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# Leveraging Market Mechanisms for Climate Change Mitigation in the UAE and the Gulf Region

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This EDA Insight is a summary of presentations and discussions at a workshop organized by the EDA. It has been compiled by EDA Senior Research Fellow Dr Mari Luomi and is based on presentations by Dr Axel Michaelowa of University of Zurich and Perspectives. Please do not reproduce the content or ideas in the document without permission from or due attribution to the EDA/Dr Michaelowa. The views expressed do not necessarily reflect the views of the workshop participants, the EDA or the UAE Government. Photo: Ian D. Keating/Flickr.

## Executive Summary

- This EDA Insight provides an overview of recent developments around international market mechanisms for greenhouse gas (GHG) emission reductions and analyses their relevance for Gulf Cooperation Council (GCC) countries, in particular the United Arab Emirates (UAE).
- The paper is based on discussions at a carbon market stakeholder workshop organised by the Emirates Diplomatic Academy in January 2018. It draws extensively on presentations by Dr Axel Michaelowa of the University of Zurich and Perspectives. This Insight provides a summary of the workshop presentations and some of the key points made in the discussions. It should not be read as representing the agreed view of the participants or of the editors.
- The urgency to rapidly reduce GHG emissions worldwide is unprecedented. Market mechanisms for GHG reductions can provide a way to address climate change in an efficient manner, mobilising mitigation efforts where reducing emissions has the lowest cost.
- In the short term, there are at least two reasons for the UAE and its GCC neighbours to initiate more active discussions on carbon pricing among government and non-governmental stakeholders.
  - Understanding what global carbon pricing and market trends could mean for the region's competitiveness going forward but also exploring related opportunities; and
  - Being able to actively participate in the ongoing discussions on international carbon market mechanisms, based on lessons learned from the region's experience to date.
- In terms of participation in the Kyoto Clean Development Mechanism (CDM), the UAE is a regional leader in registered projects. At present, however, low market prices remain the major challenge for CDM projects in the UAE and the broader region. UAE-based market actors highlight the importance of providing a long-term perspective for carbon markets.
- With an eye on this, in the pre-2020 period, the UAE and other Gulf countries could explore a number of actions, which relate to the preparation of the next round of national pledges, 'NDCs', under the Paris Agreement, mitigation target-setting, division of labour among government entities, and awareness-raising among, consultations with, and coordination of, national carbon stakeholders.
- A significant number of issues still need to be agreed with regards to the design of the two market mechanisms under the Paris Agreement, which are expected to be implemented post-2020. There is still time, and it could be beneficial, for each country to identify key areas of interest (and related positions) with regards to the functioning of these mechanisms. This paper provides some tentative suggestions on some of these areas.
- The UAE is also a key player in the International Civil Aviation Organization's emissions offsetting scheme, CORSIA. Its airlines currently account for the third highest share in international traffic volume. Potential key issues for the UAE to focus on in the short term, alongside other CORSIA participating countries, relate to implementing the required regulatory frameworks, and thinking about national offset demand needs and global offset credit supply and prices in the long term.

## The Issue

This EDA Insight provides an overview of recent developments around international market mechanisms for greenhouse gas (GHG) emission reductions and analyses their relevance for Gulf Cooperation Council (GCC) countries, in particular the United Arab Emirates (UAE).

First, it explains what carbon markets are and 'why they matter' for the region's countries. It then discusses the UAE's experience with the first global carbon offsetting scheme, the Clean Development Mechanism (CDM), and draws related lessons. It also provides suggestions on how the UAE and other Gulf countries could build on this experience to be well-positioned for the post-2020 period when two new market mechanisms under the Paris Agreement will be implemented.

The Insight also provides an update on the status of negotiations on the 'rulebooks' for these two Paris Agreement mechanisms and makes some suggestions on potential opportunities for further defining national priorities and positions. The paper ends with an overview of linkages between international aviation emissions and market mechanisms, and highlights some areas of relevance for the UAE and its neighbours.

This paper is based on a stakeholder workshop organised by the Emirates Diplomatic Academy in Abu Dhabi in January 2018 under the title *Leveraging International Market Mechanisms for Climate Change Mitigation: Opportunities and Challenges for the UAE*.<sup>i</sup> The workshop was attended by 25 participants from various UAE governmental and semi-governmental entities, the private sector, academia and international organisations. The workshop was structured around four stage-setting presentations, delivered by Dr Axel Michaelowa, Head of International Climate Policy at University of Zurich and Senior Founding Partner of carbon market and climate policy consultancy Perspectives.<sup>ii</sup> Each presentation was followed by a discussion exploring the issues from a UAE perspective.

This paper draws extensively from the presentations by Dr Michaelowa, in addition to the discussions among the participants. It provides a summary of the workshop presentations and some of the key points made in the discussions. It should not be read as representing the agreed view of the participants.

## Carbon Markets and Why They Matter

*What are the key trends of relevance for the UAE in international carbon pricing and markets? Why is engaging with the issue important?*

The urgency to rapidly reduce GHG emissions worldwide is unprecedented. To date, the international community has collectively used up two-thirds of the remaining carbon budget (the amount of GHG that science estimates can be emitted) for staying below 2°C. According to some estimates, the entire budget may be exhausted in as little as 20–25 years.

Addressing climate change requires global cooperation. Climate change mitigation is essentially a global public good because the benefit of a GHG emission reduction in terms of reduced climate change will accrue to everyone in the world. As noted by the Intergovernmental Panel on Climate Change (IPCC), 'individuals and nations acting independently will provide, together, fewer resources than all individuals and nations would if they acted in concert'.<sup>1</sup>

Market mechanisms for GHG reductions can provide a way to address climate change in an efficient manner, mobilising mitigation where reducing emissions has the lowest cost. Although market mechanisms have been criticised for enabling 'a way to buy one's way out' and may not serve all purposes (such as mobilising new, initially costly technologies), they have several advantages. They can:

- Be an effective mitigation option for mature technologies;
- Allow for transfer of technologies and financing to developing countries;
- Encourage more ambitious mitigation targets (because they enable access to a broader range of, and lower-cost, mitigation activities); and
- Enable GHG reductions at costs that are less harmful to industries, and thereby reduce the opposition of emitter lobbies to mitigation policies.

Countries have been implementing market mechanisms since the mid-2000s, both independently and through international cooperation, the latter through market mechanisms enshrined in the Kyoto Protocol (Clean Development Mechanism, CDM, Joint Implementation, JI and International Emissions Trading, IET). In addition to carbon taxes (setting a fixed price for carbon), there are two principal economic instruments for pricing GHG emissions by setting a pre-determined emissions reduction outcome:

<sup>i</sup> This EDA Insight has been compiled by Dr Mari Luomi, Senior Research Fellow at the EDA. The workshop was held under the Chatham House Rule.

<sup>ii</sup> EDA Research extends its thanks to Dr Michaelowa and the workshop participants for their contributions. We also thank Dr Michaelowa for his review of the paper manuscript and valuable comments and edits.

- **Cap and trade:** involves setting a limit for emissions and allocating units to industries, for example through auctions. The best-known system is the EU emissions trading system (EU-ETS).

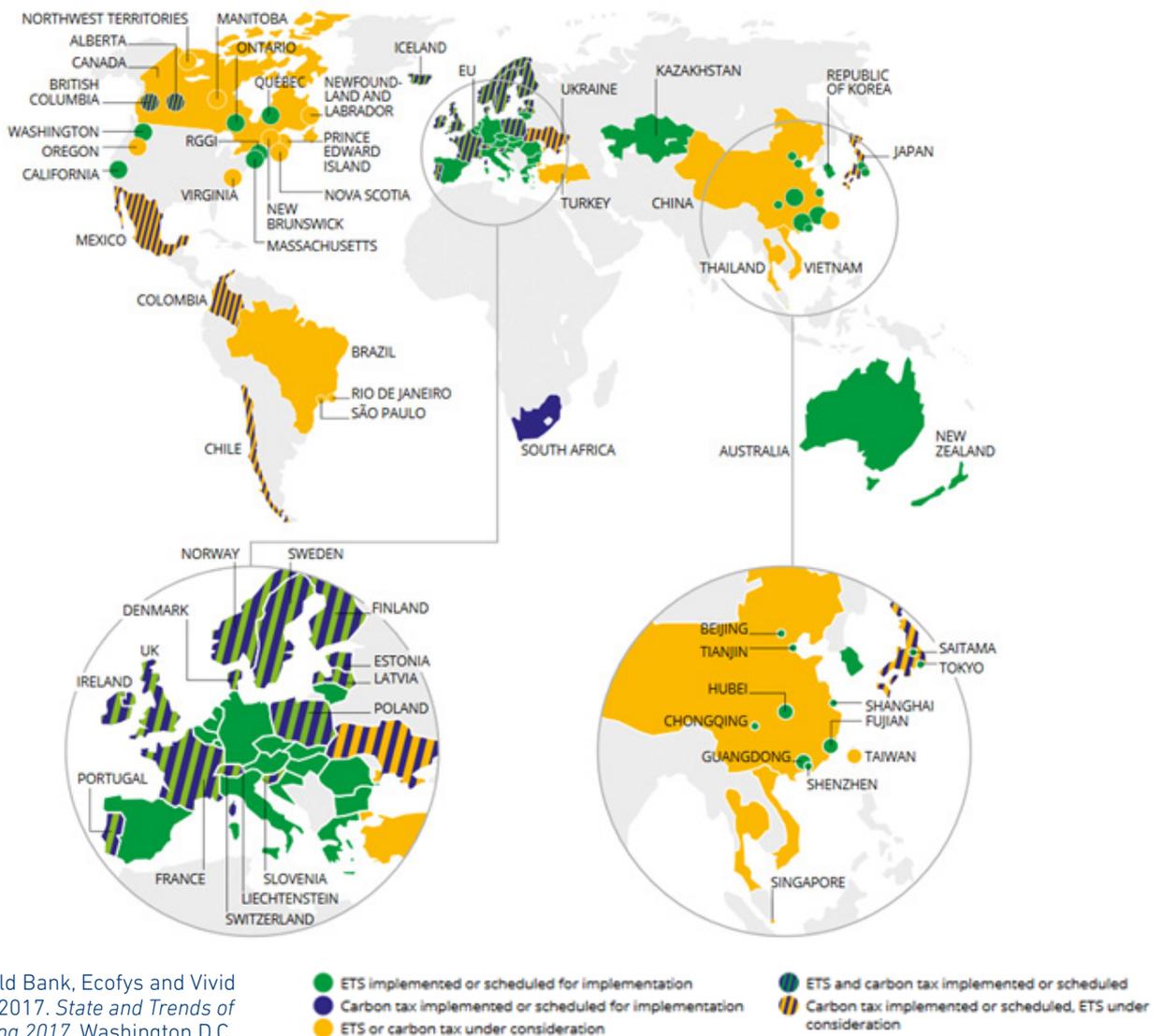
- **Offsetting/'baseline and credit':** requires calculating a baseline for emissions and anchoring the system into other policy instruments – in other words, demand for reductions achieved through offsetting systems needs to be created externally, for example by a system applying cap and trade, a carbon tax, or by direct acquisition of emissions credits through governments. The CDM is the best-known offsetting scheme.

**Relevance for the UAE:** Governments worldwide are showing increasing interest in putting a price on carbon. Various emerging economies, including Chile, Colombia and Mexico, have introduced a carbon tax, while Singapore and South Africa are actively considering it. India has increased its coal tax several times.

Most recently, in December 2017, China launched its national cap and trade system, which will initially cover the power and heating sectors only, but is already larger than the EU-ETS in terms of emissions coverage. The same month, 11 national and subnational governments announced a regional collaboration on carbon pricing, titled the 'Paris Declaration on Carbon Pricing in the Americas'.

The World Bank is orchestrating a Carbon Pricing Leadership Coalition. Businesses are also adopting internal carbon pricing as a way to increase competitiveness in a carbon-constrained world: in 2017, 1,400 companies (including more than 100 Fortune Global 500 companies) disclosed the use of an internal carbon price. Before the Chinese announcement, the World Bank reported that a total of 15% of global emissions were covered by carbon pricing, even if at highly uneven pricing levels (see also Figure 1).<sup>2</sup>

**Figure 1** Summary Map of Regional, National and Subnational Carbon Pricing Initiatives (November 2017).



Carbon taxes can be extremely useful as domestic instruments, in particular for diffused sources of emissions, such as transport. So far, the Gulf region has not shown appetite to consider them. Canada, for example, has begun implementing a system that allows for its provinces to select their preferred carbon pricing instrument. Discussions on a cap and trade system are similarly not very active in the Gulf region, and may not be an easy sell given the carbon-intensive industrialisation policies many countries are still implementing.

In the short term, there are at least two reasons for the UAE and its Gulf neighbours to initiate more active discussions on carbon pricing among government and non-governmental stakeholders:

- Understanding what global carbon pricing and market trends could mean for the region's competitiveness going forward but also exploring related opportunities; and
- Being able to actively participate in the ongoing discussions on international carbon market mechanisms, based on lessons learned from the region's experience to date.

## Regional Experiences with the CDM

*What are the main lessons from the UAE's experience with the CDM?*

The Kyoto Protocol's CDM has been the first and largest international emissions offsetting instrument to date (See Box 1). At the start of 2018, the total number of registered (approved) CDM projects worldwide stood at 7,792. Of this, 27 (0.4%) are located in the GCC countries, of which 15 (0.2%) are located in the UAE. The countries with the most projects are China (63%), India (10%) and Brazil (5%). More than two-thirds of all CDM projects are renewable energy ones. Worldwide, 1.9 billion Certified Emission Reductions (CERs, equal to one tonne of CO<sub>2</sub> avoided) have been issued so far. China accounts for 58% of the global total and the GCC for 0.5%. The UAE has so far only issued 1.1 million CERs, which equals to 0.05% of CERs issued.

Globally, both registration of CDM projects and issuance of CERs have declined significantly since 2012, due to a crash in CER prices from around €11 to €0.3/tonne of CO<sub>2</sub> and, in line with this trend, most GCC projects in the CDM registry have been registered

pre-2013. The UAE's CDM projects are distributed across various types/sectors, including: energy efficiency in industry, generation and supply side; fugitive emissions; landfill gas; and solar and wind energy. Seven are in Abu Dhabi, six in Dubai and two in Ras Al Khaimah.<sup>3</sup> <sup>iii</sup>

In terms of success in issuance, UAE-based projects have achieved relatively good rates, with most ranging between 70–180%. This compares well to the global average of 86%.<sup>4</sup> The only challenges have been in energy efficiency projects in the industry sector where two projects' average success rate remains at approximately 30%. Issuance delays have also been a challenge: the average delay for the UAE is currently three years. However, this is largely attributable to the low market prices for CERs.

A number of UAE projects were conceived in the 'gold rush' era of the CDM, pre-2008. The first project developers played a role in building government capacity, including the establishment of a Designated National Authority (DNA) to approve UAE-based projects. Masdar, which to date owns the largest CDM portfolio in the UAE, both has its own projects and has worked with partners in the emirate – including with the national oil company ADNOC – to develop projects. At the same time, developers also engaged in developing new project methodologies.

Challenges included establishing baselines and proving additionality, due to a dearth of relevant data on emissions at the time, and developers spent time communicating with government entities to gather this data. Low awareness in the region about the CDM was a further challenge. Despite the 'additional work' involved, this initial period saw a number of successes.

At present, low market prices remain the major challenge for CDM projects in the UAE and the broader region. Since late 2013, primary CER prices have remained below €2, except for projects with high sustainable development co-benefits from poor countries. Given the long period of low prices, finding relevant expertise, for example auditors, is also becoming a challenge. UAE actors still monitor the market but do not have plans to proceed to verification (the step preceding certification and issuance of CERs) given the lack of demand for CERs. Also, many UAE-based projects were implemented around 2010, which means their 10-year crediting period is coming to a close. Some were never implemented.

<sup>iii</sup> In addition, the UAE has registered four and Saudi Arabia two Programmes of Activities (PoAs), which are programmatic approaches (coordinated implementation of policies, measures or goals) under the CDM umbrella. Worldwide, 310 PoAs had been registered, as of January 2018.

## Box 1: Global Experiences with the Kyoto Mechanisms

Three flexibility mechanisms (CDM, JI and IET) were set up under the Kyoto Protocol and used to various degrees.

The main purpose of the CDM has been to enable emissions reductions and support sustainable development in developing countries, which do not have emissions mitigation commitments under the Kyoto Protocol. There are currently more than 300 approved methodologies for establishing baselines for CDM projects (i.e. the GHG emissions from activities that would have been implemented in the absence of a CDM project), which are aimed at avoiding 'fictitious reductions'. Reductions generated by the CDM are 'real' when the activities underlying the reductions are 'additional', in other words, when they would not have taken place in the absence of the revenue from the credits created.

The difficulty of assessing whether CDM projects are truly 'additional' has been a challenge. In particular in its initial years (2004 to 2007), the CDM system suffered from fraud in this regard due to lack of regulatory capacity. Subsequently, these issues were addressed, including through temporary suspensions of auditors.

Another challenge in the initial years of the CDM, was the complexity of the regulatory process. Progress has also been made in this area, and a number of measures have been taken to simplify the project cycle and methodologies as well as the overall documentation required.

Over the past decade, the CDM market has suffered from low prices owing to a low demand for credits from industrialised countries. The 2008 economic and financial crisis led to a fall in industrial production in the EU and, consequently, caused a slump in Certified Emission Reduction (CER) prices. The EU also set a limit on how many credits could be used for trading through 2020, which was reached around 2013. Furthermore, it refused to accept CDM credits from projects outside of Least Developed Countries that were registered after 2012.

As no other industrialised countries generated demand that could replace the reduction of demand from Europe, CER prices slumped. In addition, both Australia and Japan also reduced CER purchases, and New Zealand closed its market completely for CERs. The only remaining buyers are Scandinavian countries and the World Bank. Some emerging economies (China, Colombia, Mexico and South Korea) allow use of CERs against domestic carbon tax obligations or ETS.

While experts do not agree on to what extent the CDM has resulted in real reductions, most agree that the mechanism has contributed to transparency in carbon markets.

A number of lessons can be drawn from experiences with the Kyoto Mechanisms worldwide, including:

- International oversight and good governance are needed for market mechanisms to function properly – a lesson particularly from the Kyoto Protocol's JI mechanism, which resulted in negative outcomes in areas where direct trade between governments took place in the absence of an external audit.
- The CDM has demonstrated how the private sector can be mobilised to support emissions reductions and their monetisation. The CDM experience worldwide suggests the private sector needs (1) limited government involvement – in the CDM only an approval letter from the host government was required – and (2) clear incentives – introducing market mechanisms and then 'ditching them' after a few years does not provide the kind of long-term certainty that private investments require.
- Protectionism (e.g. the EU and New Zealand decision to stop CER imports) and political risks (e.g. Australia's decision to cease its ETS) are additional uncertainty factors that can deter participation.

Sources: Axel Michaelowa, 2018; UNFCCC. 'CDM', website, accessed in February 2018.

UAE-based carbon market actors highlight the importance of providing a long-term perspective on carbon markets, which should go beyond the next three or so years. Experts and project developers from the Gulf region have suggested that, in order for the CDM market to be revived, a CER price of US\$3–5 would be required, with some suggesting that this would merely cover the break-even costs.

The economic returns from energy efficiency measures and the competitiveness of certain technologies, such

as solar, are already driving a lot of implementation in the UAE. UAE-based stakeholders, however, have suggested that market mechanisms could play a role in accelerating the deployment of certain emission-reduction technologies, such as rooftop solar.

Taking a joined-up approach to leveraging existing expertise in the area is also an area where UAE stakeholders see great potential. This would require a clear communication of roles among different government entities and a decision on one entity

taking an active lead on stakeholder coordination at the national level. Building further technical capacity is also seen as necessary, as is promoting data sharing among different entities.

**Relevance for the UAE:** In the pre-2020 period, the UAE and other Gulf countries could explore the following:

- **NDC preparation:** Governments could seek to explicitly spell out the role (if any) they expect market mechanisms to play in achieving their future nationally determined contributions (NDCs, or plans submitted as contributions to the Paris Agreement). The UAE, for example, is expected to communicate a new NDC by 2020, so consideration could be given to the possible use of carbon pricing or market mechanisms as part of that;
- **NDC stakeholder consultations:** When updating their NDCs and considering the possible use of carbon pricing/market mechanisms, countries can benefit from consultations with national carbon market stakeholders, in particular project developers, which could involve exchanges on data-related methodologies and assumptions, plans and expectations on both sides. Should countries decide to include these instruments, the next step would be to define the activities that would be implemented;
- **Clear targets:** Carbon stakeholders have also indicated that quantitative targets with clear methodologies can help in providing longer-term certainty;
- **Clear roles:** Providing clarity to stakeholders on the roles and responsibilities among government entities working on the different (regulatory) aspects of GHG management and (potentially) carbon pricing could also help non-governmental stakeholders (pro)actively engage with these entities;
- **Stakeholder awareness:** Lead government entities could also actively reach out to their existing and potential carbon market stakeholders to raise awareness and share information about international developments; and
- **Stakeholder coordination:** Lead government entities could furthermore arrange for regular fora for national carbon stakeholders from government, private sector and academia to meet to exchange experiences and clarify priorities, needs and expectations.

## Paris Agreement Article 6 Negotiations Status and Prospects

*What potential opportunities and challenges are there for the UAE and other Gulf countries in relation to the Paris Mechanisms? What are the areas/issues of interest for the UAE's international climate change policy?*

The Paris Agreement, which entered into force in 2016 and will be implemented from 2020 onwards, establishes two new carbon market mechanisms, under its Articles 6.2 and 6.4, commonly known as 'cooperative approaches' and the 'Sustainable Development Mechanism' (no agreement on the formal name for the latter has been reached so far). The specific rules for both mechanisms are still under negotiation at the UN Framework Convention on Climate Change (UNFCCC) where countries have agreed to finalise them, along with the broader set of implementation guidelines of the Paris Agreement, by the end of 2018. In addition, countries are negotiating on the rules for 'non-market approaches' (Article 6.8), with the same deadline.<sup>iv</sup>

Cooperative approaches involve the transfer of 'internationally transferred mitigation outcomes' (ITMOs) between two or more countries, on the basis of bi/multilateral agreements. A discussion is ongoing on whether these transfers (in addition to those from the 'SDM') would be subject to a tax to finance the Adaptation Fund, which countries have agreed shall serve the Paris Agreement and which currently serves the Kyoto Protocol and is financed through a mix of proceeds from the CDM and voluntary contributions.

The 'SDM' is largely seen as the successor to the CDM. Similarly to the CDM, it will be subject to international oversight. In practice, when developing the rules for the 'SDM', countries are drawing from the experiences with the Kyoto Mechanisms (CDM and JI). In contrast to the CDM, however, the 'SDM' will be open to all countries and it could potentially accommodate policy instruments and sectoral approaches, in addition to projects and programmes (as the CDM).

At the recent UN Climate Change Conference in Bonn, Germany (COP 23), in November 2017, countries made some progress in developing the rulebooks for these two mechanisms. Existing views are currently captured in 'co-facilitators' informal notes' that contain elements of guidance, mostly in the form of topic headings and content descriptions, totalling 26 pages for cooperative approaches and 13 pages for the 'SDM'.<sup>5</sup>

<sup>iv</sup> It should be noted that Article 6.8 was brought in by socialist Latin American countries who would only accept market mechanisms if also a non-market mechanism was introduced.

With negotiations on the rulebook for Article 6 mechanisms proceeding slowly, some see a possibility that the development of (the more complicated) rules for the 'SDM' could be deferred beyond 2018 to allow for agreement on cooperative approaches this year. In a worst-case scenario, countries could only agree to an interim decision on Article 6 rules and continue negotiating on both mechanisms beyond 2018.

**Open questions around the CDM and 'SDM':** There are a number of open questions regarding the future of the CDM in the post-2020 period as well as the design of the 'SDM' and its relationship with the NDCs. Issues still to be resolved include:

- Whether the CDM will continue beyond 2020, and whether CDM projects and CERs issued in the past will be transferrable to the post-2020 period and be part of the 'Sustainable Development Mechanism' under the Paris Agreement. Views among countries range from those supporting full transferability (e.g. Brazil) to those completely opposed to it (the EU, for example).
- If countries' NDCs can revive demand for carbon credits, when such revival could take place, and what the role of the private sector in this revival could be. Overall, there is a risk of a continued supply overhang. Demand growth for offset credits could come from:
  - (1) direct government acquisition. Switzerland is considering acquisitions. However, the EU, for example, does not currently foresee using international credits after 2020.<sup>6</sup> Also, many countries have indicated, in their initial NDCs, plans to sell credits;
  - (2) host country carbon taxes (e.g. Chile, Colombia, Mexico);
  - (3) ETSs in industrialised countries and emerging economies (where the challenge will be ensuring a sufficiently stringent allocation of units); and
  - (4) from the international aviation emissions off-setting mechanism CORSIA.
- Some experts argue that, in the future, there will no longer be a supply of offset mechanisms since all countries contribute to mitigation, and no one would be willing to sell credits. This is however unlikely, given the different degrees of stringency of NDCs. Others suggest that there will be 'niches of supply', for example in countries with low carbon prices, the size of which will decrease over time.

**Relevance for the UAE:** A significant number of issues still need to be agreed with regards to the design of the two Paris market mechanisms. There is still time, and it could be beneficial, for each country to identify key areas of interest (and related positions) with regards to the functioning of these mechanisms. These might include:

- Whether and how the CDM should continue in the post-2020 period and to what extent already generated CERs can be used;
- How the rules for using market mechanisms in NDCs should look like (and whether use of markets should be allowed for conditional parts of NDCs only or also unconditional parts);
- How specific the international guidance on cooperative approaches should be, especially with regards to environmental integrity and transparency;
- Whether there should be one centralised 'SDM' registry or multiple country-based ones;
- If the scope of the 'SDM' should also include policy instruments and sectoral approaches; and
- How accounting of ITMO transfers should be done, e.g. through a buffer registry or other forms of 'corresponding adjustment' of NDCs.

## Market Mechanisms and International Aviation Emissions

*How do international aviation emissions relate to market mechanisms under the UNFCCC? What could be some of the key areas of focus for the UAE and other participating countries?*

International aviation emissions have not been traditionally covered under the UNFCCC and they are not addressed in countries' NDCs under the Paris Agreement. Emissions from this sector currently account for 2% of global GHG emissions, but could rise to account for 4–8% by 2050. In 2016, the International Civil Aviation Organization (ICAO) agreed to the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) 'to address any annual increase in total CO<sub>2</sub> emissions from international civil aviation... above the 2020 levels, taking into account special circumstances and respective capabilities.'<sup>7</sup>

The CORSIA will be implemented in three phases, with a binding phase starting in 2027, at which stage, it is expected to cover close to 90% of total international air traffic. A total of 66 countries (including the UAE) have signed up to the scheme since its beginning and jointly cover 86.5% of international aviation volume. Airlines from these countries will need to buy offset credits from projects or programmes that reduce GHG emissions to cover any growth in emissions compared to 2020 levels. Offsetting requirements for airlines are calculated based on total airline sector and individual airline growth rates.<sup>8</sup>

**Relevance for the UAE and other CORSIA countries:**

The UAE is a key player in the CORSIA, as its airlines currently account for the third highest share in international traffic volume, after China and the US and followed by the UK and Germany. Potential key issues for the UAE to focus on in the short term, alongside other CORSIA-participating countries, relate to implementing the required regulatory frameworks and thinking about national offset demand needs and global offset credit supply and prices in the long term.

At the moment, in order to operationalise CORSIA by 2021, all participating governments are working on: determining a national authority to which their airlines need to report the necessary data; conducting necessary arrangements for a national measurement, reporting and verification (MRV) system to be implemented in January 2019 (based on ICAO Standards and Recommended Practices, still under development); and ensuring all national policies are in place for the scheme by 2020. This timeline is considered as very ambitious for an international market mechanism and it places a lot of pressure on all parties involved. Some delays can therefore be expected.

Both the CDM and the two market mechanisms under the Paris Agreement qualify as eligible offset mechanisms under the CORSIA. (It remains unclear if offsets from voluntary markets and avoided deforestation activities are covered.) According to some estimates, owing to the significant supply of CDM credits available, offset prices may not rise above US\$6/tonne before 2030. There also remains a potential for more than 23 million CDM offsets in the GCC countries through 2020.<sup>9</sup>

The availability of CDM credits for use towards CORSIA-related offsets will depend on (1) to what extent the CDM is transitioned into the post-2020 period and (2) how ICAO interprets this new system under the UNFCCC. Overall, supply shortage is likely not to be a concern over the next decade, unless governments introduce strict rules regarding double counting of offsets in the context of NDCs. The situation, however may change in the late 2020s, with a possible 'crunch period', when offset demand rises significantly at the same time as NDC compliance is becoming relevant due to the first NDCs ending in 2030.

Possible measures to mitigate related problems could include:

- Conducting studies on potential offset needs and developing scenarios to estimate global supply of offsets and related processes through 2030;
- Proactively engaging with CDM developers to ensure that sufficient offset supply at competitive prices is available to cover airline needs; and
- Assessing preferences for domestic offset procurement.

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## Endnotes

- 1) IPCC. '[TAR: Working Group III: Mitigation: 10.1.2 Scope of the Problem](#)', website. Accessed in February 2018.
- 2) Information in this paragraph is partly from: The World Bank. '[Carbon Pricing](#)'. 1 December 2017.
- 3) Information in this paragraph is partly from: UNEP DTU. '[CERs](#)', website. Accessed in February 2018; UNEP DTU. CDM Pipeline. Updated 1 February 2018.
- 4) UNEP DTU. '[CDM News: January 2018](#)'. Accessed in February 2018.
- 5) UNFCCC. '[In-session documents and agenda item information - November 2017 – SBSTA](#)'. Third informal notes by co-chairs on Articles 6.2 and 6.4. Accessed in February 2018.
- 6) European Commission. '[Use of International Credits](#)', website. Updated on 19 February 2018.
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- 8) Axel Michaelowa. *Tackling CO2 Emissions from International Aviation: Challenges and Opportunities Generated by the Market Mechanism 'CORSIA'*. EDA Insight. November 2016. Abu Dhabi: Emirates Diplomatic Academy, 2016.
- 9) Ibid, pp. 3–4.