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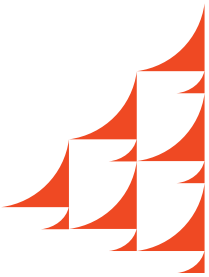
Aisha Al-Sarihi



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The Arab Gulf States Institute in Washington (AGSIW), launched in 2015, is an independent, nonprofit institution dedicated to providing expert research and analysis of the social, economic, and political dimensions of the Gulf Arab states and how they impact domestic and foreign policy. AGSIW focuses on issues ranging from politics and security to economics, trade, and business; from social dynamics to civil society and culture. Through programs, publications, and scholarly exchanges the institute seeks to encourage thoughtful debate and inform the U.S. policy community regarding this critical geostrategic region.

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About the Author

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Al-Sarihi holds a MSc and a BSc, with distinction, in environmental science from Sultan Qaboos University and a PhD from the Centre for Environmental Policy at Imperial College London. Her thesis was focused on studying the challenges and opportunities for adopting renewable energy in Oman.

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Executive Summary

For decades, Saudi Arabia's economy has been highly vulnerable to oil prices shocks. Climate change presents an additional challenge to Saudi Arabia's economy as it affects both the oil and non-oil economic sectors. Aware of the potential threats posed by climate change, Saudi Arabia has expressed its intention to engage in remedial action and planning in accordance with the kingdom's efforts toward economic diversification.

While Saudi Arabia's long involvement in global climate change negotiations has attracted mounting attention from analysts and researchers alike, little is known about the kingdom's climate change governance at the domestic level or its progress in terms of addressing climate change in line with its economic diversification strategy. This paper sheds light on Saudi Arabia's climate change governance at the national level. In particular, it examines the challenges and opportunities for aligning climate change policies with the kingdom's economic diversification strategies.

Drawing from secondary literature and interviews with Saudi climate change experts, the paper reveals that effective governance of climate change in Saudi Arabia still faces fundamental challenges, among them, a lack of quantitative data, consistency, and certainty; absence of a climate action plan; heavy involvement of the Ministry of Energy, Industry, and Mineral Resources and the energy industry itself in addressing climate-related matters; and fragmentation of climate-related policies and efforts.

Recommendations

- Develop a climate action plan that sets out targets, strategies, policies, and regulations and assigns clear duties and responsibilities to coordinate and advance climate action with respect to reducing greenhouse gas emissions, as well as climate resilience.
- Use existing arrangements and institutional architecture set for delivering economic diversification ambitions, but ensure to factor climate change into sectoral planning and development.
- Ensure economy-wide implementation of climate action in order to achieve potential co-benefits from aligning climate policies with economic development.
- Develop a strong, independent climate change committee to extend the influence now enjoyed by the Ministry of Energy, Industry, and Mineral Resources in addressing climate change to other ministries; ensure consistent policy delivery across ministries and sectors and eliminate policy fragmentation.
- Support climate change research, and coordinate efforts of data collection, monitoring, and verification.
- Facilitate information exchanges between climate experts and economic development policymakers.

- Secure climate finance based on an economic assessment of climate impacts on different sectors.
- Develop climate change capacity building programs targeting not only policymakers but also end users, such as utility companies, private investors, local municipalities, and civilians.
- Integrate climate change topics into school and university curricula to raise awareness about climate change among Saudi youth.

Introduction

Climate change has already had observable effects across the world. Each of the last three decades has been successively warmer at the Earth's surface than any proceeding decade since 1850.[1] Global warming has led to the shrinking of snow and ice cover, rising sea levels, and a greater frequency of extreme weather events such as flooding, wildfires, heatwaves, and droughts.[2] Human activities are estimated to have caused approximately 1.0 degree Celsius of global warming above preindustrial levels, with a likely range of 0.8 to 1.2 degrees Celsius.[3] In particular, the release of greenhouse gas (GHG) emissions from the combustion of fossil fuels has been identified as a key driver of climate change.

A recent report by the Intergovernmental Panel on Climate Change suggests that global warming is likely to reach 1.5 degrees Celsius between 2030 and 2052 if it continues to increase at the current rate, and the world has just over a decade to get climate change under control.[4] Although some countries are larger contributors to GHG emissions than others, the Intergovernmental Panel on Climate Change's Global Warming of 1.5°C Report urges the widest cooperation of all countries to participate in an effective and appropriate international response, in accordance with their social and economic conditions.

Being responsible for only 2.52 percent of total global emissions,[5] the Gulf Arab states are not major contributors to global GHG emissions. However, with their high economic reliance on oil and gas export revenue as well as their ranking as the world's highest contributors of carbon dioxide emissions on a per capita basis, the Gulf states are having a notable impact on climate change, especially Saudi Arabia, which holds around 18 percent of the world's proven petroleum reserves and ranks as the largest exporter of petroleum.[6]

1 Thomas F. Stocker et al., Intergovernmental Panel on Climate Change, "Summary for Policymakers," in *Climate Change 2013: The Physical Science Basis* (Cambridge: Cambridge University Press, 2013).

2 Christopher B. Field et al., Intergovernmental Panel on Climate Change, "Climate Change 2014 Synthesis Report: Summary for Policymakers," in *Climate Change 2014: Impacts, Adaptation, and Vulnerability* (Cambridge: Cambridge University Press, 2013).

3 Valerie Masson-Delmotte et al., Intergovernmental Panel on Climate Change, "Summary for Policymakers," in *Global Warming of 1.5°C* (Geneva: World Meteorological Organization, 2018).

4 Ibid.

5 "CAIT Climate Data Explorer," World Resources Institute, accessed October 5, 2018.

6 "Saudi Arabia Facts and Figures," Organization of the Petroleum Exporting Countries, accessed January 17, 2019.

Saudi Arabia has long been involved in global climate change negotiations. While the kingdom's involvement in the United Nations Framework Convention on Climate Change has attracted mounting attention from analysts and researchers alike,[7] its climate change governance at the national level has been understudied.

This paper sheds light on Saudi Arabia's climate change governance at the national level and examines the challenges and opportunities for aligning climate change policies with the kingdom's economic diversification strategies. It draws on a review of secondary literature including Saudi Arabia's national communication reports, the kingdom's intended nationally determined contribution, Saudi Vision 2030, and the National Transformation Program (2018-2020), as well as interviews with Saudi climate change experts.

Impacts of Climate Change on Saudi Arabia

Climate change poses threats both to Saudi Arabia's oil-based and non-oil based economic sectors.[8] Non-oil economic sectors such as agriculture, fisheries, tourism, and infrastructure are already affected by the physical impacts of climate change, including increases in the Earth's average surface temperature, decreases of annual total precipitation, sea level rise, and, in some cases, extreme events like intense rainfall. Examples of such rainfall events are the flash floods that hit Jeddah in November 2009 and most recently in October 2018. The 2009 flash flood was described as the worst in the region in 30 years, causing the deaths of more than 150 people and resulting in great economic losses, with damage to more than 7,000 vehicles and 8,000 homes. Over 3.5 inches of rain fell in four hours over an area that normally receives 1.8 inches per year.[9] The flash flood in October caused the deaths of at least 30 people.[10]

Climate change poses threats both to Saudi Arabia's oil-based and non-oil based economic sectors.

On the other hand, oil-based economic sectors can be adversely impacted by global climate change mitigation measures, especially with global regulatory constraints on fossil fuel resources. Since fossil fuels represent more than 70 percent of global GHG emissions,[11] the future access to fossil fuel-based energy will need to be constrained to keep climate change

7 See, for example, Joanna Depledge, "Striving for No: Saudi Arabia in the Climate Change Regime," *Global Environmental Politics* 8 (2008): 4, 9-35; Jean Chemnick, "Saudi Arabia: Oil Kingdom and a 'High Priest' Stall Action for 30 Years," *E&E News*, October 29, 2018; Arianna Skibell, "Politics: How Do You Shift Republicans on Climate? Be Nice," *E&E News*, September 6, 2017; and Aisha Al-Sarihi, "Saudi Arabia and Climate Change: From Systematic Obstructionism to Conditional Acceptance," *Arab Gulf States Institute in Washington*, August 2, 2018.

8 Aisha Al-Sarihi, "Prospects for Climate Change Integration into the GCC Economic Diversification Strategies," *LSE Kuwait Programme Paper Series* No. 20, February 2018.

9 Mai Mahmoud, "Weathering Climate Change in the Gulf," *Arab Gulf States Institute in Washington*, November 14, 2017.

10 Aarti Nagraj, "Saudi Officials Form Committee in Qassim to Investigate Flood-Related Incidents," *Gulf Business*, November 19, 2018.

11 Bert Metz et al., eds., Intergovernmental Panel on Climate Change, "Technical Summary: Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change" (Cambridge: Cambridge University Press, 2007).

at a (relatively) safe level, meaning a rise in global mean surface temperatures well below 1.5 degrees Celsius compared to preindustrial levels. These are the objectives of the Paris Agreement, which entered into force in November 2016.

The implementation of mitigation measures can change the trading landscape of hydrocarbon markets by reducing the demand for fossil fuel exports as well as prices.[12] A recent study by Oil Change International suggests that for a likely chance of keeping warming below 2 degrees Celsius, 68 percent of reserves must remain in the ground, and 85 percent of fossil fuels should remain unburned in order to keep global warming below 1.5 degrees Celsius.[13] In this context, the Middle East would need to leave about 40 percent of its oil and 60 percent of its gas underground.[14] In this sense, if Saudi reserves are fully extracted and burned, the resulting emissions would amount to an estimated 112 gigatons of carbon dioxide, one-seventh of total global emissions in a 2 degree-Celsius carbon budget, or one-third of total global emissions in a 1.5 degree-Celsius carbon budget.[15] Global constraints on fossil fuel resources (which have already started to take place in a form of low-carbon economic transitions, fossil fuel divestments, or stranded assets) could thus impose direct economic losses on Saudi Arabia because crude petroleum and downstream oil products continue to dominate Saudi Arabia's export profile (Figure 1).

Efforts to reduce carbon emissions and improve energy efficiency are not only taking place in Western countries. Many of Saudi Arabia's trade partners, including European countries, China, and India, are pursuing ambitious programs to cut GHG emissions. Significant changes in regulations are underway in emerging economies such as China and India, which are major importers of Saudi Arabia's oil. India aims for at least 15 percent of the vehicles on its roads to be electric in five years, and more than 30 percent by 2030.[16] Similarly, China targets 2 million annual electric vehicle sales by 2020 and a complete ban on internal-combustion engines by 2040.[17]

Furthermore, climate change mitigation measures, especially constraints on the use of fossil fuels (e.g. fossil fuel taxes), can increase production costs and hence prices of exportable goods and services. Saudi Arabia, like other Gulf countries, is highly dependent on imports of goods, especially food. Since the 1960s, the percentage of imports of goods and services in total gross domestic product has continued to increase in all Gulf countries, except for

12 Mustafa Hussein Babiker and Mohammed Fehaid, "Climate Change Policy in the MENA Region: Prospects, Challenges and the Implication of Market Instruments," *Economic Research Forum*, May 2011.

13 Greg Muttitt, "The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production," *Oil Change Internationa*l, September 2016.

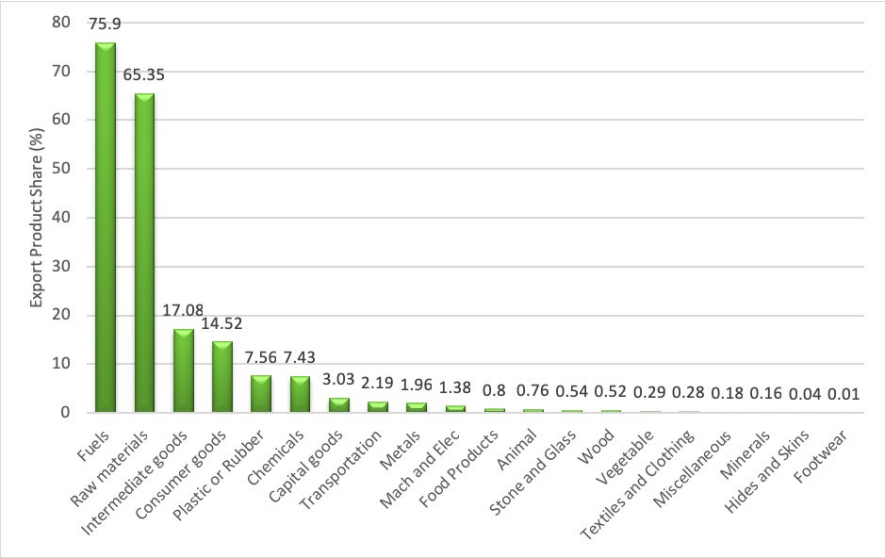
14 Christophe McGlade and Paul Ekins, "The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2C," *Nature* 517 (2015): 187-90.

15 Greg Muttitt and Hannah McKinnon, "Overheated Expectations: Valuing Saudi Aramco's IPO in Light of Climate Change," *Oil Change International*, August 2017.

16 Anurag Kotoky, P R Sanjai, and Anindya Upadhyay, "India Proposes a Goal of 15% Electric Vehicles in Five Years," *Bloomberg*, September 6, 2018.

17 Chris Busch, "China's All In On Electric Vehicles: Here's How That Will Accelerate Sales In Other Nations," *Forbes*, May 30, 2018.

Figure 1: Composition of Saudi Arabia's Export Products



Source: World Integrated Trade Solution

Bahrain. In 2015, the imports of goods and services accounted for more than 35 percent of GDP in Bahrain, 83 percent in the UAE, 45 percent in Kuwait, 52 percent in Oman, 36 percent in Qatar, and 37 percent in Saudi Arabia.[18]

Saudi Arabia, Economic Diversification, and Climate Change

Global climate change mitigation measures such as the use of electric vehicles, renewable energy, energy efficiency, and carbon taxes, as well as fluctuation in oil prices create a dual challenge for the Gulf Arab states to compete in a future with low oil prices and low demand for fossil fuels.

Holding around 22 percent of the world's proven petroleum reserves, Saudi Arabia's economy is highly reliant upon oil and gas, the exportation of which continues to account for over 60 percent of government revenue. And Saudi Arabia's economy has been highly vulnerable to oil price shocks mainly because of its narrow profile of exports – oil and gas account for nearly 78 percent of its total exports and 43 percent of its gross domestic product.[19] Aware of this challenge, the Gulf states have discussed economic diversification for decades. However, serious action toward such economic reform was not taken until after the oil price drop in mid-2014. In response, in 2016, Saudi Arabia launched its ambitious economic diversification plan, Vision 2030.

Also, aware of the potential threat posed by climate change mitigation measures, especially constraints on fossil fuels, the main source of its income, Saudi Arabia has been actively involved in climate change negotiations since the 1990s. Saudi Arabia joined the U.N. Framework Convention on Climate Change in 1992 and has been persistently working toward

18 "Imports of Goods and Services (% of GDP)," The World Bank, accessed 2015.

19 "Oil Rents (% of GDP)," The World Bank, accessed December 2018.

global acknowledgement of the special circumstances of fossil fuel-rich countries, stressing the possibility for those countries to address climate change through co-benefits of economic diversification. In 1995, for instance, during the last few days of the first Conference of Parties, the supreme decision-making body of the U.N. Framework Convention on Climate Change, Saudi Arabia fought hard to prevent the launch of negotiations on what became the 1997 Kyoto Protocol. Further, Saudi Arabia has adopted a skeptical stance toward climate-change science, paying more attention to uncertainties and downplaying potential impacts. This was clear from its efforts to water down the conclusions of the Intergovernmental Panel on Climate Change's assessment reports, including the Second Assessment Report in 1996 and the Fourth Assessment Report in 2007. In its intended nationally determined contribution submitted in response to the Paris Agreement, Saudi Arabia stated:

Aware of the potential threat posed by climate change mitigation measures, especially constraints on fossil fuels, the main source of its income, Saudi Arabia has been actively involved in climate change negotiations since the 1990s.

> The Kingdom will engage in actions and plans in pursuit of economic diversification that have co-benefits in the form of greenhouse gas (GHG) emission avoidances and adaptation to the impacts of climate change, as well as reducing the impacts of response measures.[20]

Indeed, economic reforms aimed toward promoting diversification could create a window of opportunity for addressing climate-related matters at the lowest cost as well as bringing about potential co-benefits in relation to economic diversification and sustainability, employment, energy security, and public health.[21] The introduction of subsidy reforms and subsequent increase in the price of fuel, electricity, and water are a few examples of recent economic policy reforms, and, if managed properly, could accelerate the penetration of nonconventional technologies, such as those associated with renewable energy.

At present, however, little is known about Saudi Arabia's progress in terms of addressing climate change in line with its economic diversification strategy, or the factors and conditions that facilitate or hinder the incorporation of climate-related matters in economic diversification strategies. Therefore, this paper:

- Creates a framework to test or measure the coherence between climate policy and general economic development,
- Identifies the challenges and opportunities for Saudi Arabia to align climate-related matters with its economic diversification strategies,
- Discusses policy options for operational integration of climate policies in Saudi Arabia's economic diversification strategies.

20 "The Intended Nationally Determined Contribution of the Kingdom of Saudi Arabia under the UNFCCC," United Nations Framework Convention on Climate Change, November 2015.

21 Aisha Al-Sarihi, "Prospects for Climate Change Integration into the GCC Economic Diversification Strategies," *LSE Kuwait Programme Paper Series*, No. 20, February 2018.

Understanding Climate Policy Integration

In response to heightened concern about climate change, the concept of climate policy integration has come to the fore in the last decade. In 2014, for instance, the 5th Assessment Report of the Intergovernmental Panel on Climate Change called for a form of development that combines adaptation and mitigation to realize the goal of sustainable development.[22] For some scholars, climate policy integration draws heavily on environmental policy integration literature, which refers to the incorporation of environmental concerns in nonenvironmental policy sectors.[23] In this regard, different meanings and concepts – such as "climate policy integration," "climate compatible development," "climate mainstreaming," and "climate proofing" were developed.

What is Climate Policy Integration?

Here, climate policy integration refers to the "integration of policies and measures to address climate change in ongoing sectoral and development planning and decision-making" to "minimize the harm caused by climate impacts, while maximizing the many human development opportunities presented by a low emission, more resilient future" combining definitions by Richard J. Klein et al.,[24] and Tom Mitchell and Simon Maxwell.[25]

With this in mind, climate policy integration can be problematic because in practice it often involves economic, social, technological, and political dimensions; interactions between different sectors (such as energy, water, and agriculture); interactions between different actors (such as academic, government, private, nongovernmental, and individual citizens); different policy domains (e.g. climate policy and development policies); and interactions between different levels of governance.[26] Regarding governance, William Lafferty and Eivind Hovden identify two main orientations for integration: vertical integration, referring to the assimilation of environmental or climate goals at vertical tiers of governance; and horizontal integration, which is achieved when climate concerns are addressed across policy sectors.[27]

22 Fatima Denton et al., "Climate-Resilient Pathways: Adaptation, Mitigation, and Sustainable Development," Suruchi Bhadwal et al., eds., in *Climate Change 2014: Impacts, Adaptation, and Vulnerability* (Cambridge: Cambridge University Press, 2014).

23 See, for example, Hens Runhaar, Peter Driessen, and Caroline Uittenbroek, "Towards a Systematic Framework for the Analysis of Environmental Policy Integration," *Environmental Policy and Governance* 24, no. 4 (April 4, 2014): 233-46.

24 Richard J. Klein, E. Lisa F. Schipper, and Suraje Dessai, "Integrating Mitigation and Adaptation into Climate and Development Policy: Three Research Questions," *Environmental Science & Policy* 8, no. 6 (2005): 584.

25 Tom Mitchell and Simon Maxwell, "Defining Climate Compatible Development," *Climate and Development Knowledge Network*, November 2010.

26 See Camilla Adelle and Duncan Russel, "Climate Policy Integration: A Case of Déjà Vu?" *Environmental Policy and Governance* 23, no. 1 (2013): 1-12; Monica Di Gregorio et al., "Climate Policy Integration in the Land Use Sector: Mitigation, Adaptation and Sustainable Development Linkages," *Environmental Science and Policy* 67 (2017): 35-43.

27 William Lafferty and Eivind Hovden, "Environmental Policy Integration: Towards an Analytical Framework," *Environmental Politics* 12, no. 3 (2003): 1-22.

Vertical and Horizontal Integration of Climate Policy

Following Lafferty's and Hovden's definitions, vertical integration refers to the mandates, roles, and interactions within the responsibility of one sectoral ministerial authority or within one policy domain such as the energy sector.[28] Other scholars often refer to vertical integration as vertical constitutional division of power, for example, between regional, national, and subnational authorities. However, here, vertical climate policy integration refers to "the extent to which a specific or policy domain has adopted procedures that facilitate the adoption and implementation of climate change objectives"[29] in line with the general economic development plans within one policy domain or sector.

Horizontal policy integration refers to the institutional interactions across distinct sectors, or "the extent to which a central authority has developed a comprehensive cross-sectoral strategy."[30] Evidence for effective vertical and horizontal policy integration includes an authoritative long-term climate change policy, which requires well-specified targets, timetables, and reporting requirements; the presence of a climate change specific authority mandated to supervise, coordinate, and implement climate change policy; the requirement for sectoral ministries to report to a central authority; and a clear indication of sectoral responsibility for overarching goals.

Challenges to Climate Policy Integrity

Different challenges and hurdles can confront firms, industries, and governments when they try to incorporate climate policies into economic development processes. These include technical as well as informational and awareness challenges; institutional and organizational factors such as formal and informal rules, responsibilities, regulations, policies, and routines; and availability of resources such as financial resources or human capacity. Other barriers can be the suboptimal advancement of research and development and limited innovation and knowledge creation in the field of climate policy integration.[31] Despite the substantial number of barriers to climate policy integration identified from experiences across the world, the relevance in the context of the Gulf Arab states needs to be investigated.

The knowledge gap on the links between climate change and economic development could prevent an accurate analysis of the opportunities for integrating climate policies into economic development policies.

28 Ibid.

29 Camilla Adelle and Duncan Russel, "Climate Policy Integration: A Case of Déjà Vu?" *Environmental Policy and Governance* 23, no. 1 (2013): 1-12.

30 William Lafferty and Eivind Hovden, "Environmental Policy Integration: Towards an Analytical Framework," *Environmental Politics* 12, no. 3 (2003): 1-22.

31 See, for example, Robbert Biesbroek et al., "Barriers to Climate Change Adaptation in the Netherlands," *Climate Law* (2011): 181-99; Cristoph Oberlack and Klaus Eisenack, "Alleviating Barriers to Urban Climate Change Adaptation Through International Cooperation," *Global Environmental Change* (2014); W. Neil Adger et al., "Assessment of Adaptation Practices, Options, Constraints and Capacity," in *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Abdelkader Allali et al., eds. (Cambridge: Cambridge University Press), 717-43.

This paper uses three indicators to measure the challenges and opportunities for climate policy integration in Saudi Arabia: information and awareness, institutional architecture, and availability of financial and human resources.

Data, Information, and Awareness

The challenges related to climate change information critically affect climate change policy integration. These include the extent of data, knowledge, and awareness of climate-related issues and the availability, accessibility, credibility, and reliability of information. Furthermore, the manner by which information is communicated and translated by climate change experts and the way the information is received by the users (i.e. planners and decision makers) are also vital. Science-based knowledge needs to be applicable and relevant to be integrated into policy. This requires translating scientific data on climate change into policy-relevant information.[32] The knowledge gap on the links between climate change and economic development could prevent an accurate analysis of the opportunities for integrating climate policies into economic development policies. The level of awareness of climate change and its predicted impacts can shape the attitudes, behaviors, priorities, and actions of governments toward climate change policy integration, and this can result in powerful opportunities or barriers to integration.[33]

Institutional Architecture

Planning for climate change policy integration is a challenge about "leadership, co-ordination, and collective action," thus it is about institutions.[34] Several studies have identified the serious barriers to climate policy integration as institutional[35] – classified as rule-based institutional, social structure-based institutional, and organizational challenges.

Rule-Based Institutions

The rule-based institutional challenges relate to how official procedures and practices, such as policies and regulatory support, affect the commitment of governments to address climate change, the government prioritization of climate change, and the autonomy of governments

32 Sining C. Cuevas et al., "Challenges in Mainstreaming Climate Change Adaptation into Local Land Use Planning: Evidence from Albay, Philippines," *International Journal of Climate Change: Impacts and Responses* 7, no. 3 (2015): 45-65; Jessica Ayers et al., "Mainstreaming Climate Change Adaptation into Development in Bangladesh," *Climate and Development* 6, no. 4 (2014): 293-305; Barbara C.P. Oliveira, Jelle H. Behagel, and Luisa S. Sette Camara Moreira, "Integrating Climate Resilience in Policy and Planning of Low Emission Development Strategies," *Ecosynergy* (2015).

33 Robbert Biesbroek et al., "Barriers to Climate Change Adaptation in the Netherlands," *Climate Law* 2, no. 2 (January 2011): 181-99.

34 Alex Evans and David Steven, "An Institutional Architecture for Climate Change: A Concept Paper," *Center on International Cooperation* (March 2009).

35 Sining C. Cuevas et al., "Challenges in Mainstreaming Climate Change Adaptation into Local Land Use Planning: Evidence from Albay, Philippines," *International Journal of Climate Change: Impacts and Responses* 7, no. 3 (2015): 45-65; Christoph Oberlack and Klaus Eisenack, "Alleviating Barriers to Urban Climate Change Adaptation Through International Cooperation," *Global Environmental Change* 24 (January 2014); Klaus Eisenack, et al., "Explaining and Overcoming Barriers to Climate Change Adaptation," *Nature Climate Change* 4 (2014): 867-72.

to make decisions on climate change. For instance, the absence of formal legislation that mandates actors to incorporate adaptation or mitigation into their activities is a serious barrier to climate policy integration.

Social Structure-Based Institutions

Social structures that affect the planning for climate change include attitudes, values, norms, practices, and beliefs that influence how and why individuals and societies engage in climate change and economic planning.

Organizational Institutions

The challenges related to organizational institutions primarily deal with the institutional arrangements between organizations that build cooperation and collaboration across scales, and the linkages among organizations that encourage either cohesion or fragmentation among institutions.

Availability of Financial and Human Resources

Resource constraints have always been a problem for governments. Yet, they also play a crucial role in climate change planning and integrational capacity.[36] In many cases, lack of funding is typically among the primary reasons why the implementation of climate policy integration is delayed.[37] Governments have limited capabilities to invest in or begin new endeavors since their budgets often are overextended. Hence, funding can be a great barrier to integration when it is lacking and a significant opportunity when it is sufficient.

Because climate change is a long-term challenge, the stability of tenure of the human resources is vital – a permanent workforce can help ensure the continuity of integration activities.

In climate policy integration, the need for adequate resources extends beyond finance. The availability of staff dedicated solely to climate policy integration is critical. Because climate change is a long-term challenge, the stability of tenure of the human resources is vital – a permanent workforce can help ensure the continuity of integration activities. This issue becomes more complex because these workers must be trained, skilled, and knowledgeable about climate change.[38] Accordingly, investing in human resources becomes necessary.

Climate Change Governance in Saudi Arabia

In terms of climate governance at the international level, Saudi Arabia ratified the U.N. Framework Convention on Climate Change, an international environmental treaty, by accession on December 28, 1994. The treaty pledges to stabilize GHG concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system."

36 Robbert Biesbroek et al., "Barriers to Climate Change Adaptation in the Netherlands," *Climate Law* (2011): 181-99.

37 Sining C. Cuevas, "Examining the Challenges in Mainstreaming Climate Change Adaptation into Local Land-Use Planning: The Case of Albay, Philippines," (PhD thesis, University of Queensland, 2016).

38 Ibid.

In 1997, the Kyoto Protocol emerged from the U.N. Framework Convention on Climate Change. It was adopted to strengthen the global response to climate change, mandating individual county's GHG emission reduction; it entered into force on February 16, 2005. The Kyoto Protocol recognizes that developed countries (i.e. Annex I countries) are primarily responsible for the high levels of GHG emissions into the atmosphere due to more than 150 years of industrial activity. Thus, it imposes a greater burden on developed countries under the principle of "common but differentiated responsibilities." To demonstrate all parties' compliance with the Kyoto Protocol, non-Annex I countries are also required to submit national communication reports providing a vulnerability and adaptation assessment and relevant information on national circumstances; GHG inventories; financial resources and transfer of technology; and education, training, and public awareness. Non-Annex I parties were required to submit their first national communications within three years of entering the convention and every four years thereafter. Saudi Arabia acceded to the Kyoto Protocol on January 31, 2005. In response to the protocol, the kingdom submitted its first, second, and third national communications in 2005, 2011, and 2016, respectively.

On December 12, 2015, parties to the U.N. Framework Convention on Climate Change reached a landmark agreement to combat climate change and accelerate and intensify the actions and investments needed for a sustainable low carbon future. The Paris Agreement builds upon the convention and – for the first time – brings all countries, including developing countries, into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. Entered into force on November 4, 2016, the Paris Agreement requires all parties to put forward their best efforts through nationally determined contributions and strengthen these efforts in the years ahead. This includes requirements that all parties report regularly on their emissions and implementation efforts. Saudi Arabia ratified the Paris Agreement on November 3, 2016 and had submitted its intended nationally determined contribution ahead of the Conference of Parties in December 2015.

At the national level, Saudi Arabia does not have a climate action plan outlining specific targets, plans, strategies, policies, and regulations to deliver on its climate change mitigation and adaptation ambitions.

At the national level, Saudi Arabia does not have a climate action plan outlining specific targets, plans, strategies, policies, and regulations to deliver on its climate change mitigation and adaptation ambitions. Yet, the kingdom has established different initiatives to address the impacts of climate change. These include the kingdom's National Committee for the Clean Development Mechanism and Designated National Authority, which were established in 2009. The Designated National Authority oversees the development process of Clean Development Mechanism projects, preparation and submission of national communications, biennial update reports, and preparation and updating of the intended nationally determined contribution.

Other climate-related initiatives include the 2003 launch of the first National Energy Efficiency Program as a three-year program to improve the management and efficiency of electricity generation and consumption in the kingdom. Building on the experiences gained during that period, a Council of Ministers' decree established the Saudi Energy Efficiency Center in 2010. The center is managed by a board of directors composed of more than 26 entities from ministries, government departments, and the private sector. Its main tasks have included

development of a national energy efficiency program, promoting awareness about energy efficiency, participating in the implementation of pilot projects, and proposing energy efficiency policies and regulations as well as monitoring their implementation.

In 2012, the Saudi Energy Efficiency Center launched the Saudi Energy Efficiency Program, which designs and implements energy efficiency initiatives. To establish the program, an executive committee was created, chaired by Prince Abdulaziz bin Salman, vice minister of petroleum and mineral resources (now the Ministry of Energy, Industry, and Mineral Resources), and composed of members from 14 government and semi-government entities. The executive committee targeted more than 90 percent of the kingdom's energy consumption by creating specialized teams that focused on the building, transportation, and industrial sectors. The National Energy Efficiency Plan is currently focusing on the design of the first energy conservation law and national and regional regulations, preparation of a new national database on energy supply and demand, capacity development of energy efficiency managers, and public awareness.

By the end of 2014, the kingdom had more than 300 green building projects, investing approximately $53 billion.

Furthermore, in 2010, the Saudi Green Building Forum was launched to promote the construction of energy- and resource-efficient and environmentally responsible buildings. By the end of 2014, the kingdom had more than 300 green building projects, investing approximately $53 billion.

Additionally, the kingdom's first carbon dioxide enhanced oil recovery demonstration project commenced in 2015. The Uthmaniyah project compresses and dehydrates carbon dioxide from the Hawiyah natural gas liquid recovery plant in Saudi Arabia's Eastern Province.[39] The captured carbon dioxide is transported via pipeline to the injection site at the Ghawar oil field (a small flooded area in the Uthmaniyah production unit) for enhanced oil recovery. Also, in 2017, a Renewable Energy Project Development Office was established in the Ministry of Energy, Industry, and Mineral Resources to raise the share of renewable energy capacity in the kingdom's energy mix.

Climate Policy Integration in Saudi Arabia: Challenges and Opportunities

Data Uncertainty and Knowledge Gap about Climate Change

Availability of country-specific data and information is vital to address the impacts of climate change effectively. The data needed to guide strategies, plans, and decision-making processes include: emissions inventories (to guide mitigation plans); physical impacts of climate change (such as increased average temperatures, changes in precipitation, and sea level rise) on non-oil economic sectors, including agriculture, fisheries, tourism, water, and infrastructure

39 "The Global Status of CCS 2018," Global CCS Institute, accessed January 2019.

(to guide adaptation plans); and the socioeconomic impacts of climate change and the potential co-benefits resulting from addressing climate issues in line with general economic development plans.

Saudi Arabia's national communications provide relevant information on the kingdom's national circumstances, GHG inventories and their sources and sinks (or reservoirs), as well as the impacts of climate change on water resources, desertification, health, agriculture, and food security. The national communications indicate that climate-related data, if available, is inconsistent, and of a high level of uncertainty. The uncertainty of data inputs was addressed in many instances in the "Third National Communication":

> Due to the unavailability of certain source specific input data including emission factors, uncertainties are unavoidable when any estimate of national emissions or removals is made. It is therefore important to establish and express uncertainties quantitatively and/or with the acceptable confidence interval or range. ...
>
> Uncertainties related to input data depend mainly on the size and quality of data collection and record keeping. ...
>
> Uncertainties also appear when the unavailability of input data compels the use of extrapolated and/or averaged values for a particular set of data. Uncertainty of extrapolated or averaged data cannot be quantified precisely because the uncertainties associated with the interpolation and/or averaging procedures also depend on the quality of the relevant data including accuracy.[40]

The inconsistency of available data can be attributed to the lack of a focal point responsible for collecting, monitoring, and validating climate-related data. The collection of climate-related data in Saudi Arabia is based on ad hoc processes depending on the need to respond to U.N. Framework Convention on Climate Change requirements, such as through national communications or the nationally determined contribution. Indeed, the King Abdulaziz City for Science and Technology, King Abdullah City for Atomic and Renewable Energy, King Abdullah Petroleum Studies and Research Center, and King Abdullah University of Science and Technology, as well as industries, are important sources of climate-related data and information. Yet, the lack of a central mechanism to coordinate the efforts between these different entities and communicate their research outcomes to end users, including policymakers, could contribute to delays in addressing climate change in the kingdom. Importantly, fragmentation and uncoordinated efforts to collect data may lead to ineffective communication of information between climate change experts and decision makers, and thus hinder the integration of science into policy.

Additionally, the lack of available data, credibility, and a communication channel are major reasons behind the limited awareness of the impacts of climate change among stakeholders, especially those who are directly impacted by the adverse effects of climate change. Climate change awareness is vital both at a decision-making level and for societal actors, who are the most vulnerable to its impacts and who can play a vital role in addressing those impacts. In Saudi Arabia, the climate change delegation has been described as highly skilled, with the ability to spot opportunities to push the country's agenda forward in international climate

40 Kingdom of Saudi Arabia, *Third National Communication of the Kingdom of Saudi Arabia* (2016), 16.

change negotiations.[41] However, the knowledge gap and understanding of climate change impacts for end users (such as utility companies) or at the societal level remain an issue in Saudi Arabia. For instance, the "Third National Communication" indicates that:

> The public and health care professionals are not fully aware about the issue of climate change and its adverse health impacts. There is also a lack of [a] comprehensive research programme on climate change and health impacts across the Kingdom. As a result, there [are] scarce statistics on climate related health problems and other environment related health events with climate change."[42]

Heavy Involvement of the Ministry of Energy

At the international level, the Saudi delegation to international climate change negotiations has been dominated by the Energy Ministry (now the Ministry of Energy, Industry, and Mineral Resources). The centrality of the Energy Ministry reflects the early focus of Saudi Arabian climate change policy on its economic, more than environmental, dimension.[43] The Energy Ministry also dominates Saudi Arabia's climate change governance at the national level.

In its nationally determined contribution, Saudi Arabia listed its climate change ambitions in terms of mitigation (such as promoting energy efficiency, renewable energy, carbon capture and storage or utilization, methane recovery, and flare minimization) and adaptation (such as water and wastewater management, urban planning, marine protection, desertification reduction, early warning system establishment, and coastal zone management). At present, however, Saudi Arabia does not have a national climate action plan, which is an essential milestone to translate ambitions listed in the nationally determined contributions into action. Importantly, while the nationally determined contribution acknowledges the importance of addressing climate change impacts in line with economic diversification strategies in pursuit of potential co-benefits, climate-related matters are currently not prioritized in the government's economic diversification agenda, which includes enhancing the education-based economy, privatization, boosting small- and medium-sized enterprises, and improving the business environment.

The centrality of the Energy Ministry reflects the early focus of Saudi Arabian climate change policy on its economic, more than environmental, dimension.

Yet, Saudi Arabia is undertaking some initiatives to address climate change. For instance, in 2017, a Renewable Energy Project Development Office was established in the Ministry of Energy, Industry, and Mineral Resources. The aim of the office is to raise the renewable energy capacity in the total energy mix within the kingdom to 9.5 gigawatts by 2023, in line with Vision 2030. Further, Saudi Aramco took the lead as a founding member of the Oil and Gas Climate Initiative, a chief executive officer-led initiative of 10 companies that formulates a platform for knowledge exchange and collaboration on action to reduce GHG emissions.

41 Joanna Depledge, "Striving for No: Saudi Arabia in the Climate Change Regime," *Global Environmental Politics* 8, no. 4 (2008): 9-35; Jean Chemnick, "Saudi Arabia: Oil Kingdom and a 'High Priest' Stall Action for 30 Years," *E&E News*, October 29, 2018; and Arianna Skibell, "Politics: How Do You Shift Republicans on Climate? Be Nice," *E&E News*, September 6, 2017.

42 Kingdom of Saudi Arabia, *Third National Communication of the Kingdom of Saudi Arabia* (2016), 244.

43 Joanna Depledge, "Striving for No: Saudi Arabia in the Climate Change Regime," *Global Environmental Politics* 8, no. 4 (2008): 9-35.

This is indeed useful. However, successful planning for climate change integration is about coordination and collective action. The central role of the Ministry of Energy, Industry, and Mineral Resources and Aramco in addressing climate-related matters focusing mainly on the energy sector could jeopardize the kingdom's ambitions to align climate change policies with economic diversification strategies by: creating biased decision making that benefits oil and gas sectors at the expense of other sectors, such as agriculture, water, fisheries, and infrastructure; and fragmentating policy among organizations, especially given the limited role of the Ministry of Environment, and the lack of an interministerial committee whose role it is to ensure integrity and collaboration between organizations across sectors and different levels of governance. This could eliminate the role of bottom-up initiatives and citizens' involvement in addressing climate change, and could counteract Vision 2030's economic ambitions.

Availability of Financial Resources but Misallocation toward Climate Finance

Allocating financial resources for both mitigation and adaptation, or the synergy of the two with general economic development funding, is essential to achieve climate action ambitions.

The gap in data, information, and knowledge and the lack of a climate action plan hinder the allocation of funding for climate-related issues. Saudi climate change experts stress that the availability of financial resources is not an impediment to addressing climate change; rather, it is the allocation of finances that is the challenge. The lack of necessary information about the costs of climate change impacts, potential co-benefits associated with addressing climate change in line with economic diversification, and the knowledge gap necessary to factor climate change into sectoral development planning are major challenges to allocate available funding toward addressing climate-related issues.

Vision 2030 focuses on enabling the private sector as a main pillar of its economic diversification away from hydrocarbon dependence. Addressing the impacts of climate change can bring about potential co-benefits and open a window of opportunity for local and international investors to participate in new markets, such as renewable energy, energy efficiency, and electric vehicles. Investments in value chains of renewable energy, energy efficiency, electric vehicles, or sustainable water desalination are promising opportunities with economic, environmental, and social advantages, including the creation of new jobs and reduction of air emissions and associated health benefits. Investments in these new markets means new technologies, which in many cases involve financial incentives to enable their adoption, especially at an early stage. Lack of sectoral plans that factor in climate change misinforms the financial needs of sectors to address climate-related issues or puts an extra burden on the state budget. In Saudi Arabia, at present, there is no climate-related finance specified in the nationally determined contribution, national communications, or Vision 2030. This is mainly because of the lack of climate change governance architecture in Saudi Arabia.

"Green finance," or "climate finance," which is a mechanism aimed at funding sustainable projects and enabling green economic growth,[44] is yet to be adopted in the Gulf Arab states, except the UAE. In Saudi Arabia, oil and gas export revenue continues to account for over 60 percent of government revenue. Saudi Arabia's sovereign wealth fund, the Public Investment Fund, has shifted attention toward investing in green technologies only recently. For example, the Public Investment Fund agreed to invest more than $1 billion in the electric car startup Lucid Motors.[45] However, a lack of a climate action plan brings no clear signs whether clean technology investments and divestment from fossil fuels is a priority for the Public Investment Fund. For instance, Saudi Arabia and the SoftBank Group announced a $200 billion plan to build the world's biggest solar power generation plant.[46] However, the project has been stalled.[47]

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Human capacity, on the other hand, offers a mix of challenge and opportunity for Saudi Arabia to support the implementation of ambitions set out in the nationally determined contribution. Saudi Arabia's nationally determined contribution suggests that there is a need for sustained capacity building efforts and upgrading of skills at the individual and systemic level to support the implementation of the climate ambitions set out in the nationally determined contribution. Yet, insufficient knowledge of links between climate change and economic development pose a barrier to specifying the need for capacity building, and the financial needs to support upgrading of skills.

Conclusions

Saudi Arabia has been involved in addressing climate change both at the international and national level. However, at a national level, the kingdom has yet to develop a climate action plan.

In its intended nationally determined contribution, submitted in November 2015, the kingdom expressed its intention to align both climate change mitigation and adaptation ambitions with general economic development plans in pursuit of potential co-benefits that can arise from systematic consideration of climate and development policies. This is indeed useful as the intended nationally determined contribution and national communications provide an exhaustive list of ambitions and initiatives to address climate change impacts across sectors including energy, water resources, desertification, health, agriculture, and food security.

44 Read more about "green financing" at "Green Financing," United Nations Environment Programme, accessed March 7, 2019; and "climate finance" at "What is Green Finance?," Climate Mundial, accessed March 7, 2019.

45 Tom Arnold, "Saudi's PIF Invests More Than $1 Billion in Electric Carmaker Lucid Motors," *Reuters*, September 17, 2018.

46 Sarah Algethami, "From Lucid to Tesla, Saudi Wealth Fund Goes on Spending Spree," *Bloomberg*, September 19, 2018.

47 Rory Jones and Summer Said, "Saudi Arabia Shelves Work on SoftBank's $200 Billion Solar Project," *The Wall Street Journal*, last modified September 30, 2018.

At present, however, despite the existence of some climate-related actions on the ground, these climate-related ambitions are not translated into national laws and policies, or a national climate action plan, which defines quantified and measurable domestic targets. Importantly, climate change and economic development matters are still viewed separately. Three main challenges toward systematic consideration of climate change across sectors and in line with economic diversification are limitations of data and information, institutional challenges, and allocation of resources.

Availability of country-specific data may not be a serious challenge for policymakers in Saudi Arabia, but the quality and consistency of available data remain a big issue. The limited quality (or the lack) of data hampers the building of models used to forecast future impacts of climate change across sectors. Further, the sources of climate-related data are sporadic, and acquisition of data depends solely on the willingness of relevant organizations to share the required data when needed. There is no focal point or climate-related database that ensures continuous monitoring, evaluation, and validation of data.

Furthermore, the institutional architecture necessary to address climate-related issues, both mitigation and adaptation, does not exist. The present climate-related actions are heavily focused on the energy sector, with an intensive role for the Ministry of Energy, Industry, and Mineral Resources. The heavy involvement of the Energy Ministry, along with the lack of a national climate action plan, may possibly result in policy fragmentation and hinder the coordination of efforts necessary to address climate change across sectors, jeopardizing climate action in other sectors, such as agriculture, water, tourism, health, infrastructure, and fisheries.

In Saudi Arabia, financial resources are not a serious challenge to addressing climate change. However, the aforementioned challenges, especially data availability as well as the lack of a national climate action plan, eliminate effective allocation of funding targeted toward addressing climate change issues in the kingdom. At present, financing climate-related initiatives is ad hoc, on a per-project basis.

In theory, addressing climate-related matters requires adoption of new technologies, infrastructure, and new investment partnerships, and in many cases enabling the entry of new technologies, such as renewable energy technologies, requires financial incentives. A defined climate action plan per sector would lead to clarity in the financial needs of each sector. Importantly, considering intersectoral interactions could possibly prevent duplication of efforts and avoid conflicting policies.