to the Paris Agreement goals, as shown in Figure 20.

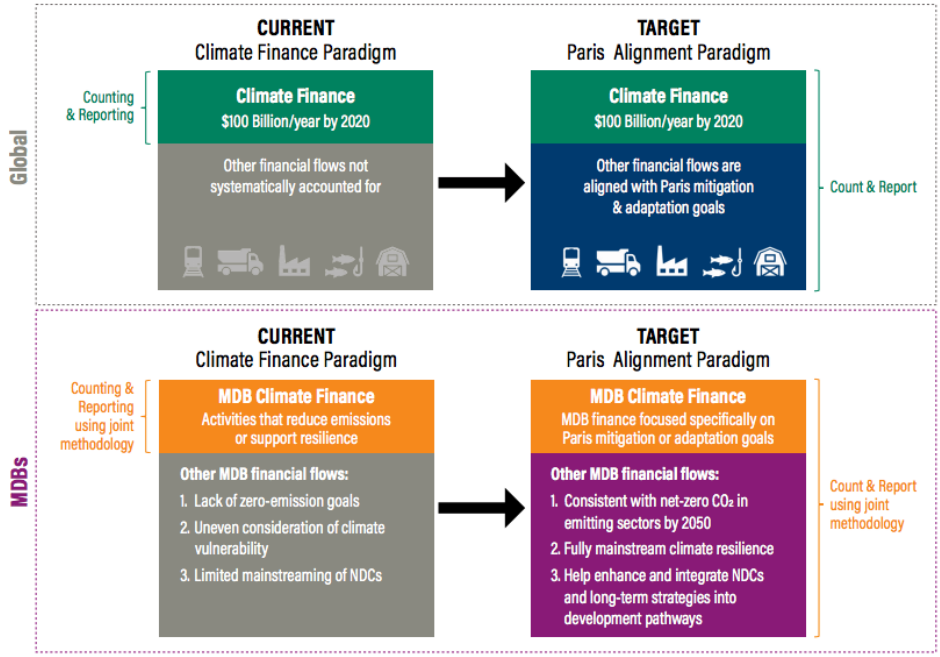

Figure 20: Overview of shift to climate finance Paris Agreement alignment

(Source: WRI, 2018[22])

In 2017, the MDBs and the International Development Finance Club pledged to align financial flows and their operations with the Paris Agreement objectives. This initiative goes beyond the specific MDB's 2020 and 2030 climate finance targets, which in 2017 amounted to USD 35 billion in developing and emerging economies and mobilised an additional USD 52 billion from private and public sector sources.

One year later at COP24, the MDBs signed a joint declaration to work together to reach the goals of the Paris Agreement. The declaration includes six key areas of work to achieve these goals through the development of relevant methods and tools; progress on defining the alignment approach was presented at COP25 in Madrid.

The six areas of work are:

1) alignment with mitigation goals;
2) adaptation and climate-resilient operations;
3) accelerated contribution to the transition through climate finance;
4) engagement and policy development support;
5) reporting; and
6) align internal activities.

At the same time, they are working together on the design and piloting of carbon market and non-market mechanisms under Article 6 of the Paris Agreement – important for both climate ambition and market efficiency.

The MDBs classify their support to carbon markets as climate mitigation finance (Multilateral Development Banks, 2018). As early as the 1990s, the World Bank Group has positioned itself as a pioneer in proving the capacity of carbon markets to lower global emissions (The World Bank, 2018). Since then, several initiatives from different MDBs and with various scopes have been launched. Some examples of these initiatives are:

[22] https://newclimate.org/wp-content/uploads/2018/12/WRI-MDBs-and-Paris-Report-.pdf

- **World Bank 'Mitigation Outcome Warehouse':** at the moment is at the conceptual stage and consists of a meta registry to link different carbon pricing systems. The Warehouse would store Mitigations Outcomes (MOs) that could be transferred for use by a country to help it meet or increase its NDC target. The Warehouse could be useful for the global voluntary market as it could be an additional resource for buyers to identify emission reduction activities;
- **World Bank Group Emission Reductions Purchase Agreements (ERPAs) support** governments and companies from OECD country members in purchasing offsets through their funds. For example, in 2010 alone, its German fund had signed ERPAs for the value of around EUR 54 million (The World Bank, 2019);
- **EBRD supports carbon markets** by managing carbon funds, assisting clients in developing their carbon assets, building capacity and engaging in policy dialogue with the objective of further developing existing carbon markets and promoting new trading schemes[23]; and
- **World Bank PMR** focuses on capacity building and supports countries in designing and implementing carbon pricing instruments, including carbon markets. To date, 30 countries have joined the initiative with the objective of benefiting from knowledge sharing and getting ready for the new carbon market landscape that the Paris Agreement will bring.

4.4 Technology transfer

Technology transfer has been an important element of the UNFCCC since its establishment in 1992. The Convention has since promoted cooperation among Parties to facilitate access to and transfer of climate technologies and knowledge, in particular from developed countries to developing countries. It has also facilitated climate finance through its financial mechanism, which includes the Global Environment Facility (GEF) and the Green Climate Fund (GCF) (UNFCCC, 2016). The GEF and GCF were set-up in 1991 and 2010, respectively, and have played a significant role in scaling up technology transfer in developing countries.

In 1997, a provision for technology transfer was included in the Kyoto Protocol together with a technology transfer framework. A provision to establish the CDM was also included to support emission reduction activities through the issuance of CERs. Although CDM was not created to exclusively support projects focused on technology, it has made significant contributions in this area, with approximately two-thirds of CDM projects involving technology transfer to some extent (Gandenberger, C. et al, 2015).

In 2001, a technology transfer framework and an Expert Group on Technology Transfer (EGTT) were created to support developing countries in assessing and addressing identified technology needs. The EGTT was then replaced in 2010 by a Technical Mechanism (UNFCCC, 2016), which was included in the Paris Agreement (Article 10) as an implementation tool. Other mechanisms are also being explored and developed as part of Article 6.

The Joint Crediting Mechanism (JCM) is an example of a technology transfer-focused, cooperative approach, serving as a pilot under Article 6. Developed in 2010, JCM is a bilateral mechanism, involving Japan and a host country, that generates credits that can be used towards NDCs in both countries. This mechanism was designed with robust accounting guidelines to avoid double counting. It is guided by Joint Committees, formed by representatives from both countries, who assess the technological needs of the host country, select the most appropriate methodologies based on the types of projects and decide on the number of credits to be shared between both countries (Greiner, S., et al., 2019). JCM supports all types of low-carbon technologies, including those used in fossil fuel processes.

[23] EBRD website: https://www.ebrd.com/what-we-do/sectors-and-topics/sustainable-resources/carbon-market-support.html

Other initiatives that are being considered as Article 6 pilots are the Climate Cent Foundation (CCF) voluntary scheme and the Klik Foundation for Climate Protection and Carbon Offset (both of which are based in Switzerland). The CCF promotes investments by businesses in emission reduction projects overseas, generating offsets that can be purchased and handed over to the government of Switzerland (Greiner, S., et al, 2019). Funds come from revenues generated from 2006 to 2012 through a levy on petrol and diesel imports; since 2013, CCF has been entrusted with a portion of this revenue to support pilot initiatives up until 2032 (Greiner, S., et al, 2019). To be eligible, activities must meet robust accounting and environmental integrity requirements of the Swiss government, as well as generate mitigation outcomes that Switzerland can use towards its NDC. A percentage is shared with the host country toward its own NDC. Once projects are selected, a Mitigation Outcome Purchase Agreement (MOPA) is negotiated between CCF and the host country and signed.

While CCF funds projects internationally, KliK was developed to fund domestic projects that generate carbon offsets. Nonetheless, it is preparing to allow for the purchase of ITMOs, starting in 2021 (Greiner, S., et al, 2019). KliK has identified eligible organisations and private sector partners to participate in this initiative. Eligible organisations can present their ideas for consideration, and selected activities are then required to prepare a Mitigation Activity Description Document. An agreement between the Swiss government and the host country is then issued and a MOPA is signed. So far, the only activities and technologies that are excluded are those involving biological carbon sequestration and nuclear and fossil power plants (Greiner, S., et al., 2019).

Given that rules have not yet been issued under Article 6, existing mechanisms can inform the guideline development process. For example, some of the rules and methodologies developed and implemented through CDM, JCM, CCF and KliK could be used as a basis for the development of international guidelines, in particular for ITMOs generated by technology transfers (Koakutsu, K., et al., 2016). Restrictions could be included on the types of technologies considered to ensure alignment with the objectives of the Paris Agreement to transition to a low-carbon economy. This can be done, for example, by excluding technologies used in processes that can have significant environmental and social impacts, such as those utilised for industrial gases, large-scale hydropower plants and energy efficiency fossil fuel processes, particularly coal and oil (Brescia, D., et al., 2019). However, it will be important to consider that methodologies can change rapidly given fast-paced changes in technology development, making it difficult to establish specific rules as the robust quantification of emissions must be ensured at all times. The principles of accounting and transparency, including robust MRV systems, will also need to be applied to technology transfers being used to meet countries' NDCs. Capacity building in the availability and use of low-carbon technologies, as well as support to developing countries in the development of their own technologies, would also be relevant in this context to reduce the dependency of these countries on international resources.

SEMED countries are currently recipients of climate finance focused on low-carbon technology. They receive support from the EBRD Green Economy Financing Facility (GEFF), which, through local financial institutions in host countries, facilitates investments in energy efficiency and renewable energy projects. Businesses and households that access these investments also receive technical advice and product development support, therefore ensuring capacity building at the domestic level and the long-term deployment of clean technologies. In Egypt, GEFF facilitates the transition to a green economy through EUR 140 million in financing for investments in energy efficiency and small-scale renewable energy projects (Regional Center for Renewable Energy and Energy Efficiency, 2019). In Morocco, GEFF consists of a credit line facility of up to EUR 110 million directed to SMEs (GEFF & EBRD, n.d.). GEFF financing consists of EUR 130 million in Tunisia (DAI, n.d.) and EUR 60 million in Jordan (EBRD, 2019). What the role of these investments will be in the implementation of Article 6, remains to be seen.

5 Recommendations

The Paris Agreement allows country Parties to engage cooperatively to develop mitigation actions that will result in the potential transfer of mitigation outcomes though the market mechanisms created under Article 6. Although the rules for these mechanisms are still to be completed, countries have started to deploy efforts bilaterally to conduct pilot exercises and to explore potential avenues for operationalisation. These bilateral arrangements open the door to enhanced capacity building and to promote technology transfer and knowledge sharing. Countries that are currently implementing a type of market-mechanism for emissions reduction or in the process of improving methodologies, legal and institutional arrangements for including such mechanisms, are well prepared to embark in Article 6 transactions.

SEMED countries have expressed interest in using carbon markets to meet their NDCs and are receiving financial and technical support to develop the systems required to engage in future transactions. Nonetheless, these countries are at different stages in their journey to implementing carbon pricing mechanisms, making it difficult to create a regional or even a bilateral carbon market in the short-term.

Analysis of potential economic and social impacts of implementing a market-based mechanism

SEMED countries, through climate finance support, are exploring carbon pricing options best suited to the sectors for which emission reduction opportunities have been identified. The energy and industrial sectors, being the highest GHG emitting sectors due to the use of fossil fuels for electricity generation, are targeted as part of strategies to enhance energy efficiency and renewable energy. In Jordan, an energy efficiency crediting mechanism is being explored for residential buildings. Tunisia is preparing to implement a carbon tax on energy consumption, which would influence carbon pricing in the cement sector, and a results-based payment system for electricity generated from renewable energy, rewarding avoided GHG emissions of electricity producers by topping up the purchase price of electricity sold to the grid (PMRb, 2018). In Morocco, an analysis of appropriate market-based instruments was conducted as part of the PMR project and suggested the introduction of a carbon tax in the short term and an ETS in the long term. A similar analysis would need to be conducted for Egypt.

Sector alignment among SEMED countries

SEMED countries have selected different sectors for the development of carbon pricing mechanisms and the design and piloting of MRV systems. In Morocco, the focus has been on the electricity, cement and phosphate sectors. Tunisia has focused on the energy and cement sectors, and Jordan has already piloted an MRV for the environment, energy and water sectors, which has been extended to the transportation, industrial processes and agricultural sectors. Tunisia and Morocco show the most alignment in terms of sectors; they are both working on an MRV system for electricity as part of PMR and are also developing the capacity of the cement industry to potentially include it in a carbon market. Therefore, ETS implementation and bilateral linkage between Morocco and Tunisia in the cement sector could be a starting point.

Egypt could also explore the possibility of implementing carbon pricing in the cement sector similar to Tunisia and Morocco, as the cement industry is the largest in Egypt and is responsible for most emissions in the energy sector[24]. In addition, Egypt has included the optimisation of the cement industry in its NDC. Finally, given that Jordan is piloting an MRV for industrial processes, it could also explore the possibility of linkage through the cement sector. Finally, electricity can be an additional area of focus for the development of an ETS in Jordan, Tunisia and Morocco, as all three countries are in the process of designing or piloting MRV systems.

[24] Egypt BUR.

Development, implementation and alignment of MRV systems

While a regional ETS for SEMED countries is not currently possible, the unification of methodologies and minimum common criteria in an MRV system could set the foundation for eventually linking carbon markets in the region. Strong institutional and technical arrangements for a common MRV system could facilitate these linkages, as well as compliance with transparency requirements of the Paris Agreement.

Jordan is the most advanced in this area, as an MRV system has already been piloted for various sectors and is being tested by relevant stakeholders. Morocco had the MRV system in place for the electricity, cement and phosphate sectors, but the project with PMR ended right before the pilot was launched and before capacity building activities took place. Tunisia's focus is on the development of an MRV system for electricity generation and Egypt is testing an MRV for the waste sector. MRV systems in identified common sectors will need to be compared before linkage, by verifying the robustness of data collection systems and accounting methods to ensure credibility of the systems.

This alignment of MRV systems could benefit the generation of emissions reduction credits in the region, as SEMED countries could guarantee environmental integrity is met and avoid of double counting. Providing certainty not only to comply with UNFCC requirements, but also to encourage the private sector to develop mitigation activities.

Meanwhile Article 6 guidelines are completed, SEMED countries could continue engaging through bilateral agreements for developing emissions reduction activities, working with domestic airlines for potentially participating in non-UNFCCC mechanisms such as CORSIA and, to participate in voluntary carbon markets. Being involved at the early stages of these programmes will benefit SEMED countries to be prepared when a more stringent regulation enters into force. For example, in the case of Phase 2 of CORSIA (i.e. the mandatory phase), all international flights will be subject to CORSIA offsetting requirements, therefore, in this phase criteria will be much more stringent for SEMED countries compared to the voluntary phase.

SEMED countries could benefit from voluntary markets by creating an enabling legal framework ensuring that any use of carbon credits for non-state actors would not compromise the achievement of their NDC and are used by the host SEMED country towards meeting its NDC targets under the Paris Agreement. This would require the SEMED host country to have a registry or tracking system in place to ensure that all projects registered by a credible international voluntary market standard are recorded by the host country and checked against the separate emission reduction activities that the host country plans to use towards achieving its NDC.

NDC update and ambition increase

Reviewing NDCs and adjusting targets will also be required before the creation of a carbon market. Ongoing capacity building is also necessary, as this has been identified as a recurrent need by all countries. It is important to note that political, social and economic conditions particular to each country play an important role in the implementation of carbon pricing mechanisms and MRV systems, as rapidly changing circumstances can accelerate or hinder progress. Taking into account these conditions and involving stakeholders throughout the process to ensure 'buy-in' are important steps to mitigate risks and ensure the success of a future carbon market mechanism. SEMED countries could benefit from shared capacity building initiatives in the future such as the Integrated Carbon Programmes of the EBRD to continue building the foundation for carbon market mechanisms in SEMED countries.

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Annex I. Country profiles

Morocco

Climate change plans, policies and strategies

Morocco has taken an active role in climate governance since signing the UN Convention on Climate Change in 1992. In 1994, it conducted its first GHG inventory as part of the first National Communication (NC), submitted in 2001. Two additional NCs were submitted in 2010 and 2016, as well as the Biennial Update Report submitted in 2016.

In 2011, Morocco included sustainable development as a right for all citizens in its constitution. Since then, the government has progressively worked on integrating climate change, sustainable development and the protection of the environment in all aspects of government. This has been done through:

- the adoption of a National Charter for Environment and Sustainable Development in 2011, which reinforces citizens' environmental rights;
- the introduction of the Moroccan Climate Change Policy in 2014, which places climate change as a national priority and consolidates the country's vision to transition to a low-carbon economy;
- Framework Law 99-12 on the National Charter for the Environment and Sustainable Development in 2014, which mandates the integration of sustainable development in all areas of government, public policies and sectors;
- the development of a National Greenhouse Gas Inventory System (GHG-IS) in 2015, as a means to improve transparency in reporting mitigation measures and complying with international requirements;
- the submission of its NDCs to the UNFCCC in September 2016 (UNFCCC, 2016), presenting an increase in reduction targets compared to the INDC presented in 2015;
- hosting COP22 in Marrakech from November 7 to 18 2016, including the first meeting of the Parties to the Paris Agreement, the launch of the NDC Partnership and the launch of the Marrakech Partnership for Global Climate Action, which promotes climate action through collaboration between key stakeholders; and
- the adoption of the 2030 National Sustainable Development Strategy (NSDS), identifying seven main challenges, 31 strategic focus areas and 137 objectives to achieve a transition towards a green and inclusive economy.

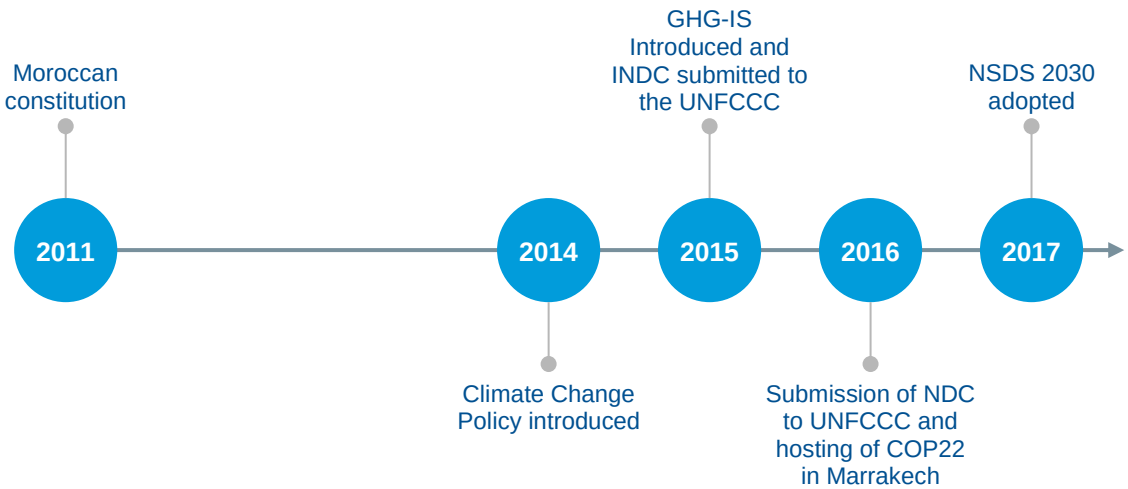

Figure 21: Key developments in Morocco climate governance since 2011

(Source: South Pole, 2019)

Based on key national policies and requirements derived from international commitments, Morocco has progressively developed new laws and strengthened or created institutions to ensure adherence to its climate change and sustainable development objectives. The following institutions look after climate change matters (Kingdom of Morocco, 2017):

- the Ministry of Energy, Mining, and the Environment, with the assistance of the State Secretariat in charge of Sustainable Development (SSSD), looks after the country's international engagements, including compliance with UNFCCC requirements and monitoring of NDCs;
- the National Climate Change Committee (NCCC), composed of key stakeholders from the private and public sectors;
- the National Scientific and Technical Committee, consisting of national experts;
- the National Designated Authority, in charge of the CDM; and
- the Climate Change Competence Center of Morocco (4C), consisting of a Public Interest Group established to support the SSSD in building capacity for climate change mitigation and adaptation.

In 2009, Morocco adopted the National Energy Strategy, which set a target to have 42% of the country's installed capacity come from renewable electricity by 2020 (Kingdom of Morocco, 2017). This target was revised in 2015 to 52% by 2030.

The implementation of the energy strategy involves the following institutions (Kingdom of Morocco, 2017):

- the Moroccan Agency for Sustainable Energy (MASEN in French), in charge of implementing the solar energy plan;
- the Moroccan Agency for Energy Efficiency, which contributes to the implementation of the national energy policy through the reduction in energy dependency and the promotion of energy efficiency measures;
- Energy Investment Society, dedicated to energy efficiency projects;
- Research Institute for Solar Energy and New Energies; and
- National Office for Electricity and Drinking Water (in French).

These institutions make the implementation of the following laws possible:

- Law 13-09 (2010) and Law 58-15 (2016) related to renewable energy, allowing for the production and commercialisation of renewable energy;
- Law 47-09 (2011) for energy efficiency, which requires the implementation of energy efficiency measures in buildings, transport, agriculture, industry and public lighting; and
- Law 48-15 (2016), which regulates the electricity sector and established the National Authority for Electricity Regulation.

In addition, the following two decrees were passed in April and June 2019, respectively:

- Decree 2-18-74 for the National Greenhouse Gas Inventory System (NIS-GHG), which ensures compliance with international commitments; and
- Decree 2-19-452 for the organisation of the National Sustainable Development Committee, which establishes the creation of two committees: one that looks after the NSDS 2030 and one that monitors the Sustainable Development Goals.

In terms of the NIS-GHG, Decree 2-18-74 (Kingdom of Morocco, 2019) provides the institutional and legal framework for the functioning of the national GHG inventory and proper data collection. It assigns responsibilities to sectoral ministries and establishes the creation of a National Inventory Commission and a National Inventory Unit. The former approves the national inventory report, while the latter supervises report elaboration and ensures the quality of data collected.

Morocco's 2030 NSDS lists the acceleration of the implementation of the national policy to fight climate change as one of its seven challenges. One of the strategies identified to address this challenge focuses on improving climate governance by strengthening the existing institutional framework (Kingdom of Morocco, 2017). Another challenge involves the transition to a green economy; the strategies identified to accomplish this include the acceleration of the energy transition, modernisation of the agricultural sector, effective management of fisheries and forests, alignment of industries with the green economy, promotion of a sustainable mining, craft products, transportation and tourism sector, proper waste management for a circular economy and alignment of urbanisation with sustainable development principles (Kingdom of Morocco, 2017).

GHG profile

Since 1994, Morocco has conducted eight GHG emission inventories as part of its NCs under the IPCC 1996 guidelines, for the years 2000, 2004, 2005, 2006, 2008, 2010 and 2012.

In 2015, the NIS-GHG was introduced to fulfil transparency requirements of the UNFCCC. This was done with the support of 4C, a project funded by the international climate initiative of the German Ministry for the Environment) (4C Maroc, 2015). The GHG-IS served to prepare the country's GHG emission data for 2010 and 2014 under 2006 IPCC guidelines, in preparation of the Fourth NC and the Second Biennial Updated Report (BUR). At the time of this report, neither the Fourth NC nor the Second BUR has been published. Emission calculations for later years, if conducted, have also not been published.

According to Morocco's 4C data, GHG emissions in 2014 amounted to 85.22 $MtCO_2e$, compared to 75.45 $MtCO_2e$ in 2010, representing a nearly 13% overall increase in emissions (calculations exclude land-use, land-use change and forestry (LULUCF)). The four sectors taken into account for the GHG calculations were energy, including impacts from energy exploitation, transformation and distribution; industrial processes, including the chemical, mineral and steel industries; agriculture, including arable land, livestock and fertiliser use; and waste, including impacts of landfills and domestic wastewater.

As shown in Table 15, the sector with the most GHG emissions in both years was the energy sector, with 47.89 $MtCO_2e$ and 55.52 $MtCO_2e$ in 2010 and 2014, respectively, representing 63.5% and 64.8% of total emissions. The agricultural had the second most emissions with 17.61 $MtCO_2e$ in 2010 and 19.35 $MtCO_2e$ in 2014, representing 23.3% and 22.7% respectively. Figure 22 and Figure 23 show the contribution of GHG emissions by sector in 2010 and 2014.

Table 15: Emissions by sector in Morocco, 2010 and 2014

Sector	2010 ($MtCO_2e$)	2014 ($MtCO_2e$)
Energy	47.89	55.25
Industrial processes	6.02	5.85
Agriculture	17.61	19.35
Waste	3.91	4.77
Total	**75.45**	**85.22**

(Source: South Pole, based on 4C Maroc, 2015)

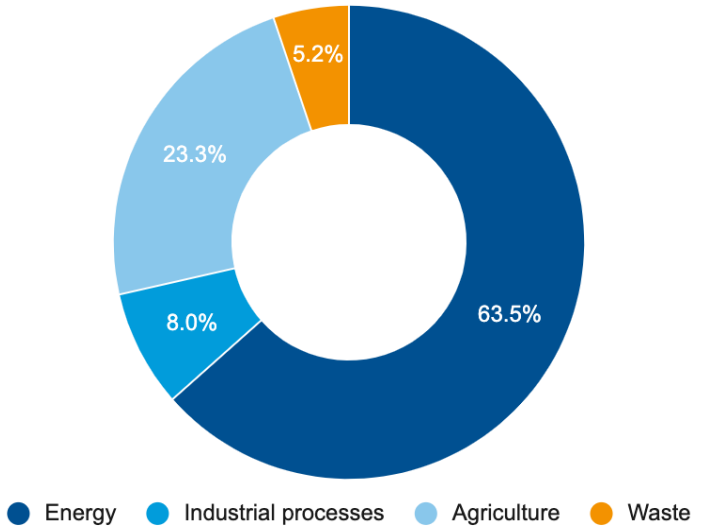

Figure 22: Morocco's GHG emissions profile by sector, 2010

(Source: South Pole, based on 4C Maroc, 2015)

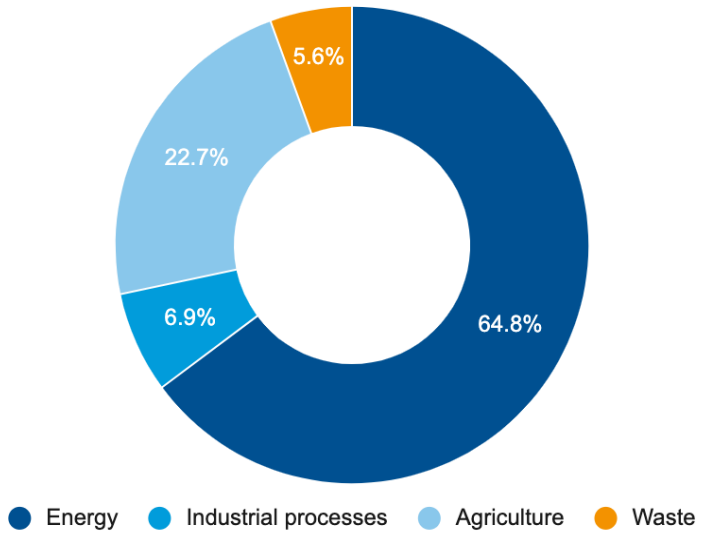

Figure 23: Morocco's GHG emissions profile by sector, 2014

(Source: South Pole, based on 4C Maroc, 2015)

Between 2010 and 2014, most sectors increased their absolute GHG emissions, with the exception of the industrial processes sector, where GHG emissions decreased by approximately 2.8%. GHG emissions related to waste increased by 21.7%, energy emissions increased by 15.4% and agricultural emissions increased by 9.9%.

The country's GHG profile sheds light on the relevance of Morocco's NDC, which focuses on the transition to renewable energy sources and improvements in energy efficiency.

Nationally Determined Contribution

Morocco has a relative[25], economy-wide conditional GHG emission reduction target of 42% below Business-As-Usual (BAU) emissions by 2030, and an unconditional reduction target of 17% below BAU levels by 2030 (Kingdom of Morocco, 2016).

To achieve these targets, Morocco's mitigation goals rely on an energy transition that entails (Kingdom of Morocco, 2016):

- reaching over 52% of installed electricity production capacity from renewable sources by 2030;
- reducing energy consumption by 15% by 2030;
- substantially reducing public fossil fuel subsidies and building on the reforms already undertaken in recent years; and
- substantially increasing the use of natural gas, through infrastructure projects allowing liquefied natural gas imports.

The country has made significant progress towards these goals. Regarding the participation of renewable energy in the country's electricity production mix, from 2007 to 2017, the amount of electricity sourced from renewables tripled. In 2017, 4.6 TWh of electricity came from renewable sources, of which 3 TWh was produced through wind power, 1.2 TWh through hydropower and 0.4 TWh through solar power, representing around 14% of total electricity generation (IEA, 2019).

In 2018, according to MASEN, approximately 1,770 MW of installed capacity came from hydropower, 1,215 MW from wind power and 700 MW from solar power. At the beginning of 2019, the Ministry of Energy, Mining and Sustainable Development announced that the country is well on track to fulfilling its 52% target of installed electricity production capacity from renewable energy, having reached 35% at the end of 2018 (Morocco Ministry of Energy, 2019).

In terms of energy efficiency, Morocco aims to generate energy savings of 5% in 2020 and 20% in 2030 (Kingdom of Morocco, 2017). The AMEE is in charge of leading programmes in key sectors, such as transportation, buildings and industry, to achieve these targets.

The third target, pertaining to the reduction of fossil fuel subsidies, is well underway, as the government has progressively phased out most fossil fuel subsidies with the exception of butane gas (LPG) for residential use (IEA, 2019). Although there is a plan to eliminate this subsidy, the strategy is being handled carefully given the political and social implications, particularly for vulnerable groups.

Finally, plans to increase the use of natural gas are reflected in the country's NSDS and the corresponding regulatory framework is in the process of being developed (Ministry of Energy, Mining, and the Environment, n.d.).

The country's progress towards fulfilling its NDC targets indicate a tangible commitment to the reduction of its national footprint.

[25] An emission reduction target relative to BAU projections.

Jordan

Climate change plans, policies and strategies

Among the first countries to ratify the UNFCCC, Jordan has been active in the climate change governance field since 1992. From 1992 onwards, the country has progressively built an environmental institutional structure that integrates climate change as follows (Ministry of Environment, UNDP, GEF & Royal Scientific Society, 2017):

- in 2001, the National Committee on Climate Change (NCCC) was formed to promote climate change dialogue among stakeholders. Members include representatives from line ministries, research and public institutions, academia and NGOs;
- in 2003, the Ministry of Environment was created, becoming the main institution responsible for environmental protection and overseeing compliance with international conventions and agreements. The Ministry of the Environment chairs the NCCC; and
- in 2014, the Ministry of Environment appointed a Climate Change Directorate to coordinate UNFCCC-related activities, improve the institutional climate change structure and strengthen relevant laws and regulations.

To date, Jordan has submitted three NCs, in 1997, 2009 and 2014, and a BUR in 2017. It also submitted its NDCs in November 2016.

Jordan was the first country in the Middle East to adopt a National Climate Change Policy (NCCP). This overarching policy, which establishes a climate change framework for the period 2013 to 2020, is supervised by the NCCC and serves as an instrument for policy-making and law development (Ministry of Environment, 2013). It also provides guidance on the implementation of GHG mitigation and adaptation measures in key sectors. The ultimate responsibility of implementation lies in the corresponding sectoral ministries.

The following policies and strategies also integrate climate change:

- National Climate Change Health Adaptation Strategy and Action Plan (2012);
- National Biodiversity Strategy and Action Plan 2015-2020;
- National Energy Strategy 2015-2025;
- National Water Strategy 2016-2025, on which ten water-related policies, programmes and action plans are based;
- National Green Growth Plan (2017);
- Jordan Long Term National Transport Strategy and Action Plan, 2030 horizon; and
- National Environmental Protection Law (2017).

The main legal instrument in the energy sector is Law No. 13 of 2012 on Renewable Energy and Energy Efficiency, which aims to increase the share of renewables in the country's energy mix and promote investment. The following bylaws and directives complement this law:

- the Directive for the Costs of Connecting Renewable Energy Facility to the Distribution System for Direct Proposals and Competitive Tenders;
- the Directive Governing the Sale of Electrical Energy Generated from Renewable Energy Systems;
- the 2012 Bylaw on Regulating Procedures and Means of Conserving Energy and Improving its Efficiency; and
- the Reference Pricelist Record for the Calculation of Electrical Energy Purchase Prices from Renewable Energy Sources.

A Climate Change Bylaw (Climate Change System No. 79) also went into force in 2019. Led by the NCCC and headed by the Ministry of Environment, this bylaw formally establishes an institutional framework to oversee climate change matters and UNFCCC responsibilities. It requires ministries to integrate climate change into strategies, action plans and policies, and to keep track of and submit sectoral data on GHG emissions to the national inventory, at least annually (Ministry of Environment, 2019). In addition, it supports the implementation of an MRV system and includes consideration for the use of ITMOs.

GHG profile

In 2014, Jordan's emissions amounted to 32.4 $MtCO_2$ e, excluding LULUCF (CAIT, n.d.). As shown in the figure below, 75.4% of emissions come from the energy sector, followed by waste with 11.4%, industrial processes with 9.4% and agriculture with 1.2%.

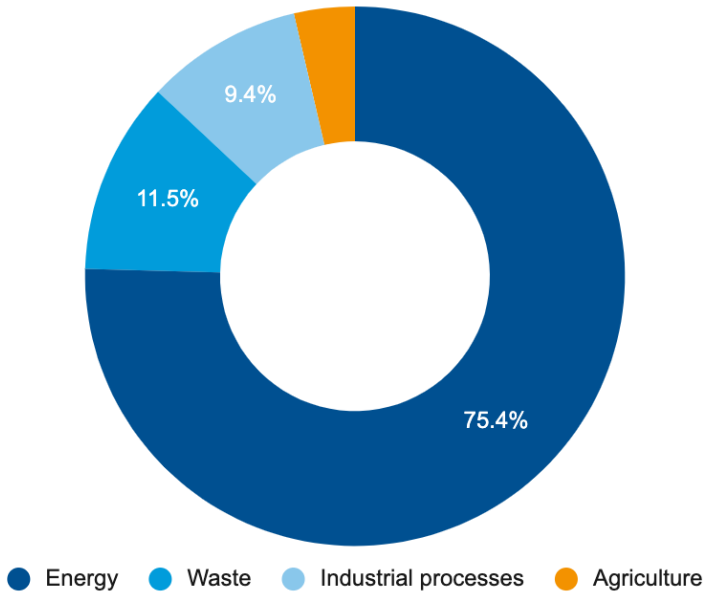

Figure 24: Jordan's GHG emissions profile by sector, 2014

(Source: South Pole, based on Climate Watch, 2019)

Within the energy sector, the subsectors with the most GHG emissions are electricity and heat with 12.64 $MtCO_2$ e and transportation with 7.04 $MtCO_2$ e. Figure 25 shows the percentage share of each energy subsector.

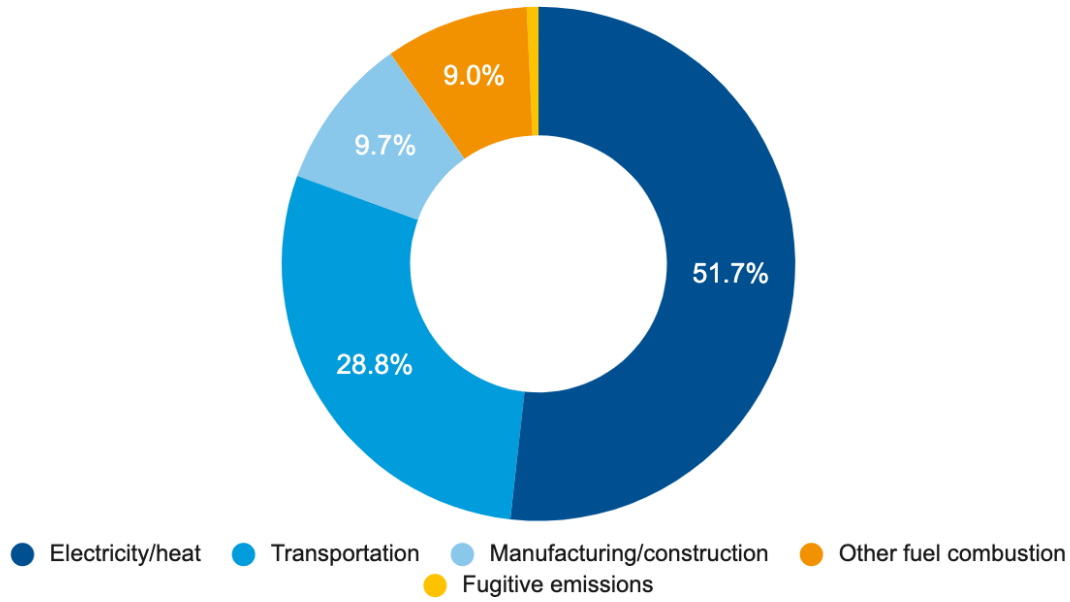

Figure 25: Jordan's GHG emissions profile by energy subsector, 2014

(Source: South Pole, based on Climate Watch/2019)

Given that the energy sector is responsible for the majority of GHG emissions, the country's NDCs and resulting emission mitigation projects focus on this sector.

Nationally Determined Contribution

In its NDCs (2016), Jordan set an unconditional target to reduce GHG emissions by a maximum of 1.5% by 2030, compared to a BAU scenario, and a conditional target of an additional 12.5%, for a total of 14% (Hashemite Kingdom of Jordan, 2016).

Jordan's NDC mentions the development of 43 projects in various sectors, aimed at advancing these targets. As part of the BUR (2017), this number was adjusted to 39, based on GHG emission reductions and cost-benefit analysis that concluded that the focus should be placed on energy efficiency and renewable energy projects (Ministry of Environment, UNDP, GEF & Royal Scientific Society, 2017 p.118).

In terms of renewable energy, the NDC contains a target to increase the share of renewable energy to 11% by 2025 (Hashemite Kingdom of Jordan, 2016). As of 2018, 10% of Jordan's electricity was generated through renewable energy sources and the Ministry of Energy and Natural Resources planned to increase this number to 20% by 2020.[26]

Jordan's NDC also places the transport sector as one of the major GHG emitters. However, Jordan does not identify any mitigation projects in this sector due to the lack of technical expertise and limited institutional capacity (Ministry of Environment, UNDP, GEF & Royal Scientific Society, 2017 p.145).

Jordan's NDC Action Plan had been approved and was presented at COP25.

[26] Interview to the Minister of Energy and Mineral Resources. (2019). Retrieved from: https://www.thebusinessyear.com/jordan-2019/powering-forward/interview

Egypt

Climate change plans, policies and strategies

Egypt ratified the UNFCCC in 1994 and has since submitted three NCs: in 1999, 2010 and 2016. It also submitted its NDCs in June 2017.

Egypt has the following institutional structure in place for matters related to sustainable development and climate change (Egyptian Environmental Affairs Agency, 2016):

- the Egyptian Environmental Affairs Agency (EEAA), established in 1982 as the main authority on environmental issues;
- the EEAA acts as the executive arm of the Ministry of Environmental Affairs, which was created in 1997 to serve as the legislative body for all sustainable development and environmental matters; and
- the National Committee on Climate Change (NCCC), was created in 2007 and composed of representatives from various ministries and experts in the field.

The NCCC was replaced in 2015 by the National Council on Climate Change, which is in charge of the country's climate change strategy and data collection.

The National Strategy for Adaptation to Climate Change and Disaster Risk Reduction, published in 2011, guides Egypt's climate change policy framework. It establishes the conditions for the strategy to be realised, including the need to strengthen the climate change institutional and regulatory frameworks. The strategy assesses the impacts of climate change on various sectors and proposes adaptation measures (The Egyptian Cabinet Information & Decision Support Center & UNDP, 2011).

Egypt passed its new constitution in 2014. It mentions the need to achieve sustainable development in various aspects, such as the economic system (Article 27), the environment (Article 46), food (Article 79) and housing (Article 41) (Egyptian Government, 2014). Egypt's 'Sustainable Development Strategy: Egypt Vision 2030', published in 2016, supports the objectives established in the constitution (Egypt 2030 Vision, 2016).

In its Third National Communication (2016), Egypt lists the constraints to ensuring effective environmental policy monitoring, including (EEAA, 2016):

- limited coordination between institutions;
- lack of a common information system for data input and management;
- absence of monitoring methodologies; and
- lack of financial resources, among others.

As such, building the capacity of existing institutions and creating new ones is necessary for Egypt to develop and implement climate change laws and regulations, ensure transparency and conduct appropriate monitoring.

GHG profile

Egypt's GHG emissions in 2014 totalled 272.69 $MtCO_2e$ excluding LULUCF and 272.47 $MtCO_2e$ including LULUCF. As shown in Figure 26, the energy sector was the largest contributor to emissions with 70%, followed by the agriculture sector (11%), industrial processes (10%) and waste (9%).

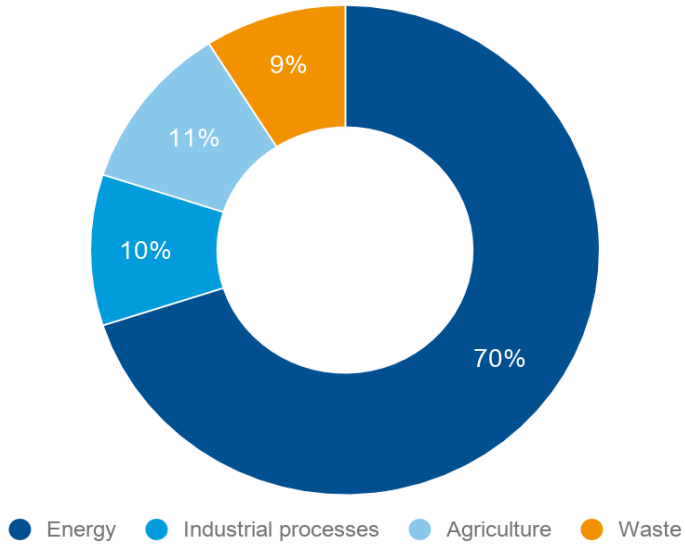

Figure 26: Egypt's GHG emissions profile by sector, 2014

(Source: CAIT, n.d.)

45.8% of emissions in the energy sector come from the electricity subsector, followed by transportation with 20.5%, manufacturing/construction with 13.8%, other fuel combustion with 11.2% and fugitive emissions with 8.7%.

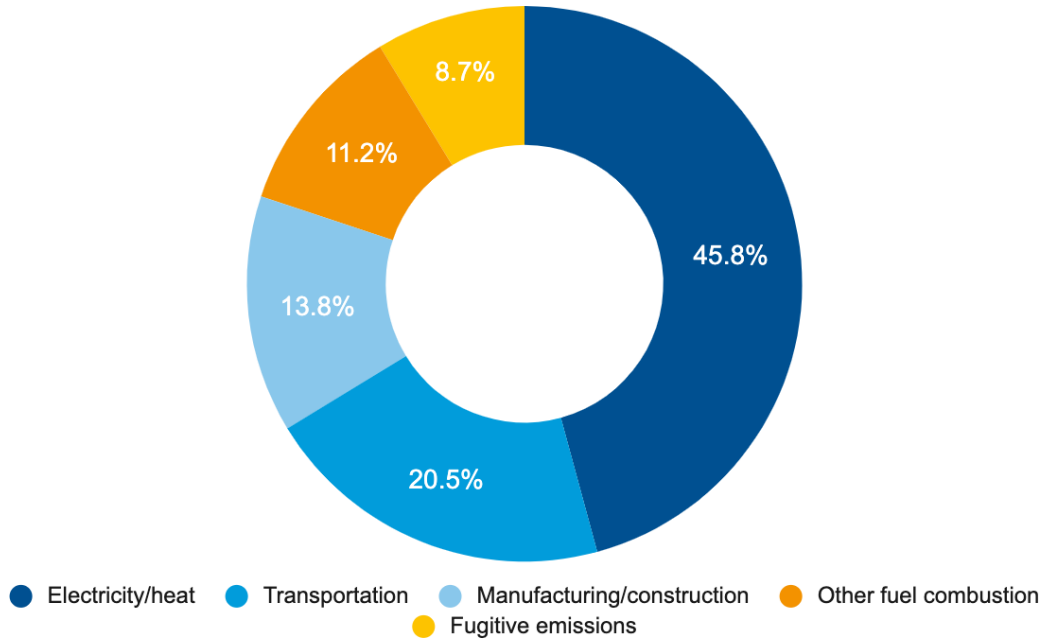

Figure 27: Egypt's GHG emissions profile by energy subsector, 2014

(Source: WRI CAIT Climate Data Explorer/n.d.)

Nationally Determined Contribution

Egypt does not specify quantitative targets to reduce GHG emissions in its NDC submission but includes a set of adaptation actions and mitigation measures.

Adaptation actions focus on coastal zones, water resources and irrigation, the agricultural sector, health sector, rural areas, populations, and roads, tourism and energy. Mitigation measures include the development of policies targeting energy efficiency, increased use of renewable energy, low-carbon technologies, upgraded infrastructure and reforms to energy subsidies (Arab Republic of Egypt, 2017). Regarding fossil fuel use, the focus is on upgrading obsolete power plants with more efficient technologies, the co-utilisation of fossil fuel and biomass and the utilisation of co-generation plants.

To support energy efficiency actions and measures, a National Energy Efficiency Action Plan (NEEAP) is in place. NEEAP was first established for the period 2012-2015, with a target of cumulative energy savings of 5% compared to 2007-2012 (LSE, 2012). The second phase of the NEEAP, valid for the period 2018-2020, aims to enhance energy efficiency standards, expand energy efficiency labelling for household appliances and implement energy efficiency codes for buildings (Ministry of Planning, Monitoring, and Administration Reform, 2018).

Egypt's Renewable Energy Law, passed in 2014, was designed to increase the use of renewable energy through greater private sector investment. Renewable energy projects tendered by the Egyptian Electricity Transmission Company (EETC), part of the state-owned organisation responsible for the country's electricity generation, transmission and distribution, will receive a long-term power purchasing agreement with EETC. Private sector solar and wind projects are also eligible to participate in a feed-in tariff scheme, granted for 25 years and 20 years respectively (LSE, 2014).

Currently, 92% of Egypt's electricity is generated from fossil fuels, as shown in the figure below. Hydropower, wind and solar account for 6.5%, 1.2% and 0.3% of the electricity mix respectively (Ministry of Electricity and Renewable Energy, 2018).

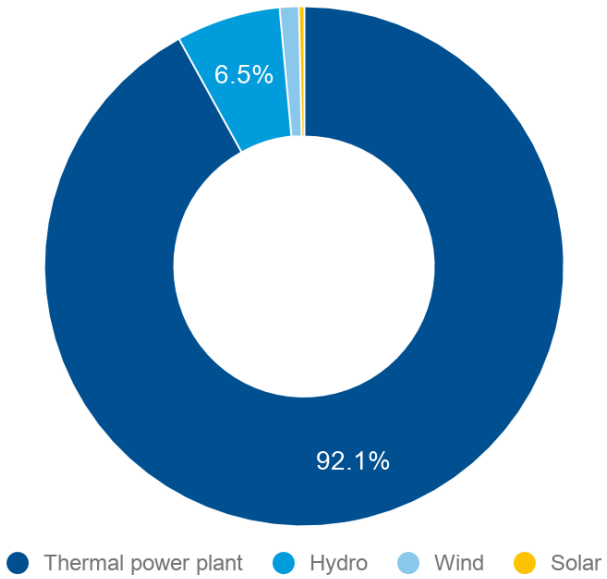

Figure 28: Egypt's current electricity mix (June 2018)

(Source: IRENA, 2018)

While increasing the share of renewable energy in Egypt's energy mix is acknowledged as necessary to reduce GHG emissions, the country's NDC does not include a renewable energy target. A renewable energy target appears in the country's Integrated Sustainable Energy Strategy 2035, aiming for an increase in the share of renewables in the electricity mix of 20% by 2022 and 42% by 2035 (IRENA, 2018). The expected share of different renewable energies is shown in Figure 29, below.

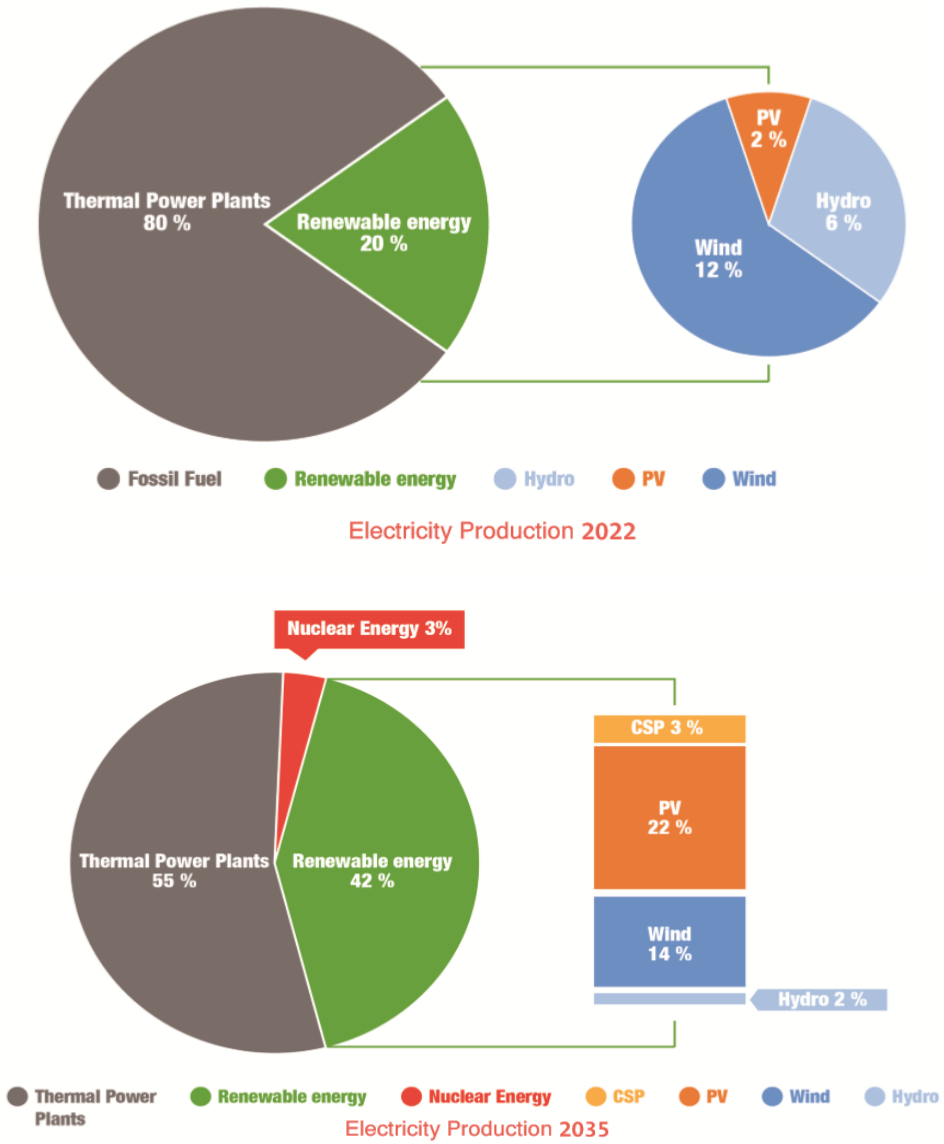

Figure 29: Target shares of renewable energy in Egypt's electricity mix, 2022 and 2035

(Source: Ministry of Electricity and Renewable Energy, n.d.)

Table 16 shows the current and forecasted renewable energy installed capacity under this strategy. By 2035, renewable energy capacity is expected to reach 62.6 GW, an increase of over 58 GW from 2018. This additional capacity can potentially serve as a sizeable domestic supply of carbon offsets in the future.

Table 16: Current and forecasted renewable energy installed capacity in Egypt (2018-2035)[27,28]

Energy type	Installed capacity (GW)			
	2018	2022	2030	2035
Hydro	2.8	2.8	2.9	2.9
Wind	1.0	13.3	20.6	20.6
Solar photovoltaic (PV)	0.1	3.0	22.9	31.0
Concentrated solar power (CSP)	0.1	0.1	4.1	8.1
Total	**4.0**	**19.2**	**50.5**	**62.6**

(Source: Egyptian Electricity Holding Company, 2018 and Regional Center for Renewable Energy and Energy Efficiency, 2017)

As for energy subsidies, Egypt has also embarked on an energy subsidy reform programme to phase-out the current subsidy system. Fossil fuel subsidies amounted to 2.7% of Egypt's GDP in 2017, down from 7% in 2014 (ESMAP, 2017). The government aims to reduce the subsidies to 0.5% of its GDP in the 2018-19 fiscal year (Egyptian Government, 2015). This gradual phase-out of fossil fuel subsidies would allow renewable energy to compete fairly with fossil fuel generation. However, after allowing the floating of the Egyptian Pound in November 2016, Egypt became more susceptible to the volatility of international energy prices, which resulted in a more than threefold increase in fossil fuel subsidies from 2016 to 2018, rising from 7.9 billion USD in 2016 to 26.7 billion USD (IEA, 2019b).

[27] Ministry of Electricity and Renewable Energy, 2018.
[28] Regional Center for Renewable Energy and Energy Efficiency & GIZ, 2017

Tunisia

Climate change plans, policies and strategies

Tunisia ratified the UNFCCC in 1993 and has since submitted three National Communications (2001, 2014 and 2019) and two BURs (2014 and 2016).

Tunisia's economic and political situation has been unstable since the Jasmin Revolution of 2011. Nonetheless, the country has continued to make progress on climate change governance, marked by the following developments (MALE, 2016), (Ministry of Energy, Mining, and Renewable Energies, 2018):

- in 2011, the Sustainable Development Strategy was published, followed by Tunisia's National Climate Change Strategy (NCCS) in 2012;
- in 2014, a new constitution integrating climate change and the protection of the environment was adopted. An energy transition policy was also adopted, followed by the creation of an energy transition fund and renewable energy law No. 2015-12 of 2015;
- in 2016, the Paris Agreement was ratified and the 2016-2020 development plan, which promotes a green economy and sustainable development, was published; and
- in March 2018, Tunisia's updated Solar Plan was published, reflecting the country's vision for increasing the share of renewable energy in the electricity mix.

In addition, decree No. 2018-268 was passed in March 2018, establishing the creation of a Management Unit to monitor and coordinate all activities for the implementation of the Paris Agreement and UNFCCC requirements[29]. A number of national adaptation strategies have also been developed for various sectors, including health, tourism and agriculture, among others.

No institution has yet been appointed to oversee public policies related to climate change (MALE, GEF, & UNDP, 2019). For the time being, Tunisia's Ministry of Local Affairs and Environment serves as the official focal point to the UNFCCC on climate change issues. Other institutions involved in the process include:

- the National Agency for Energy Management (ANME);
- the Ministry of Agriculture, Water Resources and Fisheries; and
- the DNA for the CDM.

This is due to political instability in the country, as institutional changes took place in 2018 and may continue to do so after the September 2019 Presidential elections and the October 2019 legislative elections.

GHG profile

Tunisia's energy sector accounts for 71% of the country's GHG emissions. In 2014, Tunisia emitted a total of 38.17 $MtCO_2e$ excluding LULUCF and 37.88 $MtCO_2e$ including LULUCF. The industrial processes, agricultural and waste sectors contributed 14%, 12% and 3.6% respectively (CAIT, n.d.), as shown in Figure 30, below.

[29] Government of Tunisia, 2019

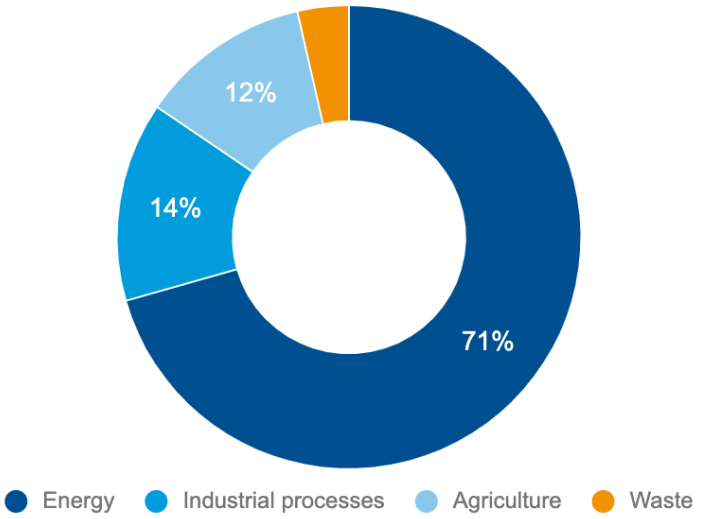

Figure 30: Tunisia's GHG emissions profile by sector, 2014

(Source: WRI CAIT Climate Data Explorer, n.d.)

Most of the emissions generated by the energy sector come from the electricity subsector, representing 36% of total energy emissions. In 2018, fossil fuel accounted for 97% of Tunisia's electricity generation.[30]

The transportation subsector represents 23.5% of energy emissions, followed by manufacturing and construction with 19.8%, other fuel combustion with 16.7% and fugitive emissions with 3.9%.

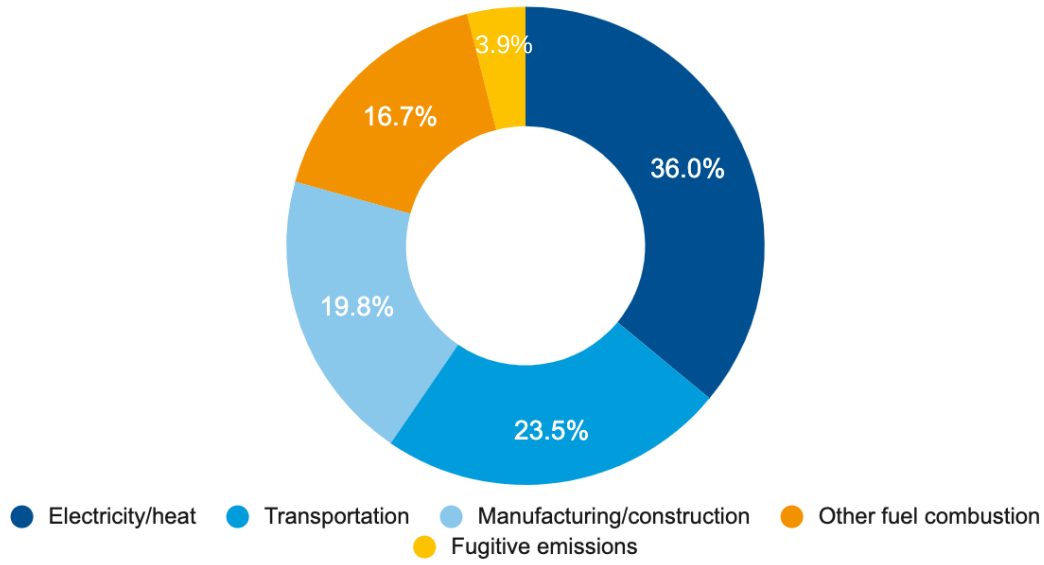

Figure 31: Tunisia's GHG emissions profile by energy subsector, 2014

(Source: WRI CAIT Climate Data Explorer, n.d.)

[30] Ibid.

Tunisia is promoting renewable energy and energy efficiency initiatives to tackle emissions from the energy sector, as reflected in its NDCs.

Nationally Determined Contribution

Tunisia has unconditionally committed to reducing its carbon intensity by 13% by 2030 compared to 2010. This reduction can rise to 41% with international support for funding, capacity building and technology transfer. An estimated USD 18 billion of international support would be required to meet Tunisia's conditional mitigation target (Ministry of Environment and Sustainable Development, 2015).

The country also seeks to reduce primary energy demand by 30% by 2030 compared to the baseline, which corresponds to 11 $MtCO_2$ of mitigation. This will be done through energy efficiency measures implemented in buildings (56%), industry (32%), transportation (11%) and agriculture (1%).

According to Tunisia's updated solar plan, the share of renewable energy in the electricity mix was 3% in 2016 (Ministry of Energy, Mining, and Renewable Energies, 2018). The country aims to reach 12% by 2020 and 30% by 2030, with an installed capacity of 3,815 MW (Ministry of Environment and Sustainable Development, 2015). Figure 32, below, shows the planned installed capacity of different types of renewable energy in Tunisia up to 2030. For the period 2016-2030, the estimated reduction in GHG emissions resulting from the implementation of the Tunisian Solar Plan is 33 $MtCO_2$ (Partnership for Market Readiness, 2018).

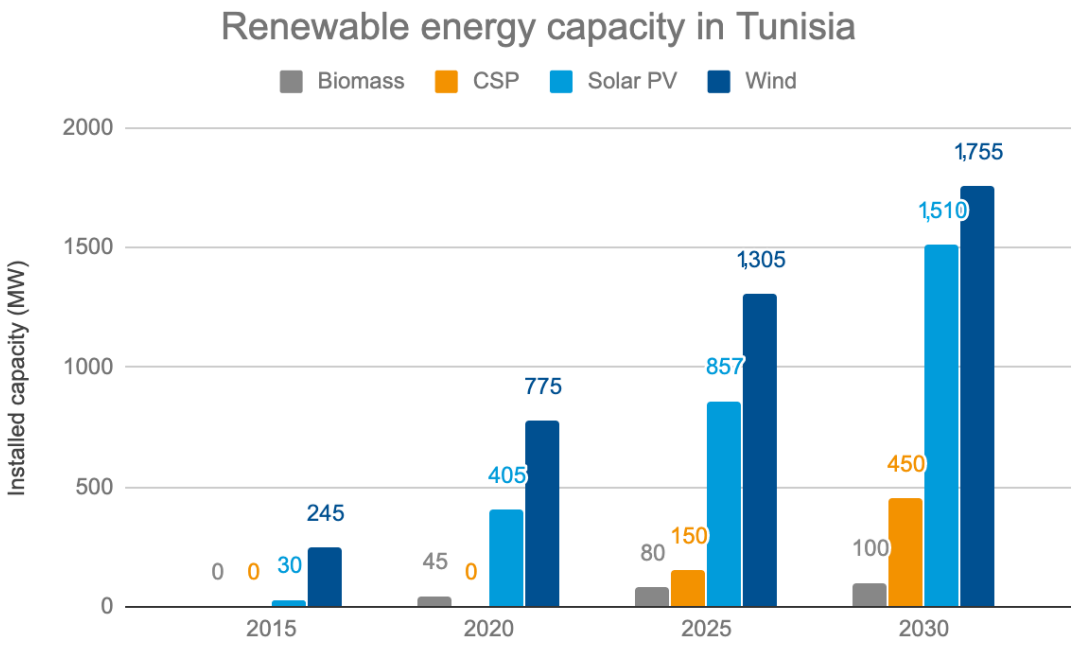

Figure 32: Tunisia's renewable energy capacity growth (2015-2030)

(Source: Detoc, L. Renewable Energy Solutions for the Mediterranean (RES4MED), 2016)

In terms of emission reductions in the industrial processes sector, the focus has been given to the cement industry as it accounts for 75% of the sector's emissions. In 2013, ANME launched a voluntary initiative to reduce GHG emissions through four different approaches: energy efficiency, renewable energy generation, the use of alternative fuels and a reduction of the clinker/concrete ratio through better segmentation of the cement market. A cumulative GHG reduction of 20 $MtCO_2e$ is expected for the 2017-2030 period and the sector is set to gain access to carbon markets from 2021 onwards (Ministry of Environment and Sustainable Development, 2015).


south pole