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Financing Transition in a Hydrocarbon Economy: The UAE Case

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Abstract

The objective of this paper is to examine the United Arab Emirates (UAE) as a test case of Gulf energy transition finance by analyzing how a hydrocarbon-dependent economy is constructing the financial, regulatory, and institutional architecture required to move from net-zero pledges to climate finance flows. Rather than treating climate finance as a set of isolated instruments, the paper conceptualizes the UAE's approach as a state-led transition-finance model shaped by Gulf state capitalism, sovereign wealth accumulation, national oil company strategy, financial regulation, and post-COP28 climate diplomacy. Using a qualitative policy and institutional review, the paper maps the UAE's transition-finance architecture across three interrelated dimensions: institutions and governance, financial instruments, and policy alignment. It examines the role of federal strategies such as Net Zero 2050 and the UAE Energy Strategy 2050, regulatory actors including the Central Bank of the UAE, the Securities and Commodities Authority (SCA), Abu Dhabi Global Market (ADGM), and Dubai Financial Services Authority (DFSA), and key financial mechanisms including green bonds and sukuk, sustainability-linked finance, sovereign wealth fund investments, national oil company decarbonization strategies, blended-finance platforms, and carbon-market mechanisms. The analysis finds that the UAE has developed a distinctive state-led, finance-centric model for financing the energy transition. This model enables rapid capital mobilization, de-risking of private investment, and strong international positioning, particularly following COP28 and the launch of ALTERRA. However, its effectiveness is constrained by unresolved tensions between net-zero ambition and hydrocarbon expansion, fragmented sustainable-finance regulation, limited carbon-pricing signals, uneven disclosure practices, underdeveloped domestic green capital markets, and restricted access to green finance for SMEs. The paper argues that the UAE's climate-finance architecture is best understood neither as simple green diversification nor as symbolic climate positioning, but as an emerging Gulf model of transition finance: well-capitalized, and institutionally coordinated, yet structurally shaped by the same hydrocarbon rents and state-led governance logics it seeks to transform. By positioning the UAE as a benchmark, the paper contributes to debates on climate finance, state capitalism, and transition governance in hydrocarbon-dependent economies, while identifying the coherence gaps to be addressed for climate finance to support economy-wide decarbonization.



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1. Introduction: The UAE as a Test Case of Gulf Transition Finance

The global energy transition has transformed climate finance from a specialized environmental policy concern into a central question of economic strategy, financial regulation, and state capacity. Achieving net-zero emissions requires not only technological change, but also the reallocation of capital across energy systems, infrastructure, industry, transport, and the built environment. The Paris Agreement's commitment to limit global warming to 1.5 °C above pre-industrial levels has made this financial reallocation central to climate governance, with the International Energy Agency estimating that global clean-energy investment must reach approximately USD 4 trillion annually by 2030 to achieve net-zero emissions by 2050 [1,2]. For hydrocarbon-dependent economies, this challenge is particularly complex. The transition requires these states to finance decarbonization while continuing to manage the fiscal, institutional, and political legacies of fossil-fuel dependence.

This tension is especially visible in the Gulf Cooperation Council (GCC) states. The Gulf economies have historically relied on hydrocarbon revenues to fund public investment, social contracts, infrastructure development, and sovereign wealth accumulation. They collectively control a substantial share of the world's proven crude oil reserves, while per capita energy consumption in the GCC remains significantly above the global average [3,4]. At the same time, the region is increasingly exposed to both physical climate risks and transition risks. Extreme heat, sea-level rise, water scarcity, and coastal vulnerability pose direct environmental and developmental challenges, while global decarbonization threatens the long-term value of hydrocarbon assets, export revenues, and carbon-intensive growth models [5,6]. Hence, the question for the Gulf is not simply whether climate finance can support renewable energy projects. It is whether financial systems can be restructured to support a broader transition from hydrocarbon-led growth to more diversified, resilient, and low-carbon economic models.

The UAE represents a particularly important case through which to examine this question. It was the first Gulf state, and the first country in the Middle East and North Africa region, to commit to achieving net-zero emissions by 2050 [7]. It has also positioned itself as a regional and global leader in climate diplomacy, sustainable finance, and clean-energy investment. The UAE hosted COP28 in 2023, which produced the UAE Consensus and mobilized substantial climate-finance pledges through international public and private channels [8]. At COP28, the UAE launched ALTÉRRRA, a USD 30 billion private climate investment vehicle designed to catalyze up to USD 250 billion in global climate investment by 2030 [9]. These developments have strengthened the UAE's international profile as a climate-finance hub and a policy laboratory for transition governance in hydrocarbon-exporting economies.

Yet the UAE's case is analytically significant precisely because it is not a straightforward green-transition story. The country remains one of the world's major oil producers, and hydrocarbon revenues continue to shape public finance, sovereign investment, and industrial strategy. ADNOC has committed to achieving operational net-zero emissions by 2045 and has invested in carbon capture, methane abatement, electrification of operations, and lower-carbon solutions [10]. At the same time, ADNOC continues to expand upstream production capacity. This duality—climate-finance leadership alongside continued hydrocarbon expansion—is not an inconsistency to be noted only in passing. It is the central political-economic tension through which the UAE's transition-finance architecture must be understood.

This paper argues that the UAE is constructing a distinctive model of Gulf transition finance: state-led, finance-centric, sovereign-capital-driven, and internationally outward-facing. Rather than emerging primarily from decentralized market demand, the UAE's

transition-finance architecture is shaped by the interaction of federal strategies, financial regulators, sovereign wealth funds, state-owned enterprises, national oil companies, and international climate-finance platforms. This model reflects the broader dynamics of Gulf state capitalism, in which the state controls key productive assets, deploys hydrocarbon rents through sovereign investment vehicles, and uses state-backed institutions to pursue economic diversification and strategic repositioning [6]. It enables rapid mobilization of capital and gives the state significant capacity to de-risk private investment, coordinate strategic sectors, and project climate-finance leadership globally. At the same time, it also reproduces several structural constraints associated with hydrocarbon-dependent state capitalism, including regulatory fragmentation, limited market depth, weak carbon-pricing signals, uneven disclosure practices, limited SME access to green finance, and unresolved dependence on hydrocarbon rents.

The paper, therefore, moves beyond a descriptive mapping of UAE climate initiatives to ask a more analytical question: What kind of financial architecture is being built to translate net-zero pledges into transition-finance flows, and where do coherence gaps remain? The objective of the study is to examine how the UAE organizes transition finance through institutions, regulation, sovereign capital, market instruments, and policy alignment, and to assess whether this architecture supports structural decarbonization or mainly strengthens climate-finance positioning under hydrocarbon dependence. This framing builds on the growing literature that treats climate finance not merely as a volume of capital flows, but as a governance system through which risks, incentives, institutions, and development pathways are structured [11,12].

The paper's contribution is threefold. First, it shifts attention from climate pledges to the financial architecture through which transition commitments are operationalized. While much discussion of Gulf climate policy focuses on targets, projects, or diplomatic positioning, this paper examines the institutional and financial mechanisms that determine whether pledges can be translated into durable capital flows. Second, it conceptualizes the UAE as an emerging state-led transition-finance model rooted in the political economy of Gulf state capitalism. This helps explain both the strengths of the UAE approach, particularly its ability to mobilize sovereign capital at scale, and its limitations, particularly the risks of opacity, concentration, and hydrocarbon lock-in. Third, it identifies the policy and regulatory coherence gaps that must be addressed if climate finance is to support economy-wide decarbonization rather than remain concentrated in flagship projects and internationally visible initiatives.

Methodologically, the paper adopts a qualitative policy and institutional review. It draws on national strategies, regulatory frameworks, institutional reports, climate-finance data, and academic literature to analyze the UAE's transition-finance architecture across three dimensions: institutions and governance, financial instruments, and policy alignment. This approach is appropriate because the central concern is not only the volume of climate finance, but how finance is organized, governed, and connected to the broader political economy of transition [11,12]. By examining how transition finance can support or constrain economy-wide decarbonization in a hydrocarbon-dependent economy, the paper contributes to sustainability debates on climate governance, sustainable finance, and low-carbon economic transformation.

The remainder of the paper is structured as follows. Section 2 develops the conceptual framing, linking climate finance, transition finance, and Gulf state capitalism. Section 3 presents the methodology and analytical framework. Section 4 examines the UAE's transition-finance architecture, focusing on institutions, regulation, and policy alignment. Section 5 analyzes the main instruments in practice, including green bonds and sukuk, sovereign wealth funds, national oil companies, blended finance, and carbon markets.

Section 6 discusses the strengths, contradictions, and coherence gaps of the UAE model. Section 7 concludes with policy implications for the UAE and the wider GCC region.

2. Conceptual Framing: Climate Finance, Transition Finance, and Gulf State Capitalism

2.1. From Climate Finance to Transition Finance

Climate finance has traditionally referred to local, national, and transnational flows of public, private, and alternative finance that support mitigation and adaptation actions to address climate change [13]. In the multilateral climate regime, the concept has often been associated with concessional flows, development assistance, and the obligations of developed economies to support climate action in developing countries. Over time, however, the meaning of climate finance has expanded substantially. It now includes a broader ecosystem of market-based instruments, financial regulation, institutional investors, sovereign capital, corporate transition plans, and public-private partnerships [11].

This expansion reflects a wider shift in the political economy of climate action. The challenge is no longer only how to finance discrete mitigation or adaptation projects, but how to reorient financial systems toward long-term decarbonization and climate resilience. Global climate finance flows have increased significantly in recent years, yet they remain unevenly distributed across sectors, geographies, and risk categories. Mitigation finance continues to dominate, while adaptation finance remains underfunded relative to need. Climate finance is also concentrated in advanced economies and China, with emerging markets and developing economies receiving a smaller share of global flows [11]. These patterns highlight that the central challenge is not only the quantity of finance, but also its allocation, governance, accessibility, and alignment with national development pathways.

For hydrocarbon-dependent economies, this wider agenda is better captured through the concept of transition finance. Transition finance refers to the mobilization and governance of capital to support the transformation of carbon-intensive sectors, institutions, and economic models toward lower-carbon pathways. It differs from conventional green finance because it does not focus only on activities that are already low-carbon, such as renewable energy or clean transport. Instead, it addresses the more difficult question of how carbon-intensive economies and sectors can finance credible, measurable, and time-bound transition pathways. This distinction is particularly important in the Gulf context. GCC states are not simply seeking finance for renewable energy projects; they are attempting to manage the financial implications of transforming economies historically built around hydrocarbon extraction, export revenues, energy-intensive infrastructure, and state-led development. In this setting, transition finance includes green bonds and sukuk, sustainability-linked lending, sovereign wealth fund portfolio allocation, national oil company decarbonization strategies, carbon-market mechanisms, blended-finance platforms, and regulatory frameworks for climate-related financial risk. It is therefore both a financial and a governance challenge.

The analytical value of transition finance lies in its ability to capture the tension between continuity and change. On one hand, transition finance can enable hydrocarbon economies to mobilize capital for clean energy, industrial decarbonization, green infrastructure, and climate-resilient development. On the other hand, it may also allow carbon-intensive actors to preserve existing business models by financing incremental emissions reductions without fundamentally altering production structures. This ambiguity makes transition finance a contested concept, particularly in economies where the institutions financing the transition are also beneficiaries of hydrocarbon rents.

2.2. Financial Regulation, Climate Risk, and Market Discipline

A second conceptual pillar concerns the role of financial regulation in governing climate-related risks and shaping capital allocation. Climate change creates both physical risks, arising from extreme weather, heat, water stress, and infrastructure vulnerability, and transition risks, arising from policy changes, technological shifts, market repricing, litigation, and changes in consumer and investor preferences. Financial systems are exposed to both categories of risk through bank lending, insurance, capital markets, sovereign portfolios, and corporate balance sheets.

The emergence of climate-related financial disclosure frameworks reflects the growing recognition that climate change is a financial stability issue as well as an environmental issue. The Task Force on Climate-related Financial Disclosures (TCFD) provided an influential framework for integrating climate risk into corporate and financial reporting, while the International Sustainability Standards Board (ISSB) has developed global baseline standards for sustainability-related disclosures [14,15]. Similarly, the Network for Greening the Financial System (NGFS) has encouraged central banks and financial supervisors to integrate climate risk into prudential supervision, scenario analysis, and financial stability assessments [16]. These developments matter for transition finance because financial instruments alone cannot generate credible transition pathways without regulatory discipline. Green bonds, sukuk, sustainability-linked loans, and carbon credits depend on disclosure, verification, taxonomy alignment, and monitoring systems. Without credible rules, climate finance risks becoming fragmented, opaque, and vulnerable to greenwashing. This is particularly relevant in emerging sustainable-finance markets, where voluntary disclosure and principles-based regulation may generate momentum but may not be sufficient to ensure comparability, accountability, and transition integrity.

In the Gulf context, financial regulation has historically focused on monetary stability, banking soundness, and capital market development rather than environmental risk governance [17]. However, the post-Paris Agreement period has seen growing regulatory attention to sustainable finance, climate-risk disclosure, and ESG reporting. The UAE's Sustainable Finance Working Group, established in 2019, reflects this shift by bringing together the Central Bank of the UAE, the Securities and Commodities Authority, Abu Dhabi Global Market, and the Dubai Financial Services Authority to coordinate sustainable-finance policy [18]. The central question is whether such coordination can evolve from voluntary guidance and market signalling into a binding, harmonized, and enforceable regulatory architecture.

2.3. Gulf State Capitalism and the Political Economy of Transition Finance

The third conceptual pillar is Gulf state capitalism. Climate finance in the GCC cannot be understood only through the language of financial markets or environmental policy. It is embedded in a political-economic model in which the state controls strategic assets, directs investment, manages hydrocarbon rents, and uses sovereign institutions to pursue economic diversification and geopolitical positioning. Hertog [6] describes Gulf state capitalism as a system in which state ownership, sovereign wealth, national oil companies, and fiscal redistribution are central to economic governance.

Sovereign wealth funds are especially important within this architecture. GCC sovereign wealth funds have traditionally served as vehicles for intergenerational savings, macroeconomic stabilization, and economic diversification. Increasingly, they are also being positioned as financiers of the energy transition. The UAE's major sovereign and state investment institutions, including ADIA, Mubadala, L'IMAD, and related vehicles, have the scale, risk tolerance, and long investment horizons required to finance clean energy, infrastructure, technology, and climate-resilient development. Mubadala's role in

establishing and scaling Masdar is a clear example of how sovereign capital can be used to create transition-related investment platforms.

Yet SWF-led transition finance also raises important governance questions. Sovereign capital can mobilize investment quickly and de-risk projects that private investors may consider too uncertain or capital-intensive. However, SWF investment decisions may be less transparent than public budgetary expenditure or listed-market investment. This can make it difficult to assess additionality, portfolio alignment, and climate impact. The Organisation for Economic Co-operation and Development (OECD) [19] notes that sovereign and strategic investment funds can play an important role in the low-carbon transition, but their effectiveness depends on mandate clarity, transparency, and alignment with credible climate objectives.

Beyond institutional and market-based perspectives, several political-economy approaches help explain why transition finance in hydrocarbon-dependent economies can simultaneously enable transformation and preserve continuity. Rentier-state theory suggests that resource-rich states remain structurally dependent on hydrocarbon revenues, thereby constraining rapid economic transformation [20]. Carbon lock-in theory highlights how existing energy infrastructure, institutional arrangements, and investment patterns can reinforce continued reliance on fossil fuels despite growing climate commitments [21]. Ecological-state perspectives further suggest that governments may pursue environmental objectives while also preserving economic activities that support growth, fiscal stability, and political legitimacy [22]. Together, these perspectives provide a useful lens for understanding the coexistence of ambitious transition-finance initiatives and continued investment in the hydrocarbon sector in the UAE.

2.4. National Oil Companies and the Paradox of Transition Finance

National oil companies are another central actor in Gulf transition finance. In hydrocarbon economies, NOCs are not simply commercial firms. They are revenue generators, industrial anchors, technology investors, employers, and instruments of state strategy. Their transition plans, therefore, have economy-wide implications. In the UAE, ADNOC's commitments to operational net-zero emissions, carbon capture, methane abatement, electrification, and lower-carbon energy investment place it at the center of the country's transition-finance architecture [10]. The role of NOCs in transition finance is inherently paradoxical. On the one hand, they possess the technical capacity, capital resources, infrastructure, and project management capabilities needed to scale low-carbon technologies such as carbon capture, hydrogen, and methane reduction. On the other hand, their core business model remains tied to fossil-fuel production. This creates a potential mismatch between operational decarbonization and economy-wide emissions reduction. A national oil company may reduce the carbon intensity of production while continuing to expand output, thereby improving operational performance without necessarily aligning with a global 1.5 °C pathway.

This paradox has been widely discussed in the literature on national oil companies and the energy transition. Manley and Heller [23] argue that NOCs face distinctive transition risks because their investment decisions are shaped not only by commercial incentives but also by state revenue needs, industrial policy, and national development strategies. In the Gulf, this means that NOC transition finance may simultaneously support decarbonization technologies and extend the economic life of hydrocarbon assets. The key question is therefore not whether NOCs invest in low-carbon solutions, but whether these investments are embedded in credible, measurable, and time-bound transition pathways that reduce absolute emissions and avoid long-term lock-in.

This issue is especially relevant to the UAE because ADNOC's decarbonization strategy coexists with planned expansion in oil production capacity. The resulting tension illustrates a broader challenge for hydrocarbon-dependent economies: the same institutions that finance and implement parts of the energy transition may also have incentives to preserve the fossil-fuel system. Transition finance in this context must therefore be assessed not only by the volume of capital allocated to low-carbon activities, but by the coherence of that allocation with national net-zero objectives and global decarbonization pathways.

2.5. Analytical Implications for the UAE Case

Taken together, transition finance, climate-risk regulation, Gulf state capitalism, rentier-state dynamics, carbon lock-in, and ecological-state perspectives provide the analytical foundation for examining the UAE's climate-finance architecture. They suggest that the UAE should not be analyzed simply as a market developing green financial products, nor only as a hydrocarbon economy responding to external climate pressure. Rather, it should be understood as a state-capitalist transition-finance model that combines sovereign capital, regulatory coordination, national oil company strategy, and international climate diplomacy to manage the risks and opportunities of decarbonization.

This framing leads to three analytical expectations. First, the UAE's transition-finance architecture is likely to be highly centralized, with state-backed institutions playing a dominant role in capital mobilization and project development. Second, financial instruments are likely to function not only as sources of capital but also as tools of signalling, de-risking, and international positioning. Third, coherence gaps are likely to emerge where state-led financial ambition collides with hydrocarbon dependence, fragmented regulation, limited market discipline, and incomplete carbon-pricing mechanisms. The following sections apply this conceptual framing to the UAE case.

3. Materials and Methods

3.1. Research Design

This paper adopts a qualitative policy and institutional review methodology to examine how the UAE structures and governs transition finance in the context of its net-zero and energy-transition objectives. This approach is appropriate because the paper is concerned not only with the volume of climate finance, but with the architecture through which finance is mobilized, regulated, allocated, and aligned with national transition goals. In hydrocarbon-dependent economies, transition finance is shaped by the interaction of state institutions, sovereign capital, national oil companies, regulatory frameworks, and market-based instruments. A qualitative institutional approach allows the analysis to capture the governance logics, policy linkages, and structural tensions that may not be visible through financial-flow data alone.

The research design is analytical rather than evaluative in a narrow performance-measurement sense. It does not seek to quantify the causal impact of specific financial instruments on emissions outcomes. Instead, it maps and interprets the institutional and financial architecture through which the UAE seeks to translate its net-zero commitments into transition finance flows. The objective is to identify the strengths, contradictions, and coherence gaps of the emerging UAE model and to assess what it reveals about transition finance in hydrocarbon-dependent Gulf economies more broadly.

3.2. Data Sources

The analysis draws on four main categories of sources.

First, the paper reviews primary policy and strategy documents, including the UAE Net Zero by 2050 Strategic Initiative, the UAE Energy Strategy 2050, the UAE's Nationally

Determined Contributions under the Paris Agreement, federal climate and sustainability strategies, and policy documents issued by relevant ministries and government entities. These sources are used to identify the stated objectives, targets, and strategic priorities that frame the UAE's transition-finance agenda.

Second, the paper analyzes regulatory and supervisory documents issued by key financial authorities, including the Central Bank of the UAE, the Securities and Commodities Authority, Abu Dhabi Global Market, the Dubai Financial Services Authority, and the UAE Sustainable Finance Working Group. These documents are used to assess the evolution of sustainable finance regulation, climate-related disclosure, taxonomy development, and climate risk governance.

Third, the analysis uses institutional and corporate reports from major transition-finance actors, including sovereign wealth funds, national oil companies, renewable energy companies, development finance entities, and state-backed investment platforms. These include reports and frameworks related to ADNOC, Masdar, Mubadala, ADIA, L'IMAD, the Abu Dhabi Fund for Development, DEWA, and ALTERRA. These sources are used to examine how state-linked actors mobilize capital, structure investment vehicles, and position themselves within the UAE's broader architecture of transition finance.

Fourth, the paper draws on academic literature and secondary data from international organisations, market data providers, and climate finance institutions, including the Climate Policy Initiative, Climate Bonds Initiative, International Renewable Energy Agency, International Energy Agency, OECD, World Bank, UNFCCC, NGFS, TCFD, and ISSB-related sources. These materials provide comparative context, market evidence, and conceptual grounding for interpreting the UAE case within wider debates on climate finance, transition finance, state capitalism, and GCC political economy.

3.3. Analytical Framework

The paper applies a three-dimensional analytical framework to assess the UAE's transition-finance architecture: institutional governance, financial instruments, and policy alignment.

- a. Institutional governance examines the actors and coordination mechanisms that govern transition finance. This includes federal ministries, financial regulators, emirate-level authorities, sovereign wealth funds, state-owned enterprises, national oil companies, and cross-regulatory coordination bodies. The analysis asks who governs transition finance, how responsibilities are distributed across institutions, and whether the architecture supports coordination or generates fragmentation.
- b. Financial instruments examine the mechanisms through which capital is mobilized and deployed. This includes green bonds and sukuk, sustainability-linked finance, sovereign wealth fund investments, national oil company decarbonization finance, blended-finance structures, partnerships, and carbon-market mechanisms. The analysis asks how finance is mobilized, which actors dominate specific instruments, what scale and depth these instruments have achieved, and whether they support economy-wide transition or remain concentrated in flagship projects and large state-backed entities.
- c. Policy alignment assesses the coherence between the UAE's climate-finance architecture and its stated net-zero, energy transition, and economic diversification objectives. This dimension examines whether financial regulation, capital allocation, carbon-market development, disclosure practices, and public investment incentives are aligned with transition goals. It also identifies areas where inconsistencies emerge, particularly between net-zero ambition and hydrocarbon expansion, sustainable-

finance regulation and market practice, and climate-finance leadership and domestic decarbonization.

This framework allows the paper to move beyond a descriptive inventory of climate-finance initiatives. It provides a structured basis for assessing how institutions, instruments, and policy objectives interact, and where gaps emerge between climate-finance ambition and transition-finance effectiveness (Table 1).

Table 1. Analytical Framework for Assessing the UAE Transition-Finance Architecture.

Analytical Dimension	Focus of Analysis	Guiding Questions	Examples of Evidence
a. Institutional governance	Ministries, regulators, SWFs, NOCs, state-owned enterprises, coordination bodies	Who governs transition finance? How are responsibilities distributed? Is coordination centralized or fragmented?	Net Zero 2050 governance, CBUAE frameworks, SFWG, ADGM/DFSA rules, Mubadala/Masdar, ADNOC
b. Financial instruments	Bonds, sukuk, SWF investment, blended finance, NOC finance, carbon markets	How is capital mobilized? Which actors dominate? Are instruments scalable and inclusive?	Green bonds/sukuk, ALTERRA, Masdar investments, ADNOC low-carbon finance, ADFD/IRENA facility, UAE Carbon Alliance
c. Policy alignment	Coherence between finance, regulation, energy strategy, and net-zero targets	Do financial flows support transition goals? Where do contradictions or gaps emerge?	Net Zero 2050, UAE Energy Strategy 2050, NDCs, carbon pricing absence, disclosure gaps, SME finance limitations

3.4. Scope and Case Selection

The UAE is selected as a critical case for analyzing Gulf transition finance for three reasons. First, it was the first GCC and MENA country to commit to net-zero emissions by 2050, making it an early regional mover in formal climate ambition. Second, it has developed one of the most sophisticated sustainable-finance ecosystems in the GCC, combining federal strategies, financial free zones, sovereign wealth funds, green capital-market instruments, and international climate-finance platforms. Third, the UAE embodies the central paradox of transition finance in hydrocarbon economies: it is simultaneously expanding its climate-finance leadership and maintaining a strategic role for oil and gas within its economic model.

The paper focuses primarily on federal-level and Abu Dhabi-centered institutions because these actors dominate the UAE's hydrocarbon economy, sovereign investment architecture, and major transition-finance initiatives. However, Dubai-based institutions and regulatory developments are also included where relevant, particularly regarding sustainable finance, green sukuk, energy-efficiency finance, and carbon-market infrastructure. The analysis is therefore national in scope but attentive to the UAE's multi-emirate institutional structure.

3.5. Limitations

Several limitations should be acknowledged. First, the qualitative design does not allow for causal inference regarding the direct impact of specific financial instruments on emissions reduction, investment additionality, or macroeconomic diversification. The paper, therefore, assesses architecture, coherence, and governance rather than measuring financial or environmental performance outcomes.

Second, data availability is uneven across instruments and institutions. Publicly available data on green bonds, sukuk, and major climate-finance initiatives is more accessible

than data on private sustainability-linked lending, carbon-credit transactions, transition-risk exposure, or sovereign wealth fund portfolio alignment. This limits the extent to which the paper can independently verify the climate additionality of some investments.

Third, the UAE's climate-finance architecture is evolving rapidly. Developments following COP28, including ALTERRA partnerships, sustainable-finance regulation, disclosure standards, taxonomy implementation, and carbon-market mechanisms, continue to unfold. The analysis, therefore, reflects the available evidence at the time of writing and should be understood as an assessment of an emerging architecture rather than a settled system.

Fourth, while the UAE is treated as a critical case of Gulf transition finance, the findings are not automatically generalizable to all GCC states. Saudi Arabia, Qatar, Kuwait, Bahrain, and Oman differ in institutional capacity, fiscal structures, sovereign wealth strategies, regulatory development, and energy transition priorities. Nevertheless, the UAE case offers important analytical insights into how hydrocarbon-dependent countries may use sovereign capital, state institutions, and financial regulation to construct transition-finance models.

4. Results: The UAE Transition-Finance Architecture

4.1. Strategic Anchors: Net Zero 2050 and the UAE Energy Strategy 2050

The UAE's transition-finance architecture is anchored in a set of national strategies that frame decarbonization as both a climate commitment and an economic transformation agenda. The UAE Net Zero by 2050 Strategic Initiative, announced in 2021, positioned the country as the first GCC and MENA economy to formally commit to economy-wide carbon neutrality by mid-century [7,24]. This commitment is not presented solely as an environmental target, but as part of a broader national strategy linking decarbonization to economic diversification, technological upgrading, investment attraction, and global competitiveness.

The financial scale of this commitment is significant. Under the UAE Energy Strategy 2050, the country plans to invest AED 600 billion in the energy sector by 2050 to meet growing energy demand while supporting the transition to a more sustainable energy system [24]. More recently, the updated Energy Strategy has also set a near-term objective of mobilising AED 150–200 billion in investments by 2030, reflecting an accelerated pace of implementation. Together, these commitments signal the state's intention to leverage public investment, sovereign capital, and market-based financial instruments to drive the energy transition. In this sense, the Net Zero 2050 Strategy serves as more than a climate target; it is a strategic anchor for capital mobilization.

The UAE Energy Strategy 2050 provides the sectoral framework for operationalizing this ambition. Updated in 2023, the strategy targets a diversified power mix that includes renewable, nuclear, and natural gas sources, while aiming to improve energy efficiency and expand clean-energy capacity [25]. Flagship projects such as the Barakah Nuclear Energy Plant, Al Dhafra Solar PV project, and the Mohammed bin Rashid Al Maktoum Solar Park demonstrate the UAE's capacity to deliver capital-intensive energy infrastructure through state-backed investment, public-private partnerships, and long-term procurement models.

However, the policy architecture also contains an important tension. The UAE's energy strategy continues to assign a major role to natural gas as a transition fuel, while the country remains committed to expanding its hydrocarbon production capacity. This raises questions about the extent to which the financial architecture supports a transition away from hydrocarbons or a transition within a hydrocarbon-centered economic model. Therefore, the credibility of the UAE's transition-finance framework depends not only on

the volume of clean-energy investment but also on the alignment between capital allocation, fossil-fuel strategy, and long-term decarbonization objectives.

4.2. Institutional Architecture: Centralized Coordination and Multi-Level Governance

The UAE's climate-finance architecture reflects the broader characteristics of Gulf state capitalism: centralized strategic direction, strong state institutions, sovereign capital deployment, and close coordination between public policy and state-linked enterprises. At the federal level, the Ministry of Climate Change and Environment plays a central role in climate policy, while the Ministry of Energy and Infrastructure oversees energy strategy. The UAE Climate Change Council provides a coordination mechanism across ministries and relevant government entities, reflecting the state's preference for strategic coordination through high-level institutional platforms [24].

At the emirate level, Abu Dhabi occupies a particularly influential position because it controls the majority of the UAE's hydrocarbon resources and hosts several of the country's most important transition-finance actors, including ADNOC, Masdar, Mubadala, ADIA, L'IMAD, TAQA, and the Abu Dhabi Department of Energy. Accordingly, Abu Dhabi functions as the institutional center of gravity for the UAE's transition-finance model. Its role is not limited to energy production; it also extends to sovereign investment, infrastructure finance, renewable-energy deployment, carbon-management technologies, and international climate-finance platforms.

Dubai has developed a parallel but complementary architecture. The Dubai Supreme Council of Energy, Dubai Electricity and Water Authority, Dubai Financial Market, and Dubai Carbon Centre of Excellence have supported clean-energy deployment, ESG reporting, green sukuk issuance, energy-efficiency finance, and carbon-market experimentation [26]. This multi-emirate structure allows innovation across different institutional spaces, but it also creates coordination challenges, particularly when regulatory authority, disclosure rules, and market-development initiatives differ across jurisdictions.

The strength of this architecture lies in its ability to mobilize capital rapidly. State-backed entities can deploy capital, coordinate infrastructure, and create market confidence faster than fragmented market-led systems. However, the same architecture can also generate concentration risks, as when strategic decision-making is dominated by a small number of state-linked actors, transition finance may become concentrated in large flagship projects, while smaller firms, decentralized solutions, and civil-society scrutiny remain underdeveloped. This is one of the central trade-offs of the UAE model: centralization enables scale, but it may limit market depth and broader participation.

4.3. Financial Regulation and Sustainable-Finance Governance

Financial regulation is a core pillar of the UAE's transition-finance architecture. The Central Bank of the UAE (CBUAE) has become increasingly active in integrating climate and sustainability considerations into the financial system. Its Sustainable Finance Framework established expectations for UAE-licensed banks to incorporate environmental and climate-related risks into governance, strategy, risk management, and disclosure practices [27]. The CBUAE's participation in the Network for Greening the Financial System further signals the integration of climate-risk governance into financial supervision [16].

The UAE Sustainable Finance Working Group has played an important role in coordinating sustainable finance policy across regulatory bodies, including the CBUAE, the Securities and Commodities Authority, Abu Dhabi Global Market (ADGM), and the Dubai Financial Services Authority. Its work has supported the development of national sustainable-finance principles, ESG disclosure initiatives, and the UAE taxonomy for sustainable finance [18,28]. The taxonomy is especially significant because it seeks to classify

sustainable and transition activities in ways that reflect the realities of a hydrocarbon-dependent economy.

The UAE's financial free zones have also advanced sustainable-finance regulation. ADGM introduced a Sustainable Finance Regulatory Framework that sets requirements for green and sustainability-linked financial products, investment funds, and disclosure practices, with reference to international standards, including the ICMA Green Bond Principles and global ESG frameworks [29]. The Dubai Financial Services Authority has similarly moved toward sustainability-related disclosure and governance expectations within the Dubai International Financial Centre. These developments strengthen the UAE's position as a regional sustainable-finance hub.

Despite this progress, regulatory fragmentation remains a key challenge. The UAE's financial system operates across multiple jurisdictions, including federal regulators, main-land capital markets, ADGM, and DIFC. While this structure enables regulatory experimentation and international alignment, it may also lead to uneven standards, inconsistent disclosure requirements, and regulatory arbitrage. The Sustainable Finance Working Group provides coordination, but it does not fully eliminate differences in implementation and enforcement across jurisdictions. A second limitation is that much of the UAE's sustainable-finance regulation remains principles-based and gradually evolving. Disclosure expectations, taxonomy use, climate-risk stress testing, and transition-plan requirements are not yet uniformly mandatory across all relevant financial institutions and listed companies. This weakens the capacity of regulation to impose market discipline and to ensure that sustainable-finance claims are comparable, verifiable, and aligned with credible transition pathways.

4.4. Capital Markets, Disclosure, and Market Infrastructure

The development of sustainable capital markets is central to the UAE's ambition to become a climate-finance hub. The country has made visible progress in green and sustainable debt markets, ESG disclosure guidance, and sustainable-finance platforms. The Abu Dhabi Securities Exchange and Dubai Financial Market have introduced ESG reporting guidance, while ADGM and DIFC have developed regulatory frameworks designed to attract green funds, sustainable bonds, and climate-aligned investment products. These initiatives are important because transition finance requires more than public expenditure. It requires financial markets capable of pricing climate risk, rewarding credible transition strategies, and channeling capital toward low-carbon and transition-aligned assets. Green bonds, green sukuk, sustainability-linked loans, and ESG investment products can help deepen the market and mobilize private capital, provided they are supported by credible disclosure, external review, and alignment with taxonomies.

However, the UAE's sustainable capital markets remain relatively shallow compared with the scale of the investment challenge. Green bonds and sukuk have grown, but they still account for only a limited share of total debt issuance. Secondary market liquidity remains underdeveloped, and corporate sustainability disclosure varies significantly across issuers. Earlier research on GCC disclosure practices found considerable variation in corporate governance and social responsibility reporting, with limited standardization across firms and jurisdictions [17]. This remains relevant to the current development of climate-related disclosure in the UAE.

The disclosure challenge is not only technical but also strategic. Without high-quality, comparable, and decision-useful climate data, investors cannot adequately assess transition risk, regulators cannot monitor systemic exposure, and issuers cannot credibly demonstrate alignment with net-zero pathways. Digital transformation may help improve the quality of sustainability-related data and monitoring systems, particularly in countries

such as the UAE, which has an advanced digital infrastructure [30]. However, digital capacity must be matched by regulatory requirements, independent verification, and enforcement mechanisms.

4.5. Fiscal Policy, Public Investment, and Carbon-Pricing Gaps

Fiscal policy shapes the incentive structure within which transition finance operates. The UAE has introduced important fiscal reforms in recent years, including a value-added tax and a federal corporate income tax, thereby broadening its fiscal base beyond hydrocarbons [31]. In principle, these instruments could support transition finance through green tax incentives, accelerated depreciation for clean technologies, concessional treatment for energy-efficiency investments, or targeted support for low-carbon industrial development.

Public investment remains the dominant channel through which the UAE has financed large-scale energy-transition projects. Major clean-energy and infrastructure investments have been supported by federal and emirate-level institutions, sovereign wealth funds, state-owned utilities, and public-private partnerships. This public-investment capacity is one of the UAE's strongest advantages. It enables the state to absorb early-stage risks, build strategic infrastructure, and signal long-term policy commitment to private investors. Yet the UAE does not currently have a federal carbon tax or mandatory emissions trading system. This represents a significant policy gap because carbon pricing is one of the most direct mechanisms for internalizing the environmental cost of emissions and shifting incentives across the economy [32]. In the absence of a clear carbon-price signal, transition finance relies heavily on state direction, voluntary commitments, and project-level incentives rather than economy-wide market discipline.

The absence of carbon pricing is particularly important in a hydrocarbon-dependent economy. Without a price on carbon, private investors may have limited incentive to reallocate capital away from carbon-intensive activities unless regulation, procurement rules, or reputational pressures create alternative incentives. This weakens financial markets' ability to support broad-based decarbonization and reinforces the state's central role as the primary driver of transition finance.

4.6. Policy Alignment and Coherence Gaps

The UAE's transition finance architecture shows a relatively high level of strategic alignment between climate ambition, state investment capacity, and financial-market development. Net Zero 2050 provides the long-term direction. The UAE Energy Strategy 2050 identifies sectoral priorities. The CBUAE, SCA, ADGM, DFSA, and SFWG are building sustainable-finance governance. Sovereign wealth funds and state-backed entities provide the capital and implementation capacity required to scale clean-energy and transition-related investments. This alignment gives the UAE model a level of institutional coherence that is advanced by regional standards.

However, several coherence gaps remain. The first is the gap between net-zero ambition and hydrocarbon expansion. Continued investment in oil and gas production capacity may weaken the credibility of the transition-finance architecture if low-carbon investments are perceived as supplementing rather than transforming the hydrocarbon model. This tension is central to the UAE case and reflects a wider Gulf dilemma: the revenues that finance the transition are generated by the sectors that transition finance is expected to reduce over time. The second gap concerns regulatory coherence. Sustainable-finance frameworks are advancing, but requirements differ across jurisdictions and remain unevenly implemented. This may limit comparability, increase compliance complexity, and create uncertainty for investors and issuers. The third gap concerns market depth and inclusion. Transition finance remains heavily concentrated in large-scale projects, sovereign-backed platforms,

and major corporate actors. SMEs, smaller issuers, community-level adaptation projects, and decentralized clean-energy solutions have less access to green finance. The fourth gap concerns transition-risk pricing. Without a federal carbon-pricing mechanism and with climate stress testing still developing, the financial system may not yet fully price the risks associated with carbon-intensive assets. This reduces the disciplining role of markets and places greater reliance on state-led coordination.

Taken together, these gaps suggest that the UAE has built a sophisticated and well-capitalized transition-finance architecture, but one that remains uneven in its capacity to translate national ambition into broad-based, market-deep, and economy-wide decarbonization. The next section examines how this architecture operates through specific financial instruments, including green bonds and sukuk, sovereign wealth funds, national oil companies, blended finance, and carbon markets.

To respond to the need for a clearer empirical grounding, Table 2 summarises selected quantitative markers that contextualise the scale, timing, and limits of the UAE's transition-finance architecture. The table is not intended as a comprehensive dataset, but as a compact statistical snapshot linking the qualitative architecture to observable policy and market indicators.

Table 2. Selected statistical snapshot of the UAE transition-finance architecture.

Indicator	Value/Status	Relevance to Transition-Finance Architecture
National net-zero target	Economy-wide net zero by 2050	Provides the long-term strategic anchor for transition-finance mobilisation.
Clean and renewable energy investment target	AED 600 billion by 2050	Signals the scale of public and state-backed capital mobilisation expected under Net Zero 2050.
ALTÉRRRA climate-finance platform	USD 30 billion initial capital; ambition to mobilise up to USD 250 billion by 2030	Illustrates the use of sovereign-backed catalytic capital for global climate-finance mobilisation.
ADNOC operational net-zero target	Operational net zero by 2045	Shows the central role of the national oil company in operational decarbonisation while preserving the need to distinguish operational targets from structural transition.
Masdar sustainable debt example	USD 750 million green bond issued in 2023	Demonstrates the emergence of UAE sustainable debt instruments and market-signalling capacity.
Carbon-pricing status	No federal carbon tax or mandatory emissions trading system identified in public sources	Highlights the remaining gap between state-led mobilisation and economy-wide market discipline.

Sources: [9,10,24,32–34].

5. Results: Instruments in Practice

5.1. Green Bonds, Green Sukuk, and Sustainable Debt Instruments

Green bonds, green sukuk, and sustainability-linked debt instruments are among the most visible mechanisms through which the UAE seeks to mobilize market-based finance for the energy transition. These instruments serve several functions: They raise capital for renewable energy, clean infrastructure, energy efficiency, and other climate-aligned projects; they signal issuer commitment to sustainability; and they help develop the market infrastructure required for climate-related capital allocation. The UAE has made visible progress in this area: Masdar issued a USD 750 million green bond to finance renewable-energy projects, while Dubai Electricity and Water Authority issued green sukuk to support

solar and clean-energy investment [33,34]. These issuances are particularly significant because they link the UAE's transition-finance agenda to both conventional sustainable debt markets and Islamic finance. Green sukuk are especially relevant in the GCC because they combine Sharia-compliant finance with environmental objectives, potentially expanding the investor base for climate-aligned assets.

However, the strategic importance of these instruments should not be measured only by issuance volume. In the UAE context, green bonds and sukuk also function as instruments of market signalling. They communicate regulatory readiness, demonstrate issuer capacity to comply with external review and reporting requirements, and support the UAE's ambition to become a regional sustainable-finance hub. In this sense, their role is partly developmental: they help build the norms, investor expectations, and institutional routines needed for a deeper transition-finance market.

Yet the market remains at an early stage relative to the scale of the UAE's transition-investment needs. Cumulative green and sustainable issuance remains modest compared with the AED 600 billion investment ambition associated with Net Zero 2050. Secondary-market liquidity is still limited, issuance is concentrated among large state-linked or quasi-sovereign entities, and smaller corporates have limited access to sustainable debt markets. Certification, taxonomy alignment, external review, and post-issuance reporting also remain critical for ensuring that proceeds are genuinely aligned with transition objectives.

The main limitation, therefore, is not the absence of green debt instruments, but their insufficient depth and inclusiveness. Green bonds and sukuk have helped establish the UAE's sustainable-finance credentials, but they have not yet become a broad-based mechanism for economy-wide capital reallocation. To play that role, the market requires more issuers, stronger disclosure standards, more liquid secondary markets, clearer transition-bond frameworks, and greater participation from private-sector firms beyond large state-backed entities.

5.2. Sovereign Wealth Funds as Transition Financiers

Sovereign wealth funds are central to the UAE's transition finance model. Unlike many emerging economies, where climate finance depends heavily on external concessional finance or private capital mobilization, the UAE has large pools of sovereign capital that can be strategically deployed to support clean energy, infrastructure, technology, and international climate investment. This gives the UAE a distinctive advantage: it can use state capital not only to finance projects directly, but also to de-risk markets, crowd in private investors, and project global leadership in climate finance.

Mubadala's role in establishing and scaling Masdar illustrates this model. Masdar has become one of the UAE's flagship renewable energy platforms, with a growing international portfolio of solar, wind, and clean energy projects. Through Masdar, sovereign capital is transformed into a specialized transition investment vehicle capable of operating across multiple markets and technologies. This reflects a broader pattern in the UAE, where state investment entities create sector-specific platforms that combine commercial objectives with strategic policy goals.

ADIA and L'IMAD also form part of this wider architecture. ADIA's integration of ESG considerations into its investment framework reflects the gradual incorporation of sustainability criteria into sovereign portfolio management, while L'IMAD's investments in utilities, logistics, water, food systems, and industrial platforms intersect with key areas of climate resilience and transition infrastructure [35,36]. Together, these institutions show how transition finance in the UAE is embedded within the broader sovereign investment ecosystem rather than treated as a separate environmental funding stream.

ALTÉRRRA represents the most visible extension of this logic into global climate finance. Launched at COP28 with an initial capitalization of USD 30 billion, ALTÉRRRA was designed as a catalytic climate investment platform with the ambition to mobilize up to USD 250 billion in climate investment by 2030 [9]. Its structure reflects the UAE's attempt to use sovereign-backed capital to mobilize institutional investment, especially in emerging markets and developing economies where climate-finance gaps remain substantial.

The strength of the SWF-led model is scale. Sovereign capital can absorb long-term horizons, support large infrastructure projects, and provide confidence to private co-investors. It can also move faster than fragmented private markets when national strategic priorities are clear. In the UAE, this enables rapid capital deployment and reinforces the country's international position as a climate finance hub.

However, the same model raises important governance concerns. SWF investment decisions are often less transparent than public budgetary spending or listed-market investment, making it difficult to assess climate additionality, portfolio alignment, and long-term transition impact. There is also a risk that sovereign capital may dominate rather than deepen the market, especially if climate finance remains concentrated in state-backed platforms rather than diffused across private firms, SMEs, and domestic capital markets. The OECD [19] has emphasized that sovereign and strategic investment funds can support the low-carbon transition, but their contribution depends on clear mandates, transparent reporting, and credible alignment with climate objectives. The UAE's SWF model should therefore be understood as both a source of strength and a site of vulnerability. It enables scale and strategic coordination, but it also places significant weight on the quality of governance, transparency, and accountability of sovereign investment institutions.

5.3. National Oil Companies and Transition Finance

National oil companies occupy a particularly complex position in the UAE's transition finance architecture. ADNOC is not only a hydrocarbon producer; it is a major source of fiscal revenue, industrial capability, technological investment, and state strategic influence. Therefore, its transition-finance role has implications that extend beyond corporate decarbonization. ADNOC has made substantial commitments to lower-carbon operations and transition-related technologies. It has announced an operational net-zero target for 2045 and invested in carbon capture, utilization, and storage, methane abatement, electrification of operations, hydrogen, and lower-carbon energy solutions [10]. The Al Reyadah carbon capture facility, ADNOC's plans to expand carbon capture capacity, and its participation in international oil and gas decarbonization initiatives illustrate how NOCs can mobilize capital and technical expertise for emissions-reduction technologies. These investments matter because NOCs possess capabilities that many private actors lack. They control large infrastructure systems, have experience managing complex engineering projects, and can scale technologies such as carbon capture, hydrogen, and methane reduction. In this respect, ADNOC can be viewed as an important transition-finance actor, particularly for hard-to-abate sectors and industrial decarbonization.

At the same time, ADNOC's role reveals the core paradox of NOC-led transition finance. Operational decarbonization does not necessarily imply a transition away from fossil fuel dependence. ADNOC's low-carbon investments coexist with plans to expand oil production capacity, creating a tension between reducing the emissions intensity of production and reducing absolute emissions in line with global climate goals. This tension is central to the credibility challenge facing transition finance in hydrocarbon-dependent economies.

The financial structure of the NOC transition also raises questions. When low-carbon investments are financed through general corporate capital rather than dedicated green or transition finance frameworks, it becomes difficult to distinguish between capital allocated

to credible transition activities and capital supporting conventional hydrocarbon expansion. This is especially important for investors, regulators, and international partners seeking to assess whether NOC transition commitments are aligned with measurable decarbonization pathways. The UAE case, therefore, illustrates why transition finance must be assessed through coherence, not only expenditure. The critical question is not whether ADNOC invests in decarbonization technologies—as it does—but whether these investments are sufficient, transparent, and aligned with a broader national pathway that reduces reliance on hydrocarbon production over time. Without such alignment, NOC transition finance may reduce operational emissions while extending the economic life of fossil-fuel assets.

5.4. Blended Finance, Development Banks, and Partnerships

Blended finance is another important instrument within the UAE's transition finance toolkit. It refers to the strategic use of public, concessional, or catalytic capital to mobilize additional private investment. In transition contexts, blended finance can help overcome barriers such as high upfront costs, long payback periods, technology risks, policy uncertainty, and weak project pipelines. The UAE has used blended and partnership-based finance both domestically and internationally. Domestically: energy-efficiency initiatives such as those supported by Etihad Energy Services illustrate how public sector backing can help mobilize private capital for building retrofits and efficiency improvements. These models are particularly important because energy efficiency is often financially viable over time, yet is constrained by split incentives, high transaction costs, and limited upfront financing. Internationally, the Abu Dhabi Fund for Development and IRENA partnership has supported renewable energy projects in developing countries through concessional financing and project support [37]. Masdar's partnerships with multilateral development banks and international financial institutions further demonstrate how UAE-backed entities use co-financing models to expand renewable energy investment across emerging markets. These initiatives reinforce the UAE's position as both a domestic transition finance actor and an exporter of climate finance capital. ALTERRA can also be read as a large-scale blended finance platform, especially where its catalytic capital is used to reduce risk and mobilize institutional investors into climate projects in emerging and developing economies. This is important because one of the persistent global climate finance challenges is not simply the absence of capital, but the mismatch between available institutional capital and the risk-return profile of projects in climate-vulnerable or emerging markets. The strength of blended finance lies in its ability to connect public purpose with private capital. It can reduce risks, create bankable project pipelines, and support markets that would otherwise remain underfinanced. For the UAE, it also serves a diplomatic and strategic function by positioning the country as a climate finance partner for the Global South.

However, blended finance has limitations. It is complex in structure, costly to negotiate, and often dependent on strong institutional capacity. It can also become concentrated in large infrastructure projects, leaving smaller firms, adaptation projects, community-level initiatives, and distributed energy solutions underserved. In the UAE context, this raises an important inclusion question: can blended finance be designed not only for large-scale energy and infrastructure projects, but also for SMEs, local innovation, circular economy initiatives, and adaptation-related investments? For blended finance to support economy-wide transition, it must therefore move beyond flagship partnerships and become part of a broader ecosystem of green credit lines, guarantees, technical assistance, and risk-sharing instruments that reach firms and sectors outside the state-backed infrastructure space.

5.5. Carbon Markets and Emerging Financial Mechanisms

Carbon markets represent an emerging component of the UAE's transition finance architecture. They are intended to create financial value for emissions reductions and removals, support offsetting and mitigation activities, and connect domestic climate action to international carbon market mechanisms under Article 6 of the Paris Agreement. The UAE has taken steps to position itself within this evolving market. It supported the operationalization of Article 6 during and after COP28, signed bilateral agreements related to carbon-credit transfers, and supported the establishment of the UAE Carbon Alliance as a platform for developing high-integrity carbon markets [8]. These initiatives reflect the UAE's broader ambition to become a regional hub for climate finance, carbon trading, and sustainability-linked market infrastructure. The strategic appeal of carbon markets is clear. If properly designed, they can mobilize private capital for mitigation projects, create price signals for emissions reductions, and support cross-border climate cooperation. They may also help channel finance to sectors or geographies where direct investment remains difficult. For a country such as the UAE, carbon markets can complement green finance by creating tradable climate assets and linking domestic institutions to international climate-finance flows.

However, the UAE's carbon-market ecosystem remains nascent. The country does not yet have a federal compliance carbon market or mandatory emissions trading system. This means that demand for carbon credits is driven largely by voluntary commitments rather than binding regulatory obligations. In the absence of mandatory demand, carbon markets may remain limited in scale and may have a weaker influence on domestic emissions trajectories. Integrity is another major challenge. Voluntary carbon markets globally have faced scrutiny over additionality, permanence, leakage, double counting, and verification standards. For the UAE, which seeks to establish itself as a credible climate-finance hub, the reputational risks of weak carbon-credit integrity are significant. Robust monitoring, reporting, and verification systems, alignment with Article 6 rules, independent verification, and transparent registries will be essential.

The central question is whether carbon markets will function as a genuine tool for domestic decarbonization or primarily as an international mechanism for offsetting and trading. Without a domestic compliance market, clear sectoral emissions caps, or a carbon-pricing framework, carbon markets may support climate-finance positioning without substantially reshaping domestic incentives. They are, therefore, promising but incomplete as a transition-finance instrument.

5.6. Synthesis: A State-Led Instrument Mix with Uneven Market Depth

Taken together, the UAE's transition-finance instruments reveal a distinctive state-led mix of instruments. Green bonds and sukuk build sustainable capital-market credibility; sovereign wealth funds provide scale and strategic direction; national oil companies finance operational decarbonization and emerging low-carbon technologies; blended-finance platforms mobilize partnerships; and carbon markets create the basis for future climate-asset trading. The common feature is the state's central role in shaping instruments, platforms, and market signals.

The UAE has therefore built a sophisticated and well-capitalized set of transition-finance instruments, but these instruments do not yet amount to a mature and broad-based transition-finance market. They are strongest where the state can direct capital, create platforms, and mobilize flagship projects, and weaker where transition requires decentralized private-sector participation, transparent market discipline, and wider capital reallocation.

6. Discussion: Strengths, Contradictions, and Coherence Gaps

The preceding analysis shows that the UAE has developed one of the most sophisticated transition finance architectures in the Gulf. Its model is distinguished by strong state coordination, large pools of sovereign capital, internationally connected financial free zones, active sustainable finance regulation, and a growing set of instruments, including green bonds and sukuk, sovereign wealth fund investments, national oil company decarbonization finance, blended-finance platforms, and emerging carbon-market mechanisms. This architecture has enabled the UAE to move beyond climate pledges and construct a set of institutions and instruments capable of mobilizing capital at scale. Yet the UAE model is not without tension. Its strengths are closely linked to the same structural features that limit it. Centralization can speed things up, but may reduce transparency and market contestability. Sovereign capital enables scale but may crowd out broader private-sector participation. National oil companies can finance low-carbon technologies but remain anchored in hydrocarbon production. Sustainable finance regulation is advancing but remains fragmented across jurisdictions. Carbon-market ambitions are growing, but without a federal compliance market or carbon-pricing mechanism, their domestic decarbonization effect remains uncertain. These tensions are not incidental; they define the political economy of transition finance in a hydrocarbon-dependent state.

To clarify this architecture, Figure 1 summarises the relationships among national policy drivers, institutional and regulatory actors, financial instruments, capital-allocation channels, intended transition outcomes, and remaining coherence challenges. The figure is not intended as a causal model, but as a conceptual map derived from the institutional and policy analysis presented above.

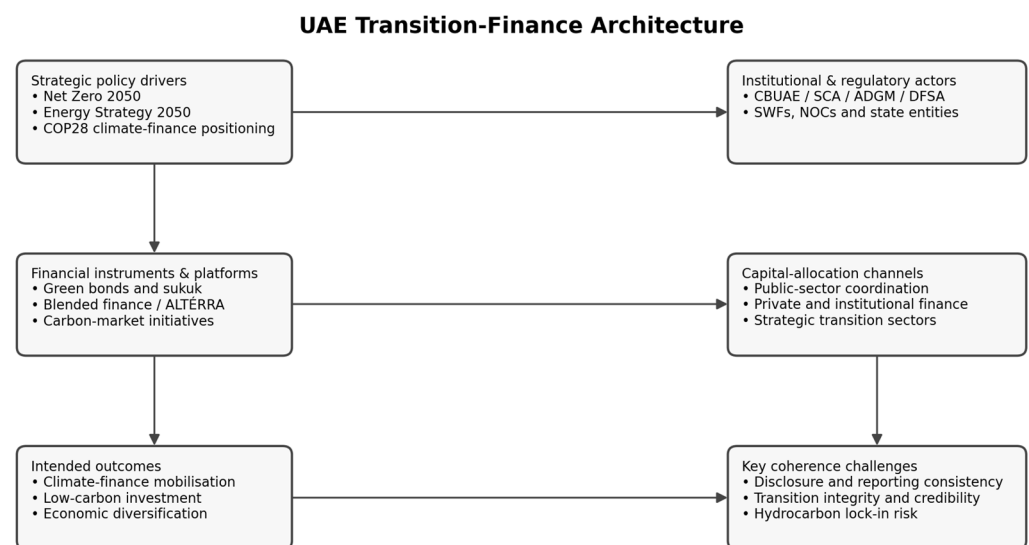


Figure 1. UAE transition-finance architecture. Conceptual representation of the relationships between strategic policy drivers, institutional actors, financial instruments, capital-allocation channels, intended transition outcomes, and remaining coherence challenges.

Recent transition-finance literature emphasizes that credibility depends not only on capital mobilization but also on transparent disclosure, measurable transition pathways, entity-level accountability, and independent verification (Table 3). The OECD's guidance on transition finance highlights the importance of credible transition plans, internal coherence, governance, transparency, verification, and safeguards against greenwashing [38]. The IEA similarly stresses that transition finance should help emissions-intensive sectors and countries reduce real-economy emissions, rather than enabling financial actors to reduce portfolio exposure on paper without supporting actual decarbonization [39]. Applied to the

UAE case, this means asking whether ADNOC's operational decarbonization is linked to absolute emissions and diversification pathways, whether ALTERRA mobilizes additional climate finance rather than merely relabeling existing capital, and whether carbon-market initiatives are supported by robust monitoring, reporting, verification, and safeguards against double-counting.

Table 3. Evaluative assessment of the UAE's transition-finance architecture.

Dimension	Assessment	Rationale
Capital mobilization	Strong	Significant public and private capital commitments have supported the expansion of sustainable and transition-finance initiatives.
Policy alignment	Strong	National strategies, net-zero commitments, and regulatory initiatives demonstrate increasing alignment between sustainability objectives and financial-sector development.
Institutional development	Strong	Dedicated regulatory frameworks and state-linked financial institutions have played an active role in supporting market development.
Market development	Moderate	Sustainable-finance instruments, including green bonds and sukuk, continue to expand, although the market remains relatively young compared with more mature jurisdictions.
Governance and disclosure	Moderate	Progress has been made in sustainability-related governance and reporting; however, disclosure practices and reporting consistency continue to evolve.
Transition integrity	Mixed	While substantial resources have been mobilized to support the energy transition, tensions remain between decarbonization objectives and continued hydrocarbon-sector expansion.

This assessment demonstrates notable strengths in capital mobilization, policy alignment, and institutional development, reflecting the important role of state institutions in supporting sustainability transitions. At the same time, challenges relating to governance, disclosure, market depth, and transition integrity remain. The coexistence of climate-finance leadership and hydrocarbon-sector expansion reflects broader carbon lock-in dynamics in resource-dependent economies [21]. The IEA [39] and Naran et al. [40] similarly emphasize that transition finance must be evaluated not only by the volume of capital mobilized, but also by whether finance supports credible transition pathways, institutional capacity, policy coherence, and real-economy emissions reductions.

6.1. Mobilization Capacity: The Strength of the State-Led Model

The first major finding is that the UAE's state-led model gives it significant capacity to mobilize transition finance quickly and strategically. Its sovereign wealth funds, state-owned enterprises, national oil company, public utilities, development-finance institutions, and financial regulators together create a powerful architecture for directing capital toward strategic transition priorities.

This capacity is visible in Masdar's expansion as a renewable-energy platform, ALTERRA's use of state-backed catalytic capital, green bond and sukuk issuance by major state-linked entities, and regulatory initiatives led by the CBUAE, ADGM, DFSA, SCA, and the Sustainable Finance Working Group [9,27,28]. The state is therefore not merely setting targets and waiting for markets to respond; it is actively creating investment platforms, shaping regulatory expectations, and backing large infrastructure projects.

However, mobilization capacity should not be equated with transition effectiveness. The ability to deploy large amounts of capital is necessary but not sufficient for economy-wide decarbonization. The key question is whether capital is allocated in ways that reduce structural hydrocarbon dependence, deepen sustainable markets, and shift incentives across the broader economy. In this respect, the UAE model remains incomplete.

6.2. *The Central Contradiction: Net-Zero Ambition and Hydrocarbon Expansion*

The most important contradiction in the UAE's transition-finance architecture is the coexistence of net-zero ambition with continued hydrocarbon expansion. The UAE's Net Zero by 2050 Strategic Initiative and updated energy strategy signal long-term climate ambition and a commitment to clean-energy investment [24,25]. At the same time, ADNOC's strategy includes expanding oil production capacity while investing in operational decarbonization, carbon capture, methane abatement, and lower-carbon technologies [10].

This dual strategy reflects a wider dilemma for hydrocarbon-dependent economies. The revenues that enable large-scale transition finance are generated by the very sectors that transition finance is expected to reduce over time. Sovereign wealth funds, public investment vehicles, and state-backed transition platforms are partly financed by hydrocarbon rents. This creates a circular political economy: fossil-fuel revenues finance climate investments, while climate investments may help sustain the legitimacy and competitiveness of the hydrocarbon economy.

The distinction between operational decarbonization and structural transition is therefore critical. ADNOC may reduce the emissions intensity of oil and gas production, and such reductions matter. Yet a lower-carbon barrel is still part of a fossil-fuel system if production expansion continues. From a transition-finance perspective, the key test is not only whether capital is allocated to lower-carbon technologies, but whether this capital supports a credible pathway toward absolute emissions reduction and economic diversification beyond hydrocarbons. This contradiction is not unique to the UAE. It is central to the Gulf transition challenge. However, the UAE's international climate leadership, especially after COP28, makes the contradiction more visible. The country's credibility as a climate-finance hub will increasingly depend on its ability to demonstrate that transition finance not only finances cleaner production but also supports a gradual transformation of the underlying economic model.

6.3. *Regulatory Progress and the Challenge of Fragmented Governance*

A second major discussion point concerns regulation. The UAE has made meaningful progress in sustainable-finance governance. The establishment of the Sustainable Finance Working Group, the development of a regional sustainable-finance taxonomy, the CBUAE's sustainable-finance expectations, and the sustainable-finance frameworks of ADGM and DFSA all indicate a serious regulatory shift toward climate-related financial governance [18,29]. This progress matters because credible transition finance depends on more than capital availability. It requires rules that define what counts as sustainable or transition-aligned, disclosure systems that allow investors to compare issuers, and supervisory tools that help regulators assess climate-related financial risks. Without such

regulatory infrastructure, sustainable finance can become fragmented, inconsistent, or vulnerable to greenwashing.

However, the UAE's regulatory architecture remains fragmented across multiple jurisdictions. Mainland financial markets, ADGM, DIFC, federal regulators, and sector-specific authorities operate with different mandates, disclosure expectations, and enforcement mechanisms. This diversity can encourage innovation and allow financial centers to align with international best practices. Yet it can also create uneven standards and compliance complexity. For issuers and investors, fragmentation may reduce clarity. For regulators, it may complicate systemic risk monitoring. For the wider market, it may weaken the comparability and credibility of sustainable-finance claims.

The key issue is therefore not whether the UAE has regulatory initiatives; it clearly does. The issue is whether these initiatives are sufficiently harmonized, enforceable, and integrated into prudential supervision and capital-market practice. Principles-based frameworks can be useful in early market development, but as the market matures, voluntary guidance may need to be complemented by stronger disclosure requirements, taxonomy application, transition-plan expectations, and climate-risk stress testing.

The UAE's regulatory challenge is thus one of institutional maturation. The foundations have been laid, but the next stage requires moving from signalling to discipline: from voluntary alignment to mandatory disclosure, from taxonomy development to taxonomy implementation, and from climate-risk awareness to climate-risk pricing.

6.4. Market Depth, Inclusion, and the Limits of Flagship Finance

The third major issue concerns market depth and inclusion. The UAE has been successful in developing high-profile transition-finance initiatives, especially through sovereign wealth funds, state-backed entities, green bond issuance, Masdar's international portfolio, and ALTÉRRRA. These initiatives are strategically important and reinforce the country's role as a climate-finance leader. However, they also reveal the concentration of transition finance in large institutions and flagship projects. This concentration creates a market-depth problem. A mature transition-finance system requires more than a small number of high-capacity state-linked actors. It requires broad participation from private firms, banks, SMEs, institutional investors, project developers, technology companies, municipalities, and households. It also requires financial products that address different scales of investment, from large renewable-energy infrastructure to building retrofits, industrial efficiency, green logistics, circular economy solutions, adaptation measures, and small-business innovation.

SME access is particularly important. SMEs are central to employment, services, supply chains, and innovation, yet they often lack the collateral, technical capacity, sustainability reporting systems, and bankable project pipelines needed to access green finance. If transition finance remains concentrated in large-scale infrastructure and state-backed platforms, it may deliver visible projects without transforming the wider economic fabric.

This issue also has implications for just transition and inclusive growth. In the UAE context, the transition is often framed in terms of competitiveness, investment attraction, and technological leadership. These are important, but they should be complemented by attention to who can access transition finance and which sectors benefit from it. Green credit lines, guarantee schemes, technical assistance, concessional lending windows, and simplified sustainability reporting tools could help broaden participation beyond large corporate and sovereign actors.

The UAE model is therefore strongest at mobilizing large-scale, strategic finance and weaker at diffusing finance across the domestic economy. This is not unusual for state-led development models, but it is a limitation if the objective is economy-wide transformation.

6.5. Carbon Pricing, Transition-Risk Pricing, and Market Discipline

A fourth coherence gap concerns the pricing of transition risk. The UAE has made progress in sustainable-finance regulation and carbon-market positioning, but it does not yet have a federal carbon tax or mandatory emissions trading system. This limits the extent to which financial markets internalize the costs of emissions and price carbon-intensive activities systematically [32].

Carbon pricing is not the only tool for decarbonization, and it must be designed carefully in hydrocarbon economies to avoid abrupt adjustment costs. However, without some form of carbon-price signal, the incentive structure remains incomplete. Clean-energy projects may receive public support, but carbon-intensive activities may not face sufficient economic pressure to adjust. This creates a policy asymmetry: the state encourages green investment, but the market does not fully penalize emissions-intensive investment. This has direct implications for transition finance. Green bonds, sukuk, blended finance, and voluntary carbon markets can mobilize capital, but they do not automatically change the relative economics of high- and low-carbon activities. Without carbon pricing, mandatory disclosure, climate stress testing, and transition-risk supervision, financial institutions may continue to underprice exposure to carbon-intensive assets. This weakens the disciplining role of markets and reinforces dependence on state-led allocation.

The UAE's emerging carbon-market infrastructure could help address this gap over time, but only if it evolves beyond voluntary offsetting into a credible system linked to domestic emissions reduction. A voluntary carbon market may support international positioning and create useful trading infrastructure, but it is unlikely to drive deep domestic decarbonization without mandatory demand, high-integrity credits, sectoral emissions data, and robust monitoring, reporting, and verification systems.

The transition-finance architecture, therefore, requires stronger mechanisms for pricing risk, not only financing opportunities. This includes carbon pricing, climate-risk disclosure, taxonomy implementation, prudential supervision, and credible transition plans. Together, these tools would help shift the UAE model from state-led mobilization toward broader market discipline.

6.6. International Positioning and Climate-Finance Diplomacy

The UAE's transition-finance model also has an important international dimension. COP28, ALTÉRRRA, Masdar's global renewable-energy portfolio, and the UAE's role in hosting IRENA all position the country as an international climate-finance actor, not only a domestic transition case. Climate finance has become part of the UAE's economic diplomacy, soft power, and post-hydrocarbon positioning strategy. This international role is significant. Many emerging markets and developing economies face severe climate-finance gaps, particularly in renewable energy, adaptation, and resilient infrastructure. UAE-backed platforms can help mobilize capital, reduce risk, and support project development in these contexts. The UAE's ability to combine sovereign capital, financial expertise, and diplomatic convening power gives it a potentially important role in global climate-finance reform.

However, international positioning also increases scrutiny. The more the UAE presents itself as a climate finance leader, the more its domestic transition pathway will be assessed against its global commitments. International credibility will depend not only on the scale of climate finance pledges, but on transparency, implementation, additionality, and alignment with credible decarbonization pathways. In this sense, the UAE's external climate-finance leadership and domestic transition coherence are increasingly linked.

The UAE case, therefore, illustrates a broader shift in Gulf climate governance. Climate finance is becoming a tool of economic diversification, diplomatic influence, and global

positioning. Yet the durability of this role depends on whether climate-finance leadership is matched by credible domestic transition governance.

6.7. What the UAE Model Reveals About Gulf Transition Finance

The UAE case offers broader insights into transition finance in hydrocarbon-dependent Gulf economies. First, it shows that Gulf states possess significant advantages in financing the transition. Sovereign wealth, centralized governance, state-owned enterprises, and strategic infrastructure capacity can enable rapid capital mobilization and large-scale project delivery. These advantages should not be underestimated, especially when compared with countries facing fiscal constraints and weak institutional capacity.

A brief comparative perspective clarifies the distinctiveness of the UAE model. China also demonstrates strong state involvement in green finance, but its transition-finance logic is closely tied to industrial policy, domestic clean-technology manufacturing, and banking-system allocation. Norway, by contrast, combines fossil-fuel wealth with a large sovereign investment fund, but operates within a more transparent governance and disclosure environment and separates sovereign portfolio management from a smaller domestic hydrocarbon political economy. The UAE differs from both cases because sovereign capital, financial free zones, national oil company strategy, and climate diplomacy are combined within a Gulf state-capitalist setting where hydrocarbon rents continue to finance part of the transition architecture. This comparison suggests that the UAE is not simply another case of state-led green investment; it is a hydrocarbon-rent-financed transition-finance model whose strength and vulnerability both arise from the same political-economic structure [6,19].

Second, the UAE case shows that transition finance in hydrocarbon economies is not only a technical question of mobilizing green capital. It is a political-economic process shaped by the ownership of fossil-fuel assets, the fiscal role of hydrocarbon revenues, the strategic priorities of national oil companies, and the state's control over capital allocation. This means that transition finance can both enable change and preserve continuity.

Third, the UAE model suggests that state-led transition finance can be effective at launching flagship initiatives and building international visibility, but less effective at generating deep, inclusive, and decentralized market transformation unless supported by stronger regulation, disclosure, carbon pricing, and SME finance mechanisms. The transition cannot remain confined to sovereign platforms and major infrastructure projects; it must eventually reshape incentives across firms, sectors, and households.

Finally, the UAE experience suggests that the future of Gulf transition finance will depend on coherence. The central policy challenge is not a lack of ambition or capital. It is whether climate ambition, hydrocarbon strategy, financial regulation, sovereign investment, and market incentives can be aligned within a credible transition pathway. The UAE has built many of the institutional and financial foundations for such a pathway, but the architecture remains incomplete.

7. Conclusions and Policy Implications

This paper examined the UAE as a test case of Gulf transition finance, analyzing how a hydrocarbon-dependent economy is constructing the financial, regulatory, and institutional architecture required to move from net-zero pledges to climate finance flows. The central argument is that the UAE is not simply adopting individual green finance instruments; it is building a distinctive state-led transition-finance model rooted in Gulf state capitalism, sovereign capital, national oil company strategy, regulatory development, and international climate-finance diplomacy.

The UAE model has clear strengths: It benefits from centralized coordination, large sovereign wealth resources, strong state-backed enterprises, active financial free zones, and the capacity to mobilize capital rapidly for large-scale infrastructure and international climate investment. Through Masdar, Mubadala, ADIA, L'IMAD, ADNOC, ALTÉERRA, the CBUAE, ADGM, DFSA, SCA, and the Sustainable Finance Working Group, the UAE has developed a dense network of institutions and instruments that few emerging economies can easily replicate. This architecture has enabled the country to position itself as a regional leader in sustainable finance and as an increasingly visible actor in global climate-finance governance.

However, the analysis also shows that mobilizing capital is not the same as achieving structural transition. The UAE's transition-finance architecture remains shaped by the same hydrocarbon rents, state-led coordination mechanisms, and institutional concentration that define the wider Gulf political economy. This creates a set of coherence gaps: The most important is the unresolved tension between net-zero ambition and continued hydrocarbon expansion. Additional gaps include fragmented sustainable-finance regulation, uneven disclosure practices, limited carbon-pricing signals, shallow domestic green capital markets, limited access to transition finance for SMEs, and insufficient transparency around some state-backed investment flows.

The UAE case, therefore, offers a balanced lesson. State-led transition finance can accelerate capital mobilization, reduce investment risk, and support strategic climate-finance positioning. Yet without stronger market discipline, broader private-sector participation, and clearer alignment between climate ambition and hydrocarbon strategy, it may remain concentrated in flagship projects and globally visible platforms rather than driving economy-wide decarbonization.

7.1. Policy Implications for the UAE

First, the UAE should strengthen the coherence between its net-zero strategy, energy policy, and financial architecture. This requires clearer links between clean energy investment, industrial decarbonization, and long-term reduction in hydrocarbon dependence. ADNOC's operational decarbonization investments are important, but they should be situated within a more transparent national pathway that distinguishes emissions-intensity reduction from absolute emissions reduction and from structural economic diversification.

Second, the UAE should move toward greater harmonization of sustainable-finance regulation across jurisdictions. The CBUAE, SCA, ADGM, DFSA, DIFC, and relevant emirate-level authorities have all advanced important initiatives, but the next stage requires stronger alignment of disclosure expectations, taxonomy application, green and transition-finance definitions, and verification standards. A common minimum regulatory baseline would reduce fragmentation, improve investor confidence, and strengthen the credibility of sustainable-finance claims.

Third, climate-related disclosure should become more consistent, comparable, and decision-useful. Voluntary ESG reporting has helped build market awareness, but transition finance requires stronger disclosure on emissions, climate-risk exposure, use of proceeds, transition plans, and financed emissions. The UAE could build on ISSB-aligned standards and existing free-zone frameworks to develop a phased mandatory disclosure regime for listed companies, banks, and large state-linked entities.

Fourth, the UAE should gradually develop mechanisms for carbon and transition-risk pricing. A federal carbon tax or mandatory emissions trading system may require careful sequencing, especially in energy-intensive sectors. However, the absence of any economy-wide carbon price signal limits the ability of markets to internalize emissions costs. A phased approach could begin with high-emitting industrial and power sectors, supported

by safeguards for competitiveness, reinvestment of revenues into clean technologies, and technical assistance for affected firms.

Fifth, SME access to green and transition finance should become a policy priority. The current architecture is strongest at financing large-scale projects and state-backed platforms, but economy-wide transition requires broader participation. Dedicated green credit lines, partial guarantee schemes, concessional loans, simplified ESG-reporting tools, and technical assistance through institutions such as Emirates Development Bank could help SMEs invest in energy efficiency, circular economy practices, clean logistics, sustainable construction, and low-carbon technologies.

Sixth, the transparency of sovereign and state-backed climate investment should be enhanced. Sovereign wealth funds and state-owned enterprises are central to the UAE model, but their climate finance contribution should be supported by clearer reporting on portfolio alignment, additionality, emissions impact, and transition outcomes. Adoption of internationally recognized climate-reporting frameworks and independent verification would strengthen credibility and reduce concerns about greenwashing or symbolic alignment.

Seventh, carbon market development should prioritize integrity before scale. The UAE's ambition to become a regional carbon-market hub is strategically important, but credibility will depend on robust monitoring, reporting, and verification systems, clear rules to avoid double-counting, high-quality registries, and alignment with Article 6 standards. Carbon markets should complement domestic decarbonization, not substitute for it.

7.2. Implications for the Gulf Region and Future Research

For the wider Gulf region, the UAE case offers both a model and a caution. It demonstrates that hydrocarbon-dependent states can use sovereign capital, regulatory coordination, and state-backed institutions to build transition-finance architectures rapidly. This is especially relevant for GCC countries with large sovereign wealth funds, national oil companies, and centralized development strategies. However, the UAE experience also shows that state-led finance alone cannot resolve the deeper contradictions of hydrocarbon-based development. Gulf transition finance will remain incomplete unless it addresses the structural relationship between fossil fuel revenues, sovereign investment, financial regulation, and long-term economic diversification. In this sense, the core Gulf challenge is not simply how to finance clean energy, but how to finance a credible transition away from dependence on carbon-intensive growth models.

Other GCC countries can draw three lessons from the UAE case. First, sovereign capital can be a powerful catalyst, but it should be accompanied by transparency, disclosure, and market-deepening reforms. Second, national oil company transition strategies should be evaluated against absolute emissions and diversification pathways, not only operational efficiency or carbon-intensity improvements. Third, climate-finance credibility increasingly depends on coherence between domestic policy, international commitments, and financial-market practice.

This paper contributes to the literature on climate finance, Gulf political economy, and transition governance in three ways. First, it shifts the analysis from climate pledges to the architecture through which pledges are financed, governed, and translated into capital flows. Second, it conceptualizes the UAE as an emerging Gulf model of transition finance, characterized by sovereign capital, state-led coordination, and international climate-finance positioning. Third, it identifies the coherence gaps that determine whether transition finance can move beyond flagship initiatives toward economy-wide decarbonization.

Future research could extend this analysis in several directions. Comparative studies of the UAE, Saudi Arabia, Qatar, and Oman would help identify whether a common GCC model of transition finance is emerging or whether national pathways differ significantly.

Quantitative research could assess the additionality, emissions impact, and financial performance of green bonds, sukuk, blended finance platforms, and SWF climate investments. Further work is also needed on the distributional and labor market implications of transition finance, including how SMEs, workers, expatriate communities, and emerging green sectors are affected by the transition.

Ultimately, the UAE's transition-finance architecture should be understood as a work in progress. It is ambitious, well-capitalized, and institutionally sophisticated, but not yet fully coherent. Its success will depend on whether the country can move from mobilizing capital for visible climate initiatives to embedding transition finance across markets, firms, sectors, and incentives. For the Gulf region, this is the defining challenge of the next phase of climate governance: not only to finance the transition, but to ensure that finance transforms the economic structures that made transition necessary in the first place.

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