

RESEARCH

Climate Diplomacy and Energy Transition: Kazakhstan–Gulf Cooperation in Sustainable Energy Governance

Abu-Shawar Omar Ahmad*Sorbonne-Kazakhstan Institute, Abai Kazakh National Pedagogical University, Almaty, Kazakhstan*Email: shawar1970kz@gmail.com

ORCID: 0009-0008-1883-8588

Aimen Kurmangali*Sorbonne-Kazakhstan Institute, Abai Kazakh National Pedagogical University, Almaty, Kazakhstan*Email: a.kurmangali@sorbonne.kz

ORCID: 0000-0002-9846-4983

Saad Twaissi*Department of Tourism and Heritage studies, United Arab Emirates University, Al Ain, United Arab Emirates*Email: saad.twaissi@uaeu.ac.ae

ORCID: 0000-0002-1802-6327

Eimad Eldin Abdu Ali Abusham*Faculty of Computing & Information Technology, Sohar University, Oman*Email: eabusham@su.edu.om

ORCID: 0000-0002-4895-2057

ABSTRACT

PURPOSE: To analyse the role of sustainable energy policies in the climate policies with the view of comparing Kazakhstan and Gulf Cooperation Council (GCC) member states using Sustainable Development Goal (SDG) performance trends.

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DESIGN/METHODOLOGY/APPROACH: This study uses a quantitative longitudinal design, with the use of Sustainable Development Report (SDR) indicators of SDG 7 and SDG 13 and the SDG Index. The evaluation of progress and inter-relationships is done through trend analysis, descriptive statistics and correlation analysis.

FINDINGS: The achievement of SDGs is increasing in all countries with the UAE, Qatar, and Saudi Arabia making most progress. Investment in renewables and infrastructure helps GCC states to be better than Kazakhstan in SDG 7, while they are ahead in SDG 13 areas due to previous mitigation policies. The Gulf has the lowest climate action.

RESEARCH LIMITATIONS/IMPLICATIONS: Findings are based on SDR indicators and are not wholly reflective of institutional and political forces influencing implementation of policies.

ORIGINALITY/VALUE: This paper uses empirical data on the topic of sustainable energy changes and inter-regional collaboration in the era of the changing geopolitics.

KEYWORDS: *Kazakhstan; GCC; SDG 7; SDG 13; Sustainable Energy; Climate Diplomacy.*

INTRODUCTION

With countries struggling to cope with the compounding challenges in global warming and energy insecurity, and the need to develop sustainably, climate diplomacy has become a key concern in 21st century world politics. A fundamental change in the global energy system is being propelled by technological changes, economies of scale and a political environment that finds itself more and more in need of decarbonising national economies. At the same time, climate governance no longer merely represents a form of traditional environmental policy, but rather encompasses geopolitics, economic competitiveness and national security.

Kazakhstan and the states of the Gulf Cooperation Council (GCC), i.e., Saudi Arabia, the United Arab Emirates, Qatar, Kuwait, Bahrain and Oman, hold a special position in world energy and climate politics. They are all significant hydrocarbon producers and their territories are the focus of large-scale international pressure to make significant contributions to global climate mitigation. Meanwhile, they are pursuing ambitious national strategies of economic diversification, renewable energy, and involvement in global value chains of low-carbon. Kazakhstan has furthered a hybrid climate policy model of phase-by-phase reform, a scale-up of renewable energy and an increase of involvement in international climate institutions. At the same time, the GCC states have taken on visionary agendas of green development that themselves are targeted at taking top spot positions in a low-carbon economic future through innovative solar, hydrogen, and carbon-circular-economy models.

A comparative study of climate diplomacy in Kazakhstan and GCC states is not well-developed in the modern era of globalisation; neither region can be underestimated. The current body of knowledge analyses these areas individually, either through the post-Soviet environmental control in Kazakhstan or through the economic diversification and post-oil transformation of the Gulf states. Much less focus has been directed at examining the overlaps of climate action, energy diplomacy, and sustainable development options in and between these regions. In addition, how these dynamics are influencing regional and global climate governance, via multilateral negotiations, cross-border energy co-operation, and domestic policy reforms, has had little focus in the wider climate security discourse.

This paper bridges the gap and provides a comparative and empirical analysis of sustainable energy performance in Kazakhstan and the GCC, 2000-2022. Using Sustainable Development Report (SDR) indicators, i.e., SDG 7 (Affordable and Clean Energy), SDG 13 (Climate Action), and the general SDG Index, we examine the progress in the long term, identify structural tendencies, and discuss how these tendencies reflect the priorities in climate diplomacy. In addition to revealing empirically how strategies have evolved, the paper employs a purely computational approach to the time-series analysis, descriptive statistics, and correlation analysis to discuss the 20 years of national sustainability strategies.

Based on quantitative data and prior research of the politics of climate diplomacy and energy transitions, the paper contributes to the multifacetedness of comprehending how Kazakhstan and the Gulf states react to conflicting economic, environmental, and geopolitical factors. There are convergences in the findings (e.g., shared investment in clean energy technologies), but also permanent divergences as far as climate-mitigation performances are concerned. Finally, the study highlights a new opportunity to open the gap between Kazakhstan and the GCC in ensuring sustainable energy prospects and strong climate diplomacy, both regionally and globally.

LITERATURE REVIEW

One of the most notable characteristics of contemporary international relations (IR) is climate diplomacy; this is because states are progressively meeting and adapting to the political and economic realities of environmental change. Seminal work addresses the issue of multilateral negotiations of global climate governance, the influence of non-state actors, and the systemic power politics underpinning the results under the United Nations Framework Convention on Climate Change (UNFCCC) (Bäckstrand and Kuyper, 2017; Depledge and Yamin, 2009; Falkner, 2016). When states employ climate policy as an instrument of coercion and legitimacy in the international arena, other researchers believe that climate co-operation occurs not only with the help of formal agreements but also with the creation of transnational governance and public diplomacy (Marquardt *et al.*, 2022; Newell and Paterson, 2010; Keohane and Victor, 2016). Climate and energy transition

are increasingly becoming entangled within climate diplomacy with structural changes in the world energy system, not only in hydrocarbon-receiving countries (Skovgaard and van Asselt, 2019; van de Graaf and Colgan, 2016).

Despite this shifting context, Kazakhstan appears to be an important climate and energy governance case. The country's transition to a low carbon-based economy from a fossil fuel-based one has been intensively researched; however, researchers continue to cite the paradox of how its economy depends on extractive industries and promises climate reform (Mouraviev, 2021; Koulouri and Mouraviev, 2018). Kazakhstan's climate policy regime is an indication of the further existence of greater trends of post-Soviet governance, gradual change in policies, centralisation, and the prevailing role of international development agencies (Beuerle, 2023; Karatayev and Clarke, 2014). There is also some evidence in the literature that Kazakhstan had some success in the sphere of renewable energy before the introduction of feed-in tariffs, the concept of a green economy, and national pilot projects in the carbon market; this is despite the continued challenges of implementation due to the fragmented institutional structure and insignificant financial incentives (Zhunussova *et al.*, 2020; Karatayev *et al.*, 2016; Radovanović *et al.*, 2021).

According to the most recent empirical evidence, Kazakhstan has become a leader of climate mitigation among the Central Asian states, but the outcomes are rather controversial in a number of ways (He *et al.*, 2023; Howie and Atakhanova, 2022). Research on the low-carbon transition suggests that the infiltration of renewable energy in Kazakhstan has a positive connection with long-term economic growth; nevertheless, the nation must address several structural obstacles, including the presence of an outmoded coal-based grid and low grid integration rates of renewable energy (Mouraviev, 2021). Studies underline how Kazakhstan's climate diplomacy is influenced by its geopolitical location between Russia, China and the European Union, and shows how it exhibits tendencies in terms of hybridisation in the process of balancing domestic industrial interests with global climate pressures (Karatayev *et al.*, 2016; Radovanović *et al.*, 2021).

The North African states and the Gulf were the two distinctive faces of the Middle East in the second half of the 20th century. Conventionally dependent on oil proceeds, the GCC states have been facing growing pressure to diversify their economies and align themselves to the global climate standard. Comprehensive GCC evaluation indicated that, based on the per-capita emissions, energy-consumption and prevalent subsidies on fossil fuels, the region is among the poorest actors in climate mitigation (Reiche, 2010; Lahn and Stevens, 2011). However, (focus) research shows that there is a radical shift in which GCC countries are aiming at ambitious renewable energy, carbon-circular-economy, hydrogen, national sustainability visions (Griffiths, 2019; Al-Sarihi and Cherni, 2023; Al-Sarihi and Mansouri, 2022).

Vision 2030 in Saudi Arabia and Net Zero 2050 in the UAE reveal how the Gulf countries have developed the concept of climate diplomacy, influenced by economic reform nationally and the international branding of clean energy innovators (Babonneau *et al.*; Luciani, 2021). These policies are used to green the local economy, i.e., by promoting green industries, technology transfer and

job creation, and rebrand the Gulf states as positive actors in global climate negotiations (Doukas *et al.*, 2013; Mondal *et al.*, 2016). Raising the scale of renewable energy schemes, including the Masdar City of the UAE and NEOM Green Hydrogen of Saudi Arabia, is symbolic of the region's dedication to the diversification of energy (Alnaser and Alnaser, 2011; Bousrih and Elhaj, 2025).

Recent research points out that Gulf State climate diplomacy can be seen as a balancing act that balances the need to express the support of clean energy technologies to remain globally relevant. The GCC also attempts to maintain the illusion of a central role in the activity of International Oil Companies (IOCs) in hydrocarbon markets through carbon-circular-economy models, carbon capture and storage technology (Tsai, 2018; Al-Maamary *et al.*, 2017; Sanfilippo *et al.*, 2024). Although various disparities exist in the development rates of the GCC, studies overall indicate that the UAE and Saudi Arabia are the leaders in climate governance in the region since they have substantial financial assets and established institutions (Sanfilippo *et al.*, 2024; Naseer *et al.*, 2025).

There are great similarities between the sustainable energy governance of Kazakhstan and the GCC that emerge in this comparative study. The economies of both the GCC region and Kazakhstan are dependent on fossil fuels, are diversifying and are involved in global climate diplomacy processes. It has been shown that the growth of clean energy adoption (SDG 7) has a high correlation with the general growth towards sustainable development, and climate action (SDG 13) remains minimal due to high emissions based economic development trends (Sachs *et al.*, 2019; Bhattacharya *et al.*, 2016; Acheampong, 2018). Although GCC states are better developed in terms of clean energy infrastructure and the use of renewable energy, the weakening of Kazakhstan's emission pathway climate-reduction performance is higher on the whole thanks to the introduction of previously implemented regulatory reforms and lower per-capita emissions (He *et al.*, 2023; Mouraviev, 2021).

In this connection, the authors of the current study indicate that the significance of climate diplomacy and regional structures' assistance in conjunction with innovation, green finance and technology transfer and targeted foreign policy co-operation could be beneficial to Kazakhstan and the Gulf countries (Ahmad *et al.*, 2025).

There is also a distinct convergence in the strategic focus in the literature: both Kazakhstan and the Gulf states are moving towards sustainable energy systems while at the same time intensifying their climate diplomacy functions, albeit with different motives and institutional capabilities. Kazakhstan's diplomacy is characterised with economic change, geopolitics of the region, and international climate agreements, while GCC's diplomacy presents economic diversity, technological leadership in green technologies, and rearticulation of geopolitical relations due to the global energy transition. The intersections of these paths make much bilateral collaboration, exchange of knowledge and common climate diplomacy possible.

METHODOLOGY

This research paper follows a quantitative, data-driven approach to investigate the way Kazakhstan and the Gulf States (GCC) influence sustainable energy policies based on climate diplomacy. Based on the Sustainable Development Report (SDR) data that covers from 2000 to 2022 (Sachs *et al.*, 2023), we consider three indicators, namely SDG 7 (Affordable and Clean Energy), SDG 13 (Climate Action), and the total SDG Index score. The countries that have been chosen are Kazakhstan, Saudi Arabia, the United Arab Emirates, Qatar, Kuwait, Bahrain, and Oman.

Data Collection and Preparation

The SDG Index data are taken from a combined CSV repository. After loading the data, integrity checks are performed to validate that the columns needed for SDG 7, SDG 13, and SDG Index are present. The target countries are filtered out and the field of the year is changed to a numeric type. Missing years are eliminated and the dataset is ordered in terms of country with regards to time. It is a requirement that numerical variables be standardised to enable cross-country comparison. The inspected data are the basis of creating trends, summary statistics, and correlational structures.

Analytical Framework

A four-layer analytical framework is used in the methodology.

Trend analysis

Time-series line charts are created on a country-by-country basis in order to depict the progress of SDG 7, SDG 13 and the SDG Index between 2000 and 2022. This shows trends in the use of clean energy and action on climate.

Descriptive statistics

The country-level summary tables (mean, standard deviation, minimum, maximum) of all indicators are calculated to measure the relative performance over 20 years.

Correlation analysis

A pooled correlation table will be analysed to assess the relationships between SDG 7, SDG 13 and general performance of the SDGs, indicating a structure between clean energy.

Comparative regional assessment

The dynamics of Kazakhstan are checked against those of the GCC states in order to determine their convergence, divergence, and diplomatic convergence in sustainable energy approaches.

Computational Workflow

All analysis is done in Python, and generalised statistical functions. We load the data and define and render figures, calculate the summary statistics, and store the results; this defines the workflow (depicted in Figure 1).

Methodology Framework Diagram

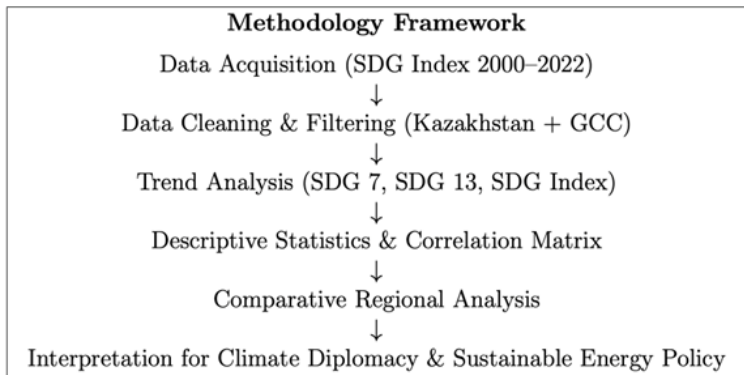


Figure 1: Analytical Methodology

Source: Constructed by authors

The analysis follows the workflow of Algorithm 1 according to which we can study the policy of climate diplomacy and sustainable energy policies in an organised manner. The algorithm will ensure consistency in data filtering, trend visualising and statistical testing of all target countries.

Algorithm 1: Climate Diplomacy and Sustainable Energy Policies

Require: SDG Index dataset (2000-2022) with fields: country, year, SDG 7, SDG 13, SDG Index.

Ensure: Trend plots, summary statistics, correlation matrix, and comparative insights.

1: *Define target countries: Kazakhstan and GCC states.*

2: *Load dataset from CSV file.*

3: *if required columns missing then*

4: *Raise error and terminate.*

5: *end if*

6: *Filter dataset to retain only target countries.*

7: *Convert year to numeric and remove invalid entries.*

8: *Sort dataset by country and year.*

9: *Trend Plotting:*

10: *for each indicator in {SDG 7, SDG 13, SDG Index} do*

11: *Pivot dataset by year and country.*

12: Plot multi-country time-series trend.

14: end for

15: Summary Statistics:

16: Compute mean, standard deviation, minimum, and maximum for each indicator by country.

17: Correlation Analysis:

18: Compute pooled correlation matrix among SDG 7, SDG 13, SDG Index.

19: Comparative Assessment:

20: Compare Kazakhstan's performance trends with the GCC group.

21: Identify convergence, divergence, and policy patterns.

RESULTS AND DISCUSSION

As demonstrated in the SDG performance of Kazakhstan and GCC states, 2000 to 2022, it is evident that sustainable development indicators are identifiable and quantifiable, yet with various directions across the states. Figure 2 presents the formation of the overall SDG Index Score of the seven countries. Such a tendency can be observed all over the region, with some countries, especially the United Arab Emirates, Qatar, and Saudi Arabia, developing at a higher rate. The SDG performance in Kazakhstan is a fast and steady rise in indicators where the level of performance is relatively high in the beginning and the indicators continue to rise over time. Conversely, two countries that present mild growth are Bahrain and Kuwait, signs of a stable policy development and, possibly, slow institutional integration of sustainability frameworks.

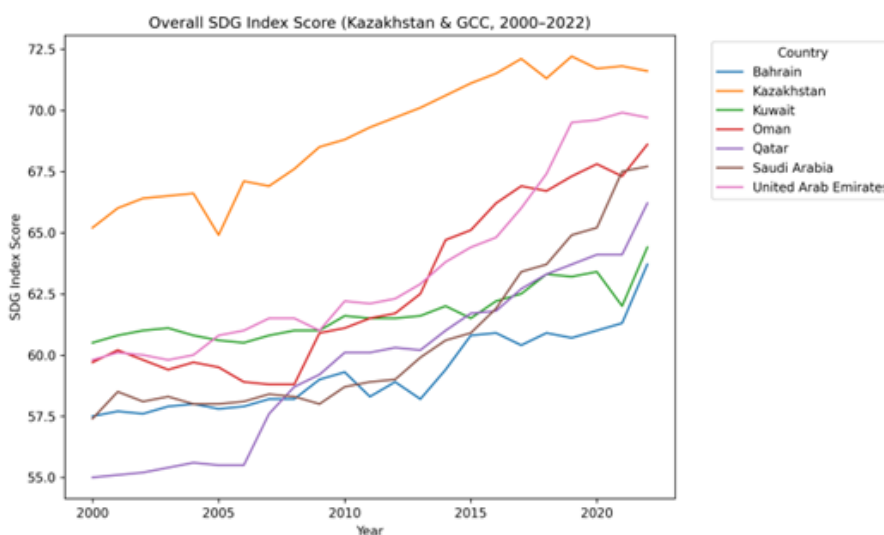


Figure 2: Overall SDG Index Score

Source: Constructed by authors

Specifically, SDG 7 (Affordable and Clean Energy) (Figure 3) shows some interesting movement. The Gulf States of Bahrain, Kuwait, the UAE and Saudi Arabia keep leading over Kazakhstan in SDG 7, reflecting their innovative, huge investments in modern energy systems and national grids, and renewable energy programmes on a massive scale launched in the 2010s. Qatar is also significantly improving over time and nearly catching up with the regional leaders at the end of the period observed. Kazakhstan nevertheless demonstrates a positive tendency, but the rate of development needs more acceleration. This deviation can be attributed to structural factors such as the conventional reliance of Kazakhstan on coal generation and slower adoption of renewable energy, although there has been policy acceleration in recent times.

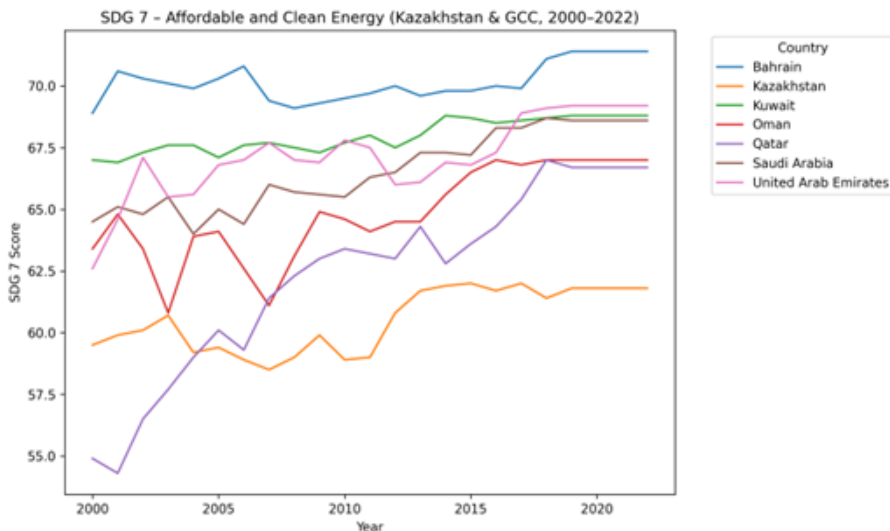


Figure 3: Affordable and Clean Energy

Source: Constructed by authors

As the analysis of SDG 13 (Climate Action) (Figure 4) shows, there is a rather complex and disproportional tendency. All SDG 13 indicators show the highest score for Kazakhstan, although its trend also exhibits a gradual decreasing pattern since approximately 2000 until approximately 2014 and then a minimal upward trend. This trend aligns to the industrialisation of the carbon-intensive sectors in the Kazakhstani economy, followed by restructuring of the economy by environmental policies and country-wide greenhouse gas reduction goals towards the middle of the 2010s. In the meantime, the GCC figures are much smaller, and most have constant values throughout the period studied. It is this inertia that is at the core of deep-rooted hydrocarbon production/sale addiction, the environmental externality of high-per-capita carbon emissions, and a lagging pace of policy implementation to curb climate change in relation to international best practice. Oman and Saudi Arabia have limited recoveries following 2015 when the country plans were being rolled out on national sustainable development and diversification visions.

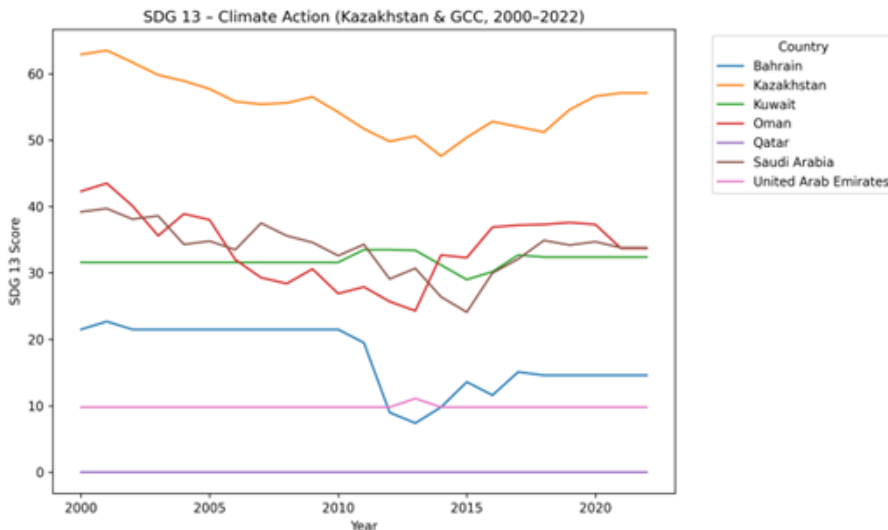


Figure 4: Climate Action Analysis

Source: Constructed by authors

The analyses also show these patterns in the summary and correlation output. Specifically, as per the correlation matrix, SDG 7 is positively correlated with the overall SDG Index; this means that clean energy advancement tends to lead to the improvement of overall sustainable development at the national level. However, correlations of SDG 13 with the remaining indexes are not very high; this is why it is still hard to reduce climate change in countries where the economy relies highly on carbon. This deviation brings forth a key observation: as clean energy accessibility is increasing throughout the region, deep decarbonisation policies are still way behind, especially in the GCC.

Combined, these findings indicate a region that is moving in the right direction towards greater sustainability, largely caused by modernising infrastructure and increased renewable energy. Kazakhstan is walking a stable and balanced course as GCC member states exhibit impressive clean energy and general SDG performance but are tied down by institutional flaws in climate action. The results support the argument that climate diplomacy between the Gulf states and Kazakhstan is increasingly revolving around balancing economic transformation and environmental stewardship that will contribute to the increased space of bilateral co-operation and convergence in the region.

CONCLUSIONS

The foundation of this paper is the comprehensive empirical analysis of the concept of sustainable energy and climate performance in Kazakhstan and the Gulf States within the 2000-2022 period. The outcomes demonstrate that the level of achieving the SDGs (SDG Index) and the progress in

the clean energies (SDG 7) are highly favourable due to the national investment schemes and the modernisation of the infrastructures, and the exploitation of national renewable sources of energies as a part of national development plans. Instead, a systematic gap in climate mitigation (SDG 13), dominated by the GCC states where long-standing economic relationships with hydrocarbons remain a thorn in their flesh, is also revealed.

Kazakhstan is the best performing country in climate action, whereas GCC countries are best performing in clean energy access and diversification and worst performing in emissions reduction and environmental adaptation. Such conflicting forces and weaknesses of two regimes create a strategic point of contact to climate diplomatic action: Kazakhstan may serve as a model of climate action in policies, and the GCC states have competencies in the field of technology innovation, the practical use of renewable energy, and the practical implementation of mass infrastructure.

The findings indicate that collaborative governance, harmonisation of policy and sharing of knowledge plays a critical role in the process of establishing sustainable energy futures in the Central Asia and Gulf regions. Improving climatic relations between Kazakhstan and GCC, could be beneficial in accelerating regional considerations of world sustainability concerns and can make material contributions in energy changes over time.

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BIOGRAPHY



Abu-Shawer Omar Ahmad has a master's degree in international relations from Abai Kazakh National University, Kazakhstan, from which he graduated in 2018. He is currently a doctoral student in international relations at this university. He also has a bachelor's and master's degree in foreign languages. In 2003-2004, he worked as a teacher at Kiev State Linguistic University and completed a two-year internship in the specialty "Socio-economic Relations" at the same university. Abu-Shawer engaged in scientific activities and has published articles in the field of international relations. He speaks several foreign languages: Arabic, English, Ukrainian and Russian. Abu-Shawer is a hardworking, purposeful, persistent and inquisitive person, helping him to achieve success in scientific and research work.



Dr Kurmangali Aimen Kuanyshbaikyzy is a Doctor of Political Sciences and an Associate Professor in the Department of International Relations at Kazakh National Pedagogical University in the Republic of Kazakhstan. With over 25 years of teaching experience in higher education, she has authored more than 180 scholarly works, including monographs, conference presentations, and articles, some of which are indexed in the Scopus database. Her research interests encompass foreign policy, democratisation, and ethnological processes.



Professor Saad Twaissi is a professor of Arabian Archaeology and history. He received his PhD from the University of Bradford, UK in 2005. During 2005-2016 Dr Abusham worked at the Department of Archaeology in Petra College for Tourism and Archaeology in Al-Hussein Bin Talal University (AHU), Jordan. He acted as the Dean of Petra College for Tourism and Archaeology during 2010-2014, and as Holder of the UNESCO Chair for Tourism and Sustainable development, AHU, Jordan (2011-2016). Since 2016 he has been lecturing in the Department of Tourism and Heritage in United Arab Emirates University.



Dr Eimad Eldin Abdu Ali Abusham is an Associate Professor of Computer Science with extensive expertise in Artificial Intelligence, Cybersecurity, and Biometric Systems. With a strong academic and research background, Dr Abusham has taught and supervised undergraduate and postgraduate students across institutions in Oman, Malaysia, and Sudan. He has published in reputable journals and has led several high-impact research projects focused on AI-driven solutions for national development, including legal tech, biometric authentication, and sustainable smart systems. In addition to his research contributions, Dr Abusham plays an active role in academic programme co-ordination, curriculum development, and international collaborations, positioning him as a key figure in advancing applied AI and digital transformation in the region.

