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U.S.-Iran Hostility and the Pursuit of Nuclear Technology Development in the Context of the Global Energy Transition: An Integrative Analysis

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Abstract
This article analyzes the Iranian nuclear program, which oscillates between friendship and hostility between the United States and Iran, threatening sustainable global peacebuilding and energy transition goals. Although research has been conducted on the relationship between the two countries, the results of existing studies have not been integrated to answer questions about the implications of the issues surrounding the Iranian nuclear program for energy transition aspirations. This study analyzes the consequences of hostility between the two countries due to the Iranian political elite's pursuit of nuclear technology, thereby attempting to implement national steps toward a global energy transition. The study hypothesizes that the previously existing hostile relationship between the two countries will influence their preference for nuclear technology as a measure of energy transition. This study uses an integrative analytical approach as its data collection method. The theoretical basis of the analysis is offensive realism, which is applied from the perspective that the desire to maximize power, egoism, and fear of other states are the conditions responsible for the conflict and competition observed in the international system. The survival of the modern Iranian state in the global system underscores the reason for this behavior of political leadership in its relations with other states. In this regard, the study notes that Iran's nuclear issues do not affect the country's desire to use nuclear technology. To acquire nuclear technology, the country must meet certain criteria, including technical, social, and political ones. However, the primary emphasis is on the social and political criteria, including an effective government and a politically stable economy. The study recommends that Iran's political leadership take real and proactive steps to adopt and implement consolidating democratic principles to ensure success in achieving its goal of establishing a civilian nuclear program.

Keywords: *clean energy, global energy transition, global peace, Iran, USA, hostile relations, nuclear technology.*

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Introduction

Iran's nuclear program, begun in the 1950s during the reign of Mohammad Reza Shah with the support of the United States through the 'Atoms for Peace' program, was part of the Iranian administration's plan to reduce dependence on oil by the year 2000 (Hussain 2015; Bazoobandi 2019; Gaietta 2015; Rezaei 2017; Eslami 2024). The 'Atom for Peace' programme in the United Nations' Nuclear Non-proliferation Treaty, NPT, of 1968 was designed as an approach to facilitate the sharing of nuclear technology with Non-Nuclear States for peaceful or civilian purposes only (Kwong 2023). The adoption of the programme in Iran is a measure to catalyse energy transition from fossil fuel/oil dependence to nuclear energy sources (Mousavian and Mousavian 2018). The offer and acceptance of the nuclear technology between the U.S. and Iran reveal the existence of a cordial relationship and trust between their leadership, which is beneficiary to addressing climate change mitigation.

Since 2003, international sanctions have been imposed on the nuclear programme amid security concerns pointed out by states on the suspected clandestine resuscitation and accusation of enrichment of uranium in nuclear facilities in the country for military purposes (Dinler and Balci 2021). These sanctions were considered appropriate due to the perceived violation of the NPT under which the country initiated the programme. It follows that while the conventional wisdom is that nuclear proliferation does not result from civilian nuclear cooperation, which Iran claimed is the orientation of its programme, the assumption is considered incorrect and dangerous because every form of civilian nuclear aid carries the risk of proliferation (Fuhrmann 2009; Juneau and Razavi 2018). More so, there is a connection between the civilian nuclear programme and proliferation due to its dual use and technological know-how (Fuhrmann 2009). Thus, this informed the suspected military intention behind the revival of the programme, the consequent international concern, and the implications for the implementation of the NPT amid security concerns. This serves as the motivation for the study, and it aims to show the impact of the suspicion on the adoption of nuclear technology in the global energy transition.

The security concern with the nuclear programme stems from the dual capability for the production of weapons for military goals and the pursuit of civilian purposes (Gaietta 2015; Rezaei 2017; Eslami 2024). Iran has, though, reiterated its position that the programme is for peaceful purposes and mainly civilian-oriented; however, there is suspicion that it may decide to pursue nuclear weapons given the power contestation and instability within the Middle East region (Kaur and Raman 2024; Gaietta 2015; Rezaei 2017; Eslami 2024). It follows that a state acquires nuclear technology for reasons including a security threat emanating from within, the regional or global environment and for prestige in the international system (Kaur and Raman 2024). The goal of the Iranian nuclear programme has been argued to extend beyond security to include power modification among states in the Middle East. This is evident in the perception that the Iranian nuclear programme can influence U.S. hegemony in the region, but without thought of its relevance in the energy transition and the deployment of low-carbon emitting sources as nuclear technology.

The possibility of Iran creating a nuclear weapon from the nuclear facilities conjured two perspectives and groups in the comity of nations, with one supporting and

the other opposing the programme. The controversy on Iranian nuclear technology status is better understood from the perspective of the global nuclear order, which is a compromise between unconstrained nuclear anarchy and nuclear disarmament (Egeland 2021). Hussain (2022), for instance, has classified the global powers based on their interests in the Iranian nuclear program largely into two groups, with one group advocating a total rollback and the other supporting verifiable and meaningful limits. The dilemma emanating from the programme could have implications for the adoption of nuclear technology in the clean energy transition and sustainable global peacebuilding. These perceived threats and challenges that the development of the nuclear programme has implied for the Iranian state have revealed the possible challenges and seeming difficulties that intending nations may be confronted with in the adoption of nuclear energy and sustaining global peace. These are the focus of this study.

The contention between the two sets of countries on the nuclear programme revolves around states' compliance, conformity, and sustenance of the NPT. The NPT forms a global security cornerstone, and all countries, especially in the Middle East, with the exception of the state of Israel, ratified the treaty (Alcaro 2021). The treaty is also a cornerstone of the U.S. national security goals (Rees 2023), and this is influenced by the Franck Report of concerned nuclear physicists in 1945 that an international treaty should underlie the control and elimination of the atomic bomb since the U.S. cannot maintain its monopoly (Kwong 2023). President Harry Truman's address to Congress on the matter of controlling nuclear technology is that an international arrangement is key to the reduction of the development of the atomic bomb and sustaining civilisation (Kwong 2023). Nuclear technology is used for the production of the atomic bomb, and to prevent improper possession and use, the NPT was initiated as an international agreement, and Iran is a signatory to it.

Contrary to the signed treaty, Iran is suspected and repeatedly accused of pursuing its nuclear programme for military purposes. In this sense, the US describes Iran as a country with nuclear ambitions and supporting terrorist organizations to strengthen its dominance in different regions of the world, and U.S. President Donald Trump, being an informed figure, was able to identify Iran's weakness and use his country’s invincible power in a manner acceptable to the whole world (The White House 2025). The country, Iran, has justified its nuclear agenda as a significant aspect of its national security strategy, but Israel perceives the programme as a threat to its existence (Eslami 2024). The differing perceptions of the two neighbours on the nuclear agenda and the status of the NPT could impact peaceful coexistence within the region. Also, the acquisition of nuclear weapons by Iran can stimulate its neighbours into a quest (Alcaro 2021; Javed and Ismail 2022), and this has implications for world peace and threatens the survival of the NPT. As such, there are recurrent calls for the monitoring of the Iranian nuclear programme due to its normative and security implications for sustainable global peacebuilding (Alcaro 2021; Javed and Ismail 2022). It is believed that a nuclear bomb from a capable Iranian state is a threat to world peace.

The survival of the NPT is projected as a major challenge posed by the programme, and the consequent problem of fostering global peace amid uncertainty resulting from the proliferation of nuclear technology is also a great concern. The programme directly

and indirectly impacts the survival of the NPT in that if the Iranian nuclear programme is not monitored, it may be diverted into military use, and it can indirectly sway Iran's neighbours, specifically Saudi Arabia and countries in this category, to pursue a similar goal (Alcaro 2021). The security implication of the programme is that the U.S. and Israel may embark on a bombing campaign to curb the programme, and the possible outcome of this is that Iran may sway its proxies, inclusive of Iraq, Syria, Yemen, Lebanon and undetermined countries around the world into a conflict of a global dimension (Alcaro 2021). The country may also join suit with countries antagonistic to the U.S. interest in attaining its programme. This may split countries into the pro and anti-NPT alliances, and this will impact the control of nuclear weapons and the fostering of global peace.

To prevent Iran from pursuing its alleged military-oriented nuclear programme and as a means of ensuring security sustenance for the NPT, recurrent killing of Iranian nuclear scientists since 2007 has been reported by the Iranian government and attributed to the state of Israel and the U.S. intelligence (Hussain 2022; Kaur and Raman 2024). There is the adoption of a narrative on the nuclear programme that the Iranian state is a terrorist sponsoring nation, and the country must not be allowed to possess a nuclear weapon (Kim, Park and Yim 2024; Rees 2023). The same countries peddling the narrative have been threatening the programme with an airstrike, engaging in covert sabotage operations to thwart the programme (Hussain 2022; Kaur and Raman 2024), have launched an air attack on Iran's nuclear facilities on the 13th and 21st of June, 2025 and have made threats for further military actions. The duo's hostile relationships have increased awareness and impacted interest in nuclear technology, and can prompt the spill over of the war around the globe. The action and possible reactions may threaten the global peacebuilding strategy of the NPT. The hostile relationship between the two countries, concerns for global peacebuilding, and the sustenance of the Iranian nuclear programme had produced the Joint Comprehensive Plan of Action, JCPOA, which is also known as the Iran Nuclear Deal, in 2015.

The JCPOA was passed by the United Nations Security Council (UNSC) through its resolution number 2231 on the 20th of July, 2015, and made provisions for the endorsement of the Iranian nuclear programme and removed all sanctions with the condition that compliance is demonstrated with the nuclear deal (Javed and Ismail 2022). The deal marked a significant era in the U.S.-Iran relationship and a contribution to global peace because it eased economic and political tension between them. The contribution of the JCPOA is that it allows for the continuity of the nuclear programme, and this is a measure of energy transition in the country. The JCPOA was notable for its relieve of the Iranian state from economic sanctions on its oil, there was an increase in trade relations with the European Union, EU, to the tone of 63 per cent, and international companies were allowed access to signing contract in automotive, oil, and commercial aircraft (Dinler and Valci 2021). In addition to the economic gains, the pariah or rogue narrative and the war threat against the Iranian state were dropped (Dinler and Valci 2021). This eases tension and implies a new dimension of global peacebuilding; still, concerns were raised by the U.S. on the nuclear programme embarked upon by the country.

The withdrawal from the JCPOA of 2015 by the U.S. in 2018 has since triggered another round of tensions between the two countries. The argument of the U.S. for quitting the agreement was due to concerns about the operations of the Iranian state in the region and the restrictions from the agreement (Eslami 2024; Mousavian 2023; Kerr 2017) remarked that the JCPOA was dead due to the maximum pressure campaign by the Trump administration against Iran, and as such, requires revival for it to work.

Evident from the above are the challenges confronting the encouragement for the adoption and control of nuclear technology in the global energy transition campaign. Hence, while studies have been conducted on the subject matter of the relationship between the U.S. and Iran, there is an absence of a study that examines the implications of the hostile relations for the adoption of nuclear technology in the energy transition. Extant studies have not been integrated to answer questions that are recurrently asked about the implications of their relationship for global peacebuilding, hence this study. The study aimed to analyse the implications of the Iranian nuclear programme-induced hostility between Iran and the U.S. for nuclear technology adoption in the global energy transition and international peacebuilding (Herzog 2025).

The study is significant and worth execution because it provides information on the campaign for other sources of energy, other than nuclear energy technology, despite the renewed interest in nuclear sources of energy by states across the globe, especially in the era of energy transition. The study provides insight into the hostile relationships between Iran and the U.S. The study has five sections that aided the accomplishment of its stated objective. The background to the study formed the focus of section one. The literature review is presented in Section two. In section three, the methodology of the study is discussed. Section four presents and analyses data on the stated objective of the study. The conclusion is drawn, and the recommendation is provided in section five.

The Choice Issues of Nuclear Energy Technology in Global Energy Transition

The sharing of nuclear technology between the *haves* and the *have-nots* has been made possible by the Atom for Peace programme of the UN. It has been reported that since the programme, more than 2000 bilateral civilian nuclear cooperation agreements (NCAs) have been signed with pledges of transferring nuclear technology, materials, and knowledge for peaceful purposes (Fuhrmann 2009). Also, as of July 2009, the International Atomic Energy Agency reported that more than 52 countries signified interest in the construction of their first nuclear power plant (Jewell 2011). This shows the preference and aspiration for nuclear energy by states as a solution to energy issues.

Nuclear technology is significant in the current effort to mitigate global warming and meet the increasing energy demand. Sadekin et al. (2019) have noted that the increase in energy demand continues every decade, and coal, gas, and oil have proven incapable of meeting the requisite energy and the contemporary pressure on it will enhance their extinction between 2050 and 2100, and the solution to this is the adoption of nuclear technology. Equally, Muellner et al. (2021) have claimed that the increase in climate change awareness has stimulated a renew interest in the use of nuclear energy, and while it has been observed that temperature has continued to rise in

the past 50 years due to the uncontrolled emission of greenhouse gases, nuclear energy is notably contributing to low carbon economy (Matthew 2022). It is sufficient to note that the production and consumption of energy have been identified as the fundamental factors responsible for greenhouse gas emissions and influencing climate change (Lin and Ullah 2024). To address the climate and environmental issues emanating from the emission of greenhouse gases, GHG, there is an increased desire for the deployment of nuclear energy in power generation to mitigate the challenge.

Nuclear technology has been identified as one of the measures to control climate change, and it is useful as a civilian technology. The NCA is reportedly signed by countries seeking a solution to climate change issues, adopted as an alternative to the shortage in energy accessibility, and addressing increasing oil prices (Fuhrmann 2009). Nuclear power is a low-carbon energy source, and it is considered a suitable option for the energy transition. Sadekin et al. (2019), having compared the source with other energy forms, noted that though it is not carbon neutral, it emits a limited quantity of carbon. It has been noted that a total of 442 nuclear power reactors are in operation around the world, are responsible for the generation of 393 GWe of electricity, and the generation represents a total of 11 per cent of electricity generated around the world (Matthew 2022). The operation of these nuclear power plants is considered a solution to energy issues in host countries.

The question raised by the number of nuclear energy plants in operation around the globe is the possible criteria to be met by countries desire to meet. Jewell (2011) has identified the criteria for the deployment of nuclear weapons into the technical and socio-political requirements. The technical requirement for the deployment of nuclear technology has included the national grid size, the existence of international grid connections and fuel supply security for electricity generation (Jewell 2011). The socio-political requirements are such that countries featuring privately owned nuclear facilities are usually wealthier, larger, and politically stable economies with high government effectiveness (Jewell 2011). There is more emphasis on the social-political requirement, and as such, politically stable economies and government effectiveness, as a criterion, can be taken to imply an established political regime, and a country without a stable political atmosphere may not be considered qualified. Democratic government may be deemed the appropriate effective government. It can be deduced that the state not having this feat may imply risk for the establishment of the technology.

The deployment of nuclear technology is not free from risks, both from environmental and energy security, and the proliferation of weapons of mass destruction. Jacobson (2020) has analysed the risks of nuclear energy and classified the challenges into two categories. In the first category of risk of using nuclear energy is the challenge of reducing global warming and air pollution, and the issues here include the delay between planning and operation, its emission contribution to global warming, and the cost implication of constructing a new nuclear power plant is estimated at 2.3 to 7.4 times of those of the wind and solar, and a period of between 5 to 17 years before it becomes operational, and also contribute between 9 to 37 per cent of emission. However, innovations such as advances in large reactors, advanced fuel, and small modular reactors, and breakthroughs in engineering with the capacity to extend

the operation lifetime of existing reactors and development in waste management have made the use of nuclear technology attractive as an energy option (Mathew 2022). Hence, nuclear energy has enjoyed improvements to better serve the purpose of efficient energy in combating climate change challenges.

Also, the second category of risk identified includes the capability of the facility to ensure environmental and energy security and the risk in this class includes proliferation of weapons, radioactive waste challenges, and meltdown of reactors, land despoilment risks, and mining cancer (Jacobson 2020). One of the global campaigns against the use of nuclear energy is the possibility of the production of an atomic bomb, which constitutes a threat to global peacebuilding. Thus, ensuring the responsible use of the technology has resulted in global nuclear orders. The global nuclear order has been described as evolving norms, practices, and institutions governing the use and development of nuclear technology worldwide (Egeland 2021). Hence, the deployment of nuclear energy is regulated but not anarchical.

However, while there are rules and regulations such as the NPT to govern its development and use, Fuhrmann (2009) has argued that the trade in nuclear activities under the NPT can endanger national and international security. Thus, the conflict over Iran's nuclear programme has left much to be desired in this respect.

A Review of National Interest Clashes with International Treaty in Iran-U.S. Relations on Nuclear Technology Aspirations

The Iranian nuclear programme has redefined the U.S.-Iran relations since the introduction of the Islamic Republic of Iran (IRI) in the aftermath of the 1979 revolution. It follows that while diplomatic relations between Iran and the U.S. started in 1883 (Meier and Vieluf 2021; Hussain 2015; Goode 1989), the discovery of oil in the country strengthened commercial ties between the two countries, with American oil companies developing trade relations with the Gulf state (Hussain 2015). The emergence of Mohammad Mossadegh as the Prime Minister of Iran affected the relationship between the country and the west in that the administration was nationalistic in orientation and as such nationalised a host of foreign investment inclusive of the Anglo-Iranian Oil Company in 1951, and the action provoked anger from the British, and the subsequent removal of the administration in a sponsored coup by the West (Meier and Vieluf 2021; Goode 1989; Edwards 2014). In the aftermath of the coup, the Mohammad Reza Shah administration was installed and ruled in line with the British and U.S. interests.

During the Shah's administration, the nuclear programme was established through the 'Atom for Peace Program' in the 1950s. Hence, while Iran had anticipated in the 1970s that the burgeoning population in the country could not be provided with the needed energy, and with the supporting evidence from the U.S.-based Stanford Research Institute in 1973, there was a forecast and suggestion for the generation of 20,000 MW of nuclear electricity by the 1990s. This informed the decision of the Shah administration to construct 20 nuclear power reactors (Hussain 2015). The administration of Shah equally took membership of the NPT in 1968 and signed it in 1970 (Hussain 2015). The development is evidence of a cordial relationship between the U.S. and Iran, and this is from the pre-revolution era.

The Iranian nuclear programme was completely shut down following the 1979 revolution (Hussain 2015). However, there was an effort to resuscitate the programme in the 1990s, an effort that had led to the construction of more advanced nuclear facilities, and the desire for the creation of more facilities across the country (Hussain 2015). During the period, the country sought the assistance of countries like China and Russia in the resuscitation and completion of its abandoned nuclear projects (Hussain 2015; Gaietta 2015; Rezaei 2017; Eslami 2024). The period is tagged post-revolution in literature. It was during this period that it was rumoured that Iran was using clandestine networks to achieve the enrichment of its nuclear facilities, and this raised suspicion of its aspired military goal.

The development prompted the introduction of sanctions on the programme between 2000 and 2015. There were attempts to stop and roll back the programme, but it was not possible (Hussain 2015; Eslami 2024). The reality encouraged the JCPOA, which was signed in 2015. Evidently, since the diplomatic agreement, the relationship between the two countries can be categorised into pre- and post-revolutionary, the era of sanctions, and the diplomatic phase (Eslami 2024). Also, while the U.S. had quit the JCPOA of 2015, there is continued campaigning against the programme. The measures deployed to fight the Iranian nuclear programme have included a narrative of terrorist sponsorship.

Contrary to the extant rogue state narrative, the diverse political groups or perspectives on the nuclear programme in the country have been classified basically into two, which are *pragmatists* and *principality* (Hussain 2022). The classification followed the agenda pursued by each group concerning the nuclear programme. The pragmatists, consisting of moderates, reformists, and liberals, opine that Iran does not need a nuclear weapon programme for an immediate purpose, but it is necessary to acquire the technological capability. To sustain the goal, they subscribed to using foreign policy as a negotiating tool to avoid isolation and détente with the West (Hussain 2022). The goal of the group concerning the nuclear programme pursued by Iran is to acquire the requisite knowledge.

The principalists, on the other hand, are championed by the Alliance of Builders of Islamic Iran, often shortened as abadgaran, formed in the year 2003 and guided by the belief in the absolute development of the nuclear program without recourse to the NPT. The orientation of the group is that developing nations should be able to acquire nuclear technology without impediment from other nations, just the way developed states have done (Hussain 2022). The two groups believed that Iran needs the nuclear programme, but the goal differs, and this is not known in the international system, as many subscribed to the monolithic narrative against the country.

In the perception of the principalist, the NPT and the International Atomic Energy Agency (IAEA) are instruments of the colonialist for denying the developing world access to nuclear power, and the strategy to accomplish the task is demonstrated in the confrontation of nuclear policies and provocative rhetoric of President Ahmadinejad of Iran (Hussain 2022). While the policies ensure domestic political gain in Iran, it affected the image of the country in the international system, and this is evident in the sanctions imposed on the country for the first time in 2003 since the 1979 revolution

(Hussain 2022). This implies the possible issues a country with such challenges can face concerning the ambitions to acquire a nuclear programme.

An Overview of the Energy Sector in Iran

Hitherto, the generation of electricity in Iran has primarily been achieved through the use of fossil fuels. The supply of electricity in Iran is dependent on fossil fuels (Aryanpur, Atabaki, Marzband, Siano and Ghayoumi 2019; Pourkiaei, Pourfayaz, Shirmohammadia, Mossavi and Khalilpoor 2020). The majority of states, like Iran, also generate electricity through the use of fossil fuels, and the implication of this is the generation of GHG emissions and climate change (Khojasteh, Khojasteh, Kamali, Beyene and Iglesias 2018). The generation of electricity from such sources implies electricity blackouts in the hot season and also raises concerns about ensuring energy security in the country (Pourkiaei et al. 2020), and it imposes a financial burden on the country (Aryanpur et al. 2019). Of course, the country has the potential to generate electricity from renewable energy such as solar, wind, and the use of biomass.

The country's due to its location in the Sun Belt, has a mean solar radiation of about 2200kWh/m2 per annum, which is greater than the global average (Pourkiaei et al. 2020). While the country is building 550MW of renewable energy, the total wind installed capacity is about 259MW, mostly situated at Manhil and Roodbar (Pourkiaei et al. 2020). The country is switching to renewable sources to generate electricity. The renewable sources have not been maximised as the best alternative to energy sources in Iran due to the challenges confronting it. Khojasteh et al. (2018) looked at the issue of marine energy production in Iran but noted that the problem with this source is that it has not received any legislative or business attention. Also, Oryani, Koo, Rezania, and Shafiee (2021) have acknowledged challenges to the development of the solar PV, biomass, and wind turbine, which are the three alternatives, and the issues have been grouped into institutional, technical, political and regulatory, behavioural, social, cultural, and economic and financial.

The problem of the development of alternative sources of energy and the challenges with nuclear technology have revealed the possibility of energy poverty in Iran (Soltani, Imani and Imani 2026). To ensure the accessibility to clean energy as declared in the Sustainable Development Goal, there is a need for a rethink on Iran's energy sector.

Thus, the theoretical basis of the study is offensive realism, which argues that the desire for power maximization, self-interest, and fear of other states are the conditions responsible for the conflicts and competition observed in the international system (Johnson and Thayer 2016). The survival of states in the international system underlined their reason for exhibiting such behaviour (Johnson and Thayer 2016). This is adopted and applied to this study from the perspective that nuclear technology is aimed at maximising power and ensuring attainment of goals, and this is the reason why countries are subscribing to it.

An integrative review is the method of study due to its appropriateness in addressing both new and mature topics, as well as its suitability in achieving a new perspective through the evaluation, critique, and synthesis of literature (Kitano 2016; Adem 2024). The U.S.-Iran nuclear technology-induced hostility, and the implications

for the choice of this technology, are a mature topic with contemporary relevance for generating insights into the possible choice of technology in the energy transition (Bowen, Esfandiary and Moran 2016; Khan 2024). The method is considered appropriate for this reason. The method synthesises perspectives from five purposively selected articles. The articles are selected based on their relevance to the subject matter of the discussion. Information obtained were content analysed and thematically presented.

Nuclear-fueled hostility in Iran-U.S. relations: What implications does it have for global energy transitions?

Nuclear technology has become a major issue in U.S.-Iran relations, as the adoption of the nuclear technology program became an international crisis of mutual interest following the 1979 Islamic Revolution (Bowen, Esfandiary and Moran 2016; Khan 2024). The revolution transformed the political and social situation in Iran and disrupted friendly relations with the West. Consequently, following the U.S.-UK coup in 1953, Iran became a key ally of the West, and nuclear aid to the country during the Shah's reign was a measure to ensure adequate and appropriate support. The U.S. provided necessary material and technical assistance, as well as training for Iranian scientists (Bowen, Esfandiary and Moran 2016; Khan 2024). Historically, successive U.S. presidential administrations have taken different approaches to providing assistance to Iran's nuclear program, including fuel supplies, technology transfer, and training. This has led to conflicting public perceptions of both the U.S. administration and its political and spiritual leaders in Iran (Kamel 2018; Valadbaygi 2023). The ousting of the Shah administration in the 1979 revolution implies a loss for U.S. hegemony in the Middle East, and relationships between the two countries in the post-revolution in Iran further aggravate the bitterness in their relationship (Hussain 2015). It was reported, for example, that the bombing of the U.S. embassy in Beirut by Hezbollah was with the financial and logistical support from Iran (Kortunov and Timofeev 2021). Thus, it has been explained that the U.S. had interfered in Iran's internal affairs in 1942 and 1953, and still believes that regime change in revolutionary Iran is possible in its interests (Hussain 2015). Thus, the Iran nuclear weapon controversy is pointed as a measure aimed at facilitating regime change in Iran in the interest of the country.

The introduction of sanctions on Iran for clandestine resuscitation of the programme, the production and failure of the JCPOA of 2015 are attributable to the U.S. actions. The action of the U.S. has encouraged the emergence of two classes of countries on the Iranian nuclear programme, with one supporting a total rollback and the other advocating limited and verifiable enrichment (Hussain 2022). The programme also recently suffered an attack from the U.S. and the state of Israel. Despite the confrontation with Iran, there is a report from the IAEA that nations are signalling interest in the possession of nuclear technology (Jewell 2011).

The question of interest here is why states continue to nurture ambition for nuclear technology despite the issues Iran is confronted with, and under what circumstances can a state be given the technology? The considerations have been listed by Jewell (2011) to include effective government and politically stable economies. The

challenges with the Iranian nuclear programme ensued from its failure to meet the outlined requirements of stable political economies and effective government. The recurrent desire for the programme is also better explained from the theoretical framework that power-maximising, self-interest, and fear of other states are the conditions responsible for the conflict and competition witnessed in the international system.

Conclusion and discussion

The study analysed the implications of the Iran-U.S. hostility for the adoption of nuclear technology in the global energy transition, with the assumption that the hitherto hostile relationship between the two countries would impact the countries' choice and preference for nuclear technology as a measure in the energy transition. Offensive realism was adopted and applied from the perspective that power-maximising, self-interest, and fear of other states are the conditions responsible for the conflict and competition witnessed in the international system. The survival of states in the global system underlined their reason for exhibiting such behaviour in their relations with other states. An integrative analysis approach is employed as the method of data collection for this study, and five published journals were purposively selected for analysis based on relevance to the study. The study noted that Iran's nuclear issues do not affect the desire for the technology. There are criteria to be met before a country can be given nuclear technology, and these include the technical and the socio-political; emphasis is placed on the socio-political criteria. The study concluded that Iran-U.S. hostile relations have not implied interest loss in the adoption of nuclear technology. The study recommends that Iran needs to embrace more of the socio-political requirements as a measure to enjoy the nuclear technology.

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The author declares no ethical issues or conflicts of interest in this research.

Ethical standards
The author affirms this research did not involve human subjects.

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