

Commentary

Governmental Carbon Crediting Mechanisms

Global Experiences
and Insights for
Saudi Arabia

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About KAPSARC

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Abstract

This paper examines governmental carbon crediting mechanisms, offering a focused look at three programs that initially operated independently of compliance schemes such as emissions trading systems or carbon taxes. The paper aims to provide insights into crediting mechanisms similar in nature to the newly launched Saudi Greenhouse Gas Crediting and Offsetting Mechanism (GCOM). It highlights key design elements, characteristics, and lessons drawn from the experiences of three selected mechanisms: Australia's Carbon Credit Units, Thailand's Voluntary Emission Reduction Program, and the United Kingdom's Woodland Carbon Code (2024). The paper also explores how governments can design effective crediting mechanisms that deliver high-quality carbon credits while supporting emissions reduction and decarbonization goals – cost-effectively and at scale. To this end, it assesses key design and operational features of the selected governmental mechanisms, including how they drive participation through incentives, interact with compliance schemes, structure supply and demand, define project eligibility, facilitate carbon trading, and manage operational costs. Key takeaways include the importance of well-designed incentives, the growing role of linkages with compliance markets to boost demand, and the critical need for credible, flexible methodologies to maintain integrity and encourage project development.

Introduction

Saudi Arabia has recently introduced the Greenhouse Gas Crediting and Offsetting Mechanism (GCOM) to accelerate national efforts in reducing and eliminating greenhouse gas (GHG) emissions, supporting the Kingdom's pathway toward net zero. GCOM allows entities to offset their emissions by purchasing carbon credits generated from voluntary projects (Designated National Authority 2024). This commentary explores comparable government-led crediting mechanisms from around the world to extract insights and lessons that can inform the effective implementation of GCOM.

Carbon crediting mechanisms provide a pathway for emissions reductions, enabling businesses and governments to offset their carbon footprints by purchasing credits issued to projects that achieve verified and measurable emissions reductions. Each credit typically represents the reduction or removal of 1 metric ton of CO₂ or its equivalent. Credibility and additionality are ensured by comparing a project's actual emissions to the estimated emissions that would have occurred in its absence.

Unlike carbon taxes or emissions trading systems (ETS), which mandate participation, carbon crediting operates on a voluntary basis. On both national and global levels, carbon crediting serves as a valuable tool to incentivize emissions reductions and channel investments into projects that might not otherwise be financially viable (World Bank 2021). While not a stand-alone solution, it can effectively complement broader climate policies when integrated into a well-structured policy framework, reinforcing overall decarbonization efforts.

Carbon crediting mechanisms are generally split into three categories:

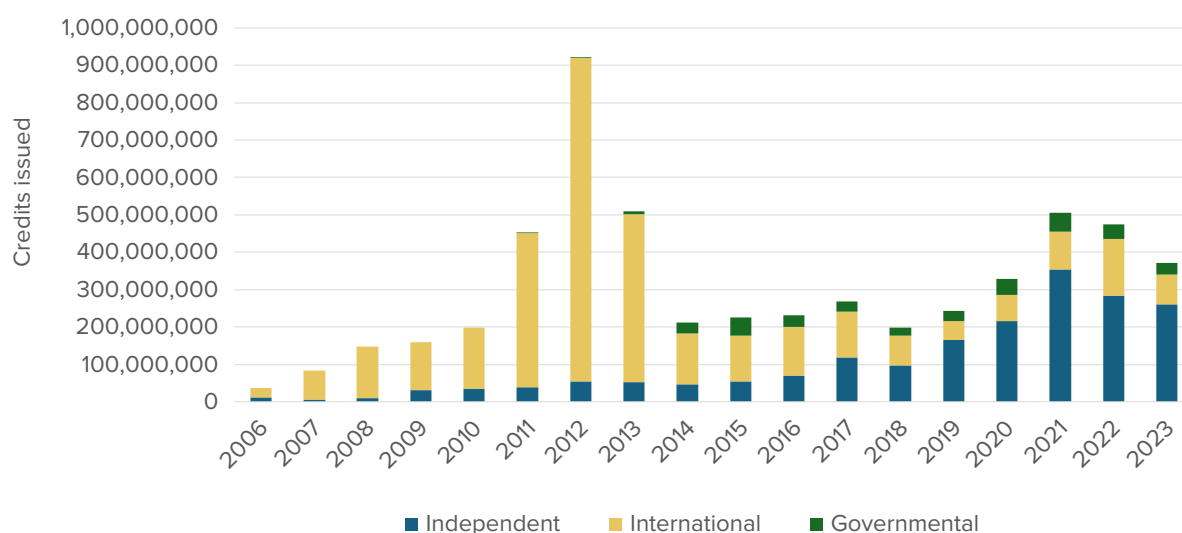
- 1. Multilateral/International Mechanisms:** Established under international treaties and managed by international organizations, such as UN agencies. Examples include the Clean Development Mechanism (CDM) under the Kyoto Protocol and the Paris Agreement Crediting Mechanism (PACM).

- 2. Governmental Mechanisms:** Managed by national, regional, or subnational governments. Notable examples include California's Compliance Offset Program and Australia's Carbon Credit Unit Scheme (ACCU).

- 3. Independent Programs:** Administered by non-governmental organizations. Examples include Verra, Gold Standard (n.d.), and other private issuers.

Figure 1 illustrates the distribution of carbon credit issuance across the three main categories. Historically, international crediting mechanisms, particularly the CDM, have dominated issuance. In recent years, however, independent programs have taken the lead. Governmental crediting mechanisms, by contrast, continue to account for a relatively small share of overall issuance. This trend, however, is expected to evolve as significant untapped potential remains, especially under Article 6 of the Paris Agreement, in addition to a growing number of countries implementing domestic compliance schemes as part of their broader strategies to achieve net-zero targets. This growing engagement signals a likely expansion in the role and impact of governmental mechanisms in the future.

Figure 1. Global carbon credit issuance by mechanism type, 2006-2023.



Source: World Bank, Carbon Pricing Dashboard (2024).

While all carbon crediting mechanisms are voluntary by nature, carbon credits issued through most governmental mechanisms are typically complementary to and supportive of compliance-based schemes, such as ETSS, carbon taxes, and other regulatory emissions reduction programs. For instance, companies can offset a portion of their emissions reduction obligations under an ETS by purchasing carbon credits from either governmental crediting mechanisms or, in some cases, from independent crediting programs.

At the national level, to enhance economy-wide decarbonization, ensure additionality, and avoid overlap, crediting mechanisms must not apply to sectors (or entities) already regulated under compliance schemes.

Table 1 below lists the 35 operational governmental crediting mechanisms as of 2024. The nine highlighted in green represent mechanisms that are currently not linked to compliance schemes, with the exception of Australia, which has recently become linked.

This commentary focuses on governmental crediting mechanisms, particularly those rare cases that operate entirely within a voluntary framework and are not connected to compliance schemes. The aim is to offer insights and draw lessons from mechanisms most similar in structure and intent to Saudi Arabia's newly established Greenhouse Gas Crediting and Offsetting Mechanism (GCOM).

Table 1. Overview of governmental crediting mechanisms and links to compliance schemes.

	Governmental crediting mechanisms	Link to compliance scheme
Asia and Pacific	Australian Carbon Credit Unit Scheme (ACCU)	As of 2023, Safeguard Mechanism
	Beijing Parking Certified Emission Reductions (PCERS)	Beijing pilot ETS
	Beijing Forestry Certified Emission Reductions (BFCERS)	Beijing pilot ETS
	China Greenhouse Gas Voluntary Emissions Reduction Program	China ETS, CORSIA, eight national pilot ETSs
	Chongqing Certified Emission Reduction (CQCER)	Chongqing pilot ETS
	Fujian Forestry Certified Emission Reduction (FFCERS)	Fujian pilot ETS
	Guangdong Pu Hui Offset Crediting Mechanism	Guangdong pilot ETS
	J-Credit Scheme	GX-ETS, Saitama ETS
	Joint Crediting Mechanism	GX-ETS
	Kazakhstan Crediting Mechanism	Kazakhstan ETS
	Republic of Korea Crediting Mechanism	Korea ETS
	Saitama Target Setting Emission Trading System	Saitama Target Setting ETS
	Saitama Forest absorption Certification System	
	Sri Lanka Carbon Crediting Mechanism	-
	Taiwan Voluntary Greenhouse Gas Reduction Program	Carbon fee and ETS
	Thailand Voluntary Emission Reduction Program (T-VER)	-
	Tokyo Cap-and-Trade Program	Tokyo cap-and-trade program
	Sakhalin Oblast Pilot Crediting Mechanism	
North America	Alberta Emission Offset Program	Alberta TIER Regulation and Canada's Output-based Pricing System
	British Columbia Offset Program	GGIRCA
	California Compliance Offset Program	California Cap-and-Trade System and Québec Cap-and-Trade System
	Canada Federal GHG Offset System	Canada's federal Output-Based Pricing System
	Nova Scotia Crediting Mechanism	Nova Scotia Output Based Pricing System
	Québec Offset Crediting Mechanism	Quebec ETS, California ETS
	RGGI CO ₂ Offset Allowances	The Regional Greenhouse Gas Initiative (RGGI)
	Washington Crediting Mechanism	Washington's Cap-and-Invest program
South America	Chile Green Tax Emission Offsetting Scheme	Chile's Carbon Tax
	Columbia Crediting Mechanism	Colombia's carbon tax
Europe	Peatland Code	-
	Portuguese Voluntary Carbon Market	-
	Spanish Carbon Fund for a Sustainable Economy (FES-CO₂)	-
	Switzerland CO ₂ Attestations Crediting Mechanism	Producers and importers of fossil motor fuels
	UK Woodland Carbon Code	-
Middle East and Africa	Saudi Arabia Greenhouse Gas Crediting and Offsetting Mechanism (GCOM)	-
	South Africa Carbon Tax Offset System	South Africa Carbon Tax

Source: KAPSARC Analysis, World Bank Carbon Pricing Dashboard data (2024).

This commentary will deep dive into three governmental crediting mechanisms: the Australian Carbon Credit Unit Scheme (ACCU), Thailand's Voluntary Emission Reduction Program (T-VER), and the United Kingdom's Woodland Carbon Code (WCC). These mechanisms were selected based on the following criteria:

1. The crediting mechanism was initially introduced in a purely voluntary context and is not linked to a compliance scheme.
2. The mechanism was launched before 2015, ensuring a reasonable timeframe and operational history from which to draw meaningful conclusions and lessons.

3. Relevant data are available.

Figure 2 shows the “size” of governmental crediting mechanisms based on the number of cumulative credits generated to date, with the boxes highlighted in green representing the mechanisms selected for analysis. The Australian ACCU scheme stands out as the second highest in terms of credits generated globally and the highest among the selected group, followed by Thailand's T-VER and then the UK's WCC. Interestingly, even with no links to compliance schemes, voluntary supply from the selected countries is substantial relative to crediting mechanisms that are linked to compliance frameworks.

Figure 2. Cumulative carbon credits generated by governmental mechanisms to date.

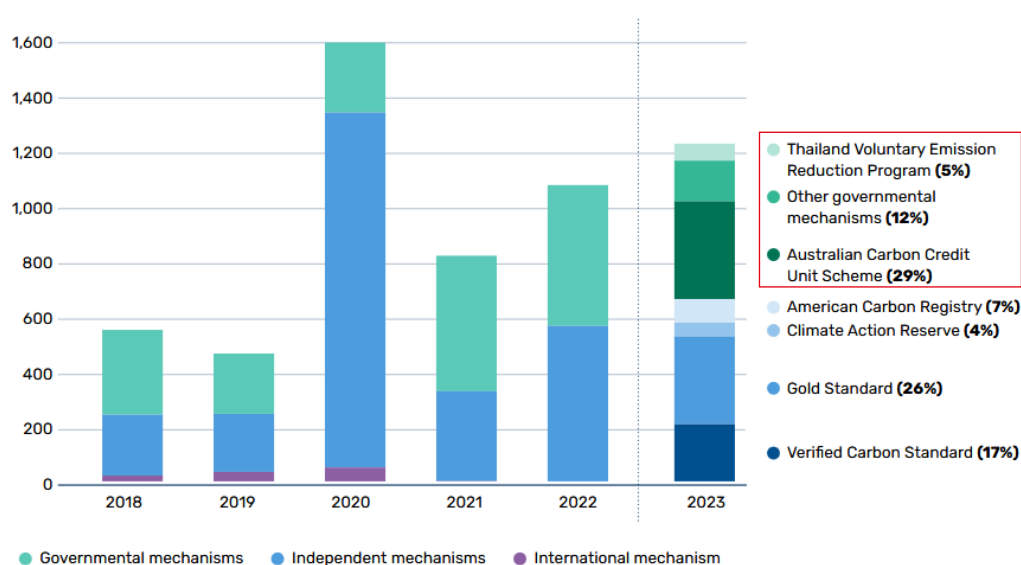


Source: KAPSARC Analysis and World Bank Carbon Pricing Dashboard data (2024).

Looking at the broader landscape of future global carbon credit supply across all categories, ACCU currently dominates, accounting for nearly 30% of all project registrations in 2023, while 5% are expected to come from Thailand – making them the two leading countries globally in project registrations. Expected supply from other governmental mechanisms combined stands at only

12%, as shown in Figure 3. This marks substantial growth in 2023 for the two selected mechanisms compared to previous years. Supply from independent programs combined stands at 54%, and while there are currently no registrations from international crediting mechanisms, this is expected to grow as Article 6 of the Paris Agreement becomes operational.

Figure 3. Annual project registrations by crediting mechanism type from 2018 to 2023.



Source: World Bank, *State and Trends of Carbon Pricing* (2024).

Comparative Analysis

This commentary explores how governments can design effective crediting mechanisms that deliver high-quality carbon credits while supporting emissions reduction and decarbonization goals cost-effectively and at scale. To do so, it assesses key design and operational features of selected government-led carbon crediting mechanisms. It examines how these mechanisms drive participation, interact with compliance schemes, structure supply and demand, define project eligibility, facilitate carbon trading, and manage operational costs. Key questions include:

1. **Policy Incentives:** What types of policy instruments and incentives are in place to drive participation in the crediting mechanism?
2. **Link to Compliance Schemes:** Are there plans to link the crediting mechanism to a compliance scheme such as a carbon tax, emissions trading system (ETS), or other mechanism?
3. **Supply and Demand:** What is the supply and demand structure in the crediting mechanism? Is the government a primary source of demand?
4. **Sectoral Scope and Methodologies:** What types of project activities are eligible for participation, and how are methodologies developed in the crediting mechanism? (Methodologies refer to the technical guidelines that project developers use for a specific project type.)
5. **Carbon Trading:** Is there a government-regulated carbon exchange, or does trading take place in the secondary market?
6. **Cost Recovery:** Does the crediting mechanism regulator collect fees to cover operational costs, or is participation subsidized?

Australian Carbon Credit Unit Scheme

Since its introduction, the crediting mechanism has operated in three distinct forms, each with relatively different goals. Between 2011 and 2014, it was introduced as part of the Carbon Farming Initiative, which aimed to support the Australian Carbon Pricing Scheme. This scheme was later repealed in 2014 following a change in government. After the repeal, the new administration reintroduced the mechanism under the Emissions Reduction Fund (ERF), which operated from 2014 to 2023. While the regulatory process remained largely the same, amendments to the ERF allowed the government to fund the purchase of carbon credits.

During the same period, the government introduced the Safeguard Mechanism, a compliance scheme that sets emissions reduction targets for the largest greenhouse gas (GHG) emitting facilities in the industrial sector (DCCEEW 2024). The two schemes were linked and together formed the cornerstone of Australia's broader climate policy. In 2023, again in response to a change in government, the terminology shifted from ERF to the Australian Carbon Credit Unit (ACCU) Scheme. Both schemes are administered by the Australian Clean Energy Regulator (CER) (CER 2024).

Policy Incentives: Over a period of 10 years, the ERF allowed the government to purchase carbon credits through a reverse auction, in which project developers bid the lowest price they were willing to accept for selling their ACCUs to the government. The ERF provided \$4.5 billion for purchasing ACCUs. From 2014 to 2023, the government purchased approximately 70% to 90% of all ACCUs issued during that period (ANAO 2024). Although the government was the primary buyer, the market was also open to entities covered by the Safeguard Mechanism and to private buyers, primarily those aiming to fulfill voluntary commitments.

Links to Compliance Schemes: In 2023, when the ERF transitioned into the ACCU scheme, it was complemented by an amendment that further linked the crediting mechanism to the Safeguard Mechanism. Through the new reforms, the stringency of the Safeguard Mechanism increased in line with Australia's international emissions targets. Emissions baselines are now set to decline progressively over time. Entities that exceed their emissions baselines can either purchase excess emissions permits called Safeguard Mechanism Credits (SMCs) or offset some of their excess emissions through the purchase of ACCUs. Entities are also rewarded with SMCs if they outperform their targets.

There is no rigid cap on the proportion of ACCUs a Safeguard Mechanism entity can surrender. However, legislation states that if surrendered ACCUs exceed 30% of the entity's emissions reduction target, justification must be provided explaining why more onsite abatement was not undertaken. This threshold may be reviewed in 2026-27 (Carbon Market Institute 2023).

Supply and Demand: Demand for ACCUs is expected to exceed issuance for the first time in 2028. Demand is projected to rise from less than 1 million in 2022 to 26 million in 2030, driven mainly by purchases from Safeguard Mechanism entities (Goliya 2023). With growing interest from the private sector, ACCU prices are expected to rise. This may help explain the increase in project registrations shown in Figure 2. The proportion of ACCUs held and purchased by the government has declined. In response to rising demand, project developers are allowed to opt out of their auction contracts with the government in order to sell their ACCUs directly on the market, potentially at higher prices to Safeguard Mechanism entities (CER 2024).

Scope and Methodologies: The ACCU scheme has a broad scope, covering project activities in agriculture, energy efficiency, landfill and waste, mining, oil and gas, transport, and vegetation.

Project methodologies under the ACCU scheme are independently developed by the CER in consultation with stakeholders, technical experts, and the Australian Ministry of Science and Technology. Project developers may also propose new methodologies, which then undergo a comprehensive review by a dedicated committee. Although independently developed, these methodologies are endorsed by the International Carbon Reduction and Offset Alliance (ICROA).

Methodologies have undergone several changes and revocations, in some cases due to concerns over additionality. For a project to be deemed "additional," its emission reductions must go beyond what would have occurred in the absence of the project. These concerns prompted an independent government review of the scheme in 2023, resulting in recommendations for methodology revocation and improvement (ANOA 2024). For instance, the "avoided deforestation" methodology – once a major contributor to overall projects – was revoked in 2023 because it failed to meet key integrity standards. It was likely issuing ACCUs for forests that were never at real risk of being cleared (Hemming, Merzian, and Schoo 2021; DCCEEW 2023). Similarly, the widely used "landfill gas" methodology came under scrutiny for additionality issues and was later improved following the review's recommendations.

Carbon Trading: Australia does not currently operate a government-regulated carbon exchange. Entities trade carbon credits through the secondary market or manually via the registry. To standardize and streamline the process, the government is developing a carbon exchange integrated with its new carbon registry (CER 2024).

Cost Recovery: The CER does not currently charge fees for its activities. Based on our analysis, it is assumed that project development costs – along with the costs of third-party verification and validation – are already significant enough that additional administrative fees or proceeds are not warranted. The only applicable fee is charged to entities that choose to withdraw from their contracts with the government in order to sell their credits on the open market. This option has gained popularity as demand from Safeguard Mechanism entities increases.

Thailand Voluntary Emission Reduction Program

The Thailand Voluntary Emission Reduction Program (T-VER) is a voluntary crediting mechanism implemented in 2013 to support voluntary reduction of GHG emissions by businesses and organizations. T-VER is managed by the Thailand Greenhouse Gas Management Organization (TGO).

Policy Incentives: To support participation in T-VER, Thailand has introduced a tax exemption allowing companies participating in T-VER projects to benefit from income tax exemption on the net profit derived from the sale of T-VER credits until 2027. To qualify, companies must register their projects under T-VER for three consecutive accounting periods and meet the criteria set by the TGO (Deloitte 2023). This marks an extension of a similar tax exemption introduced in 2020 (Umeyama 2021).

Thailand's newly proposed draft of the Climate Change Act introduces a Climate Change Fund, which aims to support carbon reduction, including projects that generate carbon credits through T-VER (Envilience 2024). Details of the fund were not available at the time of writing but could potentially incentivize further participation under T-VER (Bangprapa 2024).

Links to Compliance Schemes: T-VER has been linked to Thailand's Low Carbon City (LCC) program, which aims to support city-level GHG mitigation through projects using T-VER methodologies and issuing credits. However, it is unclear from available documentation whether the LCC program is still active. The impact of the link to T-VER is likely modest (Partnerships on Transparency 2017). A 2021 evaluation of the LCC program suggested that its connection to T-VER did not provide adequate financial incentive for participating cities (GEF 2021).

According to the draft Climate Change Act, both a carbon tax and a mandatory ETS would be introduced (Baker and

McKenzie 2024). On a smaller scale, during Thailand's pilot voluntary ETS, entities were allowed to use T-VER credits to meet up to 15% of their compliance obligations (ICAP 2024). As stated by the Department of Climate Change, the new nationwide ETS will follow a similar approach, particularly allowing a 15% offset from nature-based projects (Lee and Lee 2025). The ETS is expected to be fully operational by 2030. With this link to T-VER, supply and demand dynamics could shift significantly.

Scope and Methodologies: T-VER covers a wide range of eligible activities, including agriculture, energy efficiency, forestry, renewables, and waste. The project methodologies were initially developed in line with the Clean Development Mechanism (CDM). While these methodologies remain in use, in 2022 the TGO launched Premium T-VER, an upgraded credit category aligned with international standards and additional integrity requirements. It incorporates new methodologies that comply with Article 6 of the Paris Agreement and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

The new category also expands coverage of co-benefits. Projects must contribute to at least two Sustainable Development Goals. Under the Premium T-VER scheme, project developers may propose new methodologies, which are reviewed by the TGO, a dedicated committee, and technical experts (TGO 2021). In 2025, further reforms introduced stricter validation and verification for all T-VER projects, especially those applying for renewal. These changes bring T-VER in line with international GHG measurement standards and best practices (Singh 2025).

Supply and Demand: T-VER demand has been primarily driven by private sector purchases to meet voluntary commitments or net-zero targets. Due to the voluntary nature of the mechanism and the absence of compliance measures on high emitters, domestic demand remains modest. On the supply side, T-VER credit issuance faces challenges from project development costs and relatively low carbon prices averaging \$3 per credit, which tends to discourage participation by small project developers (SCB EIC 2023). If linked with the upcoming ETS or carbon tax, these trends could shift, creating higher demand from regulated entities and raising carbon credit prices, sending stronger signals to potential suppliers.

Carbon Trading: Project participants or buyers of T-VER credits currently trade manually through the T-VER Registry. This limits market efficiency and liquidity.

In response, in 2021 a group of major companies under the Federation of Thai Industries (FTI), in collaboration with the TGO, began developing FTIX, a digital trading platform for carbon and renewable energy credits. FTIX officially launched in 2023 (The Nation 2023).

The FTI has urged the government to complement this step with regulatory reforms, aiming to position Thailand as ASEAN's carbon credit trading hub (The Nation 2024). Operationalizing Article 6.4 of the Paris Agreement and opening access to global markets would allow project developers to sell credits at more competitive prices.

Cost Coverage: Since 2021, the TGO has collected fees for project registration and credit issuance under the standard T-VER category. Fees are doubled for projects under the Premium T-VER category (TGO 2021). Small carbon offset projects in Thailand face high operational costs, including fees for assessments and verification, which limit participation in the voluntary market (Carbon Pulse 2024). While the TGO's fees add to overall project costs, they remain relatively low compared with international crediting mechanisms.

UK Woodland Carbon Code

The Woodland Carbon Code (WCC) was introduced in 2011 to establish best-practice guidelines for organizations seeking to create woodlands as a means of carbon mitigation. Woodlands are similar to forests but are generally less dense. The code serves as a voluntary carbon crediting standard, allowing companies to purchase carbon credits from voluntary woodland creation projects in the UK to make credible claims about climate commitments. The WCC is managed by Scottish Forestry on behalf of the Forestry Commission in England.

Policy Incentives: In 2019, the Woodland Carbon Guarantee (WCaG) was introduced as a £50 million scheme to help accelerate woodland planting rates. Through WCaG, the government can buy verified carbon credits at a guaranteed price that is index-linked for the life of the contract. The incentive allows project developers to sell credits to the government every five or 10 years up to 2056, providing a long-term income stream.

The UK also offers grant-based incentives such as the England Woodland Creation Offer, which provides up to £10,200 per hectare to support new woodland creation. The Woodland Creation Planning Grant offers funding for the proposal, development and planning phase, with a maximum of £30,500. In addition, the £5 million High Speed 2 (HS2) Woodland Fund supports the restoration of existing plantations on ancient woodland sites.

Access to grants does not prevent project developers from entering the auction and selling credits to the government through WCaG. However, developers may combine only one grant program with WCaG, and they would receive a lower price for their credits compared with projects without grant access (Forestry Commission 2024).

Links to compliance schemes: The WCC is not currently linked to any compliance scheme, and no plans have been announced to do so. However, a recent study foresees significant benefits from linking the WCC to the UK ETS. The study suggests that at current voluntary carbon credit prices of £28, less than 60% of land in the UK is considered economically viable for WCC projects. Linking the WCC to the UK ETS could raise forestry credit prices by up to 67%, reaching £68 to £79 by 2030. This would economically unlock an additional 11% to 26% of UK land suitable for afforestation (Rosales, M'Hallah, and Kelly 2024).

Supply and Demand: The WCC includes two types of credits: Pending Issuance Units (PIUs) and Woodland Carbon Units (WCUs). Unique to the WCC, most trading occurs with PIUs, which are not yet verified and represent a "promise to deliver" a WCU in the future based on projected carbon removal. A PIU cannot be claimed until it is converted to a WCU; it serves only to help companies plan for future emissions compensation (WCC 2024).

WCUs, by contrast, have been verified and reflect actual emissions removals. Companies may use WCUs to report emissions reductions or support credible net-zero claims. At the time of writing, 5,258,000 PIUs were available for sale, while only 800 WCUs were available (Forestry Commission 2024). Due to the nature of woodland projects, WCUs take longer to generate, but the number is expected to grow over time. Current demand is driven mainly by voluntary buyers in the UK aiming to meet their climate goals. As more WCUs become available, the government is expected to play a larger role in driving demand through WCaG.

Scope and Methodologies: The WCC covers only forestry projects. It has an independently developed methodology specific to woodland creation, with four new methodologies currently under review: Agroforestry carbon code, Biodiversity crediting, Whole-farm approach, and Woodland water crediting. Project developers may propose new methodologies, which go through a review, expert consultation, and pilot phase. Although independently developed, the WCC methodology is endorsed by ICROA (n.d.).

Carbon Trading: There is no carbon exchange platform for WCC. Trading is conducted manually through the carbon registry.

Cost Coverage: Scottish Forestry outsources the carbon registry operation to a third party, which serves both the WCC and the UK Peatland Code. The third-party operator collects fees for registry-related activities, with a portion remitted to the government. The fee structure varies by user group. Project developers are charged only for credit-related activities, while buyers and traders are charged for all activities within the registry.

Considerations and Lessons Learned

As Saudi Arabia moves into the next phases of operationalizing the GCOM and defining its key design and enabling factors, this paper has explored several themes that offer valuable lessons and insights from the experiences of the three evaluated countries. The analysis highlights both similarities and differences across the mechanisms in terms of credit generation, supply and demand dynamics, and methodological approaches. Critical factors influencing the effectiveness of each mechanism include the presence of incentives, integration with compliance schemes, trading opportunities, and the financial sustainability model adopted by mechanism administrators. Table 2 provides a comparative summary of these themes across the evaluated mechanisms.

Table 2. Comparison of various themes across the selected carbon crediting mechanisms.

	ACCU	T-VER	WCC
Incentives provided	✓	✓	✓
Recently linked or will potentially be linked to compliance scheme	✓	✓	✗
Availability of trading platform	✗	✓	✗
Independently developed methodology	✓	✓	✓
Allows the development of new methodologies	✓	✓	✓
Operational costs covered by mechanism regulator	✗	✓	✓

Source: KAPSARC analysis.

Policy Tools and Market Incentives

The analysis shows that none of the selected crediting mechanisms operate without a supporting incentive structure to drive participation. The types of incentives vary across mechanisms. In Australia and the UK, governments play an active and important role by addressing demand uncertainty for project developers. These governments commit to purchasing carbon credits through dedicated funds that use reverse auctions, awarding contracts to the lowest-price bidders. In Thailand, the government has provided two rounds of tax credits from which companies can benefit.

In the UK, developers may combine two incentives – accessing a grant and entering the reverse auction process. Incentives can also target specific areas, such as supporting projects on ancient plantation sites or offsetting high-cost activities like project planning and preparation.

It is important to note that not all supporting policies lead to significant impacts. Thailand's experience linking its Low Carbon City (LCC) program to T-VER, for example, did not generate substantial benefits. Nonetheless, such cases offer lessons that can inform improved policy design when introducing new incentives.

Some incentives may lead to overdependence on the government, which becomes the primary driver of demand, supply, or both. In cases where the government is the main buyer, concerns arise over the uncertainty of the government's purchasing intentions and the price it is willing to pay – often perceived as too low to incentivize supply.

Most incentives reviewed in this commentary target the supply side. However, demand remains a challenge in the context of purely voluntary markets. This challenge is compounded by the availability of international carbon credits, which may be offered at more competitive prices.

As the Kingdom fully operationalizes GCOM, a balanced and well-structured incentive approach may be needed to realize its full potential. The choice of incentive will likely depend on the domestic context and needs. A recent study finds that if Saudi corporations maintain their net-zero pledges and integrate carbon credits into

their strategies, demand will be sustained and grow significantly over the coming decades. On the supply side, however, further action is needed to bring projects online and at scale (Zakkour, Gasim, and Luomi 2025).

Linkages to Compliance Markets and Supply-Demand Dynamics

Even with incentives in place, supply and demand challenges may persist in the absence of compliance measures. Additional research is needed to assess how different incentive structures influence carbon credit supply and demand, especially in mechanisms not tied to compliance frameworks.

The analysis suggests that linking voluntary crediting mechanisms to compliance schemes – such as Australia's Safeguard Mechanism or Thailand's upcoming emissions trading system (ETS) – can help optimize their role in supporting entities to meet targets and decarbonize. Such linkages create natural incentives and signal clear demand prospects, encouraging project developers to invest in credit-generating activities.

International experience further shows that many mechanisms launched as purely voluntary eventually evolve to integrate with compliance systems. This trend represents a common transition pathway and is a key learning for countries designing their own mechanisms.

During the early stages of a compliance scheme, allowing entities to offset a portion of their targets using carbon credits can provide flexibility and drive participation in the crediting mechanism. However, for both schemes to achieve their intended complementary roles, offset limits must ensure that companies still deliver meaningful internal decarbonization and treat credits as a last resort.

As Saudi Arabia plans to launch a pilot compliance-based scheme within the next two to three years (Carbon Pulse 2024), policymakers should consider the potential

linkages with the crediting mechanism. These linkages will have a direct impact on credit supply and demand. Given GCOM's economy-wide scope, early coordination between the crediting mechanism and the forthcoming compliance scheme will be essential. Proactively defining project eligibility under both schemes can help avoid overlap and ensure alignment between voluntary and compliance-based efforts.

Navigating Methodology Development: Ensuring Integrity and Flexibility

The methodology development approach will depend on the specific needs of the crediting mechanism, as shown in Table 2. Countries differ in their approaches to methodology development and may combine them. Some adopt methodologies from existing mechanisms, while others, such as the ACCU scheme and the UK WCC, developed their own methodologies through a top-down

approach. In some cases, like T-VER, methodologies were initially adopted from the CDM and later developed independently.

On the one hand, choosing a top-down methodology development approach allows countries to address specific national decarbonization needs and focus on priority sectors and technologies aligned with the domestic context. However, this approach requires in-depth expertise and capacity. It also presents risks, as seen in the case of ACCU, where some methodologies were later found to be misaligned with key principles of additionality and integrity.

All three mechanisms also allow project developers to propose new methodologies through a bottom-up approach, provided they meet the requirements set by the mechanism. These generally undergo review by a dedicated committee and expert consultation. While this option introduces flexibility, it must be managed carefully to ensure that core principles of additionality and credibility are maintained.

In a purely voluntary landscape, companies on the demand side may choose to buy domestically generated credits or opt for international credits. The decision will depend on several factors, including price, but also on credit quality and alignment with integrity standards as defined by the underlying methodology. Government-led crediting mechanisms must ensure that their methodologies reflect demand needs while upholding principles of credibility and environmental integrity.

Table 3. Considerations for choosing a methodology development approach.

Adopting methodologies from existing crediting mechanisms	Top-down (methodologies designed by program administrator)	Bottom-up (methodologies proposed by project developers)
- It is important to rapidly adopt a portfolio of methodologies, including methodologies for priority project types. - Methodologies from other mechanisms are (a) aligned with domestic crediting mechanism criteria and requirements, (b) appropriate to national circumstances, and (c) can be adapted with minimal effort. - Program administrators lack sufficient resources or capacity.	- Appropriate or desired methodologies are not available from existing mechanisms. - Program administrators lack sufficient resources or capacity. - Targeting specific project types is less important, or policymakers do not intend to rely exclusively on standardized approaches to methodologies.	- Policymakers intend to adopt standardized approaches to methodologies. - Program administrators have sufficient capacity and resources. - There is no urgent need to quickly develop a large number of methodologies. - Policymakers desire a high degree of control over methodological choices. - Targeting specific project types is a high priority.

Source: World Bank Guide to Developing Domestic Crediting Mechanisms (2021).

When it comes to GCOM, given Saudi companies' limited experience with carbon markets and crediting mechanisms, overly complex rules and methodologies may deter engagement. To encourage participation, it will be important to strike an appropriate balance in the scope and complexity of crediting methodologies. At the same time, efforts should be made to build capacity through training programs, awareness campaigns, and support for project developers. Over time, methodologies can be refined as experience and market participation grow (Zakkour, Gasim, and Luomi 2025).

Trading Platforms and Market Access

The analysis shows that the ability to trade carbon credits efficiently and quickly is a key incentive for companies to participate in voluntary markets. The availability of exchanges and trading platforms directly influences market liquidity and the financial viability of credit sales. However, in cases where the government is the primary buyer or volumes are low, a carbon registry may be sufficient (as in the WCC and ACCU). In contrast, when demand is higher from various market participants, the availability of robust trading platforms becomes critical.

Where restrictions limit the sale of credits beyond national boundaries and domestic demand is low, project developers may be reluctant to engage. In response to this challenge, a coalition of companies in Thailand pushed policymakers to establish a carbon exchange to access global markets. With the operationalization of the Paris Agreement crediting mechanism under Article 6.4, more countries can now leverage international trading opportunities – expanding market potential, increasing flexibility, and creating additional demand for nationally issued credits.

In Saudi Arabia, a carbon trading platform is being developed by the Regional Voluntary Carbon Market Company (RVCMC), a company jointly developed by the Public Investment Fund and the Saudi Tadawul Group. The platform is expected to serve as a key enabler for carbon market participants in the Kingdom and across the region.

Cost Recovery and Financial Sustainability for Mechanism Operators

Independent crediting programs such as the Verified Carbon Standard (Verra), Gold Standard, and the American Carbon Registry (ACR) have clear fee structures to cover their internal costs. This is essential, as these programs do not receive government funding and often operate on a nonprofit basis (Verra 2023; Gold Standard n.d.; ACR n.d.).

In contrast, most government-led crediting mechanisms operate on national budgets and are designed to support broader climate policy objectives. While fees can help ensure the financial sustainability of a mechanism, if set too high, they may render some projects economically unviable. Project developers already face significant costs, including those related to project design and third-party verification and validation.

When crediting mechanisms are not linked to compliance markets, governments should assess how fees may affect both supply and demand. A no-fee structure, such as that used by the ACCU, can serve as a participation incentive. Alternatively, a tiered fee structure based on user group – as in the WCC – can help avoid negative impacts on key stakeholders, particularly project developers who are central to credit generation.

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About the Project

KAPSARC's Carbon Markets and Paris Agreement Article 6 project aims to support Saudi Arabia's participation in and engagement with domestic and international carbon markets. It seeks to raise awareness and strengthen understanding of carbon markets in Saudi Arabia and the broader Gulf Cooperation Council (GCC) region through empirical, evidence-based, policy-oriented research and analysis. Carbon markets can support both private sector and government efforts to reduce or remove greenhouse gas (GHG) emissions and contribute effectively to achieving the goals of the Paris Agreement. Well-functioning carbon markets can lower the costs of GHG emission reductions, support the transfer of clean technologies and finance, and unlock higher mitigation ambition over time, providing benefits to a wide range of stakeholders.

The project focuses on questions including the following:

1. What lessons can be learned from Saudi Arabia's and the Gulf region's past experience with carbon markets that are relevant to the post-2020 era?
2. How is the international carbon market landscape evolving – including in relation to regulated carbon markets, voluntary carbon markets (VCM), and mechanisms under Article 6 – and what are the related challenges and opportunities?
3. What can Saudi Arabia do to maximize the benefits of both regulated and voluntary approaches? Which design options best align with the Kingdom's priorities and goals?

