ENERGY SECURITY

MAGAZINE

Issued by Saif Bin Helal Center
For Studies & Research in Energy Sciences
The research arm of the International Agency for Energy Security

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January 2024

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Issue

IAFES

IAFES
INTERNATIONAL AGENCY FOR ENERGY SECURITY LLC

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Editorial

By his Excellency Saif Bin Helal Al-Shehhi the Founder and CEO

His Excellency Saif Bin Helal Al-Shehhi
Founder and CEO

On March 28, 1995, the world waited for the launch of a unique conference that was held in Berlin. Then hosted by Geneva, then Quito, then Buenos Aires, and then in Germany again, but in the city of Bonn. Then, in The Hague, it returned to Bonn; Germany, then to Marrakesh in the Kingdom of Morocco; and from there to India, then Milan; Italy, then Argentina, Canada, Kenya, Indonesia, Poland, Denmark, Mexico, South Africa, Qatar, Poland, Peru, Paris, Marrakesh again, Poland, Sharm El-Sheikh, and finally Dubai.

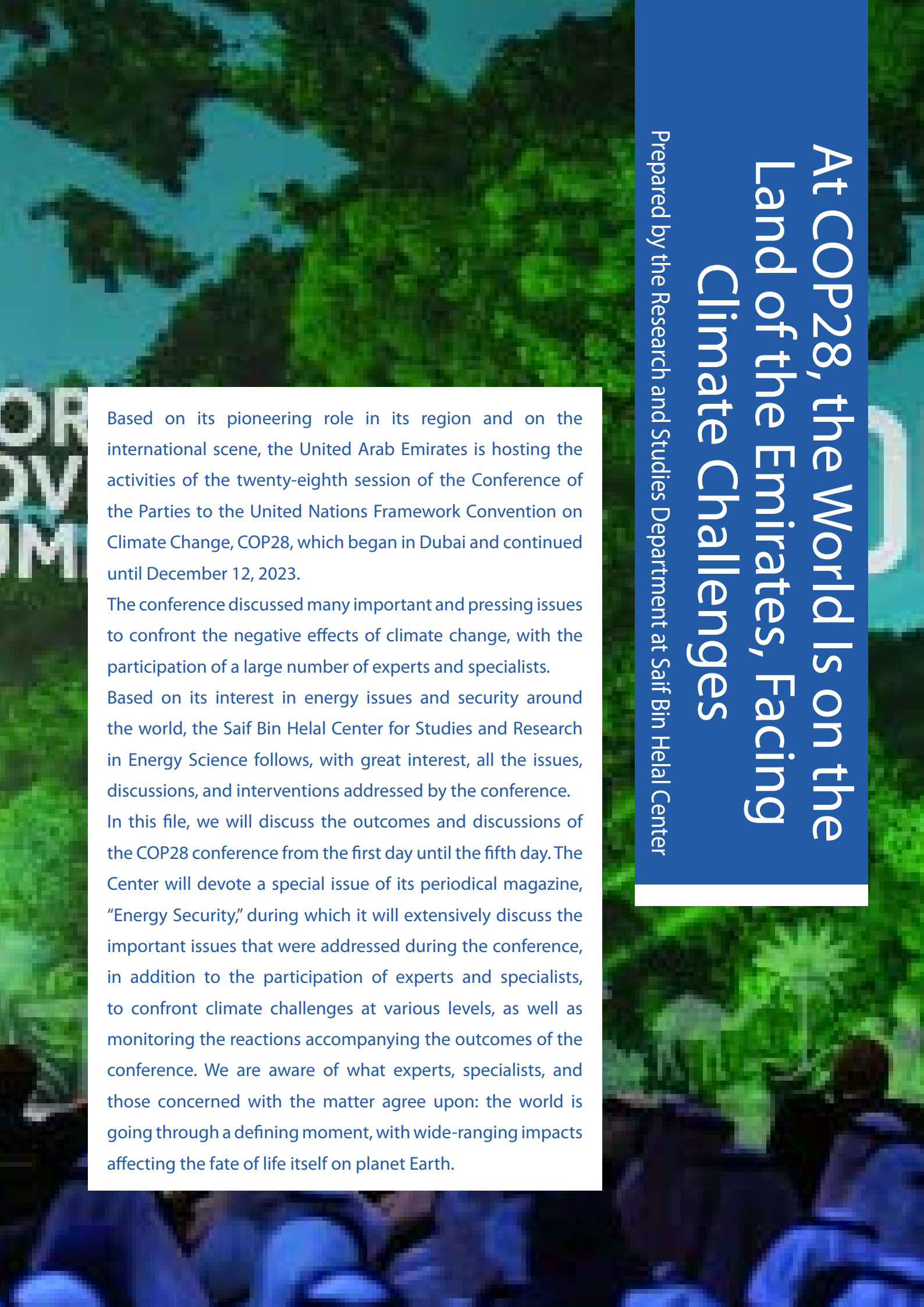
We did not mention the number of cities and countries that hosted the United Nations Climate Conference for propaganda purposes, but rather to ask one question: What did the Earth gain from 28 conferences discussing climate change?

The impartial answer from the IPCC is that global warming may reach 2.8 degrees Celsius by the year 2100. This threatens humans, trees, animals, and technological systems with a global catastrophe. Furthermore, the increase in greenhouse gases, which is reflected in the temperature of the atmosphere, we cannot deny that the production and burning of fossil fuels are one of the most important reasons for this.

We urgently need decisions to be implemented, not conferences to be held. The major industrialized countries abort conference decisions because the decisions and recommendations conflict with their interests, and the most important of those interests is investment in fossil fuels.

The world today is in dire need of implementing the decisions of COP 21, implementing the 2017 Paris Climate Agreement, and turning to renewable energy.

After all, planetary security, energy security, environmental security, and climate security are all indivisible entities.



At COP28, the World Is on the Land of the Emirates, Facing Climate Challenges

Prepared by the Research and Studies Department at Saif Bin Helal Center

Based on its pioneering role in its region and on the international scene, the United Arab Emirates is hosting the activities of the twenty-eighth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, COP28, which began in Dubai and continued until December 12, 2023.

The conference discussed many important and pressing issues to confront the negative effects of climate change, with the participation of a large number of experts and specialists.

Based on its interest in energy issues and security around the world, the Saif Bin Helal Center for Studies and Research in Energy Science follows, with great interest, all the issues, discussions, and interventions addressed by the conference.

In this file, we will discuss the outcomes and discussions of the COP28 conference from the first day until the fifth day. The Center will devote a special issue of its periodical magazine, "Energy Security," during which it will extensively discuss the important issues that were addressed during the conference, in addition to the participation of experts and specialists, to confront climate challenges at various levels, as well as monitoring the reactions accompanying the outcomes of the conference. We are aware of what experts, specialists, and those concerned with the matter agree upon: the world is going through a defining moment, with wide-ranging impacts affecting the fate of life itself on planet Earth.

The UAE is leading global discussions at COP28 about the fate of the Earth within the climate change challenge.

The outcome of the first five days of the 'Conference of the Parties' was unprecedented international participation, pledges exceeding 57 billion dollars, and a very important agreement to activate a global fund that addresses the losses and damages resulting from the repercussions of climate change.

The United Arab Emirates is hosting the 28th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28), which launched in the city of Expo Dubai and will continue until December 12, 2023. This is a new session of the Conferences of the Parties (climate conferences), which are held annually to discuss the repercussions of the climate crisis that has worsened year after year since the journey began in 1992 when the Earth Summit was held in Rio de Janeiro, Brazil, organized by the United Nations.

COP is the initials of THE CONFERENCE OF THE PARTIES, which means 'the Conference of the Parties concerned with examining, formulating, and discussing solutions related to climate change issues and related financing.' The climate conference is held annually, and the city of Sharm El-Sheikh in Egypt hosted the previous edition, "COP27," in November 2022.

The international media agency confirmed that the Arab Republic of Egypt succeeded in hosting a youth conference in its 27th session, "COP27," which was held in the city of Sharm El-Sheikh.
It also pointed to Egypt's success in terms of the results and outputs achieved, whether at the internal or global level, amid the many challenges the world is witnessing currently.

Importance:

The COP is important because of its role in researching, formulating, and finding solutions to various climate change issues. The whole world is focusing on that 'exceptional summit.' Along with high ambitions and hopes for achieving profound and influential results that will eliminate the negative effects of climate change, there will be an opportunity to enhance climate action to ensure a sustainable future.

The message:

The slogan of the UAE Climate Conference is (Connecting Minds, Creating the Future). It is expected to be a moment for the world to transform for the efforts of civil society, governments, industries, and sectors to unite to achieve tangible progress as well as provide realistic solutions to climate action and the issue of global climate change.

Conference objectives:

The conference aims to achieve several urgent goals and issues on the international scene, most notably working to reduce emissions before 2030, accelerating the transition to clean energy,

and developing the issue of financing the fight against climate change more effectively. This is through the diversity of issues up for discussion on the conference agenda this year.

The conference also aims to make tangible progress towards achieving the countries' goal, which is to reduce temperatures to 1.5 degrees Celsius above pre-industrial temperatures in preparation for reaching the Paris Agreement, which in turn requires reaching net-zero emissions by the middle of the current century.

The current Conference of the Parties (COP28) aimed to discuss some pivotal issues that are of great interest at the level of countries and governments, the most important of which are: climate finance, clean energy transition, compensation for developing countries affected by climate disasters, rising temperatures, floods and fires, global food systems, and methane gas.

This year's edition of the United Nations Climate Change Conference (COP28) also aims to present a vision of a low-carbon future while conserving fossil fuels by using technology to make oil and gas operations cleaner.

Participants:

The Emirates News Agency reported that the conference witnessed "a record number of requests to attend in the Blue and Green Zones, amounting to 500,000 participants, with more than 97,000 participants in the Blue Zone and 400,000 in the Green Zone, including ministers and representatives from non-governmental organizations, the private sector, indigenous peoples, and youth. To contribute to reformulating global climate action. The event is also attended by more than 180 heads of state and government from around the world."

The list of participants in the Conference of the Parties in the UAE also included representatives of major industrial companies in oil and energy to talk about their participation in reducing the levels of pollution they cause.

Opening speeches for COP28

In Expo City in the United Arab Emirates, the activities of the Conference of the Parties (COP28) kicked off on Thursday, November 30. The conference is scheduled to be held from November 30 to December 12. Sultan Al Jaber, Minister of Industry and Advanced Technology in Dubai, appointed President of the Conference, assumed the presidency of the 28th session of the Conference of States Parties from Egyptian Foreign Minister Sameh Shoukry after the end of the Egyptian presidency for the 27th session.

"The world has reached a crossroads regarding climate change, and the moment has come to find a different path to the crisis," Dr. Sultan Al Jaber, President of COP28, said in the opening speech. "Every country, every sector, and every one of us has an urgent role to play in the climate crisis, and we must find the broadest path to overcome the challenges," he added. "We still have the opportunity to work on solutions to the climate crisis through resilience, adaptation, and implementation," he confirmed.

The COP28 presidency, according to the leadership of the UAE, is keen to ensure solidarity and concerted efforts to achieve fundamental progress and a desired qualitative shift in climate action in conjunction with achieving sustainable economic growth that includes everyone, Dr. Sultan Al Jaber continued.

The world gathered in Dubai to present an exceptional version of the Conferences of the Parties, and the UAE looks forward to working with the negotiators in the coming days to build on this momentum and achieve its highest ambitions, he added. The time has come to provide a concrete and effective response to the global toll and to preserve the possibility of avoiding a rise in global temperature exceeding 1.5 degrees Celsius, he stressed.

Al Jaber pointed out the need to fulfill promises related to climate finance during the COP28 conference, such as providing $100 billion to the Loss and Damage Fund. He stressed the commitment to unleashing financing to ensure that the Global South does not have to choose between development and climate action, calling for the unification of the efforts of countries around the world in confronting the current climate change crisis.

Al Jaber called on state parties and oil and gas companies to work together to achieve global climate goals, expressing his hope that fossil fuels and renewable energy would be included in the negotiations of this summit.

During the first day of the conference activities, the Secretary-General of the United Nations, Antonio Guterres, warned that the world is experiencing a climate catastrophe and that the world is facing a real climate collapse. This was a strong warning message to world leaders.

In his speech, Egyptian Foreign Minister Sameh Shoukry, chairman of the previous session of the climate conference, stressed the need to conduct a frank assessment of reality. This is due to the presence of many worrying indicators that could hinder the implementation of action plans. He also warned, "Climate financing from developed countries is declining compared to the growing needs and rising financing costs of developing countries."

This year was the hottest ever for humanity, and many terrifying records were broken, Simon Steele, Executive Secretary of the United Nations Framework Convention on Climate Change, said. He also called for a commitment to a new energy system, in reference to the shift from dependence on fossil fuels to renewable energy sources, according to the international climate agenda approved by the previous climate conference.

In his speech, Steele revealed a vision for climate action over the next two years. In 2024, countries will submit their first every two years' transparency report, and an agreement will be made at the 29th Conference of the Parties on how to finance this massive transformation with the new financial target, bringing the world to the United Nations Climate Change Conference (COP30). where every commitment—in terms of financing, adaptation, and mitigation—must be in line with a global temperature rise of 1.5°C.

Steele called on everyone around the world to start taking the necessary steps to finance and confront climate change. He pointed out in his statements the importance of a just energy transition, which means sharing fair benefits across society and within the country, ensuring that everyone receives equal shares to benefit from those transformations. As well as the necessity of fulfilling commitments related to climate financing to be in line with a global temperature rise of 1.5 degrees Celsius by the COP30 climate conference.

The outcomes of the first five days of the conference:

The first day:

During the activities of the first day of the conference, November 30, 2023, the President of COP28, Sultan Al Jaber, announced a decision to activate and implement the establishment of the Climate "Loss and Damage" Fund to compensate poor countries affected by the effects of climate change. Representatives of the countries participating in the conference activities agreed to implement the establishment of that fund, which aims to pay the costs of damages resulting from drought and storms due to climate change, as an extension of the results achieved by last year's conference, "COP 27." The fund was announced last year, but it was not activated or its broad outlines were determined.

Accordingly, the European Union, the United Kingdom, the United States, and others announced contributions totaling approximately $400 million to developing countries affected by and suffering from the effects of climate change.

The UAE Minister of Foreign Affairs and International Cooperation, Sheikh Abdullah bin Zayed Al Nahyan, also announced that the UAE contributed $100 million, and the United States also announced its contribution of $17.5 million, in addition to Britain's contribution of up to 60 million pounds sterling (about $76 million). Japan will contribute $10 million, in addition to Germany, which will contribute $100 million.

The UAE's presidency of the COP28 conference, through the Green Zone, offered the private sector the opportunity to put forward its solutions and contributions to address the global climate crisis, which has increasingly swept most of the country in recent years. To make their innovative contributions, climate action technology, and entrepreneurship a major part of the conference.

Since day one, the Green Zone has been hosting panel discussions, activities, and technical conferences, focusing on current and future solutions to mitigate and limit the repercussions of the climate change crisis.

The second day:

On the second day of the conference, Friday, December 1, 2023, all participants came to attend the activities of the presidential session in the presence of leaders and leaders of countries around the world, led by the President of the Arab Republic of Egypt, President Abdel Fattah Al-Sisi, the King of Jordan, King Abdullah II, and the Emir of Qatar, Sheikh Tamim bin Hamad, in addition to the presence of several Arab and Western leaders.

The second day also witnessed the activation of the decision of the "Loss and Damage Fund" and the adoption of the mechanisms for its activation, which resulted in the "COP27" conference in Sharm El-Sheikh last year. The Fund would finance and compensate the countries most affected by the repercussions and effects of the climate change crisis and would also provide support to the countries of the Global South.

Holding the summit at this time this year comes at a time when the world is facing many challenges, the most important of which is climate change and its repercussions that affect all aspects of life, the President of the United Arab Emirates, Sheikh Mohammed bin Zayed Al Nahyan, said in his speech.

He stated that the UAE has a proven track record in climate action; over the past decades, it has built capabilities in renewable and clean energy and set a national path to reach climate neutrality in 2050. The UAE has also committed to reducing emissions by 40% by 2030, in addition to investing nearly $100 billion and financing climate action with a focus on new and clean energy.

The UAE intends to invest about $130 billion in the next seven years, and when it committed to hosting COP28, it also committed to bringing the world together to unite, accomplish, and achieve all the climate goals targeted for action, Sheikh Mohammed bin Zayed added. He stressed that they are working to accelerate the world's transition to sustainable economic growth, as the lack of financing has always been one of the biggest obstacles to the progress of global climate action.

The President of the UAE announced the formation of a $30 billion fund to diversify and support projects in climate action to provide climate solutions worldwide, and that this fund was designed to bridge the climate financing gap and facilitate access to it at an appropriate cost. He added that the fund's goal is to stimulate and collect investments of $250 billion by 2030 and concluded his speech by hoping that their achievements would lead to building a brighter future.

In his statement, the Vice President of the UAE, Sheikh Mansour bin Zayed, stressed during the Conference of the Parties the importance of working seriously to confront climate change. The UAE is the first country to declare climate neutrality in the region by 2050, and it has a $163 billion strategy to diversify sources and shift towards clean, renewable energy, he added.

Egyptian President Abdel Fattah El-Sisi gave a speech in which he stressed the importance and

necessity of uniting the parties and efforts of the international community. For us to confront the global climate change crisis that has brutally swept most countries, he pointed out that the world is now facing an unprecedented climate catastrophe of its kind that exceeds the capacity of many countries in the world.

The Egyptian President stressed the necessity of uniting and consolidating the efforts of the international community to successfully confront the climate crisis, which requires the availability of the necessary funding. He called for taking actual steps at the COP28 conference by expanding the scope of international participation. In addition, there is Egypt's participation in a group of smart green projects.

Egypt had an effective contribution and participation in the COP28 conference in 2023. It participates with a large, high-level delegation led by President Abdel Fattah El-Sisi. In addition to Egypt's participation in the current climate summit with a large pavilion dedicated to displaying its achievements and stories that confirm its success in combating the issue and crisis of climate change, the Egyptian pavilion includes a British group simulation model in addition to sessions and activities for youth and people with disabilities.

Egypt has made extensive efforts to confront and address the issue of climate change. The conference will discuss "Climate Solutions to Preserve Peace," in addition to activities to accelerate partnerships with the various parties at the Climate Summit to achieve integration between confronting climate change and protecting biodiversity, as well as the initiative of Action on Water Adaptation and Resilience (AWARE).

King Charles III of Britain warned of the climate dangers facing all of humanity due to climate change, global warming, and the loss of biodiversity, which are no longer far away. He also stressed in his speech during the second day of the COP28 conference the necessity of achieving climate targets and using clean energy.

The British King continued by emphasizing the necessity of real, serious work so that we can stop the increasing dangers resulting from climate change, such as hurricanes, floods, and droughts, which fragile societies fall victim to and afflict developing countries.

The third day:

The third day of the climate conference, Saturday, December 2, 2023, resulted in a set of outcomes that include the following initiatives and actions:

During the conference, US Vice President Kamala Harris pledged that the United States would allocate three billion dollars to the Green Climate Fund, which aims to help developing countries invest in clean energy, adapt to climate change, and reduce greenhouse gas emissions.

Harris praised the United States' pioneering role in global efforts to expand climate financing, as well as its role in investments in marginalized communities that bear the burdens of pollution caused by fossil fuels, and stressed the need to do more to maintain the 1.5-degree ambition.

European Commission President Ursula der Leyen announced the European Union's investment of €2.3 billion to support the green transition and energy transition around the world.

In terms of investment in the field of carbon markets, according to a statement published by the Emirates News Agency, the World Bank announced the launch of a plan to support and enhance the growth of global carbon markets, which includes 15 countries generating income from selling carbon credits resulting from preserving their forests. By following this strategy, these funds could generate up to $2.5 billion, which will bring a significant return to the country.

Saudi Arabia and the UAE launched the 'Oil and Gas Sector Emissions Reduction Charter,' and representatives of 50 companies, representing more than 40% of global oil production, signed it. This includes a commitment to achieve the goal of net zero emissions of methane gas and to stop burning gas by 2030, in addition to achieving carbon neutrality by 2050. More than 29 national oil companies have committed

to the charter, including the UAE Company 'ADNOC', Saudi 'Aramco', and Brazilian 'Petrobras'. The Abu Dhabi Global Market also announced its embrace of the "Altera" Fund, which was established by "Lunit," the alternative investment management company, and is the largest investment fund to stimulate global climate action.

The market said in a statement that this initiative enables the Altera Fund to stimulate and collect about $250 billion in investments globally by 2030.

Regarding the outputs of renewable energy and nuclear energy, more than 20 countries called in a joint statement—including the UAE, France, and the United States—to triple the world's nuclear energy sources by 2050 to reduce dependence on non-renewable energy sources such as gas and coal.

The UAE also announced a pledge of 118 countries to triple the world's renewable energy production by 2030; this is to avoid the severe effects of climate change in the world.

During the activities of the third day, a summit of the "Group of 77 and China" was launched, in which leaders of states and governments from several developing countries participated. The United States pledged $3 billion to address climate change crises, which is the first summit of the group launched during the climate summit.

The "Group of 77 and China" was formed in 1964, and 77 countries participated in it to protect the common interests of member states. The majority of the countries participating in the group are from South America and Africa, especially in the economic, social, and environmental fields.

The fourth day:

The fourth day, Sunday, December 3, 2023, of the COP28 conference resulted in a package of new green pledges and initiatives that would achieve sustainability to enhance countries' investments in confronting climate change.

On the sidelines of the activities of the fourth day of the conference, a $1.1 billion agreement was signed between the Egyptian Suez Canal Zone and the Norwegian company Skatek (ASA). The agreement aims to supply ships in eastern Port Said with green fuel, the production of which will reach 100 thousand tons of green methanol annually by 2027.

The Kenyan President, William Ruto, also launched the Green Industrialization Initiative to expand green industries and companies across the African continent as well as stimulate green economic growth.

On the sidelines of COP28, Sheikh Tahnoun bin Zayed Al Nahyan, Deputy Ruler of the Emirate of Abu Dhabi, met with Bill Gates, co-chairman of the Bill & Melinda Gates Foundation. During the meeting, they discussed the challenges of climate change around the world. They also stressed the importance of artificial intelligence to increase the efficiency and performance of renewable energy projects and the importance of its role in finding solutions for a sustainable future based on clean energy.

Countries and global donors pledged more than $777 million to overcome neglected tropical diseases and improve the lives of 1.6 billion people. Spain announced an increase in its financing contributions to the Disaster Fund by about $21.7 million to support the countries most vulnerable to the effects of climate change.

The fifth day:

On the sidelines of the agenda of the fifth day of the COP28 conference, Monday, December 4, 2023, the Abu Dhabi Department of Economic Development officially announced a regulatory framework for the circular economy at Abu Dhabi Sustainability Week. This department would accelerate Abu Dhabi's transition towards a sustainable economy by enabling the industrial sector to raise the level of production, rationalizing consumption by treating waste, and encouraging the use of environmentally friendly spare parts.

The regulatory framework for the circular economy in the industrial sector aims to achieve a 50% reduction in industrial process waste, at least 40 thousand tons annually, in addition to covering key industrial sectors to ensure 100% compliance by 2030 and achieving 100% compliance in the plastics industry by 2025.

During his participation in the activities of the COP28 conference, the Prime Minister of Scotland, Hamza Yousuf, stressed the need to unite global efforts to confront and address the effects and repercussions of climate change. He said in his statements that they were the first government in the Global North to confirm its commitment to financing the Global Climate Fund when it hosted COP26 two years ago.

He praised the pioneering efforts of the UAE in financing the Global Climate Fund. He also stressed the importance of intensifying global efforts and focusing at the current summit on financing the Global Climate Fund in a way that ensures that the funds allocated to the Fund are distributed fairly to all countries and do not constitute a burden on the countries of the Global South.

Saudi Arabia, which is the largest oil exporting country, announced that the production capacity of its renewable energy projects will exceed eight gigawatts by the end of 2023 and pointed out that it is an important step to highlight the Kingdom's continued progress in accelerating the path of energy sector transition.

The Saudi Minister of Energy, Prince Abdulaziz bin Salman, revealed in the third edition of the Saudi Green Initiative Forum, which is held at the COP28 conference in Dubai, Saudi Arabia's plans to produce an additional 20 gigawatts from renewable energy sources by 2024.

The activities of the fifth day of COP28 addressed topics in finance and trade. Regarding finance, COP28 focused on the issue of raising finance to confront climate change to achieve the goal of the Earth's temperature not exceeding 1.5 degrees Celsius.

In support of climate finance efforts, UAE President Mohammed bin Zayed launched the Alterra Investment Fund with an initial capital of $30 billion.

A memorandum of understanding was signed between the Emirates Nuclear Energy Corporation and the American company Terra Power by the American businessman Bill Gates to develop Natrium technology, which is used in the designs of nuclear reactors. To be used mainly in the production of carbon-free electricity along with hydrogen production.

The COP28 summit also witnessed more than 20 countries pledging to triple the capacity of peaceful nuclear energy to confront the climate change crisis.

The Chairman of the Board of Directors of the UAE Banks Federation, Abdul Aziz Al Ghurair, announced pledges by banks in the Emirates of one trillion dirhams for green financing that aims to reduce carbon emissions.

Sultan Al Jaber, President of COP28, declared that multilateral development banks have announced additional financing commitments of more than $180 billion for climate finance.

The fifth day also resulted in a draft, through which the negotiators and participants in COP28 seek to call for the gradual elimination of fossil fuels or a reduction in their use, led by the United States and the European Union.

To achieve this, the draft included three options, the first of which was the orderly and fair phase-out of fossil fuels. The second option referred to accelerating efforts to phase out fossil fuels without addressing emissions, while the third option called for not mentioning the phase-out of fossil fuels.

Over the first days of the conference, extensive discussions took place on many important and pressing issues on the climate action agenda. Among the important issues raised in the first five days were those raised by Ngozi Okonjo-Iweala, Director-General of the World Trade Organization, regarding 'the role of trade in addressing climate change.' A day was dedicated to trade for the first time, to discuss working mechanisms to enhance a roadmap for trade policy options for a fair and ambitious response to climate change. The World Trade Organization co-led the "Trade Day" with the UAE at the Conference of the Parties in cooperation with the United Nations Conference on Trade and Development (UNCTAD), the International Chamber of Commerce, and the World Economic Forum.

Also during the early days, a consortium of leading multilateral development banks and climate funds launched a global "task force". Aiming to increase the number and volume of "debt-for-nature" swaps. Debt-for-nature swaps reduce a developing country's debt in exchange for protecting vital ecosystems. This is attracting increasing interest following some successful deals in places such as Belize and the Galapagos Islands.

"COP28" A "Historic" Achievement in the Issue of Climate Finance and Other

Challenges Seeking Solutions

Ms. Nashwa Nashaat

Executive Director of the Saif Bin Helal Center for Studies and Research in Energy Science

The Arab Republic of Egypt, after its success in the Sharm el-Sheikh Climate Change Conference (COP 27), handed over the presidency of the Conference of the Parties at its twenty-eighth session to the United Arab Emirates. Thus, its activities began on November 30 and will continue until December 12, 2023, in Expo City, Dubai.

One of the most important outcomes of the Sharm El-Sheikh Conference was the establishment of the 'Loss and Damage Fund.' Following the end of the activities of the COP27 conference, the Washington Post published an article on November 21, 2023, stating: "COP27 resulted in a historic financing fund for climate issues, and COP28 must work to achieve more."

This has already been achieved. With the launch of the activities of the twenty-eighth session of the United Nations Framework Convention on Climate Change Parties (COP28) in Expo City in Dubai, a rapid response came immediately during the conference's events. Representatives of the countries participating in the conference agreed to implement the establishment of a "Loss and Damage" fund to compensate the countries most affected by climate change.

"There was a historic decision at the Sharm El-Sheikh summit to establish a Loss and Damage Fund, but the challenge was how, after one year and five meetings, we could activate that fund," Simon Steele, Executive Secretary of the United Nations Framework Convention on Climate Change, said.

The news of the activation of the Loss and Damage Fund gives this summit a good start because governments and negotiators must take advantage of this momentum to offer promising things," he added.

Accordingly, many countries announced the size of their contribution to the Climate Disaster Fund, starting with the United Arab Emirates, which announced through the Minister of Foreign Affairs, Sheikh Abdullah bin Zayed Al Nahyan, a contribution of $100 million to the arrangements for the "Loss and Damage" Fund.

While the United States announced a contribution of $17.5 million to the fund, in addition to Britain, which announced a contribution amounting to about $76 million (60 million British pounds), $10 million from Japan, and $100 million from Germany, Canada will

also provide $16 million to address the effects of the climate crisis through loss and damage.

The use of the term “damages and losses” dates back to 1991. It was formulated by the Alliance of Small Island States during the climate negotiations in Geneva with a proposal for an insurance plan against rising sea levels, including that the major industrialized countries bear the costs related to these losses and damages that they cause. Since 1991, the international community has not succeeded in deciding to establish this fund in an effective manner, with the exception of the 19th climate summit in Poland in 2013, where there was a discussion about establishing the international mechanism for this fund. However, the years passed from 1991 until 2022, 31 years, and this fund was not agreed upon until the COP27 conference was held, and it was decided for the first time in the history of the United Nations climate change conferences with a historic approval to establish the ‘Loss and Damage’ Fund.

The United Arab Emirates is making valuable efforts on the issue of climate change, whether at the local or international level. Locally, the National Climate Change Plan for the years 2017–2050, the National Green Development Strategy, and the National Green Agenda 2015–2030 aim to limit and manage greenhouse gas emissions.

In October 2022, the UAE Ministry of Energy and Infrastructure, during the Ras Al Khaimah Energy Summit, highlighted the country's achievements in the field of clean energy, its efforts to sustain the environment and confront the phenomenon of climate change, and its future goals that are in line with the "50 Principles."

The “Fifty Principles” are the ten principles of the UAE over the next fifty years, which constitute a reference for all its institutions to strengthen the pillars of the union, build a sustainable economy, and harness all resources for a more prosperous society.

In November 2022, the UAE launched a comprehensive initiative in partnership with the United States to invest in clean energy and enhance shared climate goals and global energy security.

This initiative includes investing $100 billion to generate an additional 100 gigawatts of clean energy in the UAE and the United States, in addition to emerging economies around the world, by 2035.

The UAE's participation comes in conjunction with achieving a new achievement by announcing the production of the first megawatt of environmentally friendly electricity from the third of the four Barakah plants, the first peaceful nuclear energy reactor in the Arab world, an achievement that contributes to achieving the goal of climate neutrality (achieving net zero emissions) by the year 2050.

However, despite the aforementioned achievement regarding the issue of the "Loss and Damage" Fund, there are still many challenges facing "COP28", which are:

-The necessity of completely abandoning fossil fuels, especially since they are considered the greatest threat to the climate globally, requires an agreement from the countries participating in the COP28 activities that guarantees the gradual elimination of fossil fuels and accelerate the transition to clean energy.

In this context, António Guterres, Secretary General of the United Nations, urged countries to end the use of what he calls the 'poisonous root' of the climate crisis.

"We find it difficult for anyone to understand how they can continue to allow the unabated burning of fossil fuels in the world we live in, given what we know about the risks," said John Kerry, the US climate envoy. Kerry explained that the US delegation supports the commitment to "relentlessly accelerate the phase-out of fossil fuels and achieve net-zero emissions in all energy systems by mid-century."

"We still have people who have not signed on to this," he said. "Some of them, among the major producers of fossil fuels, need to step up immediately and be part of the solution, not the most important part of the problem," he added.

Throughout the United Nations climate change conferences, the countries and companies participating in the global climate summits did not commit to stopping the use of fossil fuels categorically or decisively. This issue was raised once during the Glasgow COP 26 summit when governments agreed to "phasing out" coal, but without committing to a complete phase-out.'

Here, developed countries must pledge to make a fair and equitable transition to 100% renewable energy by 2030, eliminate subsidies to the fossil fuel industry, pledge to completely abandon fossil fuels, impose a ban on hydraulic fracturing operations, and adopt a global moratorium on fossil fuel exploration and extraction techniques. All countries must respect the international ban on geoengineering established by the Convention on Biological Diversity, reject carbon capture and storage (CCS), bioenergy with carbon capture and storage (BECCS), and other technical processing projects, and stop converting local agricultural land for non-food purposes.

A greater reduction in greenhouse gas emissions before 2030. The Earth's surface temperature will continue to rise until at least the middle of the current century, according to the United Nations Intergovernmental Panel on Climate Change (IPCC). Global warming will exceed 1.5°C unless the world sharply reduces greenhouse gas emissions in the coming decades; this will make the climate consequences more severe, which is what the world seeks to avoid, and this is the challenge of the COP28 climate summit.

In 2015, after years of negotiations, representatives of 195 countries in Paris reached an agreement to limit global warming, review mandatory pledges for rich countries, and increase financial aid to countries in the South.

At that time, countries pledged to limit the rise in global temperature and keep it 'below 2 degrees Celsius' and to 'pursue efforts to stop the temperature rise at 1.5 degrees Celsius.' But since then there has been no tangible progress; the necessary measures to achieve this must be determined, which is what we will want to achieve at COP28.

Here it is necessary to point out the words and messages that were written on the walls and corridors of Expo City in Dubai, where COP28 was held. Sometimes with one word, such as "We unite," sometimes with two words, "Let us be bold," and thirdly with complete phrases such as "Let us focus on nature, life, and livelihoods in the world's largest gathering of people of determination and work," "Hope inspires action," "Let's turn agreements into action," and "Let's start acting now." The messages reinforce hope for a road map to accelerate global climate action to confront climate challenges.

In addition to the above, despite the achievements made regarding the Loss and Damage Fund, there are challenges and problems facing it on the ground. First: how to manage this fund, and where will its headquarters be located? Some had proposed the World Bank as a headquarters, but this was rejected because it would give the rich countries influence at the expense of their poor counterparts. Secondly, who are the rich countries that will pay their affected poor counterparts? Will its pledge to pay be considered an international legal obligation? Or is it like aid decided by rich countries as they see fit? Third: identifying the developing and poor countries that have been affected by climate change damage and that will receive compensation from the Fund, in contrast to determining the principle of priorities in the concept of losses and damages according to objective criteria.

In conclusion, the world today is experiencing a "climate emergency," facing drought and storms and standing helpless as the ecosystem collapses at unprecedented intensity, in addition to the absence of climate justice and the mechanisms for achieving it, the increasing use of fossil fuels, and the increase in buried emissions. Which affects the health and safety of humanity, to create a just and sustainable world.

Articles

How Does the Energy Crisis Exacerbate the Food Crisis?

Dr. Mohamed Magdy Abdel Wahab
Professor of Meteorology and Climate Change, Faculty of Science, Cairo University

The Russian invasion of Ukraine has put growing pressure on global food supply chains:

Food prices have sharply risen over the past two years and look set to rise after the Russian invasion of Ukraine, which puts millions of people at risk. While current tensions in food supply chains are caused by many factors, their connection to the global energy crisis should not be overlooked. The disruptions caused by Russia's war in Ukraine have led to an increase in the focus on the interconnected nature of the world's energy and food supply chains.

According to the World Food Programme, the number of people facing acute food insecurity more than tripled between 2017 and 2021 and could rise by 17% to 323 million this year as a result of Russia's war in Ukraine.

The Russian invasion of Ukraine has increased pressure on food supply chains; the two countries are major food exporters (together accounting for nearly 30% of global wheat exports) and play a major role in the global fertilizer supply. A Russian blockade of Black Sea ports has disrupted exports of food and other goods from Ukraine, while the broader military aggression puts this year's crop at risk. The war also leads to higher energy prices, which have indirect effects on food supply chains through higher energy bills and higher fertilizer prices.

Disability and disruptions to supplies, which appear to be insignificant in globally interconnected supply chains and food markets and their associated inputs (agrochemicals, fertilizers, fuels, feed, capital, and labor) in a region or sector, can lead to serious consequences in another region or sector.

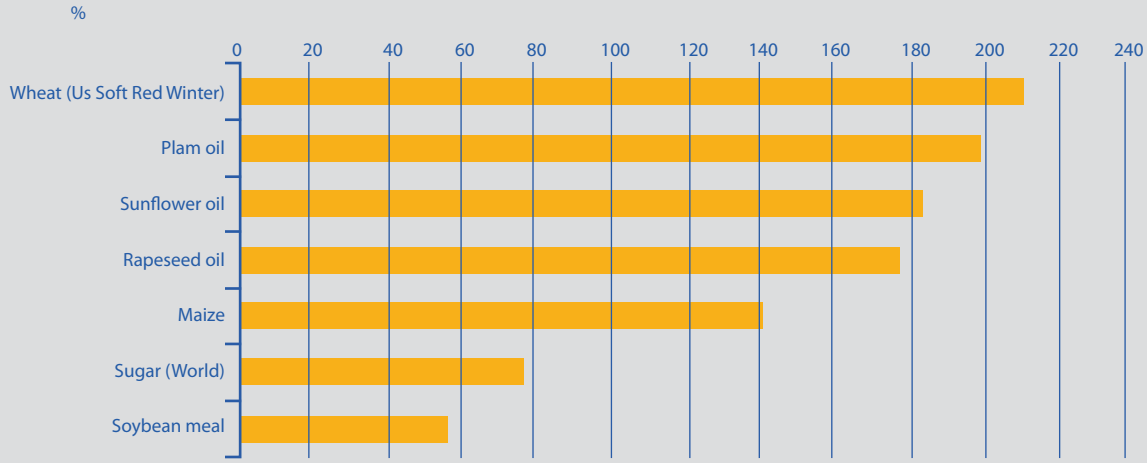


Figure (1): The main food commodity prices (2020–2022)

The recent emerging food supply crisis highlights the interconnected nature of energy and food supply security:

The agriculture and food industries use energy for different purposes. Direct energy use includes the electricity needed for automatic water irrigation, fuel consumption for agricultural machinery, and the energy needed at various stages of food processing, packaging, transportation, and distribution. The use of pesticides and mineral fertilizers causes large amounts of indirect energy consumption, with these energy inputs frequently used in manufacturing. While the share varies greatly between regions—depending on several factors such as weather conditions and crop types—direct and indirect energy costs can account for 40% to 50% of the total variable costs of agriculture in advanced economies such as the United States. Therefore, higher energy and fertilizer prices inevitably lead to higher production costs and, ultimately, higher food prices (Figure 2).

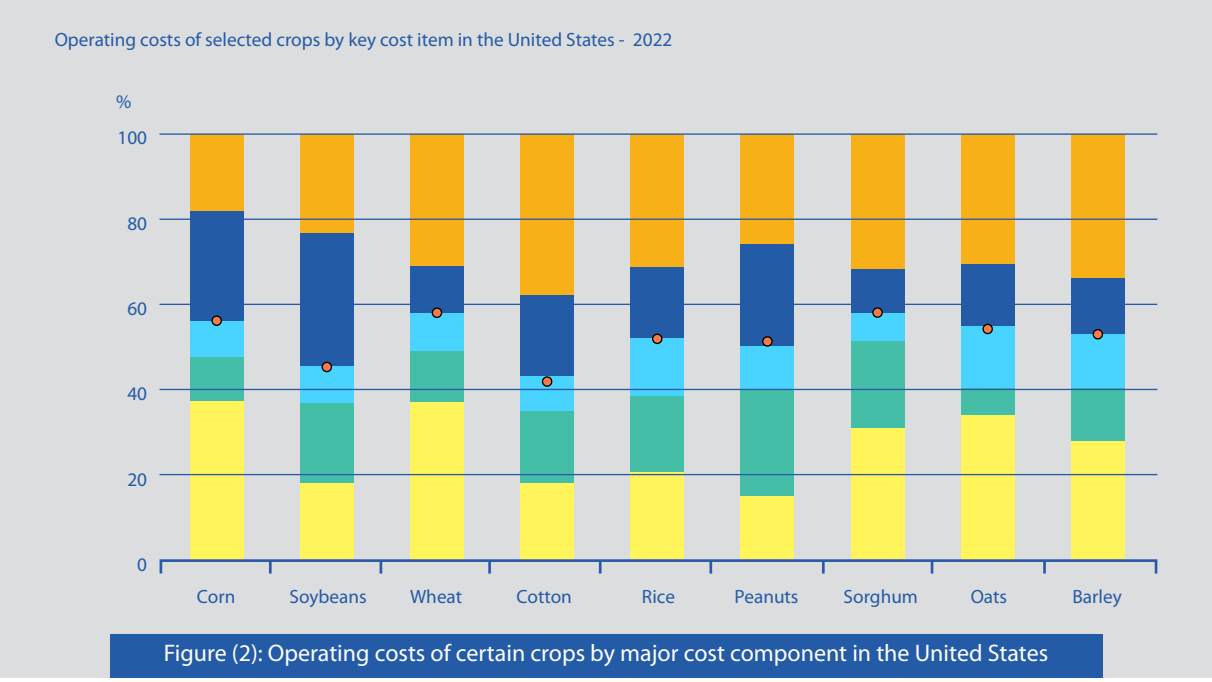


Figure (2): Operating costs of certain crops by major cost component in the United States

Fertilizers are becoming much more expensive because they are so energy-intensive.

Nitrogen is an essential nutrient for almost all plant life. Ammonia is the starting point for all mineral nitrogen fertilizers, and half of the ammonia is converted into urea, the most commonly used nitrogen fertilizer product globally. Worldwide, ammonia is made almost exclusively from natural gas, consuming about 170 billion cubic meters (4% of global gas consumption). Except in China, ammonia production depends mainly on coal.

Fertilizer prices have more than tripled since mid-2020 to reach their highest level since the 2008–2009 crisis and their highest level ever in the case of urea (Figure 3).

This rise in fertilizer prices was due to a recovery in demand, various supply disruptions, trade restrictions, and rising costs of production inputs. The cost of fertilizer production is closely linked to energy prices, especially in the case of nitrogen fertilizers. Natural gas often represents 70% to 80% of the operating costs of ammonia and urea production, which leads to a close relation with prices. In recent months, nitrogen fertilizer plants have announced temporary closures due to high natural gas costs.

Natural gas prices have risen strongly in all major gas-consuming regions since early 2021; European and Asian benchmark prices hit all-time records in the first quarter of this year after the Russian invasion of Ukraine.

In addition, the strong increase in input costs has pushed up fertilizer prices (Figure 4).

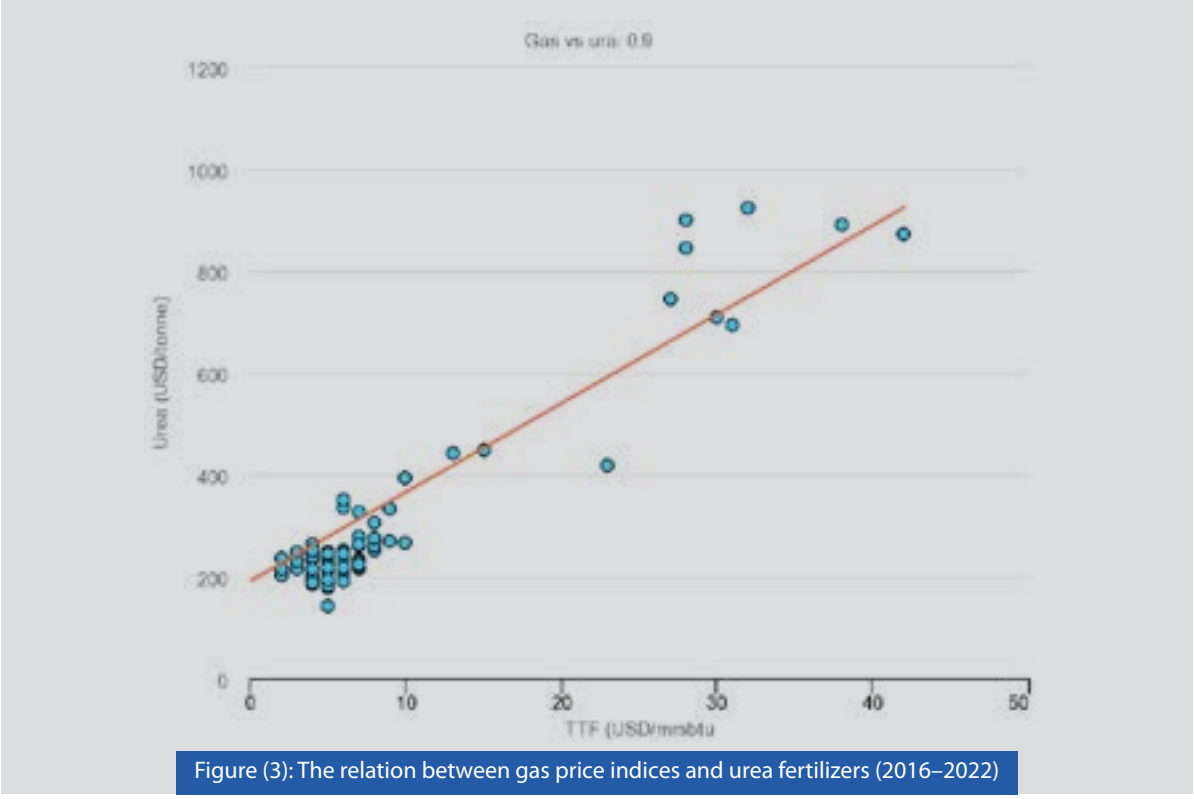


Figure (3): The relation between gas price indices and urea fertilizers (2016–2022)

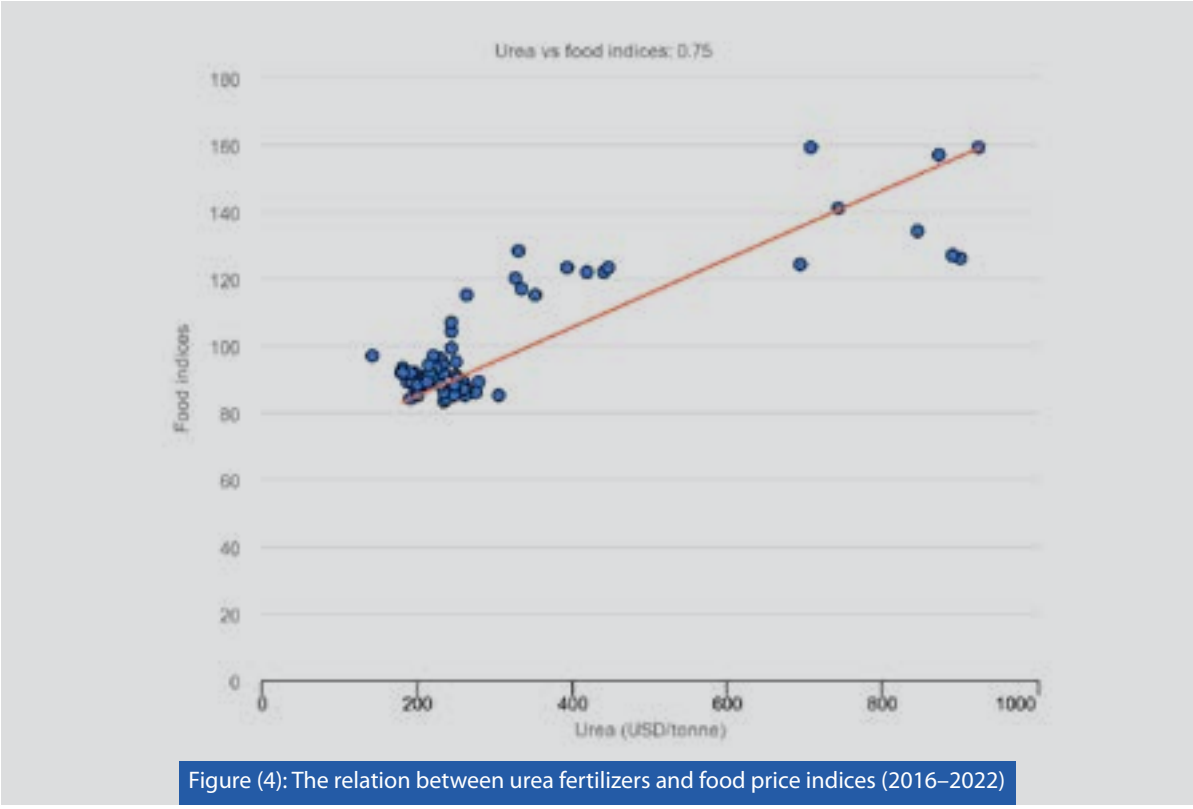


Figure (4): The relation between urea fertilizers and food price indices (2016–2022)

> The scarcity of fertilizer supplies will disproportionately affect import-dependent markets.

China, the European Union, the United States, India, and Russia are the five largest ammonia producers, accounting for about two-thirds of global production. Russia has by far the highest share of production for export; its percentage is about one-fifth. The European Union, the United States, and India are important net importers, although the European Union exports some of its production. China is the world's largest ammonia producer and is largely self-sufficient. In the case of urea, some major consuming regions rely heavily on imports. India imports about 30% of the urea it uses, and Brazil imports nearly 100%. Many African countries also import very large shares of their urea consumption, even if the quantities are small in absolute terms (Figure 5).

In the case of supply shortages and high prices, it is those areas that are highly dependent on imports that will feel the effects earlier and more severely. Farmers may respond to scarce supplies by purchasing and using less fertilizer, which may have a negative impact on agricultural production in the next harvest. This could exacerbate and extend the short-term effects of the current food crisis and impede efforts to respond to rising food prices by increasing domestic production.

The United Nations Global Crisis Response Group notes that the current disruption of food and fertilizer markets is significantly impacting wheat and vegetable oil crops; Africa is expected to bear the brunt of the impacts this summer. If the availability of fertilizers continues to decline and their prices rise in the next growing season, the next major crop to face challenges is rice. Rice is the world's most consumed major crop and will affect billions of people in Asia and the Americas.

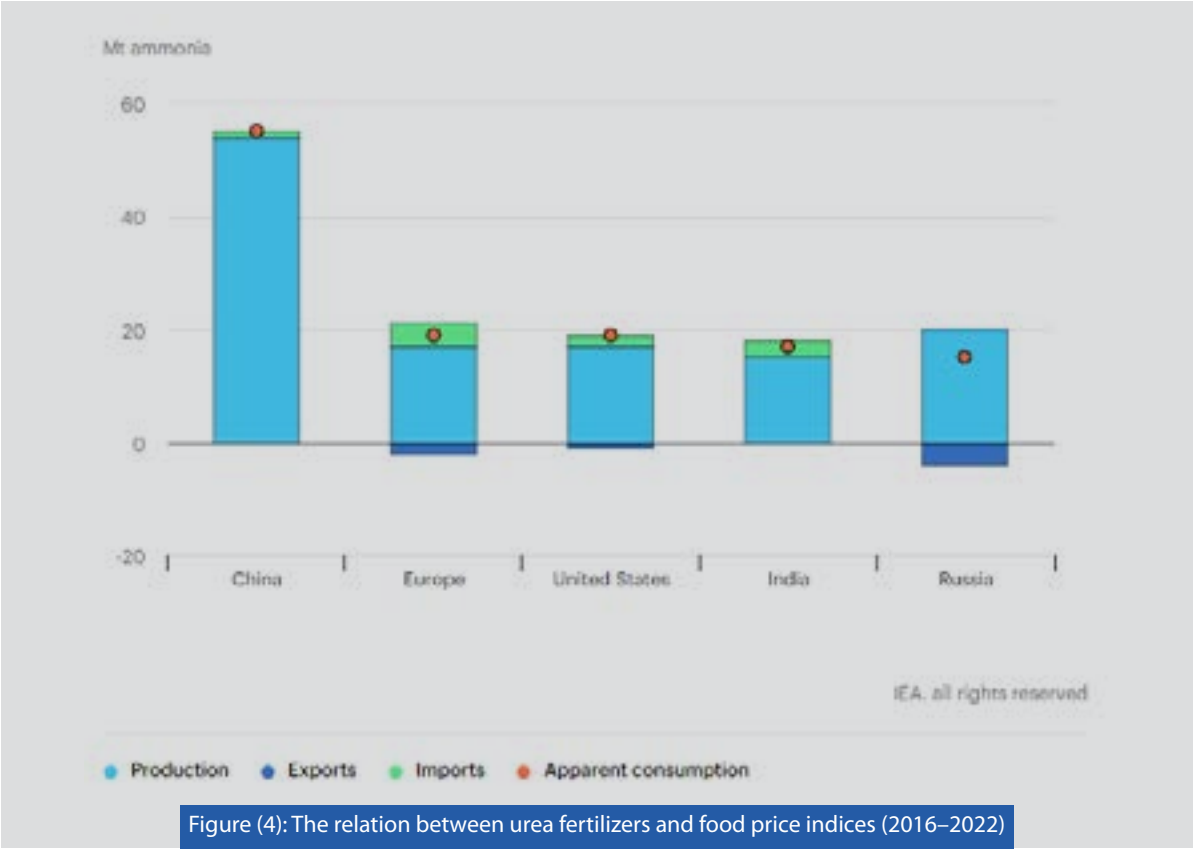


Figure (4): The relation between urea fertilizers and food price indices (2016–2022)

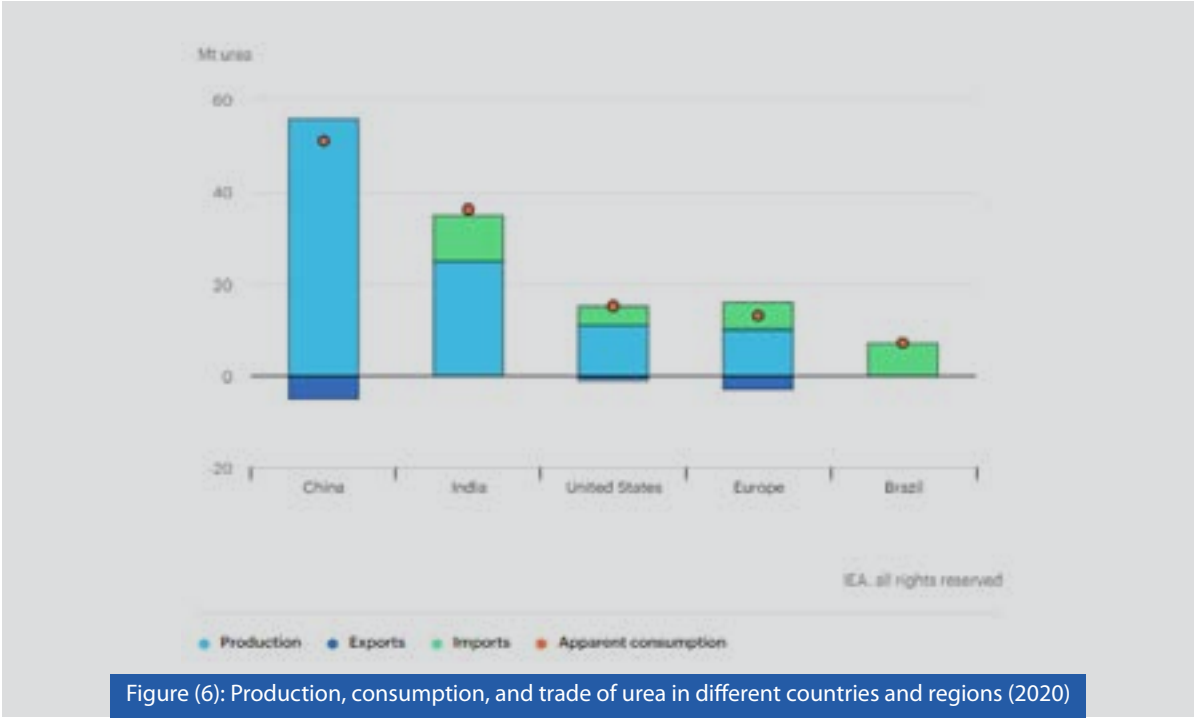


Figure (6): Production, consumption, and trade of urea in different countries and regions (2020)

What can governments do? Different tools and schedules:

The current energy and food crises have short- and medium-term impacts. Governments must act quickly and decisively on near-term issues while working to address longer-term issues.

Short-term responses related to energy and fertilizers could include:

• Strengthening international dialogue and cooperation in the fields of energy and food security, including the upcoming G7 Leaders' Summit. Phasing out trade restrictions on fertilizers could help reduce tensions in food markets. International discussions should take into account the relation between energy and food.

• Motivating and empowering food farmers to increase nutrient use efficiency. Some areas of the world don't use enough nitrogen fertilizers, and some use too much. The practices embodied in the "4Rs" can promote nutrient stewardship- applying the right source of fertilizer at the right rate, at the right time, and in the right place-and can reduce pressure on fertilizer markets by reducing demand without reducing crop yields or by increasing crop yields at the same usage rates.

• Ease pressure on the natural gas and oil markets by adopting short-term measures to reduce demand. In response to the energy market disruptions resulting from Russia's invasion of Ukraine, the IEA provided a set of recommendations for decision-makers to reduce demand for natural gas and oil quickly. These measures can help ease pressures in energy markets and lower prices, thus reducing some of the impacts on the fertilizer and food markets described in this explanation.

• Given the limited liquefied natural gas export capacity additions expected between 2022 and 2024 and the general lack of robust policies for the transition to alternative fuels, the current difficult conditions in global natural gas markets may persist in the medium term. This means continued pressure on margins and operating costs for fertilizer producers, as well as continued high prices for consumers.

Measures taken to ease these pressures in the medium term could include:

Design sustainable support structures to insulate citizens most affected by rising food prices. Subsidies and transfers should be designed in such a way that they can continue beyond the coming months if the need arises. Careful design of such subsidies would avoid the unintended consequences of simply shifting or amplifying exposure to rising prices to other parts of the world's population. Some low-income countries in the Middle East and Africa are already suffering, or are on the verge of, severe food shortages. Advanced economies have a moral responsibility to take into account the circumstances of these countries and ensure that their policies do not exacerbate the conditions they face.

Redouble efforts to replace the use of fossil fuels in the food supply chain with safe and sustainable energy sources. Decarbonizing ammonia production could have the dual benefits of reducing carbon dioxide emissions from fertilizer production as well as the industry's reliance on natural gas from Russia and other places. Reducing the use of fossil fuels in other places in the food supply chain-particularly agricultural equipment, shipping, and packaging-provides similar opportunities.

Decarbonization: One of the Innovative Climate Change Solutions

Dr. Samir Tantawi
Climate change consultant at the United Nations and member of the International Panel on Climate Change

Decarbonization, also known as carbon neutrality or net-zero emissions, is the process of reducing greenhouse gas emissions to a level that will not contribute to global warming.

This can be achieved through a range of strategies, such as renewable energy, energy efficiency, and carbon capture and storage. Decarbonization has become an important part of solving global climate change because it is the only way to reduce the amount of carbon dioxide in the atmosphere and slow down global warming.

What is carbon decarbonization?

Decarbonization is the process of reducing the amount of carbon dioxide emissions released into the atmosphere. It involves reducing emissions in the short term while also investing in technologies and practices that will help achieve net zero or near-zero emissions in the long term. This process plays an essential part in solving global climate change. Decarbonization has been adopted by many countries as part of their climate change mitigation strategies. This is because Decarbonization not only reduces emissions but also helps create a more sustainable, low-carbon economy.

Decarbonization involves not only reducing emissions but also investing in technologies and practices that will help achieve net zero or near-zero emissions. These strategies could include investments in renewable energy, energy efficiency, and carbon capture and storage. In addition, decarbonization strategies often include changes in land use and agricultural practices, which can help reduce the amount of carbon dioxide emitted into the atmosphere.

The role of decarbonization in climate change solutions

Decarbonization has an important role in solving global climate change because it is the only way to reduce the amount of carbon dioxide in the atmosphere and slow down global warming. By reducing emissions and investing in technologies and practices that will help achieve net zero or near-zero emissions, countries and organizations can help to reduce the impacts of climate change.

Decarbonization is also seen as an important step in the transition to a more sustainable and resilient future. By reducing emissions, countries and organizations can help reduce the amount of carbon dioxide in the atmosphere and slow global warming while creating a more sustainable, low-carbon economy. This can also help reduce the impacts of climate change on vulnerable populations as well as protect natural resources.

Technologies to combat climate change

In order to reduce emissions and achieve net-zero or near-zero emissions, countries and organizations must invest in technologies and practices that will help them reach these goals. These technologies and practices can include investments in renewable energy, energy efficiency, and carbon capture and storage.

Renewable energy technologies-such as solar, wind, and hydropower-can help reduce emissions because they produce electricity without the need for fossil fuels. Additionally, energy efficiency technologies-such as LED lighting, smart thermostats, and energy-efficient appliances-can help reduce energy consumption, which leads to reduced emissions.

Carbon capture and storage (CCS) technologies can also help reduce emissions by capturing and storing carbon dioxide in the atmosphere. This carbon dioxide can then be stored in deep underground tanks or used in industrial applications, such as the production of fuel or other chemicals.

Costs associated with decarbonization

Decarbonization strategies can be expensive and require significant investments in technologies and practices. In addition, the costs associated with decarbonization can vary based on the type of technology or practice used. For example, the cost of investing in renewable energy technologies—such as solar and wind energy—can be higher than investing in energy efficiency technologies such as LED lighting.

However, the costs associated with Decarbonization can be offset by the benefits achieved. For example, the use of renewable energy technologies can help reduce emissions while creating jobs and other economic benefits. In addition, energy efficiency technologies can help reduce energy consumption, resulting in lower energy bills for families and businesses.

Social and economic impacts of decarbonization

Decarbonization can have both positive and negative social and economic impacts. On the positive side, decarbonization can create jobs and other economic benefits, such as the development of new industries and the growth of existing ones. In addition, the use of renewable energy technologies can help reduce emissions and create a more sustainable and resilient economy.

On the downside, decarbonization can also increase energy costs for households and businesses, as well as displace communities that rely on fossil fuels for their livelihoods. In addition, the use of carbon capture and storage technologies can result in environmental risks, such as the potential for stored carbon dioxide to leak into the atmosphere.

Sustainable development and decarbonization

Decarbonization is an important part of the solution to global climate change and is essential for achieving sustainable development. By

reducing emissions, decarbonization can also help reduce the effects of climate change on vulnerable populations as well as protect natural resources. Additionally, decarbonization can help create jobs and other economic benefits while also leading to improved air quality and a healthier environment.

Solutions to reduce carbon emissions

In order to reduce emissions and achieve net-zero or near-zero emissions, countries and organizations must invest in technologies and practices that will help them reach these goals. These strategies could include investments in renewable energy, energy efficiency, and carbon capture and storage. In addition, countries and organizations can also pursue policies and regulations to reduce emissions, such as carbon taxes and emissions trading schemes.

In addition, countries and organizations can also follow up on climate finance initiatives, such as the Green Climate Fund, which provides funds to invest in climate change mitigation and adaptation projects in developing countries. In addition, countries and organizations can also invest in the research and development of new technologies and practices to reduce emissions, such as carbon capture and storage technologies.

Conclusion

Decarbonization is an important part of the solution to global climate change because it is the only way to reduce the amount of carbon dioxide in the atmosphere and slow down global warming. To achieve this, countries and organizations must invest in technologies and practices that will help them achieve these goals. These strategies could include investments in renewable energy, energy efficiency, and carbon capture and storage. In addition, countries and organizations can also pursue policies and regulations to reduce emissions, such as carbon taxes and emissions trading schemes.

Decarbonization can have both positive and negative social and economic impacts, depending on the type of technology or practice used. However, the benefits of decarbonization can outweigh the costs because they can help reduce emissions, create jobs and other economic benefits, and protect natural resources. Decarbonization is essential for a more sustainable and resilient future and is an important part of global climate change solutions.

Strategies for Addressing the Implications of Climate Change on Energy

Ms. Nashwa Nashaat
Executive Director of Saif Bin Helal Center for Studies and Research in Energy Sciences

Climate change is one of the most pressing global issues today. This placed it at the forefront of the agenda of all international and regional meetings, and climate action became one of the sustainable development goals directly, represented by Goal 13, and indirectly by affecting the rest of the sustainable development goals. To name just one example, according to published scientific reports, climate change threatens agricultural crop production. Thus, threatening global food security, which may impede the achievement of the second goal of the United Nations Sustainable Development Goals, which is concerned with eliminating hunger. Africa Agenda 2063 also placed the issue of climate change and environmental aspects among its goals that it seeks to achieve, which include assigning five regional technology centers, linked to national bodies dedicated to climate technology and climate change programs targeting women and youth.

In 1992, the United Nations organized the Earth Summit in Rio de Janeiro, Brazil. The United Nations Framework Convention on Climate Change was adopted, and its coordinating agency, what we now know as the UN Climate Change Secretariat, was established.

In this treaty, countries agreed to stabilize greenhouse gas concentrations in the atmosphere to prevent dangerous human activity interference in the climate system. It has so far been signed by 197 different parties. In 1992, the United Nations organized the Earth Summit in Rio de Janeiro, Brazil. The United Nations Framework Convention on Climate Change was adopted, and its coordinating agency, what we now know as the UN Climate Change Secretariat, was established.

Since 1994, when the treaty entered into force, the United Nations has annually brought together nearly every country on Earth to attend global climate summits, known as COP, which stands for Conference of the Parties.

During these meetings, countries negotiated various protocols to the original treaty to set legally binding limits on emissions, for example, the Kyoto Protocol in 1997 and the Paris Agreement adopted in 2015. All countries in the world agreed to intensify efforts to try to limit global warming to 1.5 degrees Celsius above pre-industrial temperatures and to enhance climate action finance.

At COP26, countries agreed to make stronger commitments, including updated national plans with more ambitious targets, but only 23 out of 193 countries have submitted their plans to the UN so far.

Glasgow has also witnessed many pledges made inside and outside negotiating rooms regarding net zero commitments, forest protection, climate finance, and many other issues.

COP27 witnessed negotiations on some sticking points after the Glasgow conference. These issues included loss and damage financing so that countries on the front lines of the crisis can deal with the consequences of climate change that exceed their ability to adapt and ensuring that developed countries deliver on their promises to provide $100 billion each year to finance adaptation in low-income countries.

Here we have to refer to the fact that the relation between climate change and the energy sector is mutual and overlapping to a large extent. As each of them affects the other, the excessive reliance on fossil fuels in the past led to widespread ecological damage, which included an increase in greenhouse gases and air pollution and the formation of what is known as global warming, accompanied by climate disruptions. And the effects of all of that were seen in some parts of the world during recent years, and its features will become clearer in the near future.

The year 2020 was exceptional in terms of global greenhouse gas emissions, which declined following the closure of most global economies due to the Corona pandemic and the resulting broad-based slowdown in the demand of key sectors, such as transportation and electricity, for fossil fuels. In 2019, total greenhouse gas emissions amounted to about 59.1 gigatons of carbon dioxide equivalent, an increase of 1.4% over the previous year, according to the United Nations Environment Program.

According to geographical distribution, China, the United States of America, the European Union, and India are responsible for 55% of the total global greenhouse gases in 2019. With the addition of Russia and Japan, these countries' emissions amount to 65% of the total global emissions.

While the emitted greenhouse gases from fossil fuels used in the energy sector were estimated at about 38.5 gigatons of carbon dioxide equivalent in 2019, which makes fossil fuels solely responsible for 65% of the total emissions emitted by various economic activities all over the world that year.

Some believe that global warming is a result of the increase in greenhouse gases, including carbon emissions, in the past decades, followed by extreme weather waves such as changing rainfall patterns, severe droughts, extreme cold or warming, and unexpected hurricanes.

Some studies confirm that the average global temperature may rise by 2.6–4.8 degrees Celsius above pre-industrial levels by the year 2100 if sufficient global measures are not taken to adhere to the goals of the 2015 Paris Climate Agreement.

Among other negative climate change implications, we find that as temperatures rise, operators of thermal electricity plants may be forced to operate at low capacity or even stop them completely because some steam or gas turbines cannot withstand high temperatures.

Some electrical stations are also vulnerable to physical damage due to landslides, sea level rise, and hurricanes. Extreme weather is also a strong threat to nuclear plants, as reactors, cooling equipment, control tools, and backup generators can malfunction. For example, in January 2022, about 700,000 people were affected by a massive power outage caused by a historic heat wave in Buenos Aires, Argentina. In November 2020, freezing rain coated power lines in the Far East of the Russian Federation, leaving hundreds of thousands of houses without power for days.

In 2020, 87 % of global electricity generated by thermal, nuclear, and hydroelectric systems depended directly on water availability. At the same time, 33% of thermal power plants that rely on the availability of fresh water for cooling are located in areas experiencing high water stress. This is the case for 15% of already existing nuclear power plants as well, a percentage that is expected to rise to 25% in the next 20 years.
On the other hand, 11% of hydropower is also located in areas with severe water stress. About 26% of existing hydropower dams and %23 of expected-to-be-built dams are located within river basins that are currently at a moderate to very high-risk level of water scarcity.

Nuclear power plants not only rely on water for cooling but are also often located in low-lying coastal areas; therefore, they are more vulnerable to sea level rise and weather-related flooding.

For example, the Point Nuclear Station in Florida (USA), which is located at sea level, will be under climate change threat in the coming decades. Regular improvements in operational practices and evolving regulatory commitments could significantly reduce nuclear power plant production losses caused by extreme weather, according to the International Atomic Energy Agency.

On the third hand, climate change poses challenges to renewable energy. Changing weather patterns and extreme weather events may pose challenges to generating electricity through solar and wind energy. On the third hand, climate change poses challenges to renewable energy. Changing weather patterns and extreme weather events may pose challenges to generating electricity through solar and wind energy. The expected increase in cloudiness in some areas may affect the capability of generating electricity through solar panels. While climate change negatively affects the strength and speed of winds.

In 2021, Europe's electricity generation capacity via wind turbines declined extremely under unfavorable weather conditions. Vortex, an independent weather-modeling group, estimated that the strength of the winds blowing across northern Europe has decreased by up to 15% on average. One of the explanations for the decline in wind strength and speed, according to scientists, is what is known as the phenomenon of global quiescence resulting from climate change. In this regard, it was noted in the United Kingdom, for example, that the contribution of wind to electricity generation decreased to only %2.5 of total production in September 2021, compared to an average of 18% during the past year.

Given the negative implications of climate change on energy, we are proposing an integrated strategy in order to confront these implications, which is the following:

Start working to implement the recommendations of international conferences regarding climate change and energy. In other words, to move from the stage of negotiating texts and announcing pledges to the stage of actual implementation at all levels to achieve the goals of the Paris Agreement, primarily reducing gas emissions and reducing global warming, not to exceed 1.5 degrees Celsius in accordance with the Paris Agreement.

Carbon pricing:

Reducing carbon emissions begins with clear policy initiatives. Carbon pricing systems—such as emissions trading systems that impose caps or carbon taxes per ton—send long-term signals to companies. To create incentives to reduce polluting behaviors, invest in clean energy options, and innovate low-emission methods.

Ending fossil fuel subsidies:

Fossil fuel subsidies send a different signal that encourages waste and discourages low-carbon growth. By phasing out subsidies on harmful fossil fuels, countries can reallocate their resources to areas of greatest need and effectiveness, including targeted support for the poor.

In 2013, about $550 billion was allocated to support fossil fuels globally, deducting a huge percentage of the gross domestic product of some countries in order to artificially lower energy prices. However, evidence shows that fossil fuel subsidies do not protect the poor at all. Studies prove that the richest 20 percent of the population receive six times more benefits from fossil fuel subsidies than the poorest 20 percent.

Reforming subsidies is never an easy process. Citizens often do not realize the true cost of energy, and increased support for the poor must begin with the phasing out of subsidies. The World Bank provides support for fossil fuel subsidy reform through a $20 million fund that will help the countries concerned design and implement programs to reform subsidies and associated social protection systems.

Transition to clean forms of energy generation and increase investments in renewable energy:

The energy sector is the source of nearly three-quarters of global greenhouse gas emissions. It is crucial to shift to clean forms of energy generation, such as solar, wind, and hydropower, and improve energy efficiency if we want to reach net zero emissions by 2050.

By 2050, global electricity needs, which will increase over the years as strategic lever electrification reaches net zero targets, will be met primarily with renewable energy, so solar energy will be the largest single source of supply. African countries have an opportunity

to seize untapped potential and become major market players. Africa is home to 60% of the world's best solar energy resources, but only 1% has installed photovoltaic capacity.

Investments in renewable energy must triple by 2050 to put the world on track to reach net zero emissions by 2050, according to figures in the report. In 2019–2020, most renewable energy investments were made in the East Asia and Pacific region (primarily in China and Japan), followed by Western Europe and North America .Developing countries have a weak presence when it comes to obtaining clean energy financing. International public financial flows to developing countries to support clean energy and achieve Sustainable Development Goal 7 declined in 2019 for the second year in a row; they decreased to 10.9 billion US dollars. This level of support was 23 percent lower than the $14.2 billion provided in 2018, 25 percent lower than the 2010–2019 average, and less than half the higher value of $24.7 billion in 2017.

Through the Sustainable Energy for All initiative, the World Bank Group supports three goals through 2030 to universalize modern energy, double the rate of improvement in energy efficiency, and double the proportion of renewable energy in the global energy mix.

Improving energy efficiency is crucial. Every gigawatt that can be saved is a gigawatt that we do not need to produce. Globally, the energy used today is about a third lower than it would have been without improvements in energy efficiency over the past 20 years.

At the same time, the cost of renewable energy continues to decline. In many countries, the cost of producing utility-scale renewable energy is now lower than or equal to the cost of fossil fuel plants.

Building resilient, low-carbon cities means getting all the pieces in place, which is part of the equation. Another part is building a sustainable future because all development activities take place in the context of climate change.

By carefully planning transportation and land use and setting energy efficiency standards, cities can be built in ways that prevent them from falling into unsustainable patterns. It can provide jobs and opportunities for the poor and reduce air pollution.

However, financing this growth to be sustainable is challenging. Available data show that only about 4 percent of the 500 largest cities in developing countries are considered creditworthy in global markets. The World Bank Group helps cities improve their strategic situation and correct their financial components that may prevent them from obtaining credit.

The urgent need for climate services:

Which is defined as the production and delivery of relevant, reliable, and usable climate information. The energy sector has extensive experience in using weather services. However, more efforts need to be made to integrate climate information into the decision-making process, increase the resilience of energy systems to climate-related shocks, and enhance energy efficiency.

Although the energy sector routinely uses weather forecasts for up to 15 days, the experience of using climate data is poor.

Renewable energy systems depend on weather and climate; the transition to clean energy therefore requires improving climate information and services to support decisions regarding site selection, operation, maintenance, and management.

In the energy sector, studies have shown the economic value of very short-term, sub-seasonal, and seasonal forecasts-such as temperature, wind speed, and streamflow—for fuel purchasing decisions, demand and generation forecasting, and systems planning. Temperature forecasts enable managers to forecast peak loads more accurately and schedule power plants optimally to meet demands at a lower cost. Hydropower operations benefit from daily, weekly, and seasonal forecasts of precipitation and streamflow, which can help optimize operations.

For example, using streamflow forecasts increases energy production from major hydroelectric dams on the Columbia River (in the United States) by 5.5 TWh per year, yielding an average annual revenue increase of US$153 million per year.

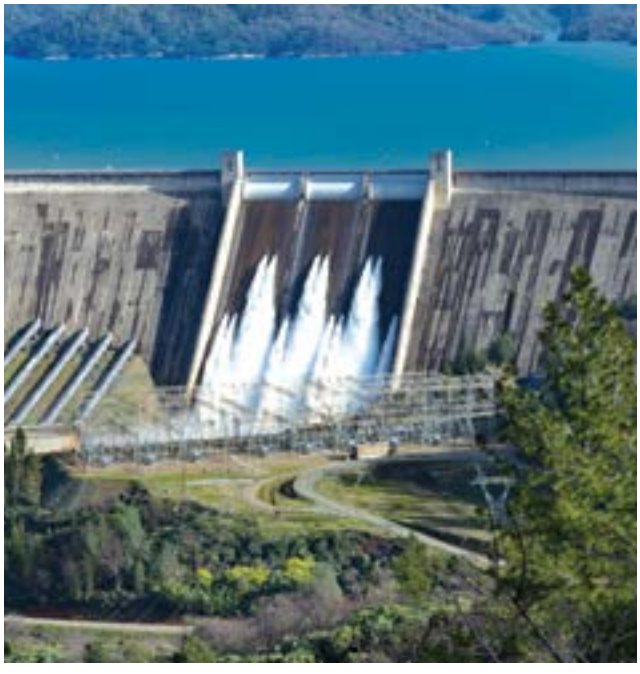
Likewise, using forecasts to manage hydropower operations in Ethiopia yields cumulative decadal benefits of US$1 billion to US$6.5 billion, compared to any climate science-based approach (with no forecasts).

The development and application of targeted climate products and services through the Global Framework for Climate Services can support both adaptation and mitigation.

Using climate information more effectively helps not only scale up renewable energy infrastructure but also enhances the efficiency and climate resilience of the clean energy system. To achieve this, investments in these services need to be increased and sustained, supported by recognition of the need for these services through enhanced policies.

The following are examples of applications of climate services for energy purposes:

Planning for gas and electric power purchases, emergency response management, capacity and resource management (e.g., grid management, distribution and production pricing of electricity), optimal operation of renewable energy plants, in particular reservoir and hydropower operations.



Studies

The Repercussions of the Current Events in Gaza and Their Impact on Security and Energy Supplies in the Mediterranean

Prepared by the Research and Studies Department at Saif Bin Hilal Center

Introduction:

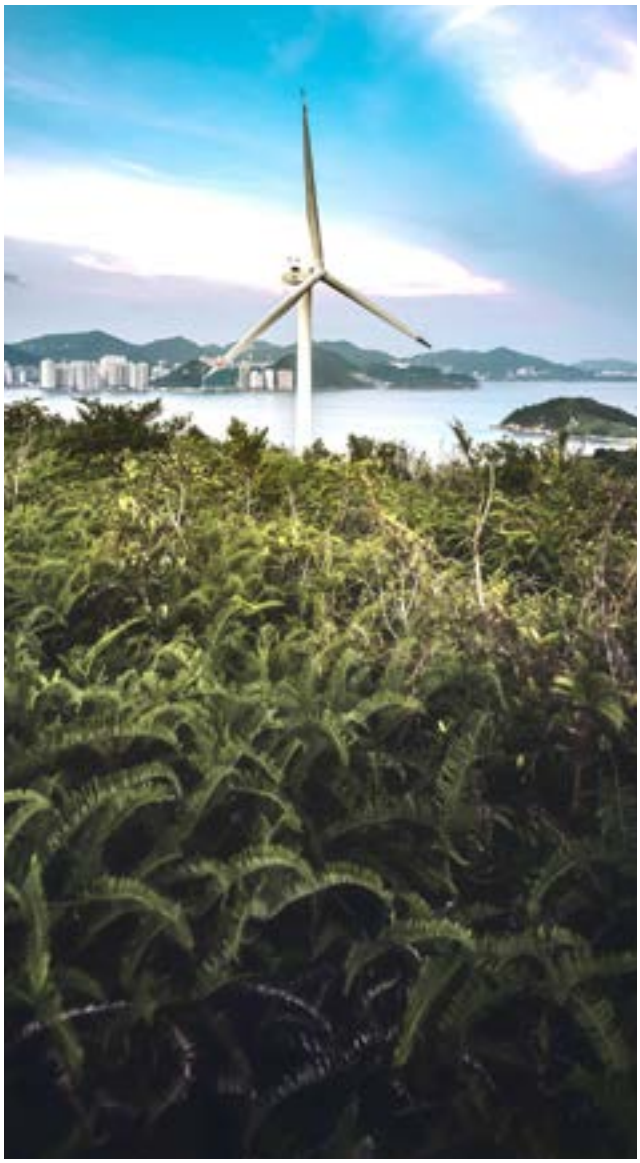
Global oil and gas markets are experiencing fear of shortages of oil supplies and supply chains due to the continuing conflict in the Middle East and the Israeli war in the Gaza Strip, which has begun to affect oil prices. Oil markets have also witnessed a rise in the current period.

The energy sector is one of the most important indicators that will affect the region in the event of a broader conflict erupting in Gaza, in addition to some of the repercussions that the region will suffer. Natural gas discoveries were taking place in the eastern Mediterranean region, and they had attractive prospects, especially with Israel increasing its natural gas production from 16.11 billion cubic meters in 2020 to reach 21.92 billion cubic meters in 2022.

Israel has expanded its energy cooperation with Egypt. Accordingly, Washington expanded a historic agreement on a maritime border between Israel and Lebanon, under which the two parties are allowed to begin gas exploration and drilling water wells that were previously disputed. The region was entering a phase of cooperation, especially in the fields of energy and security, and then the current events came to put everything on hold.

Gas is a geopolitical, strategic, and vital weapon, no less important than a nuclear weapon. During the past years, Washington opposed Germany and the rest of the European Union countries in the famous gas deal with Moscow and after the current events (the Russian-Ukrainian war and the war on Gaza).

There are fears about the effects of the continuation and escalation of the war between Israel and the Palestinian Hamas movement in the Gaza Strip, and its impact is expected on energy supplies and security in the world in general and the Mediterranean region in particular. In this report, we will discuss the repercussions of the events in Gaza and their impact on energy security in the Mediterranean region.



Repercussions of the Gaza events and their impact on oil markets:

Oil prices are rising slightly now because of the war that broke out following the attack launched by Hamas on Israel on October 7th. Indeed, the impact of the crisis began to appear when the price of European Brent crude rose by about 10%, its American counterpart rose by about 9%, and oil prices reached about $90 per barrel. Experts warn that fifty years after the oil embargo, which Arab countries imposed on countries supporting Israel during the 1973 October War, the current crisis is expected to lead to a disruption of supplies, thus raising the price of oil.

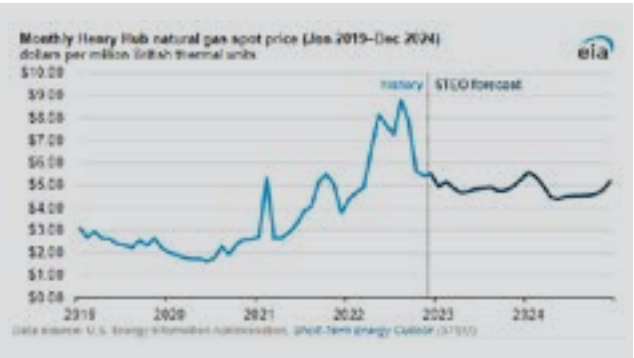
The head of the International Energy Agency, Fatih Birol, said that the current war does not bring good news to the oil markets from Saudi Arabia and Russia, and he expected stronger demand from China. Energy affairs analyst Eduardo Campanella said that Israel is not an oil producer and does not have a major international oil infrastructure near the Gaza Strip. The matter is made more difficult by the direct intervention of Iran, which supports Hamas, which is considered Israel's main enemy in the conflict.

The importance of the Middle East region is because a third of the world's oil supply is located there, and about 20% of global supplies pass through the strategic Strait of Hormuz, which is equivalent to 30% of the total oil transported by sea. The current events represent the greatest geopolitical risk threatening the world's energy market since the outbreak of the Russian-Ukrainian war in February 2022.

The world currently fears that nearby oil-producing countries such as Saudi Arabia and Iran will join the conflict, especially if the Strait of Hormuz is closed by Iran.

Saudi Arabia and the United Arab Emirates have pipelines to ship crude oil out of the Gulf without crossing the Strait of Hormuz, Campanella stressed.

On October 6, before the outbreak of events, the price of oil reached $84.46 per barrel for Brent crude futures contracts; US West Texas Intermediate crude futures recorded $82.76 per barrel; and oil prices fell on December 6 to $77.21 per barrel for Brent crude futures contracts; US West Texas Intermediate crude futures also recorded $72.28 per barrel. A series of global fluctuations is clarified in the following figure:



Below is a table of oil prices at the same time:

Month	United States (Henry Hub) (USD/MMBtu)	Europe (€/MWh)	Global Index
January	2.35	63.45	132.12
February	2.28	63.17	131.87
March	2.15	62.23	130.23
April	2.10	61.12	128.54
May	2.07	60.98	127.32
June	2.05	60.34	126.10
July	2.23	72.15	136.45
August	2.48	83.27	147.89
September	2.85	102.34	163.25
October	2.99	118.72	187.32
November	3.12	128.54	202.89
December (estimated)	3.25	138.36	218.46

Repercussions of the Gaza events and their impact on natural gas markets:

Natural gas will remain an energy source for more than 30 years, but it is no longer used as a raw material. Rather, it is used for political purposes, just like oil. Therefore, it will be governed by the same principles and mechanisms that govern energy sources and natural resources.

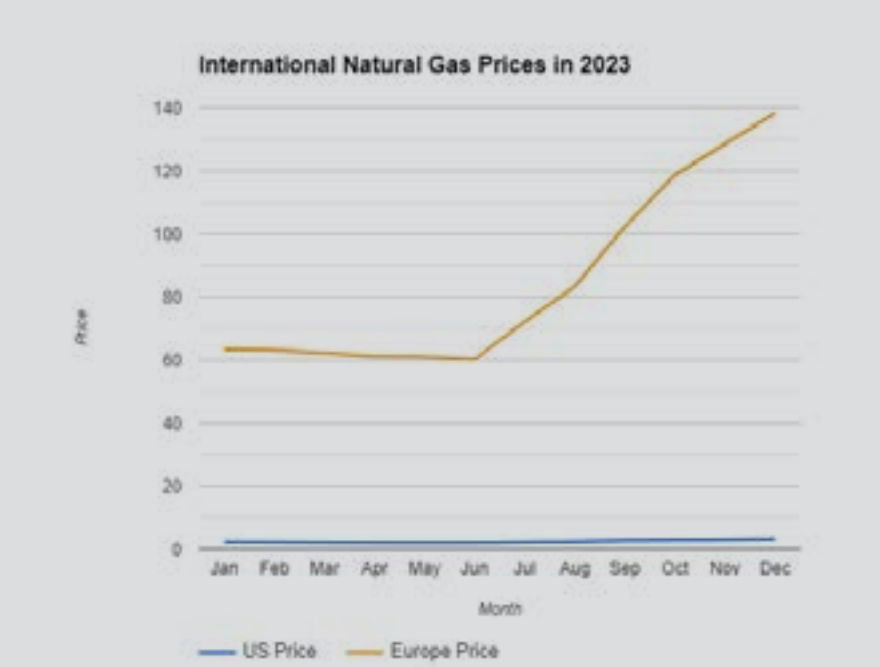
The consequences in the gas market are faster than in the oil market; the price of natural gas rose on the Dutch gas futures trading platform (TTF), the European natural gas index, by a third compared to before the current events. Indeed, the current events threaten the regional natural gas market; they are expected to affect liquefied natural gas supplies.

The suspension of the natural gas field did not confuse the gas markets, but the developments that the markets witnessed in recent years—the suspension of the Russian gas pipeline heading to Europe—pushed Europe to search for alternative markets at any cost, making the gas markets fragile and volatile.

The world fears the closure of the Leviathan field, which is considered the largest natural gas field in Israel. Experts expect that if this field is closed, prices will rise, and if the war in Gaza continues, this will reduce Europe's ability to deal with any unexpected events such as supply disruptions or the harsh winter, which would increase the possibility of gas prices rising.

Below is a monthly statistic of gas prices during the year 2023, showing the change over the past two months:

Month	US Price (USD/MMBtu)	Europe Price (€/MWh)
January	2.35	63.45
February	2.28	63.17
March	2.15	62.23
April	2.10	61.12
May	2.07	60.98
June	2.05	60.34
July	2.23	72.15
August	2.48	83.27
September	2.85	102.34
October	2.99	118.72
November	3.12	128.54
December	3.25	138.36



A chart showing natural gas prices in 2023

The impact of the war on Gaza and its impact on the energy sector in Egypt:

Egypt relies heavily on energy, and natural gas is the most consumed fuel, followed by oil. Egypt relies on coal by 1% and on renewable energy by 6%. Egypt also excelled in liquefied gas in 2022 and has preceded the Arab countries. As it surpassed the Authority of Oman, Egypt's exports of liquefied gas during the year 2022 amounted to about 7.4 million tons, and Egypt achieved a record number of gas exports, reaching 8 million tons.

Egypt is already affected by the current events. Egypt imports natural gas from Israel and works to liquefy it in local liquefaction stations, then exports it to Europe, which is important for both parties. However, it is expected that Egypt will be affected by the current war in the Gaza Strip. Priority will be given to the local market, especially in the summer, but in the winter, local demand will decrease, and then Egypt will be able to export to Europe.

The year 2022 is considered the year in which 63% of Israel's exports went to Egypt and 37% to Jordan. Exports transported from Askalan to Al-Arish have increased since 2020. The year 2022 is considered the year in which Israeli gas flows to Egypt increased via the "Mediterranean Gas" pipeline to 5.81 billion cubic meters.

Egypt produces its gas and aspires to become a regional center for the energy sector, but it has witnessed a decline in production in recent years, and this has affected its ability to meet local demand and export liquefied natural gas. However, the war in Gaza had a significant impact on Egypt, as Israel, the largest gas exporter to Egypt, stopped its production from the Tamar field in the Mediterranean in anticipation of any attack on it. This led to a natural gas crisis in Egypt, and this crisis led to a deficit in Egypt's imports and exports.

Prewar:

Egypt was a major exporter of natural gas, especially liquefied natural gas; it meets 80% of European import needs (IEA, 2023; Statista, 2023).

The main export destinations included European countries, while imports were primarily from Israel via the Eastern Mediterranean Gas Pipeline.

During the war:

The closure of the Eastern Mediterranean gas pipeline due to security concerns led to a significant decline in exports (-4.7 million tons, a decrease of 57%.)

The increasing reliance on domestic gas for consumption led to a decline in LNG exports.

Imports rose by +3.7 million tons, an increase of 148%, to compensate for the shortfall in exports, with Algeria being the main supplier.

For these reasons, Egypt lost its leading position as a supplier of liquefied natural gas to Europe.

The increase in domestic gas consumption has put pressure on strategic reserves.

Egypt transformed from a net exporter (5.7 million tons) to a net importer (-2.7 million tons).

Repercussions of the war and its impact on global energy markets:

No doubt, the war on the Gaza Strip has a major impact on regional and global energy markets. It has created a state of uncertainty despite the slight increase in oil and gas prices, and it will be more dangerous if the scope of the fighting expands to include other countries. If the scope of the war expands, it will have a shocking impact on global energy markets and disrupt the main supply lines, thus raising energy prices.

As for global gas markets, they were affected by the first week of the war. European natural gas futures rose to 14%, and natural gas prices did not rise as significantly as oil prices and the world is awaiting global energy markets due to the availability of large quantities of gas in world markets.

Many countries fear that the war will expand and lead to an increase in oil prices, which will result in problems in the global economy, a reduction in growth, and an increase in energy and food prices worldwide.

Indeed, some countries suffered from economic shocks from the Corona epidemic and the Russia-Ukraine war. Inflation had begun to decline, oil prices had begun to stabilize, and international financial institutions had warned that the fragile economic recovery could take a turn for the worse.

The war had major impacts on the energy sector and its various sources; the Russian-Ukrainian war affected energy security as well as food security. If the war on Gaza continues, it will have a major impact on global energy security. Since the region has more than 50% of the world's proven oil reserves and large gas discoveries, the impact will be limited to areas in conflict zones.

The war has its economic effects, and countries already have inflationary pressures and accumulated debt and are looking for economic stability. The war on Gaza came to overthrow all economic theories. The world will be affected, and thus the risks will increase in the Middle East region. The region provides a third of the world's oil supply, and about 20% of global supplies pass through the strategic Strait of Hormuz, which is equivalent to about 30% of the total oil transported by sea, and these are the places that suffer from crises.

For the world, the Middle East is considered a hotbed of conflict that disrupts global supply chains and shipping, and this is increasing, especially with the new economic consequences in the region. The entire world faces an economic dilemma that confuses the global economy in the field of energy and investments in general. Investors are concerned about the rise in shipping and insurance costs for transporting goods and the expansion of the conflict, which threaten stability.

The global oil and gas markets are witnessing a rise in the prices of gas, oil, and diesel. This comes as a result of the European embargo on Russian gas and the continued Israeli aggression in Gaza, in addition to tensions in the Middle East.

Oil and gas markets in Europe are witnessing a rise, especially at the beginning of the winter, which is expected to reach the range of $20 per barrel, and oil prices are ranging between $85 and $90 per barrel as a result of the events taking place in the region and the concerns about supply chains.

Conclusion:

There is uncertainty about the future of energy, especially during the ongoing war in the Gaza Strip, and the escalation of the situation will only lead to further fluctuations of oil and gas prices in the energy markets in the region, which could cause serious damage to the infrastructure of the energy sector.

The economic repercussions are reflected in the energy situation in general and the oil and gas sector in particular, and it is expected that regional governments will postpone any energy plans or projects that they had developed several years ago.

As the current crisis in the Gaza Strip worsens, this will lead to an acceleration of oil resources between countries. Each country in the world will turn to secure its share of energy resources, and this will amplify the gap between rich countries and developing countries within the scarcity of energy sources.

With the onset of winter, the world expects that the prices of oil and gas will increase, as most European countries use them as heating fuels. The world is still suffering from economic shocks since the coronavirus crisis, then the Russian-Ukrainian war, and then the current events of the war in Ga

BRICS:
Can It Help Ensure Energy Security?

Saif Bin Helal Al Shehhi
Founder and CEO of the International Agency for Energy Security

Introduction:

BRICS is an economic bloc and partnership between five leading emerging markets and developing countries, founded on historical ties of friendship, solidarity, and common interests, and includes the Federal Republic of Brazil, the Russian Federation, the Republic of India, the People's Republic of China, and the Republic of South Africa. The group's member countries are an influential global bloc, representing more than 42% of the world's population, 30% of the global land area, 23% of the gross domestic product, and 18% of global trade. It was announced in August 2023 that six new members were invited, including Egypt and Ethiopia from the African continent, along with Argentina, Iran, Saudi Arabia, and the Emirates, with membership effective from January 2024, which makes the group constitute 37% of the global gross domestic product. And 46% of the world's population. The BRICS countries are influential members of leading international organizations and agencies, including the United Nations, the G20, the Non-Aligned Movement, and the G77. They are also members of various regional associations. The Russian Federation is a member of the Commonwealth of Independent States, the Collective Security Treaty Organization, and the Eurasian Economic Union. Russia and China are members of the Shanghai Cooperation Organization and the Asia-Pacific Economic Cooperation Organization. Brazil is a member of the Union of South American Nations, Mercosur, and the Group of Latin American and Caribbean States. As for the Republic of South Africa, it is a member of the African Union and the Southern African Development Community. Finally, India is a member of the South Asian Association for Regional Cooperation.

The rapid economic and political rise of the BRICS countries as an influential group on the international political stage has contributed to changing the power dynamics in the global system. The emergence of the BRICS countries after the financial crisis has changed the structural dynamics of the global financial system, which is dominated by the West, along with the BRICS institutional framework of the New Development Bank and the Contingent Reserve Arrangement, which are key features of cooperation between emerging economies and developing countries. Therefore, it is necessary to understand the role of BRICS as one of the important pillars and influential forces in the international system.

The BRICS group also constitutes a growing economic force and a driver of global growth, trade, and investment. Therefore, it has a prominent position in the global economy. Therefore, many countries in the Global South are seeking to join its membership. The BRICS group has many advantages that qualify it to play an active role in the future transformations of the global economy and to reduce American and Western dominance over it, which has continued for decades since the collapse of the former Soviet Union and the end of the cold crisis at the beginning of the 1990s, due to the diversity of the economies of its members. Brazil has an economy based primarily on agriculture, while Russia is a leading energy exporter, India is an emerging economic power with a large and growing middle class, China is an economic and manufacturing superpower, and South Africa is a major player in the mining industry. This all gives the group a strong competitive advantage, makes it able to compete with the United States of America and its allies, and gives it the ability to make major changes in the current international system by laying the foundations for a new international economic system.

The role of BRICS in the global economy has witnessed growth over the past decade, beyond the largest global economic blocs. Many indicators have highlighted that the group's contribution to the gross domestic product of the global economy is increasing and exceeds the contribution of the G7 countries, which include the most advanced economies in the world.

The economic weight of the BRICS group enhances its vital role and effective ability to support the economic stability of its member states and its beneficiaries in general and enhance energy security in particular, especially within the accession of Saudi Arabia, the UAE, and Iran, which represent three influential powers in the field of energy globally. The group, in its new form and with its new members, includes not only six of the world's largest oil producers but also four of the world's largest natural gas producers. The expanded group now extends across vital offshore energy hotspots in the Persian Gulf and the Red Sea, with a foothold in the Mediterranean.

The focus on oil and gas shows only part of the BRICS energy map; the enlarged BRICS group is responsible for 51% of global greenhouse gas emissions in 2021. In addition, it plays an important role in the value chains of vital minerals in the energy transformation process. Argentina has the third-largest lithium reserve in the world after Chile and Australia, while Brazil, Russia, and China make up about a quarter of the world's nickel reserves. China owns 34%, India 5%, and Brazil and Russia 16% each of the world's rare earth mineral reserves.

The BRICS group pays great attention to the energy and climate change axes in all its announcements. The BRICS group recognized the urgent need for decarbonization and a fair energy transition but stopped short of committing to phase out fossil fuels. Member States commit to using all energy

sources, including fossil fuels, more efficiently while recognizing the role of fossil fuels in supporting energy security and the energy transition. The BRICS member states of the G20 have agreed to triple global renewable energy capacity without committing to reducing or eliminating fossil fuels.

Overview of the conventional energy market of the group's member countries:

The BRICS member countries represent a significant weight in the field of energy. In terms of oil production, Brazil, Russia, and China will produce approximately 891.6 million tons during 2022, which is about 20% of global oil production in 2022. The accession of Saudi Arabia, the United Arab Emirates, and Iran will raise the new BRICS share of global crude oil production to about 42%.

Figure No. 1 shows energy production in each BRICS member state during the year 2022, classified in terms of oil, electricity, and coal production. Russia and China are at the forefront of the group's energy-producing countries, with Russia in oil production and China in electricity production.

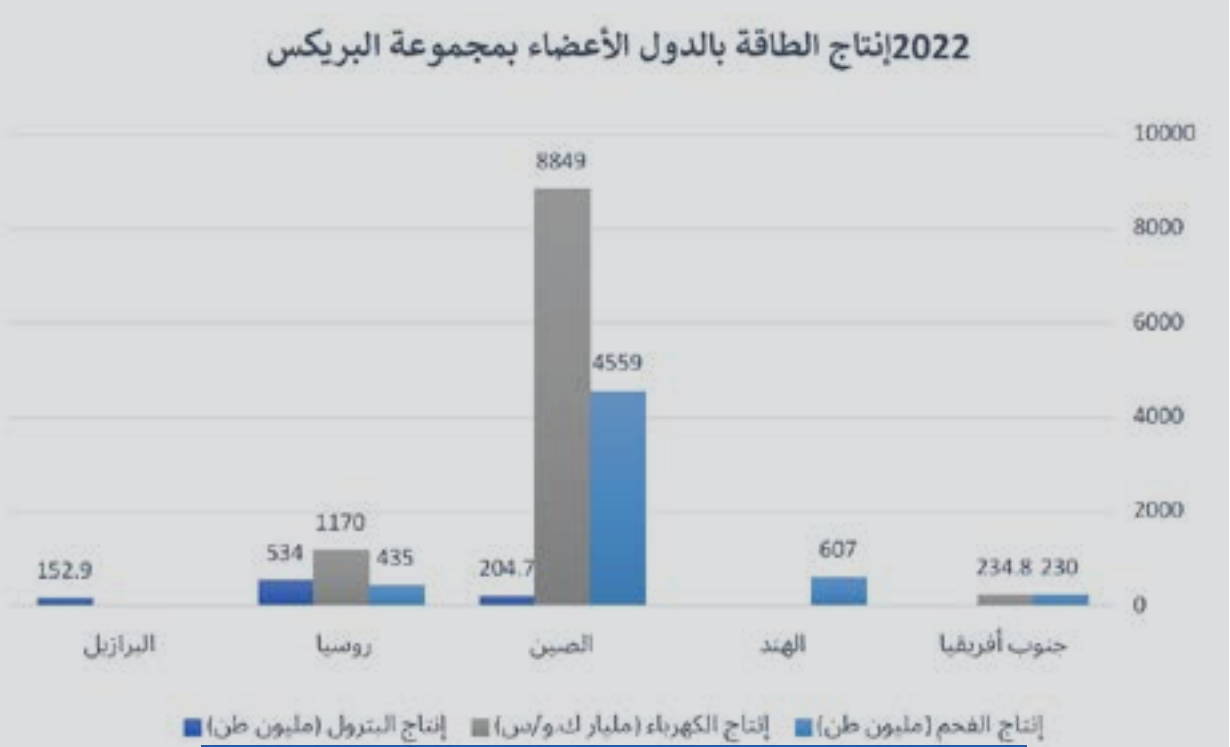


Figure (1): Energy production in each BRICS member state during the year 2022

Cooperation in the oil market between BRICS member states is taking an upward trend, especially with the new members of the group. As producers in the Russian oil market supply the United Arab Emirates with their first shipments of CPC blend crude oil in August and September 2024, this opens a new export route at a time when Moscow is looking to find new customers and circumvent Western sanctions. Moscow has also found new markets for its oil despite the sanctions imposed by the G7 countries since the start of the war in Ukraine, which Moscow describes as a special military operation.

Russia, the world's third-largest oil exporter, diverted most of its oil to China, India, and Turkey over the past year and also sent shipments to countries including Brazil, Sri Lanka, and Pakistan.

Predictions revolve around the ability of the new BRICS group to change the balance of power in the global energy market. With the joining of Saudi Arabia, the United Arab Emirates, and Iran, along with current members Russia and Brazil, these countries together control 39% of total global oil exports, which equals 17.1 million barrels per day, and the data shows that the 11 member states of the expanded BRICS group will constitute about 47.6% of the world's total oil production. In terms of oil reserves, the group will also control nearly half of the global total of 719.5 billion barrels out of 1.6 trillion.

Compared to the G7, which includes the leading economies of the United States, the United Kingdom, Germany, Italy, Canada, France, and Japan, we find that the G7 controls only 3.9% of crude oil reserves. Therefore, the expansion of BRICS to the Gulf countries will likely lead to the United States losing its influence in the global oil market. The United States used to rely on the resources of the Gulf, especially Saudi Arabia, to control oil prices.

The renewable energy sector in the BRICS countries:

BRICS is nowadays highly interested in environmental problems and their solutions. The focus of cooperation between China and other member states is on the development of green energy, specifically the field of renewable energy sources. Member states have established a framework for energy development cooperation, such as the Memorandum of Understanding on Energy Conservation and Energy Efficiency signed in 2015, the Energy Ministers' Meetings, and the establishment of the BRICS Energy Research Platform in 2018.

Within a cooperative framework among BRICS members, China is actively seeking more coordinated, in-depth, and detailed cooperation with other member states in the field of green energy. To this end, China is steadily promoting renewable energy and the low-carbon energy transition, strengthening the foundation of energy security, and investing in green technologies. As a committed supporter of international climate governance, China has launched the Global Development Initiative to accelerate the implementation of the UN 2030 Agenda for Sustainable Development, which includes climate change and green development as one of eight priority areas for cooperation.

The interaction in renewable energy projects between China and the BRICS group has focused mainly on local guarantees and financing of external loans from China, as the People's Republic of China contributes in this field. Recently, China has had extensive cooperation with the group not only in oil and gas but also in renewable energy, such as hydropower, wind energy, solar energy, and biomass energy. For example, China has successfully held events such as the BRICS Climate Change Meeting, the BRICS Environment Ministers' Meeting, and the BRICS Green Technology Exchange Symposium since 2021 to enhance information exchange

and coordination of positions among the five economies and exchange experiences on clean and low-carbon technologies.

The interaction between China and Brazil focuses on wind power, photovoltaic power, hydropower, biomass, etc. Since 2013, China and Brazil have been involved in wind energy. Besides wind power projects, Chinese companies have also participated in joint biomass power projects in Brazil. Recycling waste into energy not only helps solve the waste problem but also helps produce green and clean energy, which brings environmental and economic benefits to the population.

Sino-Russian bilateral cooperation is also focused on wind energy, and Chinese investors are also interested in Russian solar projects and intend to invest up to $1 billion. They also plan to build three power plants with a total capacity of 175 MW. However, there are problems between the two economies, such as differences in technical standards, requirements for the level of localization of production equipment, and low integration. Although experts point out that Russia and China can cooperate wonderfully in the field of alternative energy sources and that this is in the interest of the two countries' economies, the global trend reflects the necessity of increasing the use of these types of energy and increasing environmental awareness. South Africa is a major energy country in Africa and has abundant renewable energy resources. As for the partnership between China and South Africa in the field of renewable energy, it is developing very rapidly and continuously, mainly due to the high demand for energy conversion in South Africa. Experts are also mainly focused on cooperation in wind energy and photovoltaic energy.

Bilateral cooperation in the field of renewable energy between China and India is also taking place within the framework of the BRICS group. Chinese renewable energy companies have made important contributions to the development of renewable energy in India. Chinese companies entering the Indian market are mainly engaged in trade and investment in PV inverter manufacturing and other fields.

The BRICS group will produce approximately 18 exajoules (input equivalent) of renewable energy during 2022, which equals 30% of global renewable energy production. China is considered the leading country in this sector among the BRICS member states, as shown in Figure No. 2

Figure (2) Source: Global Statistical Analysis of Energy, 72nd Edition, Energy Institute, 2023

Despite the remarkable cooperation among the BRICS countries in the field of renewable energy, the alignment of strategic planning between the BRICS countries should be strengthened to achieve more results in several directions:

First, implement various planning policies, including the strategic cooperation plan for renewable energy, the plan for building energy infrastructure, and the plan for cooperation in renewable energy production.

Second, countries need to improve the BRICS renewable energy framework, insist on mutually beneficial cooperation as the only way to green development and sustainable development for BRICS members, promote investment between China and countries, and expand interaction with other countries in this field of clean energy.

Third, promote more coordinated and in-depth cooperation in this field, specifically increasing green technologies and strengthening advanced institutions in the wind energy and photovoltaic industries in the BRICS countries.

New energy development has become the main concern of the BRICS countries. At the 14th BRICS Leaders' Meeting, the leaders of the five countries agreed that they needed to address climate change and implement the United Nations 2030 Agenda for Sustainable Development. In order to guide development towards a green and low-carbon future, member states need to discuss mechanisms and policies to enhance cooperation in the field of renewable energy, develop a list of BRICS cooperation projects in the field of renewable energy and the mechanism of action, and strengthen BRICS cooperation in the field of renewable energy.

Nuclear energy on the map of the BRICS countries: China is leading the way with its plan to build 24 new nuclear reactors, one of which will be connected this year. India aims to connect eight new nuclear power plants by 2027. Three future BRICS members—the United Arab Emirates, Egypt, and Argentina—are building new nuclear reactors. In second place comes India, which plans to build eight new nuclear power plants and connect them to the grid by 2027, followed by Turkey with four and South Korea with three reactors. We find here that, along with China, India, and Russia, three of the five BRICS members are among the top eight in nuclear energy production. As of January 1, 2024, Saudi Arabia, Iran, Ethiopia, Egypt, Argentina, and the United Arab Emirates will join as new members. In three of these six future member states-the United Arab Emirates, Egypt, and Argentina-new nuclear reactors are currently being built.

Location of the new BRICS group on the global energy map:

The BRICS group, with its new members, constitutes a well-established bloc in the global energy market in terms of energy production from various sources and types. The group will produce about 40,355 thousand barrels of oil per day in 2022, which is about 30% of the total global oil production, as shown in Figure 3. Saudi Arabia ranks first in oil production with approximately 12,136 thousand barrels per day, followed by Russia with about 11,202 thousand barrels per day.

Figure (3) Source: Global Statistical Analysis of Energy, 72nd Edition, Energy Institute, 2023

In terms of natural gas production, the BRICS member countries will produce more than 1,436.9 billion cubic meters in 2022. This amount is more than a quarter of the global production of natural gas (26%). Iran and Russia are considered the primary producers of natural gas in the group's countries. Figure No. 4 shows global natural gas production and the BRICS share of this production.

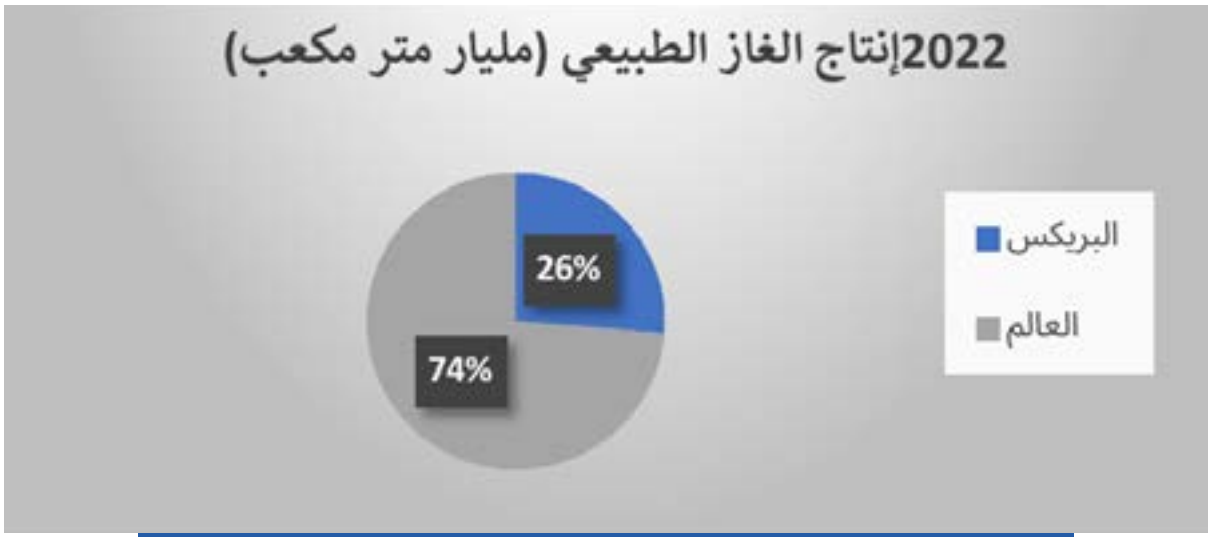


Figure (4) Source: Global Statistical Analysis of Energy, 72nd Edition, Energy Institute, 2023

The group produces more than 40% of global coal production. It produced more than 5,822 million tons in 2022. China is considered the main producer of coal among member states. As for electricity production, the BRICS members will produce about 14,164.7 terawatt-hours during the year 2022.

This amount is more than 33% of global electricity production, and China, India, and Russia are considered the largest electricity-producing countries in the group. Figure No. 5 shows the share of the BRICS group in the production of both coal and electricity globally.

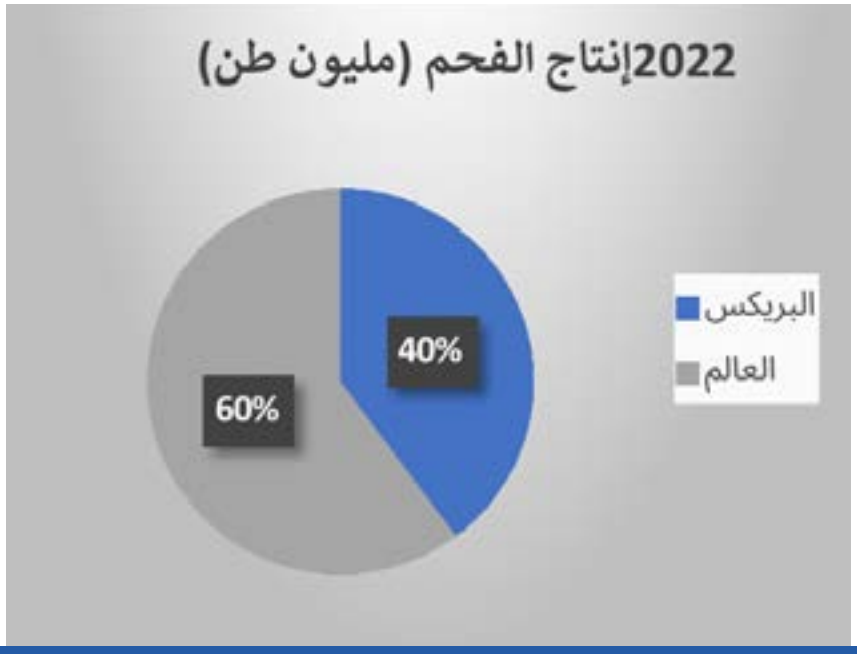


Figure (5) Source: Global Statistical Analysis of Energy, 72nd Edition, Energy Institute, 2023

As for global energy consumption, the BRICS group is considered a major consumer in the global energy market in its various sectors. Figure No. 6 shows energy consumption during the year 2022 for the BRICS countries compared to global energy consumption in the same year, estimated in input equivalents (exajoules). The figure shows that the BRICS countries as a whole constitute the largest proportion of the consumer sector in the global energy market which makes it play an important role in the demand for energy of various types.

Figure (6) Source: Global Statistical Analysis of Energy, 72nd Edition, Energy Institute, 2023

The accession of new members, such as Saudi Arabia, the United Arab Emirates, and Iran, makes the BRICS include three of the world's largest oil exporters and the most important centers of global oil supply. Managing the oil market will remain the responsibility of the Organization of the Petroleum Exporting Countries and its allied producers (OPEC+). But in the long run, an enlarged BRICS group could matter a lot to energy markets; OPEC+ countries have complained for years that Western energy sanctions imposed on Iran and Venezuela have restricted investment flows and exports.

More recently, the EU ban on Russian crude oil and seaborne petroleum products and price caps imposed by the EU and G7 have created a new sanctions mechanism targeting revenues rather than export volumes. Exporters are concerned that new sanctions tools may target them in the future, and they are also concerned about G7 interventions that have reshaped energy flows. Hence, the emergence of the expanded BRICS group represents a balance of power that enhances energy security within the current changes in the global energy market.

The enlarged BRICS group includes both oil and gas exporters and two of the largest importers, China and India. Since both have refused to join the "price cap coalition" targeting Russia, producers and consumers in this group have a common interest in creating mechanisms for trading goods outside the G7 financial sector.

Achieving such a goal is no easy matter. Energy trade continues to be denominated in dollars for several reasons: the dollar is liquid and freely convertible (in contrast to China's use of capital controls and opaque financial sector regulations), and many of the world's largest oil exporters peg their currencies to the dollar.

Since the broader concept of energy security includes ensuring the supply of energy, maintaining the stability of energy prices at tolerable levels, and preserving the environment, the expansion of the BRICS group through new members supports energy security from the supply side, at least for the member states. It also enhances global energy security by balancing the dominance of the G7, which relatively maintains price fluctuations, especially within the current circumstances of sanctions imposed on Russia and pressure on the Organization of the Petroleum Exporting Countries (OPEC). Also, partnerships between member states, especially in the renewable energy sector, will preserve environmental sustainability, which is also in the interest of energy security.

Conclusion:

Since its establishment, the BRICS group has sought to be a global political and economic player, enhancing economic, trade, and investment cooperation among member states, coordinating positions on global and regional issues, and promoting sustainable development, as well as seeking to reform the global financial system and enhance its role in global decision-making. This is in addition to its call for the existence of a common currency that has the strength of the dollar, and it seeks to attract investors to support this trend.

In the past decades, the BRICS countries have played a vital role in the global economy. The economic growth and social inclusion policies in the BRICS helped stabilize the global economy, enhance job creation, reduce poverty, and combat inequality. thus contributing to achieving the Millennium Development Goals; thus, we are witnessing a geopolitical shift in which leading developing countries are given a greater voice in the international system and thus challenge Western, especially American, dominance.

The main challenges facing the BRICS group are the possibility of actually implementing the group's proposals, in addition to the existence of internal agendas for those member states, and the possibility of harmonization between them with regard to issues of global governance and cooperation among the members of the group. This is in order to enhance strength and economic growth and overcome global crises such as food security, health care in developing countries, and other important issues.

Many forecasts indicate the future control of the BRICS group at a rate equivalent to 44% of the global economy by the year 2040, especially with the establishment of the "BRICS Bank," which is expected to cause a monetary, financial, and economic transformation in the world, especially with the future financing and investment injections into it by member states, especially the Kingdom and the Emirates. The bank pays special attention to the areas of technology transfer, promoting innovation, solving food security, energy, and health problems, developing sustainable infrastructure, and creating sustainable economic development, especially in developing countries. In addition to the existence of a common currency for the group, if the new BRICS currency stabilizes against the dollar, this may lead to a decline in the value of the dollar and a weakening of the strength of American economic and political sanctions around the world.

Regarding the future of energy, after joining the list of new countries, the group accounts for about 42% of oil production, 38% of gas production, and 67% of coal production in the global market. The joining of the UAE, Saudi Arabia, and Egypt carries within it a strategic economic partnership between these countries and the BRICS group. The UAE and Saudi Arabia have a strong, growing, and influential economy, which represents an important gain for the BRICS group and increases the size of their economies. The two countries are also major players in global energy markets, and their joining the BRICS group brings many benefits to the group by stabilizing the security of energy supplies for major consumers, specifically China and India. The joining of the two countries also opens new horizons of cooperation and strengthening relations with many countries in the world, especially the countries of the group, which are among the fastest-growing economies in the world.

The most important recommendations:

- The BRICS group should be expanded by attracting rising powers to the benefit of the BRICS bloc so that emerging countries can have a heard and influential voice within the G20.
- Introduce executive initiatives between the BRICS countries and some regional organizations, and moving from the dialogue framework of the joint summits to the executive framework through joint initiatives related to energy security, which are implemented on the ground between these organizations to ensure the attraction of new rising powers for the benefit of the BRICS grouping in the future.
- Introduce initiatives to establish joint projects between the countries of the group, especially with regard to the future of energy security and how to overcome the various obstacles and challenges facing energy security.
- Strengthen frameworks for joint dialogue among the countries of the group on the challenges facing the group and working to overcome and confront them.
- Enhance cooperation among the group's countries in the field of renewable energy and enhance energy infrastructure.
- Get use of the international circumstances surrounding the energy sector for the benefit of the countries in the group.
- Strengthen relations between the countries of the group and enhance intra-trade.

Energy in Africa (Diversity and Impact)

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Summary of the Research:

When we search for energy issues, we find that they are the main driver of all development issues, are linked to all aspects of life, are also linked to food, and are linked to war, peace, and progress, as they are the key to civilization and progress. By reviewing the enormous capabilities of the continent as well as its latent ones, despite the depletion of African continent resources over the past years, it has not yet revealed many of its secrets. This study examined the continent's potential for energy resources of all kinds, whether from renewable or non-renewable sources and their locations, and came up with a set of results and recommendations that would achieve good and joint management for the continent countries.

Keywords: Energy sources in Africa, diversity, renewable energy, fuel.

Introduction:

Energy is everything that a person can do with difficulty, but in the physical aspect, it is also the ability that the body acquires due to its movement, as well as the body's ability to perform work because of it.

It is the driving force of machines and technology, in a simple way; it operates the machines that we use in daily life, which do the hard work for us.

The shortage of energy sources in major industrialized countries has led to external dependence to meet basic needs. This had a profound impact on the foreign policy of these countries as well as their ongoing attempts to find alternatives to oil and natural gas in a way that did not affect their economic situation or international standing under the competition of rising powers, especially China and India.

As time passes, the increase in demand for energy led to competition for energy, which caused various cases of violence and conflicts, whether related to the abundance of resources or the scarcity of resources, and the emergence of violent actors and proxy wars that have taken different forms and gone by different names.

Energy has been linked to climate change, and it has become necessary to find different alternatives to energy sources to confront the effects resulting from global warming, which has been exacerbated by the expansion of the use of fossil fuels, as well as conflicts over resources, especially those related to energy. Energy conflicts stand at the forefront of global conflict in their various forms and manifestations, and the constants of major countries' foreign policies change in a way that serves the goals related to energy security.

Due to this great influence linked to energy sources in foreign policies, the possibility of resources being associated with wars and conflicts increases instead of being a strong and influential ambassador for peace based on integration and common interests.

Since the African continent has many fundamentals, many opportunities, and many hopes related to energy being a gateway to peace, in this paper we will discuss the most important opportunities and challenges and then come up with results that can create common visions in order to benefit from this enormous diversity and opportunities available within the framework of common interests.

Africa's power generation mix

Africa's energy mix has remained relatively stable over the past 30 years. Despite successful renewable energy projects, the overall scope of renewables in Africa is still very small. Africa's current power generation mix is dominated by fossil fuel generation, and there has been a more recent shift in the renewable energy mix through the acceleration of solar and wind technologies, but it is still small at 1.6%.

Africa's current power generation mix can be seen in the next figure.

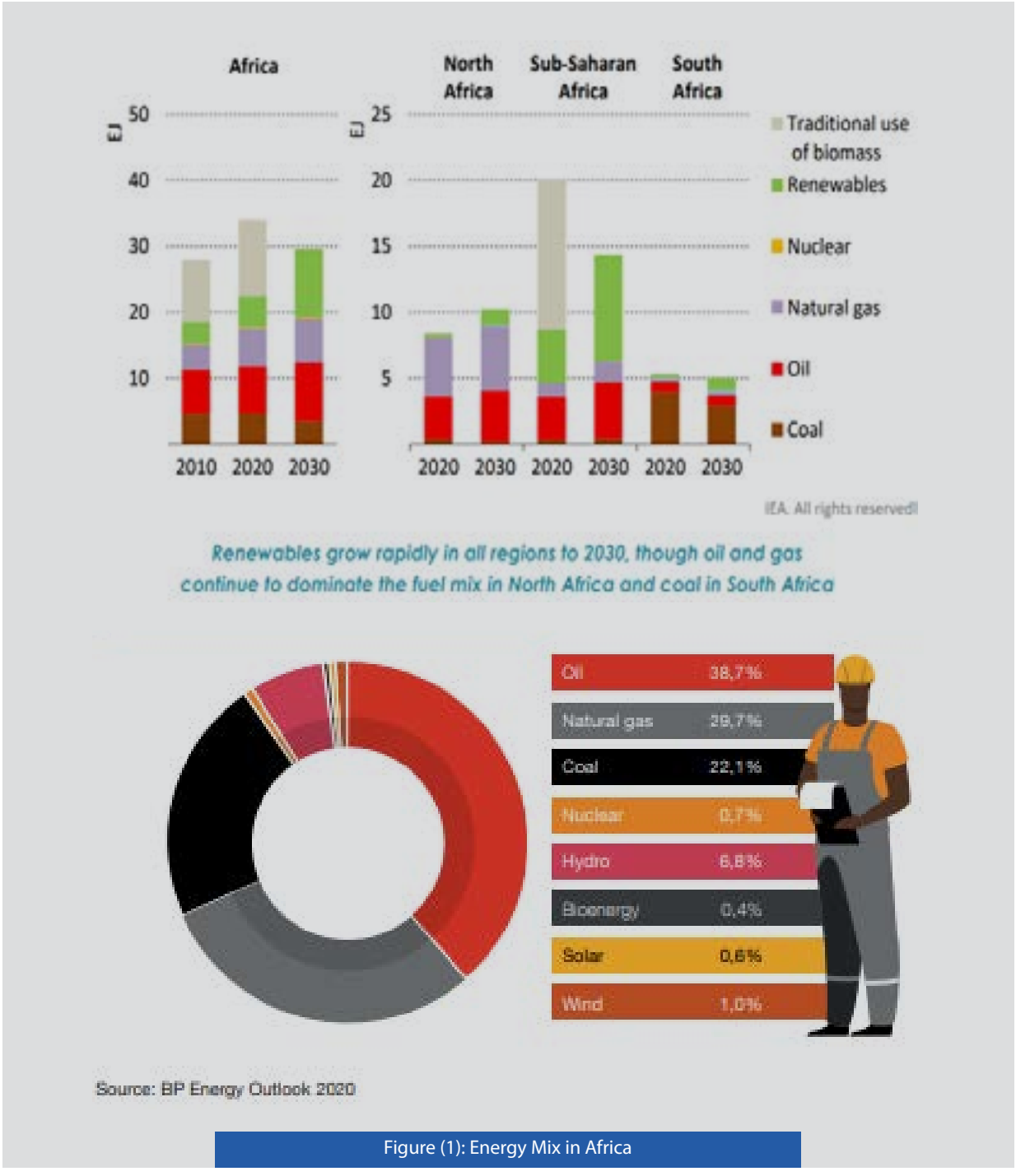


Figure (1): Energy Mix in Africa

Purpose of the study:

Despite the multiplicity of energy sources on the African continent, achieving benefits from this diversity is still subject to many challenges, which this paper attempts to understand and come up with the most appropriate recommendations and proposals necessary for a solution. The World Bank stated that 32 out of 48 countries on the African continent are suffering from an energy crisis.

The inability to manage natural resources, especially those related to energy production, is a major obstacle to development. This problem is particularly evident in some sub-Saharan African countries, where the majority of the population lives without access to electricity or clean energy (Akinwumi Adesina, 2017).

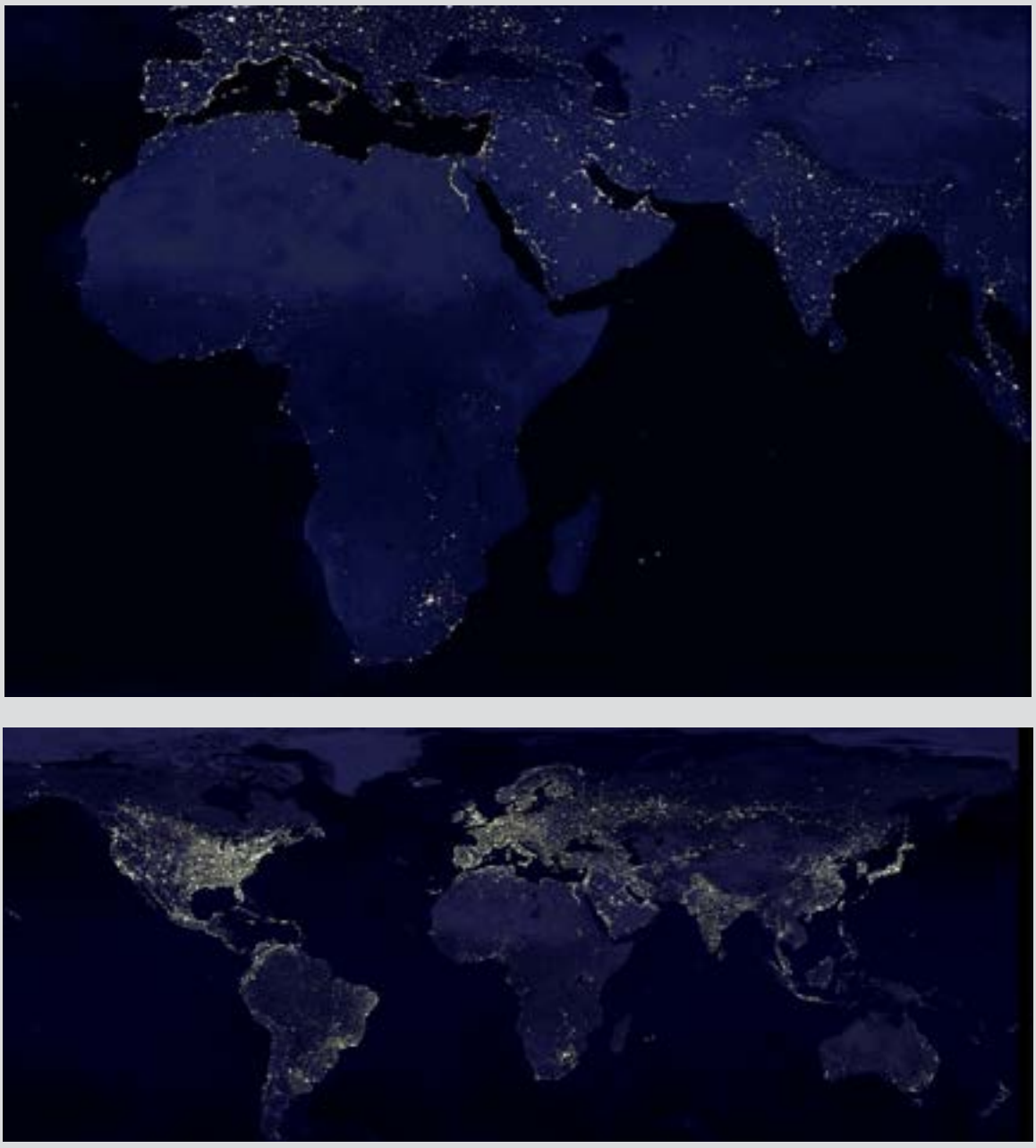


Figure (2): Energy use for lighting in Africa

Figure (3): Electricity access areas in Africa

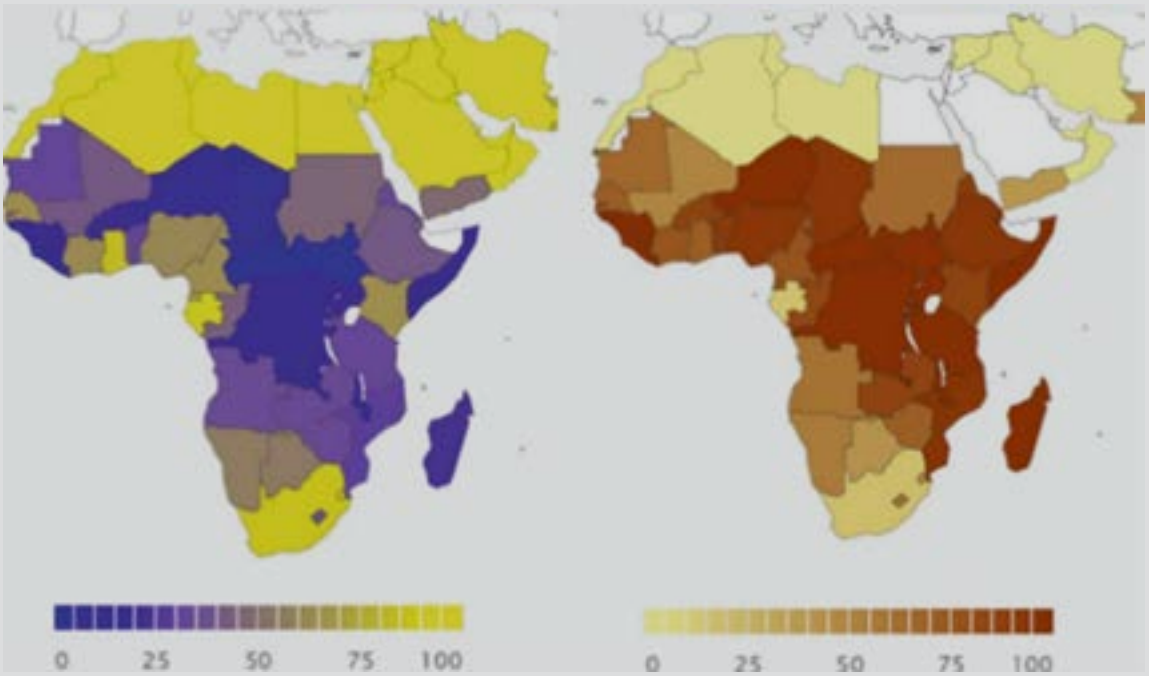


Figure (4): Percentage of population access to electricity, 2018 International Energy Agency database

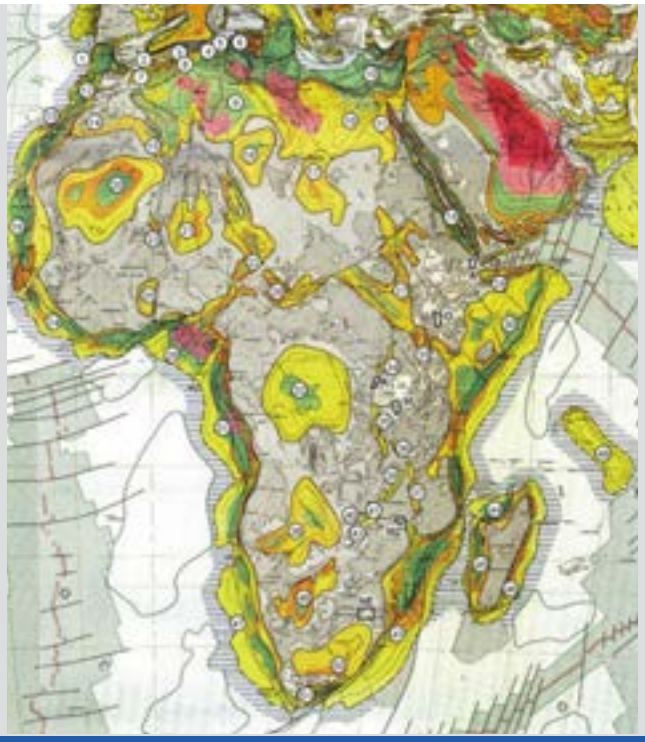
First: Energy from Non-Renewable Sources

It is of a temporary nature, meaning that the available stock in these sources is limited-term, and it is not possible to compensate for the quantities that have been consumed of it, meaning that it exists in nature in the form of a fixed reserve and includes oil, coal, natural gas, and nuclear energy (uranium).

1.Hydrocarbon resources

Geological surveys determine Africa's maximum potential at approximately 1.273 billion barrels of oil and gas associated with oil extraction and 28 trillion cubic meters of natural gas. This means that there is enormous economic feasibility of oil extraction revenues from sub-Saharan Africa. According to British Petroleum, estimations were much lower, at 128 billion barrels of oil and about 41 trillion cubic meters of gas (16 Modelevsky and Modelevsky).

According to a report by the International Energy Agency, recoverable resources are estimated at about 200 billion barrels of oil and 23 trillion cubic meters of gas in sub-Saharan Africa alone.



(Figure 5: Sedimentary basins with known or not yet discovered hydrocarbon potential (Modelevsky 2016

Figure 5 is a map of all sedimentary basins in Africa that have been identified so far with recognized hydrocarbon potential, and it is assumed that other basins are under discovery or awaiting exploration. It is immediately clear that most of the oil and gas is found in the 'continental margin basins' along the coast. In fact, a large portion of the oil available in sub-Saharan Africa (70%), as well as a significant portion of production, comes from deep or ultra-deep offshore fields (Hafner M., 2018).

1.Oil or petroleum:

Oil or Petroleum: A word derived from the Latin origin "Petra," which means rock, and "oleum," which means oil, which means rock oil. The Arabs knew petroleum by many names, including bitumen, petroleum, oil, and tar. It also has a common name, which is black gold, which is a dense, flammable, dark brown, greenish-brown liquid that is found in the upper layer of the Earth's crust and is sometimes called (Nafath) in the Persian language, which means its ability to flow.

It is difficult to find an alternative to it due to the difficulty of replacing alternatives to its use. For example, using gasoline because it costs a small percentage of the price of the car and also using other alternatives requires large investments, in addition to the difficulty of making changes in the consumer's consumption pattern and the lack of alternatives that cover oil consumption. With scientific progress, oil takes a larger place in the production and service fields, in addition to its ease of transportation and storage and the multiplicity of its derivatives. (Masoud Shab, 2018).

Africa is characterized by the presence of oil-producing countries and also has global reserves, which makes African oil of special importance. Its importance is increased due to its huge geographical location, as the continent is located in the middle of the world's continents and oversees the most important shipping lanes, such as the Red Sea and the Suez Canal.

State Reserve of crude oil (billion barrels) Reserve ratio of production

the Production (thousand barrels per day)	Reserve ratio of production (percent)	Reserve of crude oil (billion barrels)	State
1.579	21.1	12.2	Algeria
691	13.7	3.5	Egypt
426	310.1	48.4	Libya
63	18.4	0.4	Tunisia
1.807	17.5	11.6	Angola
73	56.1	1.5	Chad
2.053	49.3	37.1	Congo
280	10.7	1.1	Equatorial Guinea
227	24.1	2.0	Gabon
2.053	49.3	37.1	Nigeria
118	80.9	3.5	South Sudan
43.2	118	3.7	Sudan
128.0	**44.3**	**7,892**	Total

Table (1): The amount of crude oil reserves distributed among some African countries

According to Eni's report, the remaining countries have reserves of approximately 0.1 billion barrels, namely Ivory Coast, the Democratic Republic of the Congo, Gabon, and Tunisia (ENI 2017).

3. Natural gas:

Natural gas is formed as a result of the decomposition of biological elements, whether plant or animal, under the surface of the Earth at a relatively high temperature, under high pressure, and for millions of years. It is distinguished from other types of fossil fuels—coal and oil—in that it contains the largest amount of energy in the same mass, and its burning results in less pollution. Natural gas is used in homes for heating, and it is also used in the manufacture of agricultural fertilizers, paper, chemicals, glass, and plastic, as well as automobile fuel. The rocks of underground reservoirs are characterized by their low porosity, which helps them preserve large quantities of natural gas, water, or oil. The forms of natural gas that are extracted vary, the most **important of which are the following:**

4.Gas associated with oil:

Associated gas is a form of natural gas that is usually found inside oil reservoirs. In the past, it was customary to extract it and dispose of it by burning or taking it out with oil waste, but today it is reused after extracting it.

The continent of Africa has an abundance of proven natural gas reserves that are largely concentrated in the northern parts of the continent and also in the west. Among these countries are Algeria, Libya, Egypt, and Nigeria, the largest gas producers in the world, but other reserves are identified in them, and BP reports indicate that in 2015, Africa had 14.1 trillion cubic meters of total proven reserves, with new areas still to be developed and discovered.

About one-sixth of sub-Saharan Africa's proven natural gas reserves are associated with oil, and gas flaring—that is, the burning of associated gas resulting from oil extraction—is widespread. Sixty percent of gas flaring is in South Africa, followed by Angola, the Congo, and Gabon.

State	Gas reserves in trillion (cubic meters)	Reserve to production ratio	Production (thousand barrels per day)
91,3	49,3	4,5	**Algeria**
41,8	44,2	1,8	**Egypt**
10,1	149,2	1,5	**Libya**
44,9	117,7	5,3	**Nigeria**
20,2	54,9	1,1	**Others**
208,3	68,4	14,3	**Africa**
128.0	**44.3**	**7,892**	**total**

Table (2): Natural gas-producing countries in Africa

Figure (6): Extension of oil pipelines in Africa

5. Coal:

Coal reserves are limited to the south of the continent and are estimated at approximately 36 billion tons of raw coal, 90% of which is in South Africa. The reserves are located in Mozambique, Zimbabwe, and Botswana, and a large portion of the coal reserves are located in sub-Saharan Africa.

ductio	ductio	ductio	ductio
142.4	39	9,893	**Algeria**
1.7	186	1.7	**Algeria**
6.3	276	6.3	**Algeria**
150.4	–	**150.4**	**Algeria**

Table (3): The amount of coal reserves in South Africa

(Coal deposits (Red: anthracite and bituminous: Green: lignite

6.Nuclear energy:

The well-known definition of nuclear energy is the energy released as a result of a nuclear reaction, specifically nuclear fission. In practical terms, nuclear power uses fuel made from uranium extracted from the Earth and processed to produce steam and thus generate electricity. Nuclear energy is the only source that can reliably generate large amounts of electricity, known as base-load electricity, without emitting any harmful gases, such as greenhouse gases. Enriched uranium is used as fuel for nuclear reactors and is a naturally abundant radioactive element found in most rocks. When uranium decays or decomposes, heat is produced within the Earth's crust. In a similar way, heat is produced inside a nuclear reactor. (Emirates Nuclear Energy Corporation, 2021).

Africa is a major source of uranium in the world. It exports to the United States and European countries. The African continent contains 18% of the global reserve, and most of the production is concentrated in three main countries: The Republic of South Africa, Niger, and Namibia.

Sandstone uranium is found in Gabon (Mounana, Mikouloungou), Niger, Algeria, the Central African Republic, Zambia, and the Karoo deposits in South Africa. This kind is characterized by its geological simplicity, with weak surface rocks that facilitate the production of uranium from them, which gives a major advantage in production for mining companies.

Distribution and Production of Uranium in Africa:

Uranium mining in Africa is concentrated in three regions:

- Southern Africa is a major source of uranium, which includes the Witwatersrand Basin, Rousing, Karroo Kariba Lake, Shinkolobwe, Domes, and Tropical Region.

- Sub-Saharan Africa is a major exporter of uranium to the world, most of which is exported to the United States and European countries.

The continent contains 850 thousand tons of uranium, equivalent to 18% of the global reserve. The reserve is concentrated in three main countries: The Republic of South Africa (7%), Niger (6%), and Namibia (5%).

Figure (8): The most important African countries with uranium deposits and the percentage of production

Figure (9): Distribution of conventional extractable uranium among selected countries with a large share of uranium availability

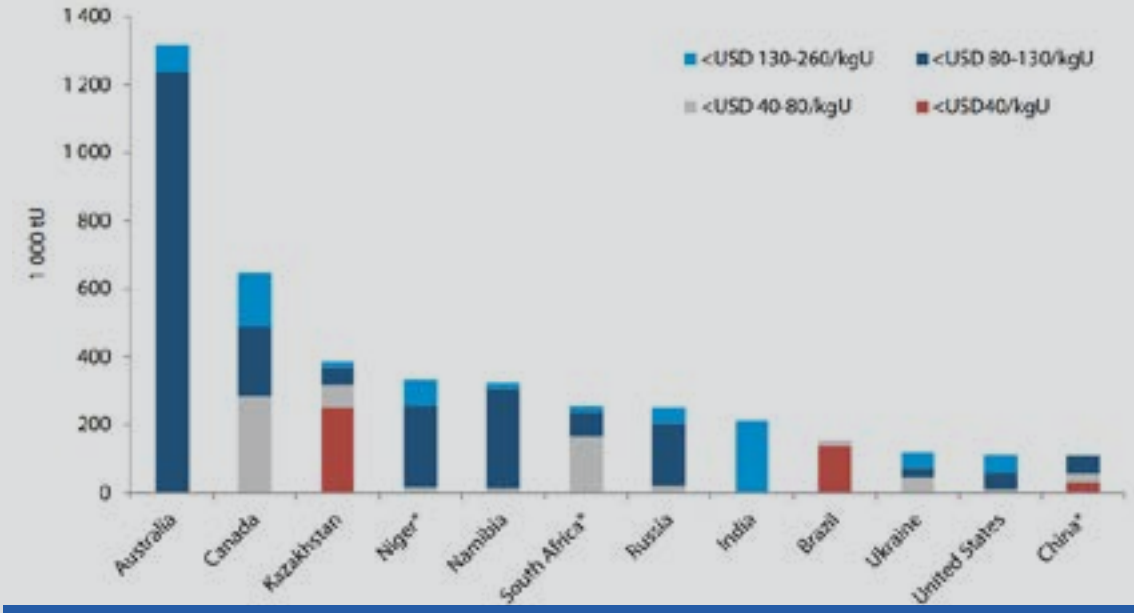


Figure (10): Uranium 2022: Resources – Production and Demand – OECD 2023 NEA No. 7634

Second: Energy from Renewable Sources

It is the kind of energy that has the ability to renew itself and has the nature of renewal and sustainability. Not long ago, generating renewable energy was an expensive option and needed industrial governments to support the transition to clean energy, but today renewable resources have become strategic assets for developing countries, and as global industry grows stronger and demand for energy increases, the cost of technology decreases dramatically. Its potential is also evident with growth in Africa, where solar, wind, hydroelectric, geothermal, and biomass energy resources are available. While it has become clear that renewable energy sources have a major role in the growth process.

The continent has many and varied possibilities for accessing renewable energy sources such as hydropower, biomass, and solar energy, in addition to geothermal energy to provide sufficient electrical energy for citizens, and the International Renewable Energy Agency's Africa 2030 report sets a wide-ranging road map for the energy transition in the African countries.

Africa is currently working to accelerate the adoption of clean energy solutions in line with the African Union 2063 Agenda and Goal 7 of the United Nations Sustainable Development Goals. For example, African countries, such as Egypt, Kenya, Morocco, and South Africa are gradually working to direct these renewable energy efforts. Other African countries such as Ethiopia, Djibouti, Rwanda, and others, have set ambitious goals for renewable energy. Other African countries are following suit, and renewable energy is gradually being adopted across the continent.

The most important:

1. Solar Energy:

Africa is located between latitudes 37 north and 32 south and extends over a wide area that crosses the equator and extends from the two tropical regions. African countries are exposed to a long period of sunlight during the day, which makes them very suitable for producing this type of clean energy.

Solar power plants in the Democratic Republic of the Congo: The state-owned electricity company in the Democratic Republic of the Congo has signed power purchase agreements for two solar power plants in the country. The two solar power plants are located in the towns of Kolwezi and Likasi, with an estimated capacity of 100 megawatts each. The two solar power plants will cost $148 million and $157 million, respectively.

Mogalakwena Solar Power Plant: It has been agreed to build a 100 MW solar photovoltaic power plant at the Mogalakwena mine in South Africa. The solar power plant is part of the country's broader strategy to integrate renewable energy with mining operations and will contribute to carbon neutrality at the mine while enhancing operational efficiency.

Shumba Solar Energy Project: Shumba Energy will make investments totaling $950,000 in the company's $80 million solar energy project. The 100 MW project in Botswana, with full funding expected by the second quarter of 2022, will be the largest project in Botswana, an important step in the company's shift from investing in fossil fuels to renewable energy sources.

Solar plants in Ghana: The Government of Ghana has announced plans to build eight solar power plants in Ghana, and site selection is expected to begin in the first quarter of 2022, with plant capacity determined by the size and specifications provided by investors.

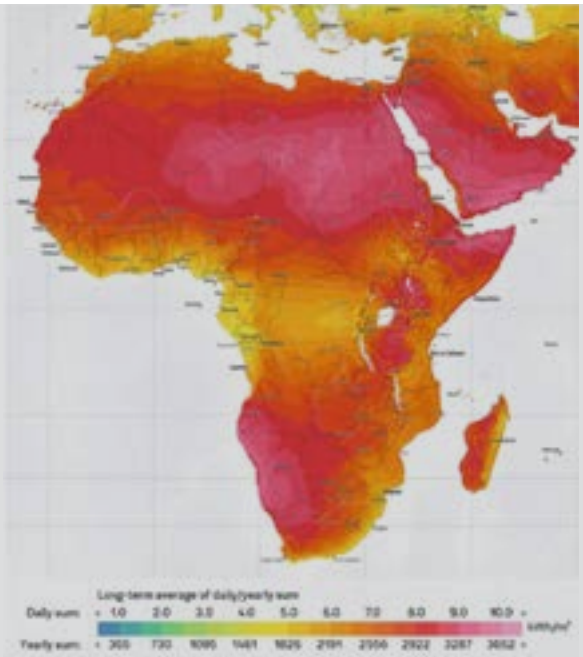


Figure (11): Distribution of solar radiation over the continent of Africa

2. Wind Energy:

Wind energy is extracted from the kinetic energy of the wind using large wind turbines located on land, in the sea, or in fresh water. Wind energy has been used for thousands of years, but onshore and offshore wind energy technologies have evolved over the past few years to produce more electricity using longer turbines and larger rotor diameters.

Wind energy on the African continent is not distributed fairly, despite the capabilities available on the continent to produce this type of energy. The mechanical energy generated by wind turbines can be used to operate a variety of machines, such as irrigation pumps and electricity production. With the possibility of placing them in rural areas and taking into account the geographical location of countries, an additional advantage is added to countries located on the coasts.

In addition to that, there are deserts, coasts, and natural canals that play in favor of high wind speeds in Africa. Therefore, the Sahara Desert becomes a strong candidate, as do the Sahel countries, including Niger, Sudan, Chad, and the mountainous regions of southern Africa (Opportunities, 2018).

The mechanical energy generated by operating a wind turbine can be used to power a range of .equipment, and windmills are permanent assets in rural communities

3. Geothermal Energy:

It is an alternative, clean, and renewable energy source that uses high thermal energy of natural origin stored in the ground. It is estimated that more than 99% of the Earth's mass is rock whose temperature exceeds 1000 degrees Celsius. The temperature rises as we go deeper into the Earth at a rate of about 2.7 degrees Celsius for every 100 meters of depth, meaning it reaches an average of 27 degrees Celsius at a depth of

one kilometer or 55 at a depth of two kilometers, and so on. This thermal energy is mainly used to generate electricity, and this requires digging many pipes to great depths that may reach about 5 kilometers. Sometimes hot water is used for heating when the temperature is close to the surface of the Earth, and we find it at a depth of 150 meters or sometimes in certain areas in the form of hot springs that reach the surface of the Earth.

Theoretically, this renewable energy could be enough to cover the world's energy needs for the next 100,000 years, but converting it into electrical energy is an expensive process. Due to drilling operations to great depths and the need for many pipes to extract hot water in abundant quantities, despite the fact that basic energy (raw material) is free and available in abundance, there is difficulty in obtaining it. Geothermal energy uses the thermal energy available underground. Heat is extracted from geothermal reservoirs using wells or other means. Reservoirs that are hot and exhaustible are known as hydrothermal reservoirs, while reservoirs that are sufficiently hot and are enhanced by hydrological stimulation are called enhanced geothermal systems.

Figure (12): One of the geothermal energy production stations

Once at the surface, liquids of different temperatures can be used to generate electricity. The technology of generating electricity from hydrothermal reservoirs has been ready and reliable for use for more than a hundred years.

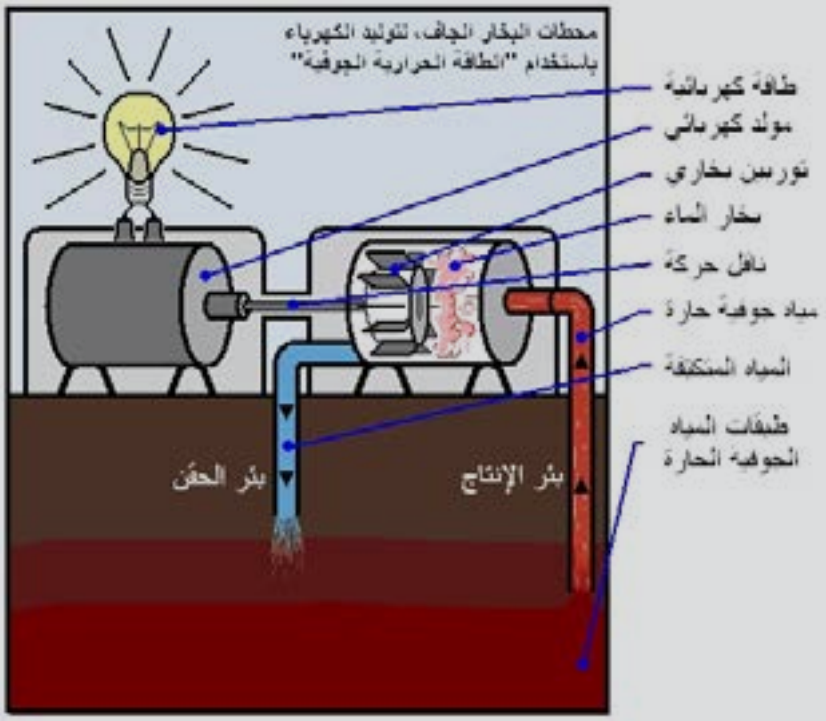


Figure (13): The idea of producing electricity using geothermal energy

Geothermal energy is converted into electrical energy in power plants using geothermal energy. There are three types of power plants using geothermal energy, which are as follows:

A) Dry steam plants:

This method is the oldest and most common, and it is the same method that was used in Italy in 1904 AD. These stations use water that is naturally present in the deep layers of the Earth and is under the influence of high pressure and temperature. It is extracted by drilling deep wells to come out in the form of water vapor. Because of its high temperature and because of the pressure difference.

This steam flows through pipes and is then sent to turbines that drive electrical generators that produce electrical energy. The condensed water is pumped into the ground through another well called an injection well.

B) Evaporation plants:

These plants use high-pressure fluids underground; they are concentrated in a vessel with a small hole that leads to another vessel with moderate pressure. When the liquid moves from the first vessel to the second through the hole, it evaporates due to the speed and high-pressure difference. The steam drives the turbine, which in turn drives electrical generators that produce electricity. The remaining condensate water is pumped to the ground through the injection well.

C) Double-circuit plants:

These plants use underground liquids with a high boiling point (about 200°C) and are pumped to the top, where they heat normal boiling point water (100°C) in another tube that runs alongside the hot tube (heat exchanger). The water that has been heated due to the high temperature

of the liquid in the other tube evaporates. The steam drives the turbine of the electric generator, condenses, and returns back into alignment with the hot tube, moving in continuous rotation. The extracted water is pumped back into the ground via the injection well.

D) Use in heating and air conditioning:

Exploiting geothermal energy for heating and air conditioning requires high temperatures, so it uses wells of medium depth and is easy to operate. For example, the famous Swedish company IKEA has begun heating its spacious stores in the winter with hot water extracted from the ground at a depth of 150 meters. This heat is also used in the summer to operate air conditioning machines. IKEA is working in collaboration with the US Department of Energy's National Renewable Energy Laboratory to use geothermal heat in its 39,000-square-meter sales floor located in Denver, Colorado. (Ladislaus Rybach, September 2007).

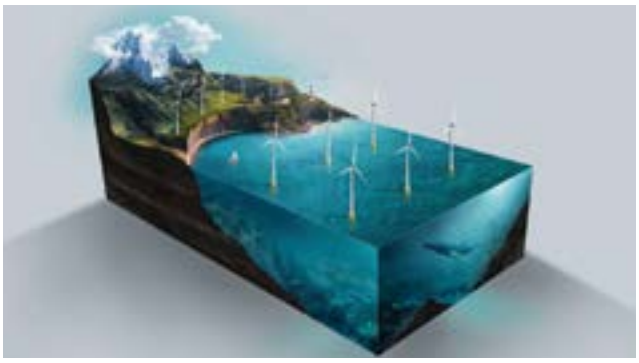
E) The positives of this energy:

- Renewable energy, as it is one of the energy sources that does not run out, at least for the coming generations.
- Clean energy that is not harmful to the environment and does not cause any pollution, whether in its extraction, conversion, or use.
- It is available in very large quantities, in vast areas, and in most countries in the world.
- Low energy production costs exceed the initial costs of producing the plant, which can be prohibitive.
- High yield of extracted energy.

4. Hydroelectric energy:

- The term hydroelectricity is considered a comprehensive term for electricity and water together. Energy is generated by exploiting water energy to generate electrical energy. It is considered very clean energy and is widely spread. In the process of exploiting this energy, we rely entirely on the potential energy in the water, or potential energy, and convert it into kinetic energy through the fall of water and its flow from top to bottom, so that the generation data turbine is managed, so the electric generator begins to rotate and thus works to produce electrical energy.
- Across Africa, hydropower is responsible for 84% of non-fossil fuel energy use. But on a continent rich in lakes and rivers, the opportunities for expanding the exploitation of hydroelectric power are enormous.
- Many energy experts believe that large dams have a vital role to play in solving the energy supply crisis in Africa, but they are accompanied by a complex set of social and environmental challenges.

To address these challenges, international hydropower organizations and development banks are developing sustainability standards-guidelines that will assess and estimate the continent's water resources (Bello, 2014).



Rank	Based on drainage area		Based on length		Based on average annual total discharge	
	Name	Drainage area ('000 km²)	Name	Length (km)	Name	Average annual total discharge (km³/yr)
1	Amazon	6 915	Nile	6 670	Amazon	6 923
2	Congo	3 680	Mississippi*	6 420	Ganges	1 386
3	Murray	3 520	Amazon	6 280	Congo	1 320
4	La Plata	3 160	Yangtze	5 520	Orinoco	1 007
5	Ob	2 990	Mackenzie*	5 472	Yangtze	1 006
6	Mississippi*	2 940	La Plata	4 700	La Plata	811
7	Nile	2 870	Hwang Ho	4 670	Yenisei	618
8	Yenisei	2 580	Mekong	4 500	Lena	539
9	Lena	2 490	Lena	4 400	Mississippi*	510
10	Niger	2 090	Congo	4 370	Mekong	505
11	Amur	1 855	Niger*	4 180	Chutsyn	430
12	Yangtze	1 800	Ob	3 650	Ob	404
13	Mackenzie*	1 790	Yenisei	3 490	Amur	380
			Murray	3 490		
14	Ganges	1 730	Volga	3 350	Mackenzie*	325
15	Volga	1 380	Indus	3 180	St. Lawrence*	318
16	Zambezi	1 330	St. Lawrence*	3 060	Niger	300
17	St. Lawrence*	1 030	Ganges	3 000	Volga	255
			Yukon*	3 000	Nile	84

Source: Adapted from *World Water Resources and Their Uses*, Joint SHI/UNESCO Product, prepared by Prof. Igor A. Shiklomanov, 1999.

* Partly or entirely in Canada.

(Figure (14): African energy review (2021

Figure (15): Source: Ministry of Electricity and Energy

Storage hydropower plants rely on water stored in a reservoir, while downstream hydropower plants exploit energy from the riverbed.

Hydroelectric reservoirs often have multiple uses: providing drinking and irrigation water, flood and drought control, navigation services, and energy supplies.

6. Bioenergy:

The term "bioenergy" refers to the energy, heat, or electricity that can be obtained through various processes from various biomass sources that store carbon that is released once it decomposes in the form of carbon dioxide gas, traditionally through the direct burning of agricultural and forest waste and wood to produce thermal energy necessary for cooking, water heating, and heating in rural and remote areas, sometimes using modern methods, including organic waste treatment.

The bioenergy source is considered a strong competitor to oil sources because of its high prices. It is classified as one of the renewable energy sources. The most common sources used in producing sustainable biofuels are plants, agricultural waste, algae, wood, and methane gas extracted from waste.

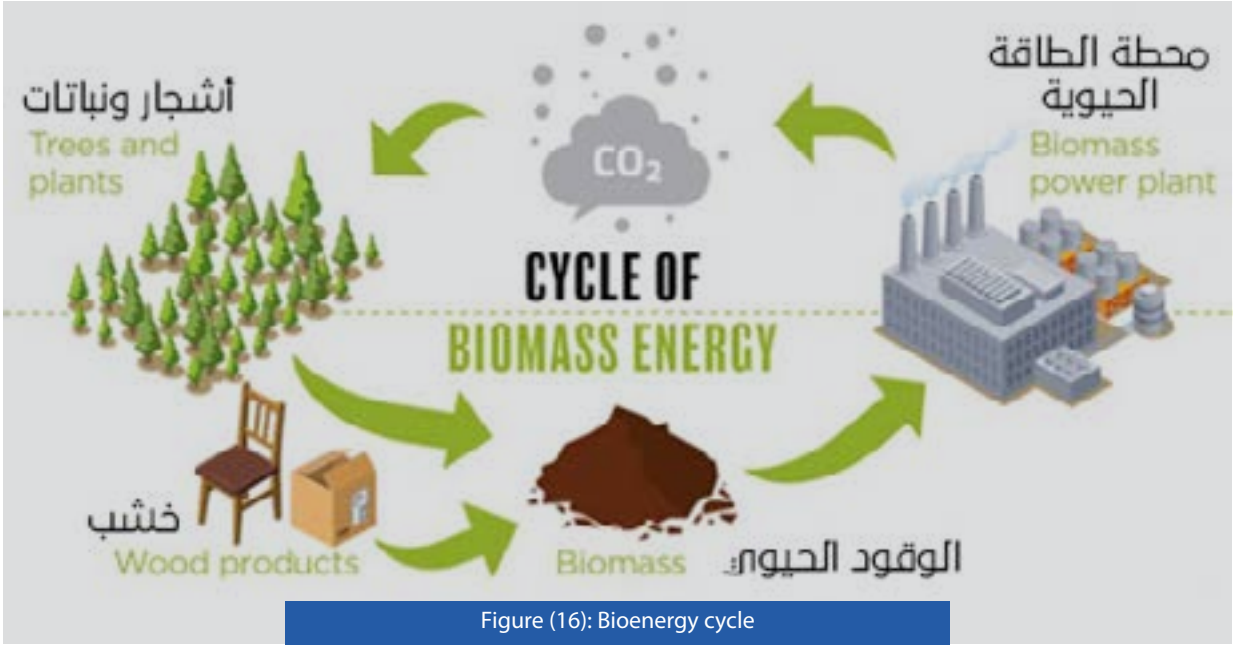


Figure (16): Bioenergy cycle

7. Green hydrogen:

Green hydrogen is produced through electrolysis, which breaks down water into two basic elements: hydrogen and oxygen, without by-products.

8. Marine energy:

Marine energy is derived from technologies that use the kinetic and thermal energy of seawater (waves or currents, for example) to produce electricity or heat.

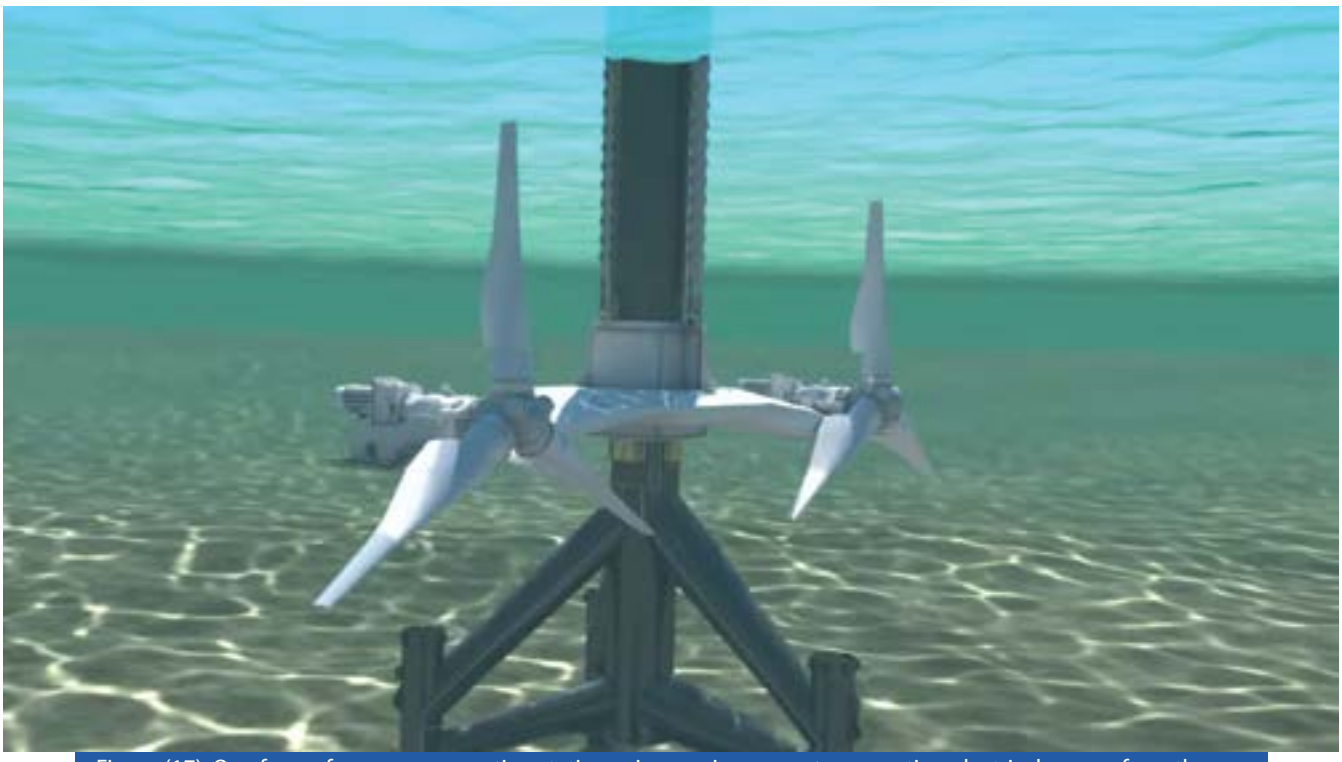


Figure (17): One form of a power generation station using marine currents generating electrical energy from the sea

There is no doubt that there is a huge amount of energy contained in tidal waves; the energy needs of people around the world can be met by them, as water covers two-thirds of the Earth's surface. So researchers around the world are conducting experiments to design smaller power plants. Today, there are already 150 projects to generate energy from the sea.

British Petroleum's estimates were much lower, estimating 128 billion barrels of oil and about 41 trillion cubic meters of gas (16 (Modelevsky and Modelevsky)

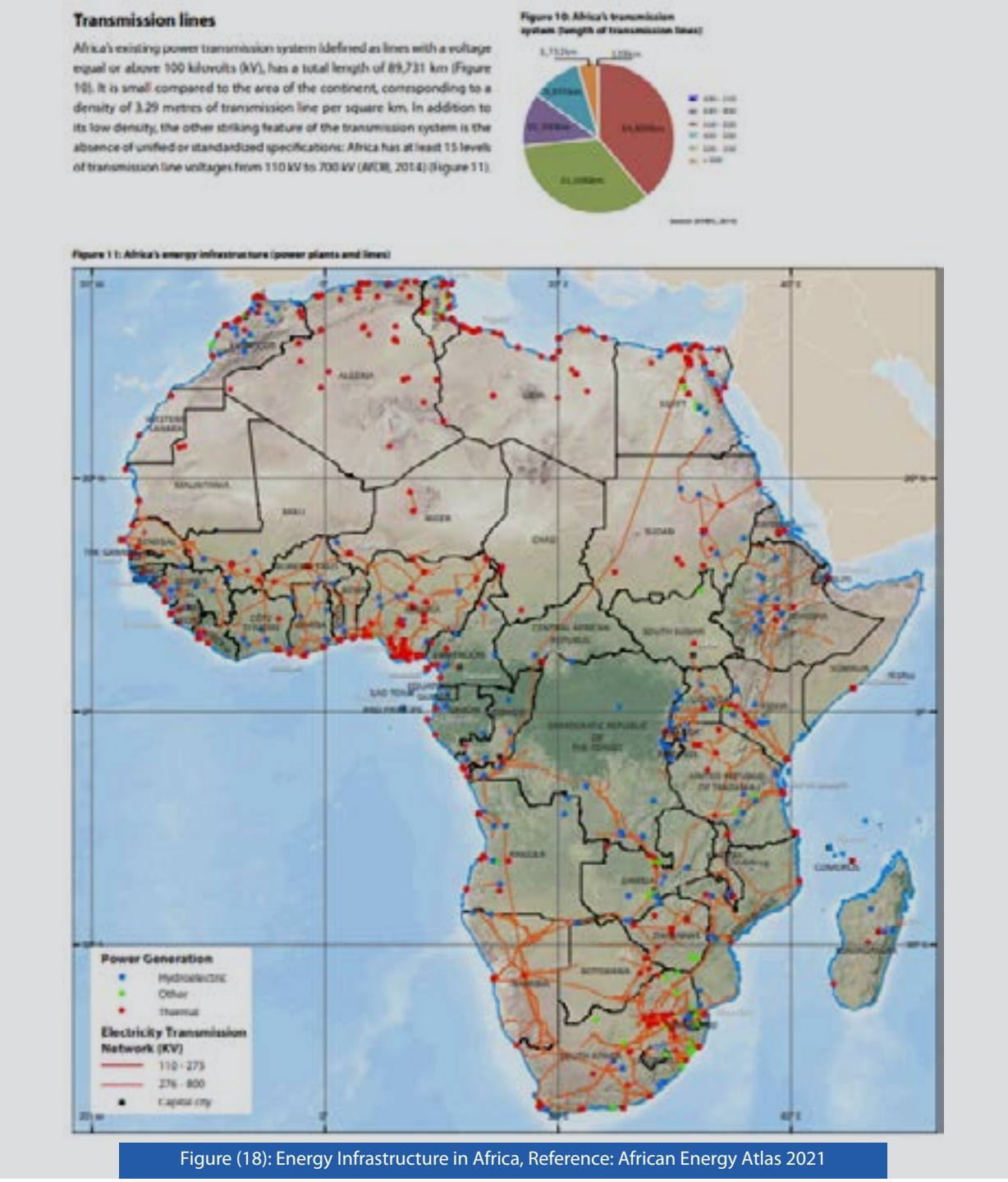


Figure (18): Energy Infrastructure in Africa, Reference: African Energy Atlas 2021

Challenges Facing the Energy Sector in Africa:

The rise in military expenditures comes at the expense of development in countries suffering from tribal conflicts of all kinds.

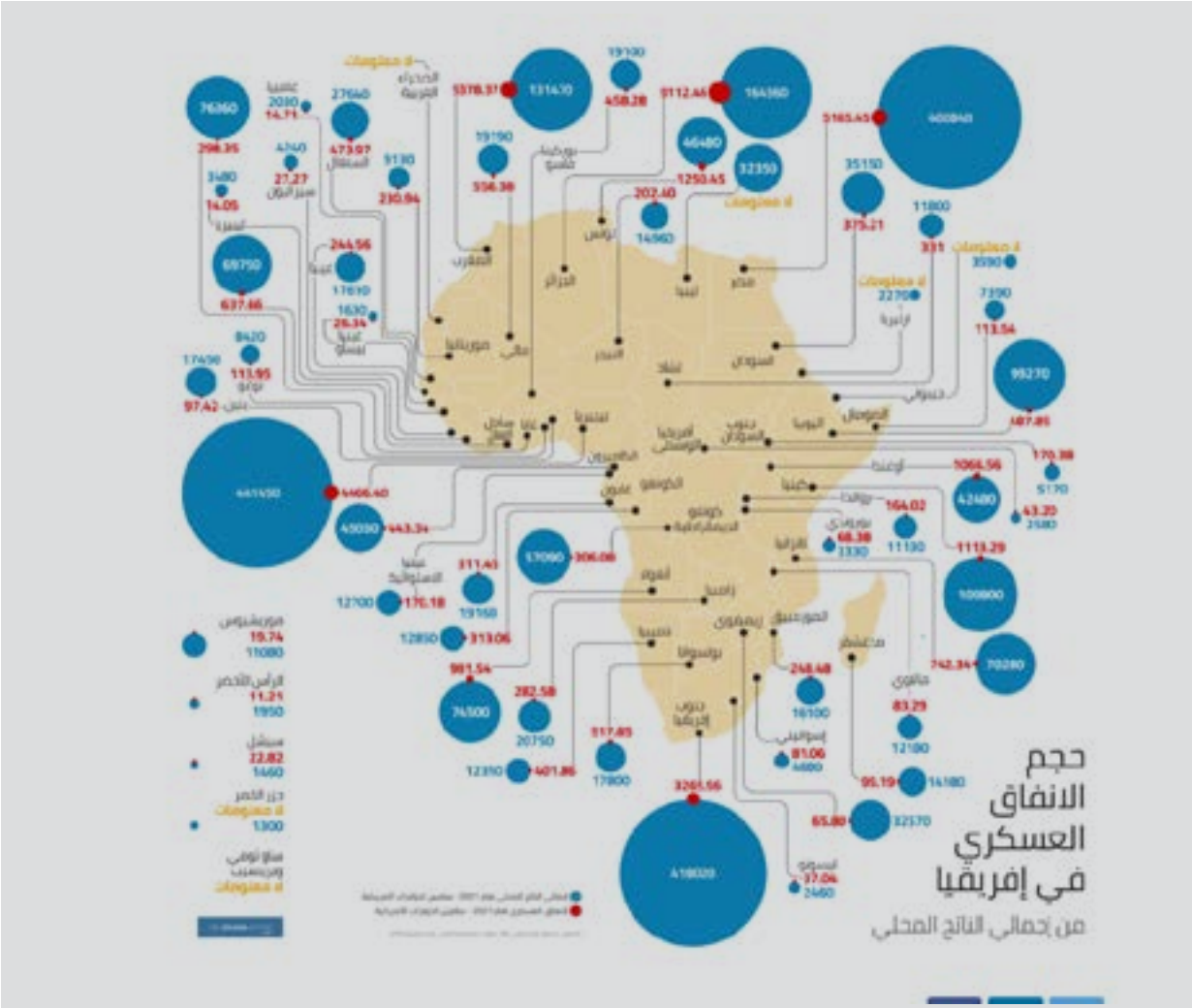


Figure (19): The value of military spending in Africa in relation to GDP

External interventions often conflict with the interests of international actors and interest groups, which has double negative effects: the depletion of resources and the emergence of violent actors and armed groups that are often used to manage resource conflicts without regard to the interests of these countries on the continent.

Weak investments in energy put pressure on financing ambitious and effective projects on the continent, for example, the completion of the Inga Dam project in the Democratic Republic of the Congo.

The inability to manage natural resources, especially those related to energy production, is a major obstacle to development, and this problem is particularly evident in some sub-Saharan African countries, where the majority of the population lives without access to electricity and clean energy.

Conclusions:

-The continent has sufficient resources to meet its current and future needs.

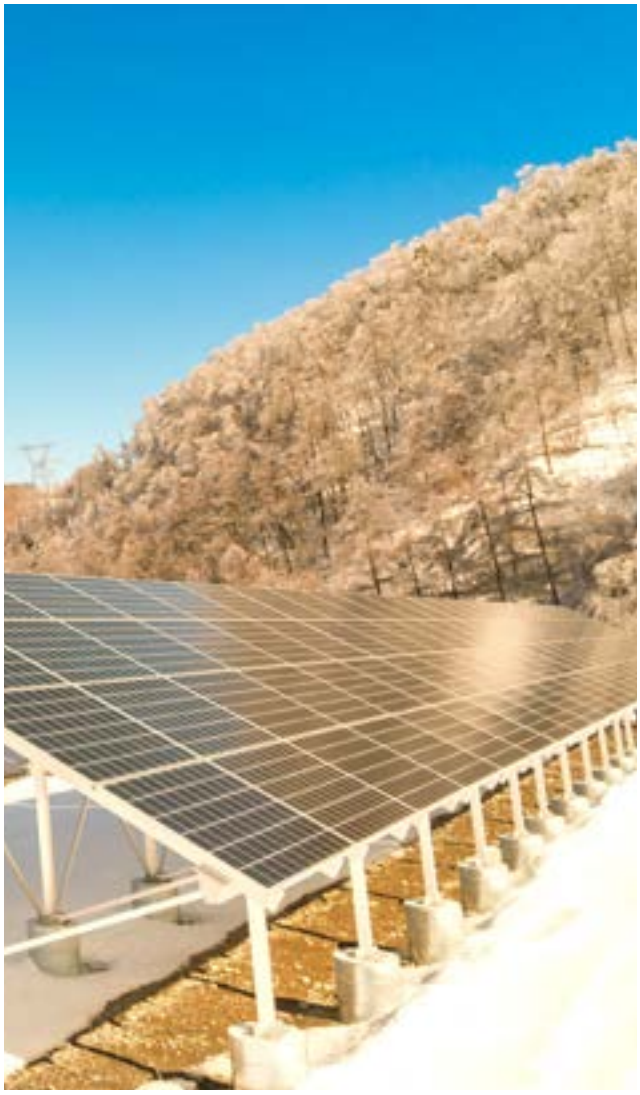
(Akinwumi Adesina, 2017).

-The continent has enormous potential to produce energy in all its forms that is sufficient for its needs, whether from renewable or non-renewable sources.

-There is a state of uncertainty in energy data in Africa, which requires the development of scientific research capabilities and continuous support for work in the field of African energy using all modern methods and means, satellite visualizations, and geographic information systems.

Recommendations:

- The continent, with its capabilities, still needs a lot of research, especially in the field of new and renewable energy.
- More development projects and lighting areas are deprived of electricity despite all these potential capabilities.
- Maximizing exploratory activities until they converge with extractive activities.
- Establish an organization that monitors resource management, does not replace its revenues with conflict management tools, and prevents them from reaching violent non-state actors who work to deplete resources.
- Reduce military expenditures in favor of developing infrastructure for all activities that achieve the best use of resources to reach the goals of sustainable development on the African continent.
- Expanding the use of environmentally friendly and low-cost nanometer materials to maintain the efficiency of solar power plants (Samir Ahmed Tayel, 2022).
- More support for scientific research and innovation in the field of energy in Africa.
- Support cooperation mechanisms between different sciences to achieve research goals, as the interconnection of sciences is inevitable; implement the results of innovative studies and research in order to develop renewable energy technology, increase energy efficiency, and improve the sustainability of the energy sector on the continent.
- Using environmentally friendly and low-cost nanomaterials in the geothermal energy industry helps in producing environmentally friendly energy at a lower cost.



Energy Security Concept

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Introduction:

Energy security has become a top political priority and a major component of the national security of any country in the world, and protecting energy security has also become no less important than protecting its territory against any foreign aggression. This drove major countries, such as the United States of America, China, Russia, and Japan, to develop clear strategies to achieve energy security in strategic regions, including the Middle East region, which is one of the most important production regions in the world. It also pushed many countries in the world into conflict and competition in order to control the largest share of various energy resources, control their sources, and control their supply centers.

Energy security is a term whose meaning varies between the industrialized countries, the largest oil importers, and those that produce and export it. The first category defines it as the ability to achieve an abundance of energy supplies without any interruption by diversifying their sources. As for exporting countries, its meaning is linked to the presence of consuming markets and acceptable prices, as well as the presence of the necessary infrastructure capabilities. Among the countries of the world, the countries of the Middle East play a pivotal role in securing energy supplies and stabilizing global energy markets in all their forms. The geographical location of the Middle Eastern countries makes them enjoy diverse sources of energy, from oil and natural gas all the way to renewable energies and hydrogen, which countries are now competing for and aspire to diversify energy sources through.

The International Energy Agency defines the term 'energy security' as the uninterrupted availability of energy sources at affordable prices. Energy security has different foundations and aspects. It can be long-term or short-term, or it can be at the international or local level. Any shortage or interruption in energy supply operations for a short period usually causes strong fluctuations in energy prices, which causes violent turbulence in the processes of supply and demand, and if this state of weak supply continues for long periods, its effects will be reflected negatively on growth rates. The other side of energy security is long-term, with the aim of securing energy sources at sufficient rates in order to meet future demand, especially during crises.

The concept of energy security globally

Important changes have occurred in the global energy sector over the past short period, which led to a rethinking of many previously adopted concepts and policies regarding energy security and its connection to the geopolitical roles resulting from countries' ambitions for energy transition, diversification of energy sources, and achieving sustainability in this sector.

The world aspired to the idea that the transition to sustainable energy sources would create a clean new world and moderate political challenges, avoiding previous conflicts. However, radical shifts have occurred in the energy sector since 2020 that accelerated the transformations, such as the European energy crisis that led to a rapid and high rise in gas prices. This in turn was reflected in crude oil prices and the rapid and uncoordinated European rush to quickly obtain alternatives to Russian fuel that was banned because of the Russian-Ukrainian war. Earlier, there was the COVID-19 pandemic spread and its impact on supply chains.

The meaning of energy security historically has been "the availability of sufficient supplies of energy at acceptable prices." However, due to previous changes in the global energy system, this definition is currently unrealistic. Security risks are now more complex and dangerous than before, and it has become clear that an energy system without security or with disturbed security means rising energy prices and perhaps other political and economic disturbances for which countries and people will pay.

According to an article entitled "The Age of Unsafe Energy" in the American Journal of Foreign Affairs, we must redefine the concept of energy security and develop new policies to deal with energy security. According to the article, there are four ways to deal with the future: diversification of energy sources, resilience in energy utilization, integration (meaning removing barriers to multiple uses of machines and supplies), and transparency. This means that when formulating future energy policies, politicians must take into account the role of oil and natural gas, work to eliminate the largest possible amount of carbon emissions from them, and achieve a balanced equation between diversifying sources, securing supplies, and acceptable prices, as well as taking into account the environmental dimension of climate change. And its negative repercussions due to carbon emissions.

The concept of energy security in the middle east

The concept of energy security may be extremely important in the Middle East region because of its geostrategic importance and geographical location. The Middle East possesses many energy sources, especially oil and natural gas, which are the secret of power and superiority and the key to controlling the world's requirements for economic progress. Hence the importance of competition for energy sources in the region is a major determinant of interactions between all regional and international parties. The Middle East region is one of them, which is the geographical region extending from Turkey in the north to Yemen and Somalia in the south, and from Libya and Egypt in the west to Iran in the east, and expanding to include Algeria, Morocco, Cyprus, and Afghanistan.

Accordingly, the Middle East region is distinguished by the fact that it is an important center in the global energy market, and it will remain one of the most

significant regions in the list of energy-supplying regions, especially during the coming decades. Energy sources, especially oil and natural gas, are considered an important focus for determining the patterns and forms of competition in the Middle East region, and they transform countries in the region or countries outside the region into major players in the energy competition game. This is reflected in the reformulation of the strategic policies of the competing parties according to what has become known as the term (energy geography, which is a term that means the study of energy resources in terms of their characteristics, diversity, and geographical distribution, globally and at the level of political units; Thus, the importance of the Middle East lies in the availability of energy from its various sources, especially oil and natural gas. It alone contains approximately 70% of the world's oil reserves, in addition to the availability of renewable energy sources and its distinctive geographical location.

Various dimensions of energy security

The concept of energy security combines various dimensions, but the most important are:

The economic dimension: The primary goal of the economic dimension of energy security in consuming countries is to ensure that the scarcity or shortage of energy resources does not lead to delaying economic growth, increasing inflation, unemployment, or other negative effects that have an economic dimension that affects the country. The economic dimension of energy security in producing countries also reflects the image of the economic dimension in consuming countries, meaning ensuring stable revenues for their products from energy exports.

As for the political dimension: It is often affected by the foreign policies and decisions of oil-producing and exporting countries, which are reflected in the decisions and affairs of the countries that depend on them to secure their energy needs. Such as the European energy crisis caused by Russia's war, on which Europe relies mainly to secure its needs.

Eastern Mediterranean gas: The recent discoveries in the Eastern Mediterranean Basin have led to a major impact on the energy security equation in both Europe and Asia and the entry of new producers in the Middle East region, namely Israel, Lebanon, and Cyprus. At the same time, these discoveries led to a worsening of the situation between Lebanon and Israel on the one hand and Turkey and Cyprus on the other, in addition to the Arab-Israeli conflict and the ongoing clashes that deprive the Palestinians of opportunities to invest their oil wealth and build their livelihood.

Global competition for energy sources in the middle east

The Middle East has always been one of the operations theatres that witnesses' battles of geopolitical competition between the great powers, as it is a vital area for their national security, and its political and economic interests are intertwined there. The region has found itself part of the political deals that followed World Wars I and II and at the heart of the bone-breaking battle of the Cold War, which laid the roots of the current unrest and left devastating political effects that still reverberate throughout the region.

Consequently, the Middle East is not isolated from the geopolitical tensions currently raging in various regions of the world but rather an integral part of international and regional conflicts. Therefore, one of the first implications of energy source competition in the region is to accelerate the pace of transition to achieve energy security, price stability, and national flexibility in the long term.

The implications of controlling energy sources have had a sovereign influence on political and economic decisions in this world under the term 'energy security'.

Therefore, energy sources in the region are on the cusp of oil price qualitative restructuring based on the supply and demand equation in consideration of international competition for them to map Middle East energy in the coming years.

Therefore, one of the most significant implications is the increase in the size of regional and international interests in the region under the term 'energy conflict', which refers to a state of competition and struggle to secure and acquire energy sources around the world. For that reason, many countries are moving toward increasing their investments in the field of energy—oil and natural gas—in the Middle East. Thus, we rely entirely on energy sources on an ongoing basis and are linked to their existence. Therefore, the diversity of energy sources allows competing parties to choose the source obtainable to them, which is a global goal that all parties seek to achieve in order to confront the negative effects of these changes.

Accordingly, the competing parties realized the necessity of adopting this global approach to compete for energy sources in the Middle East. Because God has endowed it with the abundance of these energy sources, especially oil and natural gas, which are considered a safety valve for all countries in the world, it is a cornerstone for regional and international dealings in order to invest energy in the region. Therefore, we find that all competing parties aim in their national strategy to secure access to their energy needs more insistently than in previous eras. There is also a consensus that energy sources in the region are capable of achieving sufficiency among the competing parties due to the multiple uses of energy and the diversity of their sources.

How do conflicts affect energy security?

Historic changes have occurred in the world of energy systems due to recent conflicts, especially in the Middle East. It is known that supply chain disruptions resulting from crises affect all sectors of the economy, including the energy sector. These disturbances hinder energy supplies and affect their prices, resulting in an inflation crisis.

With oil prices reaching their highest levels since 2008, the world is still facing a crisis in the supply chain after the end of the coronavirus epidemic, in addition to the crisis of the Russian-Ukrainian war and the accompanying rethinking about searching for clean energy sources with low carbon emissions. In general, the issue of energy transition and

climate change has become a matter of hesitation and disagreement regarding energy security. This creates more confusion in energy policies, which may hinder the energy transition and make investments more focused on energy security rather than energy transition. Of course, the Middle East is one of the most important regions currently concerned with this issue. Especially the Arab countries, whether they play a significant role among the oil-producing and exporting countries, such as the Kingdom of Saudi Arabia and the Gulf countries in general, or which have taken serious steps toward energy transition, energy diversification, and taking climate change into account in terms of expanding renewable energy projects.

The International Renewable Energy Agency defines the term 'energy transition' as a pathway toward the transformation of the global energy sector from fossil-based to carbon neutrality. Applying energy efficiency and renewable energy practices are examples of the options that can achieve the required 90% carbon emission reductions. There is a need to provide an additional framework of policies, legislation, market instruments, investments, information technology, and smart technology to accelerate the path toward carbon neutrality.

The strong initiatives taken by many countries to localize and diversify supply chains since the invasion of Ukraine and the global pandemic are also playing a role in weakening the new energy security. Procedures of this kind are understandable in light of the clear risks arising from over-reliance on certain countries, especially China, in the new geopolitical era. After all, a coherent global energy system remains the cornerstone of energy security, and markets remain the most effective way to distribute supplies. Meanwhile, increasing self-sufficiency may give countries the illusion of greater resilience, but it may also put them at risk. A coherent global market could mitigate disruptions caused by climate change or political instability. Climate change poses a major threat to energy security in the coming decades, poses risks to old and new infrastructure, and reduces reliance on hydropower sources due to water problems, drought, and other implications on energy transmission and distribution methods.

Energy transitions around the world

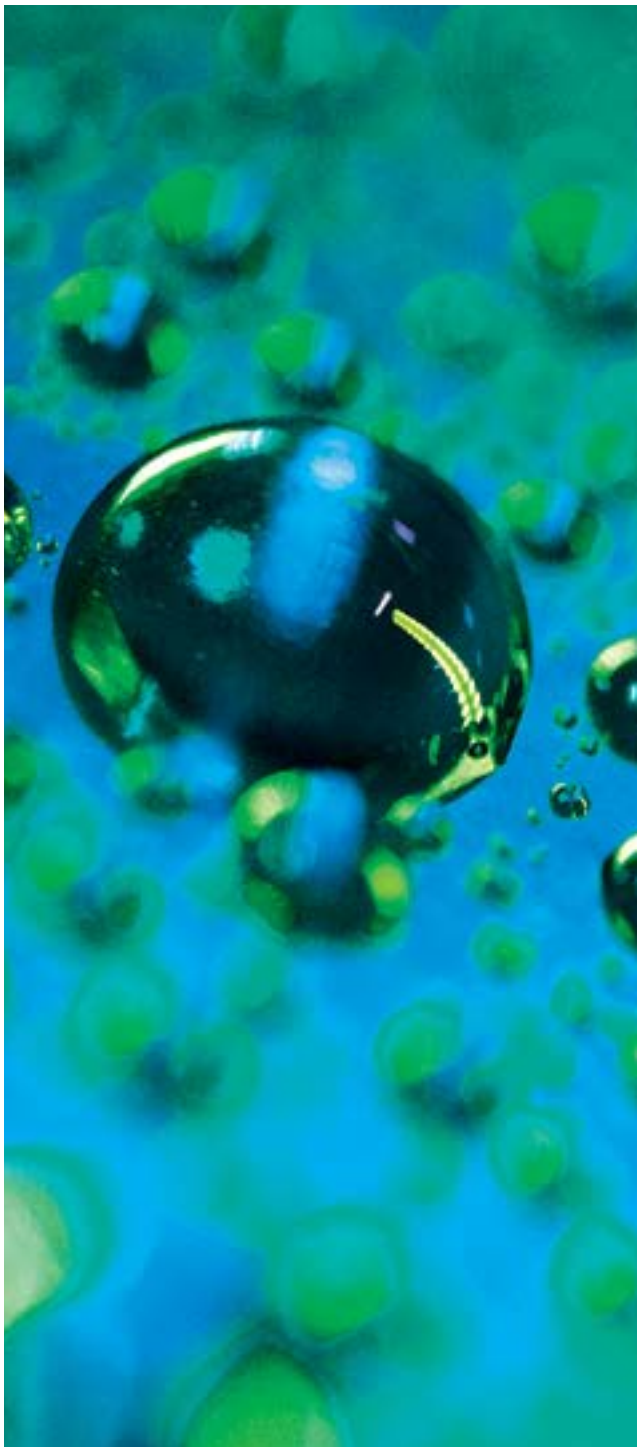
According to the International Renewable Energy Agency's report on the future of energy around the world, there is a consensus that an energy transition based on renewable energy sources and technologies, which will enhance energy efficiency and rationalize its consumption, is our only way to reduce global warming and its climate change implications for everyone. This overall transition is based on technology, policies, and markets. Over the past years, renewable energy has outperformed the amount of its contribution added to the grid annually and has outperformed both fossil fuel and nuclear energy together in the global market due to its new ability to generate electricity after it became the cheapest source of electricity generation in several markets. What's more, a record level of 295 gigawatts of generation capacity based on renewable sources was added in 2021 globally ahead of the subsequent successive global crises, which was a promising path that would ensure the decarbonization of the energy sector at a rapid pace. Yet the world's attention has once again turned to fossil fuels to fill the deficit in energy sources, especially gas, after the Ukrainian war and its implications on the global economy, and once again, the world resorted to diversification of sources instead of an overall transition to clean or low-carbon energy.

According to the report, by 2050, electricity will be the main carrier of energy, as its share of total energy consumption will rise from 21% in 2018 to more than 50% in 2050, and the boundaries between sectors have begun to shift to rely on electrical systems in end-use applications in both transportation and electrical heating sectors. This increase is mostly due to the use of electricity generated from renewable sources instead of fossil fuels. When this transition occurs, the annual growth rate of renewable energy technologies will increase eight times. Reliance on electrical systems for end uses will also contribute to changing several sectors, most notably the transportation sector. Electric cars will constitute 80% of the total activity in a year.

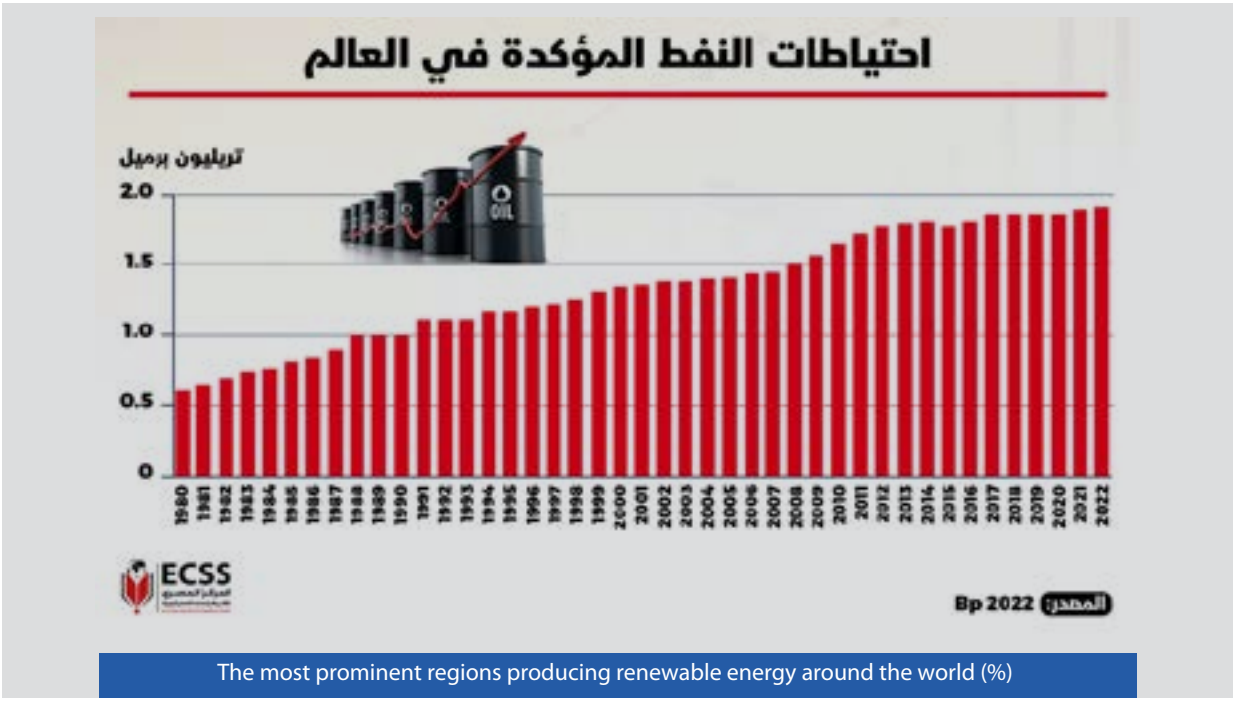
Energy transition challenges

The energy transition should be viewed from a different and perhaps more complex perspective, especially after the global changes we mentioned regarding all stages of energy supply and consumption chains as a result of recurring global crises and international and political conflicts that have begun to change the concept of energy security regionally and globally. As more countries in the Middle East consider adopting net-zero carbon targets by 2050, as it is quickly becoming the norm among some of the world's highest carbon-emitting countries, the limitations need to be considered and addressed.

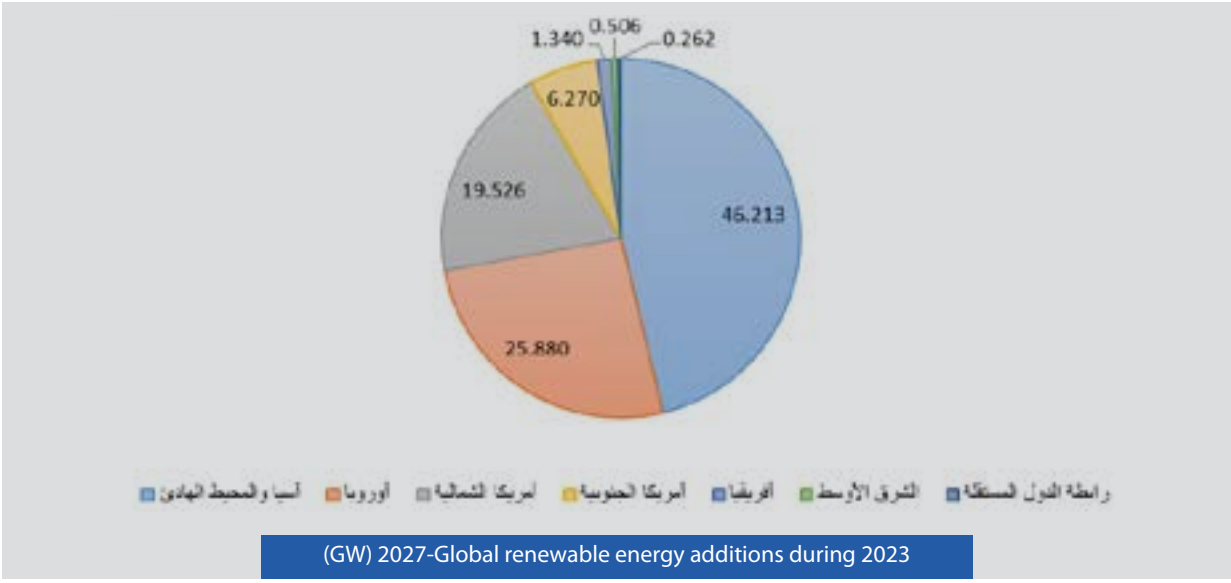
For example, blackout problems associated with solar PV and wind could be improved through battery storage, but this technology is still expensive and has not yet reached the necessary maturity and scale. In addition to the necessity of expanding the infrastructure for electric car charging stations and boosting reliance on electric cars, as all international reports in this field expect,



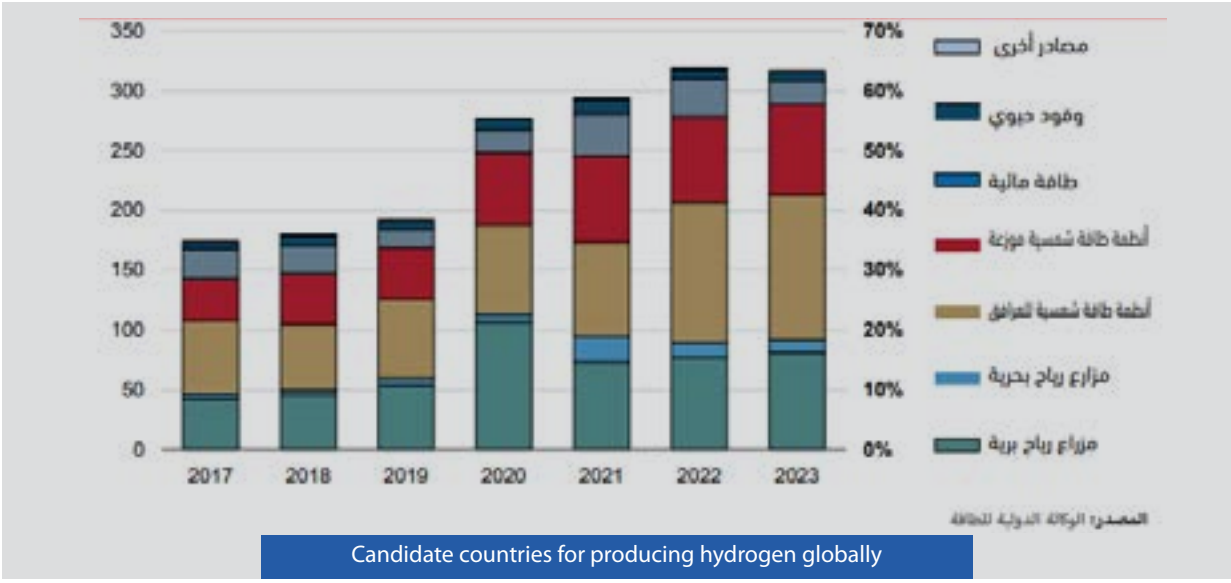
Moreover, as we transition from carbon-intensive fuel sources to greener energy, we will need to rely on natural gas as a transition fuel, which is a much cleaner fuel than coal or fossil fuels. In fact, the Middle East does not show a significant decline in natural gas production even under a net-zero emissions scenario by 2050, according to the roadmap for the global energy sector recently released by the International Energy Agency. At this stage as well, hydrogen seems to be promising in the energy transition, and many countries may bet on it, whether through production, transportation, or export, as in Europe. Using existing gas infrastructure to transport hydrogen gas would be a less expensive and better solution to reducing reliance on petroleum. Countries such as the Kingdom of Saudi Arabia and the United Arab Emirates have made significant investments in both green and blue hydrogen stations. Egypt also signed, during the Climate Summit (COP27), more than 23 memoranda of understanding and nine agreements for projects to produce green hydrogen and its derivatives and rely on them to transport and export energy. However, there are still challenges regarding storage and pressure enhancement mechanisms to ensure safe transportation using current systems. In addition, hydrogen production remains expensive under current technologies.



The most prominent regions producing renewable energy around the world (%)

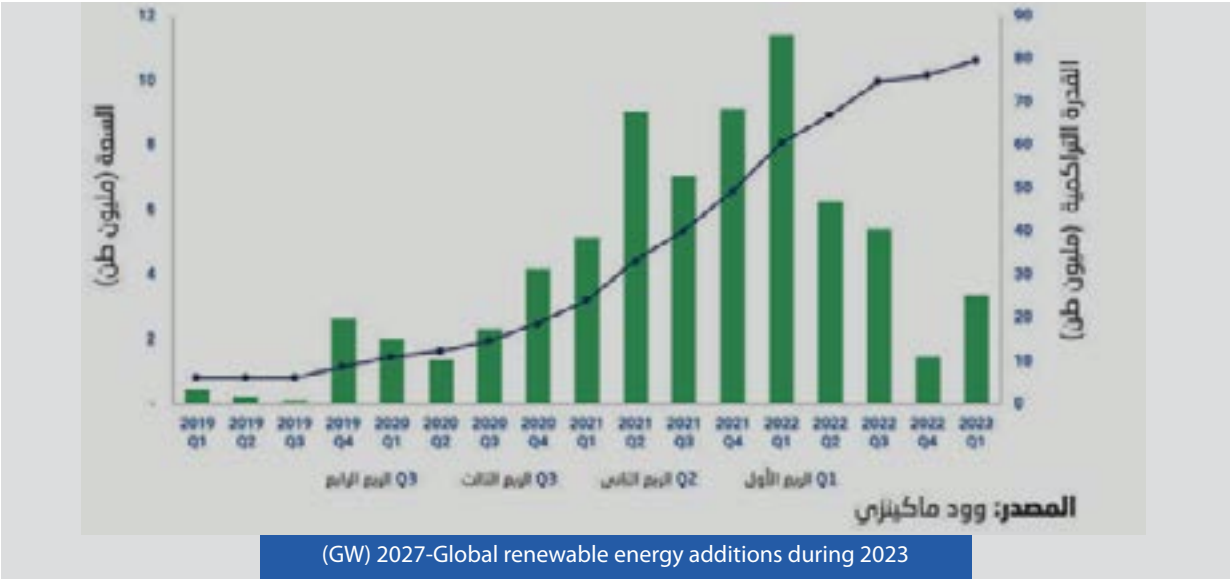


(GW) 2027-Global renewable energy additions during 2023



Candidate countries for producing hydrogen globally

(Green hydrogen projects announced globally (million tons



(GW) 2027-Global renewable energy additions during 2023

In conclusion:

The Middle East is one of the most important regions in the world, according to its geostrategic characteristics. The history of the region has always been present in the face of the efforts and aspirations of international powers seeking influence and dominance. These efforts were strengthened after the discoveries of oil there in the 20th century, which was reflected in countries' awareness of it, especially geostrategic powers searching for global influence. There is no doubt that energy is one of the causes of competition and conflict in the Middle East, and the new discoveries in the Eastern Mediterranean basin highlight two things: The first of them, the importance of the Middle East region has increased in terms of production and reserve resources as well. Secondly, it has become a cause for creating other problems in the region, especially with regard to the problems of demarcating borders and economic zones and the challenges of energy transmission lines to Europe and global markets.

Recommendations:

- Increase investments in renewable energy projects from diverse sources; this is to achieve the environmental dimensions of climate change as well as the economic dimensions of countries and to secure their energy sources at prices lower than fossil fuels.
- Develop policies and laws that would secure energy sources for neighboring countries by transporting and exporting energy in all its forms.
- Develop infrastructure to rely on blue and green hydrogen as a transport and storage of energy.
- Research and development regarding increasing the efficiency of renewable energy technologies, components, and electrolyzes for hydrogen projects and reducing the cost
- The necessity of setting clear goals and visions regarding energy transition and carbon neutrality.

The Issue

The Repercussions of the Military Coup in Niger on Energy Security

Niger: Geographical and Historical Information

Prepared by the Research and Studies Department at Saif Bin Helal Center

Niger is one of the poorest countries in the world; it has minimal government services and ranks last in the world on the UNDP Human Development Index. Despite the disruption of the largely subsistence-based agricultural economy, the Nigerian government continues its attempts to diversify the economy by increasing oil production and mining projects. In addition, Niger faces increasing security concerns on its borders due to various external threats, including insecurity in Libya, the spillover of conflict and terrorism in Mali, and violent extremism in northeastern Nigeria. 'Niger' was given this name, which is pronounced in the indigenous language "Ni-Zahir", after the 4,200 km long Niger River, which begins in Guinea, passes through Mali, southwest Niger, and western Nigeria, ending in Benin. The name of the river is taken from the indigenous term "Ni Gir," meaning "Gir River." The capital of the country is Niamey; this name, according to tradition, was originally the site of a fishing village named after a prominent local tree referred to as "Nia Niame." The capital of the country is Niamey; this name, according to tradition, was originally the site of a fishing village named after an important local tree referred to as "Nia Niame."

Niger is located in West Africa, southeast of Algeria, with a population of 25,396,840 people, and consists of 7 major administrative regions: "Agadez", "Diffa", "Dosso", "Maradi", "Tahoua", and "Tillaberi", and "Zehnder". In addition to "Niamey", an independent administrative region is located within the "Tillabery" administrative region.

The present-day nation of Niger arose from nomads in the north of the Sahara and farmers in the south. The Touareg Kingdom of Takeda was one of the largest kingdoms in the north and played a prominent role in regional trade in the 14th century. The main ethnic groups are the Songai-Zarma in the southwest, the Hausa in the center, and the Kanuri in the east.

When European colonists arrived in the 19th century, the region was a collection of disparate local kingdoms. In the late 19th century, when the British and French agreed to divide the central regions of the Niger River, France began its invasion of what later became the colony of Niger. France experienced determined local resistance, especially during the Tuareg uprising (1916–1917), but established a colonial administration in 1922.

Niger gained independence from France on August 3, 1960, and its national day was December 18, 1958, that is, before its independence day. After its independence from France, Niger experienced one-party rule or military rule until 1991, when political pressure forced General Ali Sebou to allow multi-party elections. Political infighting and democratic backsliding led to coups in 1996 and 1999. In December of that year, army officers restored democratic rule and held elections that brought Mamadou Tandja to power, who was re-elected in 2004, before leading a constitutional amendment in 2009 that allowed him to extend his presidential term. In February 2010, military officers led another coup that ousted Tandja, after which Issoufou Mahamadou was elected in April 2011 and re-elected in early 2016. In February 2021, Bazoum Mahamed won the presidential elections, marking Niger's first democratic transition from one elected president to another, but the military junta seized power again in late July 2023. President Bazoum was arrested and announced the establishment of a national council to save the homeland. Niger follows a semi-presidential republican system; its president since April 2, 2021, is Mohamed Bazoum, and its prime minister since April 3, 2021, is Ohoumoudou Mahamadou. As for the legal system in the country, it is a mixed "civil" system, based on French civil law, Islamic law, and customary law.

The Constitution of Niger was approved by referendum on October 31, 2010, entered into force on November 25, 2010, and was amended in 2011 and 2017. Constitutionally, the Constitution is amended by amendments by the President of the Republic or Parliamentary proposals, and they must be considered by at least a three-quarters majority of the votes of Parliament, and their approval requires a majority of at least four-fifths of the votes. If the proposed amendment is rejected, it will be dropped or put to a popular referendum. The non-amendable constitutional articles are those related to the form of government, the pluralism system, the separation of state and religion, the disqualification of members of parliament, procedures for amending the constitution, and amnesty for participants in the 2010 coup.

The President of the State is elected directly by an absolute majority of the popular vote in two rounds, if necessary, for a term of five years, extendable for a second term. Here it is noted that the last presidential elections were held on December 27, 2020, and the runoff took place on February 21, 2021. The next presidential elections are scheduled to be held in 2025.

The President of the Republic appoints the Prime Minister with a mandate from Parliament. Parliament consists of 171 seats by law, but it currently has only 166 seats, and 158 members are elected directly from 8 multi-member constituencies in 7 regions and "Niamey" by proportional representation of party lists. There are 8 seats allocated for elected minorities in special single-seat electoral districts by simple majority voting. There are 5 seats reserved for Nigerien citizens living abroad (one seat for each continent), who are elected in single-seat constituencies by simple majority vote for 5 years. It should be noted that the last parliamentary elections were held on December 27, 2020, and the next parliamentary elections are scheduled to be held in December 2025.

According to the World Factbook (CIA), the parties with seats in parliament in Niger are:

1.Alliance for Democracy and the Republic, Alliance for Democratic Renewal (ARD-Adaltchi-Mutuntchi), led by Laouan Magagi.

2.Alliance of Movements for the Development of Niger, AMEN AMIN, led by Omar Hamidou TCHIANA.

3.Congress for the Republic, CPR-Inganci, led by Maradi Kassoum, MOCTAR.

4.Democratic rotation for justice in Niger.

5.Democratic and Republican Renewal RDR-Tchanji, led by Mahamane Ousmane.

6.democratic movement for the emergence of Niger.

7.National Movement for the Development of Society-Nassara, or MNSD-Nassara, led by Seini OUMAROU.

8.Nigerian Alliance for Democracy and Progress-Zaman Lahia, or ANDP Zaman Lahia, is led by Musa Hassan Baraz.

9.Nigerian Democratic Movement for an African Union, MODEN/FA Lumana, led by Hama Amadou.

10.Niger Party for Democracy and Socialism (PNDS-Tarrayya), led by Mahamadou ISSOUFOU.

11.MPN-Kishin Kassa, led by Ibrahim YACOUBA.

12.Niger Rally for Democracy and Peace.

13.National Movement for the Republic (MPR-Jamhuriya), led by Albade Abouba.

14.Peace, justice, and progress Jill Dubara.

15.Rally for Democracy and Progress-Jama'a, or RDP-Jama'a, led by Hamid Al-Ghabid.

16.Rallying for peace and progress.

17.RSD-Gaskiyya, led by Amadou Chefou.

18.Social Democratic Party PSD-Bassira, led by Senussi Marini.

According to the same source, the political parties banned in Niger are the Sudan People's Liberation Movement and the Sudan People's Liberation Movement-Democratic Change.

Niger is a desert country; its climate is mostly hot, dry, and dusty, and it is tropical in the far south of the country. In 2018, the country's agricultural land accounted for 35.1%, arable land 12.3%, permanent crops 0.1%, permanent pastures 22.7%, forests 1%, and "other" land 63.9%. The proportion of the population in urban areas represents 17.1% of the total population. The annual rate of change in urbanization is expected to reach 4.72% during the years 2020 and 2025.

It was expected and is still expected - between 2000 and 2030 - that internal conflict, rising food prices, and floods will leave the people of Niger unable to achieve food security on a large scale; About 2.87 million people are expected to suffer from acute food insecurity during the lean season period (June to August 2023). Also, insecurity remains persistent or disruptive to livelihoods; this led to the displacement of more than 360,000 people by January 2023, most of them in the regions of Diffa, Tahoua, and Tillaberi. The rise in food prices and the 2022 floods, which negatively affected about 327,000 people, are additional factors exacerbating the food insecurity crisis in the country.

Atlantic drainage: Niger (2,261,741 km2); inland drainage (inland basin): Lake Chad (2,497,738 km2). The main aquifers in Niger are the Lake

Chad Basin, the Loulemiden-Erhazer Basin, and the Murzuq-Djado Basin. The total internal water withdrawal amounts to 190 million cubic meters, for industrial purposes 40 million cubic meters, for agricultural purposes 2.35 billion cubic meters, and the total renewable water resources are 34.05 billion cubic meters.

The country's per capita energy consumption is about 1.54 million British thermal units per person. Accordingly, about 21 million people live without electricity, while about 18.6% of the population enjoys it. Electricity also reaches 65.9% of urban areas and 9% of rural areas, with an installed generating capacity of 324,000 kilowatts and a consumption rate of 1,325,420,000 kilowatts per hour. Fossil fuels account for 94.1% of the total installed power generation capacity in Niger; solar energy is 5.9%; and nuclear, hydroelectric, and geothermal energy, as well as wind, tidal, and wave energy, biomass, and waste.

The country's total oil production is about 8,000 barrels per day, refined oil consumption is about 13,800 barrels per day, and estimated crude oil reserves are 150 million barrels. Niger also produces 15,280 barrels per day of refined petroleum products, exports 5,422 barrels per day, and imports another 3,799 barrels per day. It is noteworthy that Niger neither produces nor imports natural gas. Therefore, do not consume it.

Also, the country's carbon dioxide emissions are 2,374 million metric tons: 499,000 metric tons from metallurgical coke and 1,875 million metric tons from petroleum and other liquids.

History of Military Coups in Niger: Causes and Motives

Prepared by The Research and Studies Department at Saif Bin Helal Center

History of military coups in Niger:

Niger is a country that has been distinguished as one of the countries in the world that has witnessed many coups in a short period. Since its independence from the French occupation in the early 1960s and in less than half a century, Niger has witnessed about eight coups, most of which succeeded in seizing power. These coups are characterized by being influenced by the political, social, and economic transformations that the country has witnessed over the years.

We will review some of the major military coups in Niger's history.

Coups since the second decade of independence:

1974 coup:

Only 15 years had passed since independence until Niger woke up to a military coup. On the morning of April 14, 1974, the army led by Lieutenant Colonel Seyni Kountche overthrew the government that had been in power since the Declaration of Independence, headed by Hamani Diori. From 1963 to 1974, there were about 25 successful coups, while dozens of coup attempts failed.

This coup at this early time of independence and the many coups that followed it are attributed to several reasons, perhaps the most important of which are: The stifling economic crisis that the national state experienced after the departure of French colonialism was due to the state's dependence on the agricultural sector, which suffers many crises due to the nature of the lands and the difficult climatic conditions of the region. The second factor is the continuation of the political crises that the country experienced before independence. Hamani Diori's regime was a weak one, unable to bear the burdens of this stage. The third factor may be the most important, which is the corruption of the ruling elite and its connection to the former colonizer, which aroused the ire of the popular forces and the state's armed forces, especially with the frequent interference of France in many matters of economic and political life in Niger. This is because of the policy that France adopted to ensure its continued influence on the formulation of economic, financial, investment, and even political aspects, with the ruling authority at the time agreeing with those policies and not resisting French intervention. It seems that there is another factor mentioned by the researchers, which is what was called the contagion factor, which is the influence of African countries on each other due to their proximity and religious and ethnic ties, in an attempt to replicate similar experiences in neighboring countries. More than 25 successful military coups took place in neighboring countries from 1963 until the date of the aforementioned coup, which overthrew civilian authorities and established military rule, not to mention more than ten other attempts that failed.

Relative stability prevailed in the country after that. Not because there was a stable or democratic life or improved economic or social conditions, but rather because of the ability of the military force to tighten control and impose their will most of the time. Civil political life, of a pluralistic nature, returned with relatively democratic procedures, but with the military authority always controlling it. This period extended until the end of the rule of President Mahamane Ousmane, when Hama Amadou and his army officers overthrew him and his Prime Minister in January 1996. Colonel Ibrahim Baré Maïnassara assumed power as president of the country under the pretext that "the political impasse leads to economic reform." He assumed the presidency of the country, saying that "the purpose of the coup is to allow a new beginning and not to eliminate democratic pluralism." This was the first military coup to overthrow the country's first elected president.

The 1999 coup and its bloody nature:

It is the third coup in the history of Niger, and it is described as a bloody coup. Dissident fighters killed President Ibrahim Baré Maïnassara in April 1999 after overthrowing his predecessor, Mahamane Ousmane, who was the first democratically elected president in the history of Niger after three years in power. With the help of some Nigerian armed forces, Daouda Malam Wanké was installed as president of the country.

The 2010 coup and the return to democracy:

This coup violated the usual character and form of military coups. This fourth coup arose with the formation of a secret cell under the name of the Supreme Council for the Restoration of Democracy (CSDR), composed of some army commanders. The state was then rife with political tension following President Tandja Mamadou's dissolution of parliament in 2009 and his amending the constitution to enable him to rule the country for a third presidential term. This group worked in secret until February 18, 2010, and that secrecy ended with General Salogibo attacking the presidential palace with an armed force. After bloody clashes with firearms, these forces were able to arrest President Tandja Mamadou and his ministers, dissolve all state agencies, and suspend the constitution. The military government promised the people that it would make the country a model of democracy.

Current coup 2023:

The spark of disagreement with President Mohamed Bazoum since he assumed his presidential position in 2021 began with an ethnic and tribal tendency. He belongs to the Arab minority, whose percentage among the Nigerian races does not exceed 1.5%, and the rest of the races, which represent the vast majority of the people, belong to non-Arab African tribal races, so the tribal ethnic tendency appeared. Rather, the matter went beyond that, as some accused him of forging his nationality and that he was not of Nigerian nationality in origin, and a feeling emerged that they were being ruled by an outsider who was not originally from their country.

His opponents accused him of rigging the electoral process by stealing ballot boxes, changing their content, and threatening voters. This is on a personal level. In addition, on a national level, he has been accused of letting France dominate his country. This is because he strengthened foreign alliances. They consider him France's first man in West Africa.

We do not forget the people's resentment towards Bazoum's relationship with the commander of the Rapid Support Forces in Sudan, Mohamed Hamdan Dagalo, and his exploitation of his money in his election campaign, with the latter providing support to Bazoum due to their kinship, as they are cousins. So, he invited him to the inauguration and did not invite Burhan.

As for the internal reasons for the coup, some reports circulated about President Bazoum's intention to remove the Commander of the Presidential Guard, General Omar Tchiani, from his position. This is due to the disputes between them regarding appointments to the Presidential Guard and some security institutions.

What was also raised was President Bazoum's desire to dispense with some officials in some vital institutions due to the growing power struggles in the state, including the army, as well as getting rid of those loyal to former President Mahamadou Issoufou.

This is in addition to the previous reasons, from a stifling economic situation, corruption of state institutions, and lack of governance, to the encroachment of some internal authorities in the state, the most important of which is the military authority, ethnic differences, and internal and external security threats from neighboring countries, armed groups, and smuggling groups.

Coup sequence:

On July 26, 2023, the Commander of the Presidential Guard, General Abderrahmane Chiani, detained President Mohamed Bazoum and declared himself leader of the new military junta. The Presidential Guard forces closed the country's borders, suspended state institutions, and declared a curfew. The Presidential Guard also closed the entrances to ministries.

The army's recognition of the military council:

On July 27, the army issued a statement signed by the Chief of Staff of the Army, General Abdou Siddiqui Issa, declaring its support for Chiani while preserving Bazoum's safety and not dragging the country into what he called a bloodbath. Major General Abderrahmane Chiani declared himself president of what he called the National Council for the Protection of the Homeland in a speech on Télé Sahel. He said the coup came to avoid the country's "gradual and inevitable demise."

The most important reasons and motivations for coups:

The possible causes and motives for the aforementioned coup are numerous and complex, and it is important to note that a comprehensive analysis of the events requires more time and in-depth studies. However, some factors may have an impact in this context.

The deteriorating political situation and instability:

Niger has witnessed frequent political unrest in recent years, including controversial presidential elections and challenges to legitimate authority. Disputed elections and distrust of the existing political system may have been one of the factors that prompted some military elements to take strong action.

Corruption and weak governance:

Niger suffers from the problems of corruption and weak governance, which negatively affect the economy, development, and the lives of citizens. The desire to combat corruption and improve governance may have prompted some military elements to intervene directly in political affairs.

Security challenges:

Niger faces significant security challenges, including attacks from extremist groups, border disputes, drug trafficking, and threats from armed groups. The military may believe that they are best able to provide security and stability through direct control of power.

Difficult economic conditions:

Niger suffers from significant economic challenges, including extreme poverty, high unemployment rates, and a lack of basic services. These difficult economic conditions may be one of the motives that prompted the military to stage a coup to achieve radical changes in the ruling regime.

Strengthening military influence:

The military in Niger had great influence, which caused some to exploit this influence to carry out coups and achieve their political and personal goals.

Military Coup in Niger:

Economic Risks to the Energy Sector

Prepared by the Research and Studies Department at Saif Bin Helal Center

The military coup that took place in the Republic of Niger in late July of this year raises many questions about the potential economic repercussions on both the Republic and the countries closely connected economically to it, especially since this coup is met with explicit opposition from the majority of West African countries and major international powers.

In this context, many urgent and critical economic decisions have been taken by all parties, and many equally important decisions remain on the list of possibilities. The economic sanctions implemented in response to the coup policy in Niger raise many concerns about the country's ability to survive economically in light of the crisis. There are also many questions about the impact of the economic policy followed in considering the crisis on the economic relations of the African Republic.

The extent to which a country's economy is affected depends on the size of its economic and trade ties with its international counterparts, in addition to the strength and degree of stability of the economy. From this standpoint, it is necessary to look at the economic situation of the Republic of Niger during recent years to identify the strengths, weaknesses, and imbalances in its economic sectors and to identify aspects of economic interconnection and cooperation between it and other countries in the world.

The economic situation of the Republic of Niger:

Niger's economy is classified as highly sensitive to internal and external shocks. The Nigerian economy depends mainly on agriculture, which makes it constantly vulnerable to climate change risks. The following is an overview of Niger's macroeconomic performance indicators:

After two years of lackluster growth, the economic growth rate rose significantly to 11.5% for 2022, aiding a strong recovery during 2022. This increase was driven by the agricultural sector, as the year 2022 was characterized by a fruitful agricultural season thanks to heavy rains and an abundance of irrigated lands during the year.

However, the World Bank's prediction of continued growth through 2023 is no longer logical, as the prediction is essentially conditional on overcoming the risks of declining oil production, climate change shocks, and insecurity, which the current military coup crisis threatens. Moreover, 50% of the population lives in extreme poverty due to gender discrimination.

Inflation rates also reached their highest rate in 10 years, recording 4.2% in 2022, compared to 3.8% in 2021. Accordingly, high food price inflation, in conjunction with insecurity, has disrupted livelihoods and markets in some areas (Tillaberi, Diffa, Tahoua, and Maradi), which negatively affected food security, especially for poor families. This situation has been exacerbated by floods, droughts, and limited access to inputs, which are expected to affect 15% of agricultural villages and reduce their agricultural production, according to World Bank estimates. The size of public debt as a percentage of GDP increased from 51.3% in 2021 to 56% in 2022, as estimated by the World Bank. Net foreign direct investment rose to 4.1% of GDP in 2022, compared to 3.3% in 2021.

The public debt as a percentage of GDP increased from 51.3% in 2021 to 56% in 2022, as estimated by the World Bank. Net foreign direct investment rose to 4.1% of GDP in 2022, compared to 3.3% in 2021.

Economic indicators show that Niger is considered one of the fastest-growing but poorest countries, in addition to being severely affected by crises. Therefore, the unstable nature of Niger's economy places various constraints on policymakers to take into consideration when formulating any decisions, especially in times of crisis.

Energy sector risks in the Republic of Niger:

Niger has great energy potential and is rich and diverse; it is only poorly exploited. It consists of biofuels (firewood and agricultural waste, the main source that households use for cooking), uranium, metallurgical coal, oil, natural gas, hydroelectric power, and solar energy.

Access to electricity is a major challenge in Niger, and the country relies on electricity imports to cover the bulk of its supply. Niger is a center for oil resources and is one of the ten largest countries possessing uranium resources in the world.

To achieve its goal of universal access to electricity by 2035, the government of Niger is working to expand its electricity supply and encourage investment in the energy sector. Niger has taken some decisive steps to improve energy markets by establishing a regulatory body, the Energy Sector Regulatory Authority (ARSE), to increase transparency and fair competition among the many energy players. The government also established the Nigerian Agency for the Promotion of Rural Electrification (ANPER), charged with designing, implementing, and monitoring rural electrification programs across the country. Other reforms include a joint ministerial order that eliminates taxes on domestic solar power generation kits and wind power generation equipment to enable more households to have access to electricity. However, problems remain regarding the technical capacity and creditworthiness of public utilities. The following figure shows the problem of access to electricity, especially in rural areas. The percentage of people with access to electricity among the population was about 19.25% in 2020.

Figure (1): Access to electricity (percentage of population) in Niger

Increasing access to electricity through renewable sources such as solar energy in Niger, especially in rural areas, is essential for transformation and economic empowerment, as the percentage of the population able to obtain electricity did not exceed 18.6% during the year 2021. Moreover, approximately 70% of this percentage represents the urban population only. Residents of rural areas continue to suffer from the lack and interruption of electrical services in Niger.

Niger's electricity imports reached 1.16 billion kilowatt-hours in 2021. Between 2002 and 2021, Niger's electricity imports grew significantly from 0.21 to 1.16 billion kilowatt-hours. This is the highest value for electricity imports since 1980, which reflects the heavy dependence of the electricity sector in Niger on electricity imports. Despite the Republic of Niger's attempts to diversify its sources of electricity, it is still threatened by the risk of power outages.

Niger became an oil producer starting in 2011, producing 20,000 barrels per day, all of it for domestic consumption. Accordingly, Niger has set ambitious goals to double its oil production five times to 110,000 barrels per day by 2023. However, the oil sector remains a limited driving force in the economic growth process, as oil revenues represented 0.62% of Niger's GDP during 2021, as shown in the following figure.

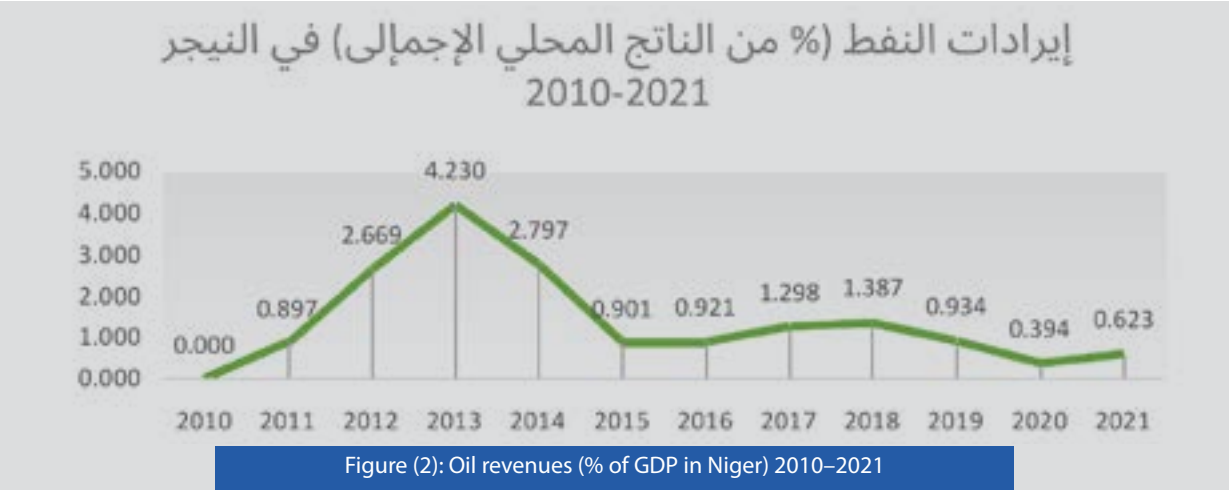


Figure (2): Oil revenues (% of GDP in Niger) 2010–2021

Niger had expected to start exporting in July or August this year from a new $2.5 billion crude oil pipeline linking the main Agadem production area to a port terminal in Benin. The pipeline, approximately 2,000 kilometers long and operated by the China National Petroleum Corporation (CNPC), will help the country increase its oil production fivefold by linking it to new fields being developed in the Agadem rift basin. However, the situation became unstable considering the military coup, which hindered the production of this project.

As for uranium production in Niger, Niger produced 2,248 tons of uranium in 2021, and the cumulative production from the country reached about 150 thousand unit tons by the end of 2019. In 2022, Niger produced 2,020 tons of uranium, representing about 4% of global uranium production, as shown in the following figure.

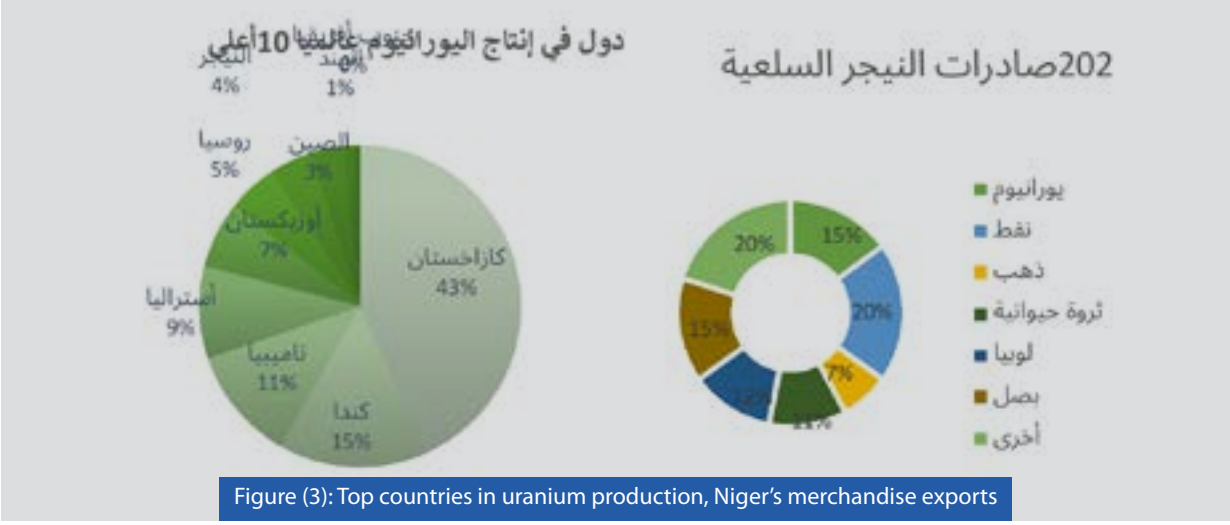


Figure (3): Top countries in uranium production, Niger's merchandise exports

Although Niger is the fifth-largest exporter of uranium in the world, Niger's uranium exports will not exceed 15% of the country's total exports in 2021. However, their total energy exports, represented by uranium, gold, and oil, account for the largest proportion of exports, approximately 42% of total exports. Moreover, the export sector represents a small percentage of GDP, approximately 15% only during 2021; this makes Niger weakly dependent on the export sector.

Accordingly, we can say that the energy sector in Niger is an essential sector for economic stability. On the one hand, any sanctions on the country's energy exports put it in a real dilemma of losing its hard currency resources, which increases its trade deficit and puts clear pressure on price levels. On the other hand, the country's dependence on the agricultural sector and the poor access of most of the population to electrical energy essential for growth hinder its economic growth and prevent it from achieving its goals of sustainable development. However, the amount of expected risk remains dependent on the government's response in the long term and the extent of the diversity of alternatives available to it from its energy resources.

International energy concerns considering the current Niger crisis:

The concern caused by the military coup in Niger with regional and international partners depends on the extent to which each country relies on Niger as a trading partner for its energy sources and the extent of the availability of alternatives for each partner.

To determine the international risks related to energy, it is necessary to look at the most important trading partners of the State of Niger. Therefore, the following figure shows the most important countries receiving Niger's exports during the year 2021.

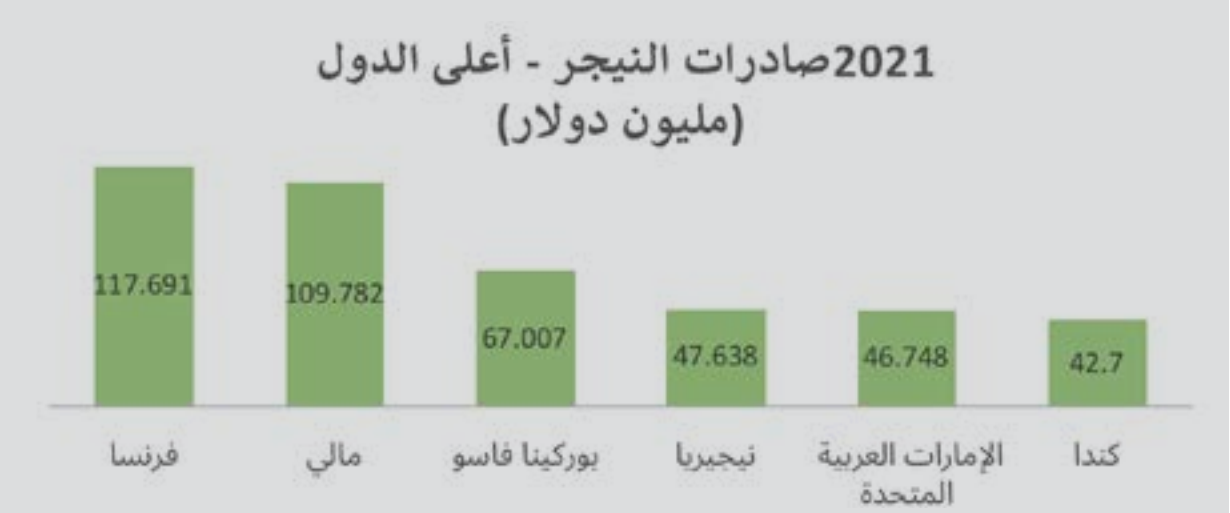


Figure (4): Niger's exports during 2021, ranked by countries, in million dollars

France is considered the first and primary destination for Niger's exports, as Niger exports to France approximately $117.7 million of various goods and services. Thus, France accounts for 23.23% of Niger's exports, followed by Mali, the first African partner, with 21.67%, then Burkina Faso and Nigeria. This is why France is at the top of the list of countries threatened by instability concerning its imports from Niger. France's imports from Niger are mainly gold and uranium.

On the other hand, France is considered the second-most important supplier to Niger after China. Niger imports approximately $413 million from France in 2021, which is 15.49% of Niger's total imports. As shown in Figure No. 5.

Figure (5): Niger's imports during 2021, ranked by countries, in million dollars

The economic relationship regarding energy between France and Niger can be described as complementary and reciprocal. Although France relies heavily on uranium imported from Niger to generate its electrical energy, which is mainly derived from nuclear energy, the majority of the leading companies in uranium extraction are mainly French companies, in addition to the fact that France has a large stock of uranium. Moreover, France depends on diversifying its uranium imports from sources other than Niger. To date, Niger has not definitively announced its intentions to suspend its exports of uranium and gold to France. On the one hand, Niger relies in a symmetric and balanced way in its energy trade relationship with its partners from other countries. On the other hand, the logistical outlets of the landlocked state of Niger are dependent on the surrounding countries, which requires agreement with these countries regarding sudden economic decisions.

Looking at the first countries to benefit from the situation in Niger, China comes first. In addition to being the primary source of Niger's imports, China's investments in Niger amount to $180 million, which ranks second after the United States of America. Thus, the current situation enhances China's opportunities for greater control in the Republic of Niger at the expense of the American and European regions, given the tension in relations in the current situation.

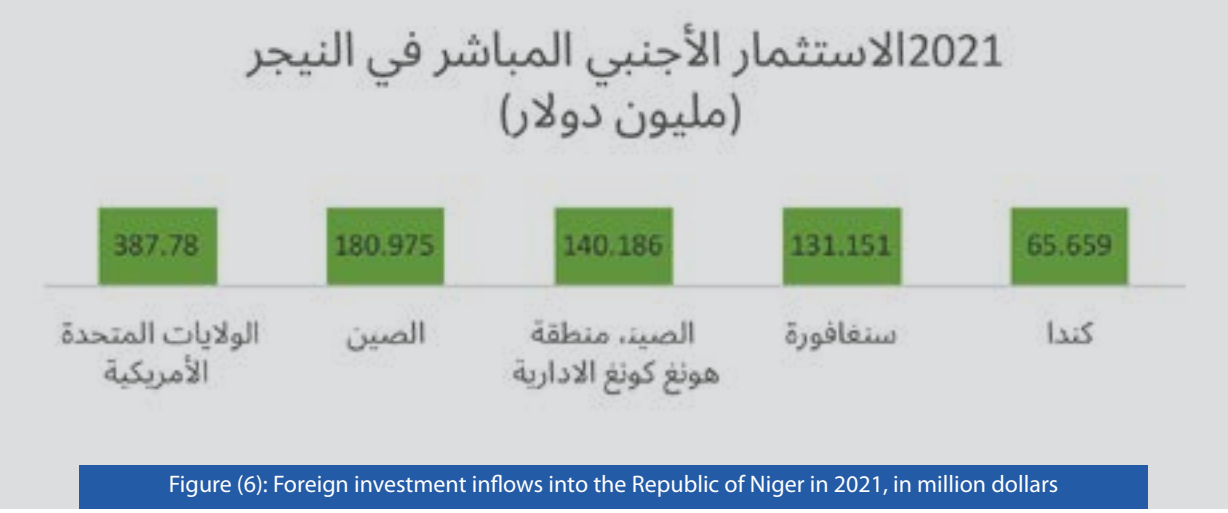


Figure (6): Foreign investment inflows into the Republic of Niger in 2021, in million dollars

The Western presence in Africa, especially France, is gradually declining in favor of Russia and China, which rely on trade and economic relations and some investments, unlike America and France, which rely on their colonial history on the African continent and weapons sales to African countries, within the framework of reformulating the international balance of power at the current stage. Medium-term expectations remain dependent on what events will lead to in the near term, in addition to the ability of decision-makers to maintain balanced economic relations with regional and international partners.

The Impact of the Military Coup in Niger on Energy Markets

Prepared by the Research and Studies Department at Saif Bin Helal Center

Niger and energy production, historically and at the time of the coup:

Niger has two large uranium mines that provide about 5% of the world's production of high-grade uranium ores. The first commercial uranium mine in Niger began operating in 1971 when strong government support began to expand uranium mining.

Uranium was discovered at Aziliq, Niger, in 1957 by the French Bureau of Geological Research and Mines, and other discoveries followed, including at Abukorum (1959), Madawila (1963), Arlet, Arregui, Artois, and Taza (1965), Imorarin (1966), and Akota (1967). In the midst of this, Niger gained independence from France in 1960.

In 1964, tyrosine coal deposits were also discovered, which produce electricity for the northern Agadez region in addition to uranium mines.

Historically, uranium mining in Gabon has been closely linked to Niger due to the role of the French Atomic Energy Commission and Kojima (now Urano). The country's cumulative production reached about 150,000 tons of uranium until the end of 2019, noting that 2,020 tons of uranium were produced in 2022, and in 2021 alone, Niger produced 2,248 tons of uranium. This number decreased from 2,991 tons in 2020.

According to military sources in the Nigerien army in July 2023, the constitution was suspended and all institutions dissolved after the overthrow of President Mohamed Bazoum. This comes in a country that is the seventh largest uranium producer in the world, according to the World Nuclear Association. Radioactive metal is the most commonly used fuel for nuclear power. It is also used in cancer treatment, marine propulsion, and nuclear weapons. It is known that the three largest uranium producers in the world are, respectively, Kazakhstan, Canada, and Namibia.

Niger has one major mining station in the north operated by French state-owned Orano, another major mine that closed in 2021, and another mine under development. Orano said it is continuing mining despite the ongoing "security incidents." Orano added that French nuclear power plants obtain less than 10% of their uranium needs from Niger, which is one of the three largest suppliers of uranium to France. How dependent are France and the world on Niger's uranium?

To operate the fifty-six nuclear reactors in its eighteen power plants, France requires an average of about 8,000 tons of natural uranium each year. After mining stopped on French soil in the early 2000s, France turned to several countries at once to obtain its supplies, as diversification of suppliers is one of the sources of safety.

The military coup in Niger has raised concerns about uranium mining in the country by the French group Ourano and its consequences for France's energy independence. One week after the military coup in Niger led by General Abderrahmane Tiani, France completed the evacuation of 600 French citizens. This ambiguous political context is also beginning to raise economic concerns.

In France, concerns are particularly focused on the exploitation of uranium from Niger and the possible consequences of this energy independence. Uranium is an essential natural resource for the operation of French nuclear power plants and has been exploited for more than four decades by the Urano Group.

The Air Mines, whose operating company Sumer is 63.4% owned by Orano, is located near the town of Arlit in the desert of northern Niger. Although the mine is nearing exhaustion, its operation has been extended until 2040.

The Akukan mining site, located about ten kilometers from Arlit, has been closed since the end of March 2021. With reserves exhausted after four decades of mining, the Akota Mining Company, 59% owned by Orano, is now working on a redevelopment project of its sites. Finally, Orano owns a 63.52% stake in the Imorarin mine, located 80 kilometers south of Arlit, which is considered one of the largest uranium mines in the world. For now, Orano has announced that it will continue its mining activities, despite the coup in Niger. "So far, activities continue at the operational sites in Arlit and the headquarters in Niamey with an organization adapted to the context of the curfew in force throughout Niger," the group announced on its website on August 3, 2023.

It is worth noting that in 2022, France was relying on five uranium suppliers, noting that the total quantities of uranium that France imported from different countries cumulatively over the years came, in order, from the following countries:

Kazakhstan, Niger, Uzbekistan, Australia, Namibia, Canada, Brazil, Kyrgyzstan, the Czech Republic, and Hungary

However, Niger's role in exporting uranium to France has begun to decline. Over the past ten years, the 88,200 tons of natural uranium imported by France came mainly from three countries: Kazakhstan (27%), Niger (20%), and Uzbekistan (19%). Niger plays an important role in France's supplies, but some politicians overestimate its importance.

However, globally, Niger has become a secondary producer over the years. Production costs rose and prices fell until 2016, after the Fukushima nuclear accident. By 2022, Niger will produce only 4% of global production, far behind Kazakhstan (43% of global production), Canada (15%), Namibia (11%), and Australia (8%).

Dynamic leaching and heap leaching and the environmental impacts of its low-grade uranium production:

In some cases, uranium is extracted from low-quality ore by heap leaching. This can be done if the uranium contents are so low that the ore cannot be processed economically.

Heap leaching involves piling the mineral-bearing ore into a pile on an impermeable pad, irrigating the ore for an extended period with a chemical solution to dissolve the desired minerals, and collecting the leachate as it is filtered from the base of the pile.

Technically, this is done by placing the crushed ore on a filter pad with an impermeable liner; the filtration agent (alkali or sulfuric acid) is introduced to the top of the pile and seeps down until it reaches the liner at the bottom of the pile; it is captured and pumped to the processing plant. After the filtration process is completed (within months to years), the washed ore is left in place or removed to a disposal site, and the new ore is placed on a filtration pad; that's why it is called dynamic heap filtration.

During filtration, piles pose an environmental hazard due to the release of dust, radon gas, and filtration fluid.

At the end of the specified filtration period, the material initially remains saturated with the filtration fluid; this leads to the continued leaching of uranium and other components (many of which are radioactive and/or toxic).

A long-term problem may arise from leaching if the ore contains pyrite; the arrival of water and air may lead to the continuous production of sulfuric acid within the pile; this leads to the leaching of uranium and other contaminants for centuries and possibly permanent contamination of groundwater.

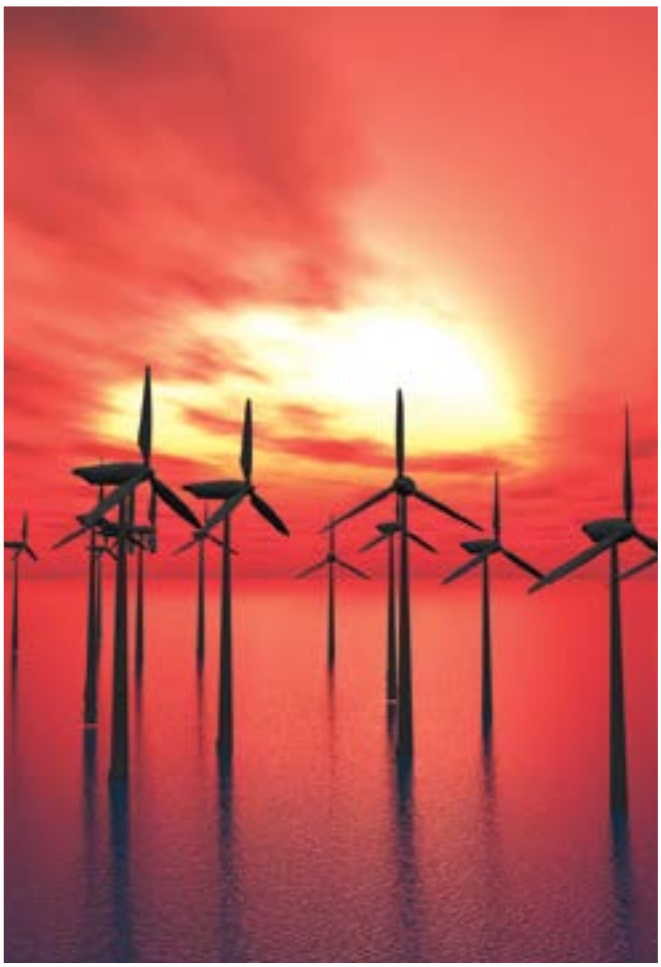
Conclusion:

If the uranium production in Niger stops, it will not significantly affect global energy markets, as it is only between 4 and 5% of global uranium production, but it will greatly affect the energy market in France, which currently depends on Niger to supply less than 10% of its uranium needs. However, from another perspective, if some energy production plants in France break down and a quick alternative is not found, it will affect many of the goods and services that France provides to the world, which will also affect supply chains that may have other economic consequences, especially considering France is one of the two largest driving forces of the European economy (France and Germany).

On the other hand, the production of low-quality uranium by leaching methods has long-term negative effects on the environment. It may affect groundwater, which is considered one of the world's water reserves, in addition to the harmful emissions produced during the filtration process.

Regional and International Stances on the Military Coup in Niger

Prepared and The Research and Studies Department at Saif Bin Helal Center



On July 26, 2023, members of the Niger Presidential Guard made a sudden move, which plunged the country into a severe political crisis, the repercussions of which, in their various internal and external aspects, continue to this day. This attempt to overthrow power is considered the third of its kind during President Mohamed Bazoum's rule. Niger witnessed two failed attempts to coup against it, the first in March 2021 and the second in March 2023, but the current attempt, which is still unstable until now, has sparked strong reactions globally and regionally. As there are divisions in international and regional stances between taking violent measures that may include direct military intervention or working according to the political and diplomatic path in resolving through international and regional mediators' efforts to deal with the potential repercussions of the crisis, the following are the most notable of these stances:

First: African regional organizations stances on the Niger crisis:

1.The African Union:

The African Union called on the Military Council in Niger to hand over power to President Bazoum within a maximum period of 15 days, and the Union's Peace and Security Council announced that it called on the Council to hand over power without any conditions, return to the constitution, and return Bazoum once again to power. It can be said that the African Union announced a set of gradual steps in dealing with this crisis, which may lead to suspending Niger's membership in the Union, imposing sanctions on the military junta, or supporting military intervention in Niger.

2.Economic Community of West African States (ECOWAS):

The Economic Community of West African States (ECOWAS) views the events taking place in Niger as a real test of its strength and the extent of its effectiveness in dealing with crises within its scope of work. Especially since it came after a series of military coups in countries in the region, such as Mali, Guinea, and Burkina Faso, this led the organization to pledge not to tolerate coups in the region and to take action at all levels to confront the military junta controlling power and avoid negative internal repercussions on regional security and stability.

To confront this, ECOWAS announced that it would take all measures necessary to restore constitutional order in Niger. To do so, it followed three paths: imposing economic sanctions, halting aid and economic relations, trying to mediate with the ruling military junta, and threatening to use military force as a last resort, **as follows:**

a)Impose economic sanctions and stop aid: ECOWAS tried to take the same path with Niger as it dealt with the military coup that Mali witnessed in May 2021 by imposing economic sanctions that led to a decline in the country's imports by 30% and forced the military junta in Mali to reach an agreement with ECOWAS that provides for the appointment of a civilian government and a road map for holding presidential and parliamentary elections in July 2022.

b)Attempt to mediate with the ruling military junta: ECOWAS turned to the second path to deal with the crisis in Niger through the former president of Niger, "Mohamed Issoufou," to

mediate between the military junta and the deposed president, Mohamed Bazoum, to calm the situation and return Bazoum to power again. However, on this path, he did not achieve his goals of calming the situation on the ground due to each party's adherence to its demands, and choosing Youssoufou to conduct the mediation was also not the best choice due to what is rumored about Youssoufou's support for the military council to remove Bazoum from power.

c)Military intervention in Niger: ECOWAS views Niger's coup as a real test of its regional power amid a series of coups witnessed by a number of its members, and the success of the military junta in isolating President Bazoum means that the strength of the regional organization has vanished. This was confirmed by the United Nations Special Envoy for West Africa and the Sahel, Leonardo Santos Simão's view of the role of ECOWAS in ending the crisis in Niger. He announced that member states might resort to the use of military force if necessary, citing the security force established in 2022 that is concerned with intervening against extremist groups and preventing military coups.

Second: Regional stances on the Niger crisis:

Egypt, by its position and weight on the continent and as an indirect neighboring country, was one of the most important Arab-African countries that clearly announced its stance on the developments in Niger. It calls for a return to the constitutional path in a way that preserves the state's capabilities and the safety of its citizens, and it supports all regional and international efforts aimed at finding solutions that would avoid any negative repercussions for Niger and the region.

The Libyan stance was also distinguished. It announced its support for the path of return to constitutional order, considering that the events in Niger are a threat to its neighbors, It also secured its extended borders with Niger. Algeria, as a direct neighboring country, was strongly present in this crisis from its first hours. It rejected the coup as an unconstitutional measure, but at the same time, it rejected the scenario of military intervention by any party and expressed its fear that the situation in the region would deteriorate to the worst in the event of military intervention to change the status quo.

Libya's view of the coup in Niger was based on the belief that it would cause negative repercussions on its national security because of the extended border between the two countries, which is estimated at 600 km, which may hinder efforts made to achieve stability in Libya. It is also feared that the coup will lead to an increase in tensions and obstacles facing the country, especially concerning securing their common borders and weak security coordination between the two countries. It can be noted here that the events that took place in Libya after 2011 led to an escalation of waves of smuggling and illegal immigration between the two countries. Niger was a transit area for illegal immigrants heading to European Union countries.

Regarding the Algerian stance, Algerian Foreign Minister Ahmed Attaf announced an initiative to resolve the crisis in his country's southern neighbor, which provides for the return of constitutional order after 6 months and under the supervision of a national authority headed by a national figure who is accepted by all parties in Niger. This initiative will be the focus of consultations within days at three levels: the first is internal in Niger between various parties, the second is with neighboring countries and members of the Economic Community of West African States (ECOWAS), and the third is international with countries supporting the peaceful path to resolve the crisis. The initiative also proposed holding an international conference on development in the Sahel and mobilizing funding for development programs in the region that would support stability in these countries. In this regard, the Algerian Foreign Minister expressed his country's complete refusal to open its airspace to military aircraft to intervene in Niger, based on its strong opposition to this step.

Algeria is looking for reconciliation in this crisis between the Nigerian stance of rejecting the military coup in Niger and its interests in Niger. Algeria's position of rejecting military action, which may suggest acceptance of the fait accompli in Niger, may lead to stopping the passage of the TSGB gas pipeline through its territory towards Europe, while Nigeria may take another measure, which is to transport gas through 14 countries, passing through Morocco.

Within the same context, the Nigerian Parliament issued a decision rejecting military intervention and the participation of his country's army in restoring President Bazoum to power in Niger, which puts the Nigerian presidency in a challenge before Parliament (even if the decision is not binding on the president). Especially since the Nigerian army is considered the main body of the ECOWAS forces and any intervention in Niger will be done through its army, which consists of 223,000 individuals in addition to possessing modern aircraft and fighters, and it has a 1,600-kilometer border with Niger.

In the same context, there are increasing concerns in Chad, which shares a 1,175-km borderline with Niger and suffers from a widespread of refugees coming to it from Sudan, that the events taking place in Niger will lead to a major refugee influx crisis if internal fighting breaks out. This increases Chad's security problems.

Third: International stances on the Niger crisis:

1.The French stance:

France categorically rejected the coup in Niger, called for the return of President Bazoum to power, and declared its support for any measures

that the ECOWAS group could take to restore the constitutional path in Niger, including support for the military intervention scenario.

France is considered one of the first countries concerned with developments in Niger. Because of its strategic importance in the West African region, after demonstrations took place in some African capitals such as Bangui, Bamako, and Bjamina against the French presence, France demanded France's complete withdrawal from it and began searching for other alternatives, such as seeking help from both Russia and China.

Therefore, Niger is considered the new point of concentration for the French military forces after the June 10, 2021, announcement of the end of Operation Barkhane, the implementation of the plan for the French forces' gradual withdrawal from the Sahel region, and the new repositioning of the remainder of its forces in the border triangle (Mali, Niger, and Burkina Faso) within the scope of the 'Takuba' forces of the European Union. This was welcomed by the deposed Nigerian President Mohamed Bazoum in his statement on February 18, 2022, to foster cooperation between the Nigerien and Takuba forces to address the state of security instability in the region.

2.The American stance:

The United States adopted an open-door policy in dealing with the military coup in Niger and the removal of President Bazoum. The American administration did not describe these events as a military coup but demanded a return to the constitutional order as soon as possible. This might be because it seeks to engage more in Africa following the new strategy of the administration of US President Joe Biden. Therefore, it does not want to create tensions with African countries that Russia could benefit from to enhance its influence, which indicates the United States' efforts to preserve its interests, regardless of the ruling regime in Niger.

3.The Italian stance:

Since the beginning of the events in Niger, Italy has tended to emphasize that it supports diplomatic solutions to the crisis and does not want military escalation. It also called on the ECOWAS group to extend the time it granted to the military junta to return to constitutional order and return President Bazoum to power without escalation with the military junta and the use of military force against it.

It can be noted that Italy tends to rely on the policy of remote monitoring to predict what will happen in Niger, which is based on two goals: The first is to maintain the implementation of the "Matti" plan, which it seeks to launch in Africa, in which the stability of Niger is an essential part of its success, which targets gas and energy projects in Libya and Algeria, the Niger's north neighboring countries.

The second is because Niger is one of the important parties in combating the phenomenon of illegal immigration, as it is considered one of the countries through which illegal immigrants migrate towards the countries of the European Union. Therefore, Italy provided financial aid to Niger, estimated at $7.5 million, for efforts to combat illegal immigration. Italy also has a military partnership in counter-terrorism efforts with the United States of America, in addition to its military base there.

4.The Russian stance:

Russia rejects military intervention in Niger and believes that the solution to the crisis must be through diplomatic tools. The Russian Ambassador to Nigeria, Alexei Shbarshin, confirmed that his country does not intend to

deploy any of its forces in Niger, while Foreign Minister Sergei Lavrov announced that the moves taken by the military junta in Niger violate constitutional norms.

It can be noted here that Russia has an expanded strategy towards returning to Africa, and this strategy began to confront French influence in its African strongholds. Russia succeeded in confronting France in Mali, Burkina Faso, and Guinea-Conakry, which are considered traditional areas of influence for France. As a result, linking the events in Niger to Russia is on the table, especially with supporters of the military junta raising Russian flags and banners and chanting the name of President Vladimir Putin. Especially since these scenes were repeated in several African countries that witnessed military movements, they do not indicate the presence of Russian support for these movements. However, this does not negate the Russian presence in these countries. On the other hand, Europe views the Russian stance on the crisis in Niger with suspicion, considering that removing Bazoum from power will open the way for Russia to establish strong relations with the military junta that seized power.

5.The European Union and NATO stance:

The European Union's position is in line with that of ECOWAS regarding supporting all options for dealing with the military junta in Niger. The European Union decided to cut economic aid and stop security cooperation with Niger and announced its refusal to recognize the authority of the military junta. In anticipation of any military action that might occur, European countries and the United States decided to withdraw their nationals from Niger for fear of being targeted and held hostage if ECOWAS launched any military action as a means of pressure that could be used to stop the escalation. The consensus between the European Union and ECOWAS is also based on a set of issues, most notably confronting the flow of illegal immigrants from sub-Saharan Africa towards European countries and confronting extremist groups. It should be noted here that the European Union's interest in Niger came after the attempted military coup that the country witnessed in March 2021 and two days before the inauguration of former President Mohamed Bazoum to the presidency in Niger. European countries were quick to praise President Bazoum and his ability to maintain security and stability within the country, which led European countries and NATO to strengthen military cooperation with Niger as an effective force in combating extremist groups in Africa.

6.The Chinese stance:

China did not tend to take a supportive stance for one party over another in Niger. Because of the focus of China's strategy in Africa on economic tools that make it follow a policy based on not criticizing the political conditions in the countries of the continent and cooperating with

any political system in Africa without regard to its directions, it distances itself from political conflicts. It can be noted here that China signed in May 2023 a partnership agreement with the Nigerien authorities for oil exploration. In addition to joint business cooperation; the Chinese Ministry of Commerce revealed that China has become the largest investor in Niger in 2022. The state-owned National Petroleum Company also spent investments estimated at (4.6) billion US dollars and (480) million in the petroleum and uranium extraction industries. These investments put China in a position to monitor what the events will produce in Niger.

7.The Turkish stance:

Turkey views the military coup in Niger with great interest due to fears that these events will affect its interests in Libya, given that there are common borders between the two countries and it is not in Turkey's interest for internal unrest to extend to Libyan territory.

On the other hand, Turkey is interested in Niger because of its distinguished geographical location, which connects it with a large number of African countries. That led it to establish the Economic Coordination Council between Turkey and Niger in June 2015 to increase trade relations between the Turkish Chamber of Industry and the Chamber of Handicrafts in Niger. The volume of trade exchange between Turkey and Niger is estimated at 203 million US dollars until 2022.

Turkey is also interested in military cooperation and military exports with Niger. It exported military equipment and drones while importing raw materials such as gold, and Turkey assisted in the fields of medicine, health, and education. Therefore, Turkey wants to preserve its interests in Niger without regard to the nature of the regime that will manage the country's affairs. It is expected that Turkey will take the direction of not condemning the coup in Niger and monitoring the situation to preserve its economic interests.

In conclusion: Internal events in Niger continue to cast a shadow on the nature of regional and international stances. The crisis that Niger witnessed after the removal of Mohamed Bazoum from power revealed the geopolitical importance that this country enjoys, especially with France and other Western powers seeking to preserve their interests in the face of Russian expansion on the African continent. This was after Russia succeeded in expelling France from Mali, Burkina Faso, and Guinea-Conakry, while Niger became, in the face of this confrontation, a French-European focal point, and Mohamed Bazoum was one of the parties to this confrontation. This was expressed by the state of conflict and international polarization between Russia on the one hand and France, the European Union, and the United States on the other hand, which means that ECOWAS's military intervention may raise criticism that it supports one international party at the expense of another. In addition to the possibility of an internal division among ECOWAS member states between supporters and opponents of escalation against the leaders of the ruling military junta, Burkina Faso, Mali, and Guinea supported what the military junta did in Niger, while the rest of the member states of the group rejected this move, which means that the future of the group itself may be heading towards disintegration, especially with the threat of countries supporting the army's movements in Niger withdrawing from the regional organization.

The crisis also led to all parties, including countries and international and regional institutions, facing a real test of how to deal with this complex crisis. Whereas the military junta's adherence to power in Niger and its refusal to return President Bazoum pushed all parties to search for a way out that would not result in other crises. Especially since the military intervention suggested by ECOWAS may not achieve its goals and may result in other crises that increase the country's problems, which already suffer from complex economic, social, and security problems. Moreover, it should be considered. Since Niger is an important front in combating extremism and terrorist organizations in the African Sahel region, the political instability in the country will exacerbate the crisis of the spread of terrorism in the entire region.

On the other hand, Western countries and the United States realize that the political crisis in Niger will lead to strengthening Russian influence in the West African region, which finds the door open to it considering the popular discontent with Western policies that, according to the people of these countries, have contributed to their impoverishment. This indicates that the coups that took place in the Sahel region in the past two years led to the severing of relations between Western countries, especially France; French embassies and consulates were targeted, and the French flag was burned.

Scientific Books and Theses Reviews in English

Thatcher's North Sea:
The Return of Cheap Oil and the 'Neo-liberalization' of European Energy

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This article is authored by Giuliano Garavini and was published in the Journal of Contemporary European History in 2022. The author tried mainly to present an idea about the management of the British conservative government during the oil crisis that occurred in the 1970s and to present a clear opinion on how that crisis has promoted the usage of renewable sources of energy.

In 1973, the Gulf countries imposed a blockade over exporting oil to the countries that supported Israel, which resulted in what is known as an "oil shock". Members of the Organization for Economic Cooperation and Development have taken serious steps to mitigate the impacts of such crises on their economies in the future by reducing their dependence on OPEC and diversifying their sources of energy. Western European governments looked, even beyond petroleum, into schemes to stabilize raw material prices so as to guarantee, at the same time, security of supply for industrialized consumers as well as income stability for commodity exporters.

The discoveries of oil in the North Sea have been perceived as an alternative to the monopoly of oil, which was exercised by the OPEC members. As a result, the UK government has led initiatives aiming at redistributing oil produced in developing countries that mainly depend on it as a main source of funding. The quality of oil extracted from the British North Sea was obviously higher than that of the OPEC countries, which was considered an advantage for the British government, which was willing to change the status quo in the 1970s.

The United Kingdom Continental Shelf: The Making of the 'Freest' Oil Province in the World:

By the end of the 1970s, the United Kingdom was widely regarded as a declining military and economic power, a country plagued by political extremism and widespread violence. Together with Italy, it was often referred to as the 'Sick Man of Europe'. To restore its previous status as one of the biggest powers in the world, the UK worked mainly on controlling energy sources such as coal reservoirs around the world while giving more space for its governmental companies to operate in different geographical spots to expand their influence and profits. For instance, British Gas has taken big contracts not only in the North Sea but also in Africa and Asia, where new discoveries have been declared. By the end of the 1970s, the United Kingdom and the United States alone had been responsible for 50 percent of the cumulative global CO_2 emissions since 1750. Unlike Norway, which succeeded in maintaining an efficient oil policy, the United Kingdom, on the other hand, faced significant challenges in designing a coherent oil policy, let alone a nationalist one. The second challenge was the difficulty of thinking about petroleum in terms of securing land rent by maximizing state income from it.

Disciplining OPEC and the Global South:

The rise of North Sea crude production contributed to sidelining the hype of the 1970s about the impending energy crisis, with the accompanying fear of natural resource depletion. It supported Thatcher in her ideological and economic battle against the forces that restrained free markets: both the

alliance of Third World countries that were still demanding a global redistribution of wealth towards raw material producers and the 'Western Marxists', as Thatcher defined British trade unionists and Labor militants that hindered private entrepreneurship.

The economic recession that hit many countries in the 1980s has impacted, for the first time since the Second World War, the oil consumption in several industrial countries. The decline in oil consumption, along with an obvious increase in supply because of the oil coming from Mexico, the USA, and Norway, has pushed the prices down, which has affected the economic growth in many countries around the world, especially developing countries. At that time, the UK had experienced a problem as increasing its supply of oil would have pushed prices downward, which might have affected its relationship with main allies such as the KSA, which depends mainly on exporting oil.

Furthermore, the UK tried to avoid any sort of commitment with oil exporters in the world and sought to present itself as a country that frames its foreign economic policies in line with the European community. Among these choices, the UK government would always choose to have lower oil prices as it benefits consumers, reduces inflation, and increases the level of trade between countries, which eventually enables the government to achieve an economic surplus that could help the government stay in office longer than expected. Despite that, some of the British companies began to experience financial losses because their prices were considered by customers to be higher than market prices.

In fact, some of these contracts had been signed long before the market went down, which gave these British companies no choice but to keep the prices high, hoping that their losses might be minimized, which did not happen in that case. The best chance for these companies to halt their losses was to stop production, which was not possible at that time because that would have undermined public confidence in the private sector. Also, letting these companies cut off their production would have affected the government negatively, as the main approach of the government at that time was.

The Dark Side of Cheap Oil:

The approach that Margret Thatcher used to manage natural resources has resulted in giving more space for scientific research to look out for alternatives that cost less money and bring a sufficient amount of energy. The government had mainly used the idea of cheap oil to promote the use of more environmentally friendly sources of energy. However, natural gas, a fossil energy source (even though relatively less polluting in terms of CO_2 than coal or oil), advanced much more rapidly than renewables between 1990 and 2008, becoming the new pillar of European electricity generation (its consumption increased by over 40 percent between 1994 and 2006, and by 1994 it had overtaken coal as the second most important EU primary energy source).

“Energy Transition and the Future of the African Energy Sector”

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Introduction:

The book "Energy Transitions and the Future of the African Energy Sector," written by Dr. Victoria Nalule Christens, tackles the transition that African countries have been pursuing since the Paris Agreement in 2015, due to the gradual decline in fossil fuel investments that are considered to be the backbone of many countries' economies. The book was published by Springer Nature Switzerland in 2021.

The urgent need of the world to address the impact of climate change and the lower dependence on renewable energy made countries start questioning their investments in fossil fuels. The book introduces the concern of African countries about the decrease in fossil fuel consumption, and as such, they have to create new strategies to match the new market demand. The author presents in the first chapter the concept of "energy progression" as an alternative to Africa's energy transition. She mentioned the five key factors to the global transition of energy, including climate change and the match of domestic energy demand, the challenges of access to energy, the fact that oil and gas sources are not unlimited and could be drained within the upcoming three decades, and finally, the fall in oil prices. In addition, the book touched upon the development and utilization of nuclear energy as an alternative source of electrical power that was previously powered by traditional sources of energy as a way to mitigate climate change impacts. The book also examines the environmental and safety aspects associated with the use of nuclear energy in the region. The author dedicated a whole section to charcoal production and the efforts made to restrict it to improve efficiency and reduce pollution. Mentioning the case study of Egypt to illustrate the idea of governance in the energy sector and demonstrating the legal measures taken to promote energy efficiency.

Hydrocarbon Transition Risk in Africa:

In this section, the author is trying to stress the relevance of hydrocarbon energy in Africa, how it shapes the economies of these countries, and what technologies are needed to reduce its negative impacts. providing the example of coal, as it's one of the most polluting sources to the environment. Most of the coal reserves are located in Asian countries, which contribute about 9.6 % globally. The recent trend is that countries should adopt low-carbon economies, which will force many companies that depend on carbon-intensive industries to close and may create an unemployment issue. The reason why countries always hesitate to transition to energy is the lack of technological developments alongside research and the high cost of technology investments. This is why governments usually take a step back to invest in technology. Moreover, it became evident that the transition of energy to African countries is heavily reliant on ANNEX 1 countries, more than just African community efforts.

Energy Progression vs. Energy Transition:

The author suggests using the term "energy progression" instead of "energy transition," as countries that choose to shift to clean energy mostly have more public pressure to move very fast. The book highlights that the "energy transition" tends to create two-sided protests from those who are pro-climate change and those who are concerned with the high costs of clean energy. The author defines the term as the ability to recognize the progressive nature of energy, indicating that such change should happen gradually and on different levels while providing financial and technological support to allow the transition from one source to another. Furthermore, the author outlined the importance of a legal framework to encourage countries to produce energy from renewable sources and, hence, to address poverty in Africa. She then provided an example of Sierra Leone, which passed a policy that aimed to provide electricity for rural areas.

Climate Change Mitigation:

The economic growth that the world has been witnessing over the last two centuries has been powered by fossil fuel energy. While the international community has been calling for the abandonment of fossil fuel reserves in Africa, many countries are now questioning the fairness of such a decision, as it's widely known that African countries are the least likely to contribute to the climate crisis. Therefore, African countries should develop their reserves to improve their economies and, at the same time, reduce carbon emissions. One of the main suggestions is to use clean fossil fuel technologies, such as clean coal technologies (CCTs), for coal upgrading technologies. Although African countries have commitments to the international community towards climate change, their national laws oppose international goals; hence, it's better for them to align their national policies with international commitments.

Various alternative options for energy sources began to appear, but charcoal remains persistent in Africa. However, the reliance on coal has led to the emergence of "energy insecurity". In fact, the excess in electricity supply has not been reflected in the reduction of charcoal; however, it has had a sustained demand for decades, causing severe environmental damage. For that, restriction policies have been put in place to limit the tools that are being used in tree harvesting, despite the fact that charcoal production is legal but restricted. The equation resulting from this is that more electricity generation would in effect reduce reliance on charcoal consumption, and thus the concept of "energy poverty" will vanish in Africa.

Nuclear Energy and Its Challenges in Africa:

Meanwhile, the whole world is concerned about the seventh goal of the 2030 sustainable development agenda: finding a clean source to combat climate change and ensuring it does not harm the environment. Nuclear energy appeared to be a good replacement for fossil fuels, and while all countries are still skeptical about using nuclear energy, it's regarded as one of the cleanest forms of energy with low emissions. However, international criticism has been raised regarding its production after many incidents occurred and its consequences, which can damage the environment. Notably, many

African countries have a technology sector that is very active in nuclear science and even invests in nuclear projects in order to meet the power demands of their population. The leading countries in this are Uganda, Ethiopia, and Tanzania, along with South Africa. But a cursory look at Sub-Saharan African countries will find that they are still facing energy challenges due to many factors, including population growth and economic development, so there may be a higher potential for nuclear energy to contribute to climate change and address these challenges.

Energy Supply Mix in the Sub-Saharan Region:

In light of the energy transition in Africa, many African countries are developing policies that focus on the electrification of the future energy supply, which is worth around $20 billion, including solar, wind, natural gas, and hydropower, mostly located in West, East, and Southern Africa. Nigeria and South Africa are major examples of planned generation. Evidently, African nations tend to consume so much energy that it forces them to borrow from the international community to cover their demand and produce electricity that they may not consume all.

Egypt Transition to Low-Carbon Economy and Governance Mechanism:

It's important to mention that Egypt is the biggest oil producer in Africa and the third largest producer of natural gas, but since 2015, it has become highly dependent on importing natural gas as domestic demand continues to grow. According to the Egyptian Natural Gas Holding Company report, most of the natural gas consumed in Egypt is to fuel electric power plants. It can be said that Egypt depends primarily on fossil fuels as its main source of energy, while it possesses unique conditions that enable it to produce renewable energy. Ever since Egypt's ratification of the 2015 Paris Agreement, it has become its responsibility to reduce its carbon footprint and has taken real steps to diversify its energy sources, with a total of 94 % of energy consumption coming from fossil fuels. Therefore, the Egyptian Supreme Energy Council issued a strategy to commit to diversifying the country's sources, which was called "the integrated sustainable energy strategy 2035" As such, the Egyptian government introduced several steps to achieve energy efficiency by increasing the citizens' awareness to reduce their consumption, besides the gradual removal of subsidies on petroleum and electricity. The country's reliance on fossil fuels, in spite of its huge deployment of renewable energy projects, necessitated the urgent need for hydrocarbons in order to cover the increasing domestic demand.

Energy Transition and Gender Justice:

The author shed some light on gender and technology issues, particularly in the oil, gas, and mining sectors. Despite the apparent growing influence of technology, especially after the fourth industrial revolution "4IR" women are still historically excluded from different sectors. The statistics reveal that there's a disproportionate number of women who participate in the global economy compared to the percentage of men. Such disparity appears because of the lack of skills needed to cope with the new technologies. However, the development of technology seems to exist to overcome these inequalities. This trend lies behind the myth that the technology field is perceived as suitable only for men rather than women, and to solve this myth, there should be a strategy for training and upskilling women in the digital sector. In Africa, women constitute more than half of the population; therefore, it's essential to include them in policy implementations. It's worth mentioning that the African countries established "the African continental free trade area agreement to make Africa the largest free trade area in the world, by initiating a single market for all goods and services. Including women in this agreement is inevitable, as they are the main drivers of consumption patterns. If we look at oil and gas companies, we will find that they form only 26 % of the total workforce. So, the transformation in leadership to include female participation is needed, whether in extractives or other sectors, to achieve team balance.

Regional Cooperation in Energy Transition:

Countries in East Africa are concerned about tackling the challenges of energy access, and many initiatives have been made on the national level and through regional cooperation to address some of these challenges. Although both renewable energy and fossil fuels are considered viable for the continent's economic development, However, it's argued that regional cooperation may have some barriers, including an unequipped energy infrastructure, a lack of financial resources, and a weak legal and institutional framework. The East African Community (EAC), which is a regional intergovernmental organization composed of six countries, including Uganda, Kenya, Tanzania, Rwanda, Burundi, and South Sudan, was established with the aim of widening cooperation among its partners. Even though its countries are still facing a struggle with electrification, in Kenya, for example, 75 % of the population has access to electricity. In light of this, the World Bank reported in 2018 that Kenya will be a leading country in the economy of the whole of Africa by 2030. So, there shall be a unified regional electricity system to be responsible for providing short- and long-term reliable energy to the citizens of EAC and allowing for power exchange among each other.

Conclusion:

To conclude, there's been a global tendency to address climate change since the 2015 Paris Agreement, which committed all parties to a low-carbon economy transition. Despite the lack of a single definition regarding "energy transition," the international community agrees that it's the gradual shift from fossil fuels to renewable energy. The question that the book revolves around is: will this transition replace fossil fuels in Africa? Most writers say no, but they do believe that the market dynamics will change. That's why the world's eyes are on climate change and the hypothesis that such a transition on the international level will have an adverse impact on developing nations. Then we need to find a way to create fewer damaging effects. There's no doubt that the transition will create negative responses to Africa's economy, so fossil fuel sources are still needed to provide access to over 600 million people who lack access. Therefore, the book intends to focus on the global energy transition debate, mentioning initiatives that are happening in Africa with the goal of reducing CO_2 emissions. Nevertheless, the book hasn't suggested any answers to that, rather referring to the different analyses and opinions proposed in this regard. Eventually, the international community will be keen to ensure that the global transition to a low-carbon economy will not leave many people behind or lack access to modern sources of energy such as electricity. It became crystal clear that the deployment of renewable energy projects is no longer an option and that they need to be implemented on a larger scale all over the continent.

The Palgrave Handbook of International Energy Economics

This book "The Palgrave Handbook of International Energy Economics", edited by Manfred Hafner and Giacomo Luciani, consists of four parties (36 Chapters) and was published in 2022 by Palgrave Macmillan.

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Introduction:

In this book, the author has tried to show the future of energy has moved to center stage in the political and economic debate at the national and international levels. Prompted by concerns for global warming, we have entered a phase of policy rather than solely market-driven energy transitions, which have turned energy from a mostly technological and occasionally geopolitical issue into a vital subject of economic policy and an area of conflict between opposing interest groups.

The Main Points in Chapters 1, 2, & 3:

The author stated that energy has a lot of types. Chapter one is devoted to oil and gas exploration and production, the so-called upstream section of the hydrocarbon industry. The author explains the different phases of an exploration-production project in order to highlight the cost of the structure and the nature of the risks related to each phase. The author also discusses rent sharing according to the different taxation systems and points out the profitability problems of this capital-intensive industry.

The author talked about long-distance pipelines, which have been the natural choice to transport methane in its gaseous form since the first historical records of practical usage of natural gas date back to 500 BCE in China.

The Main Points in Chapters 4, 5, & 6:

In these chapters, the author talked about the key steps in the oil industry, such as crude oil, which is composed mainly of hydrocarbon molecules formed from carbon and hydrogen atoms. Impurities, particularly sulfur, and metals, are also found in the oil.

The author started with the growing greenhouse gas emissions and associated anthropogenic climate change, calling for new solutions for developing a decarbonized and more sustainable energy system. The main point the author analyzed is transport. He thinks that in the transportation sector, hydrogen can be utilized in conventional combustion engines or, more prominently, to supply fuel cells, which are significantly more efficient than combustion engines.

The author saw that electricity can be generated either chemically or more frequently mechanically through the rotary movement of a generator. The needed rotary movement can be obtained by the force of steam expanding at a high temperature, water flowing or wind blowing in a turbine, or even by using a regular internal combustion engine. The high temperature needed to raise steam can be derived from burning coal, oil, gas, waste, and biomass from controlled fission in a nuclear reactor by concentrating solar radiation or by extracting heat from the Earth's crust.

The author analyzed the economics of electricity generation based on four different energy sources. coal, oil, natural gas, and biofuel. The use of coal for power generation began in the United States in the 1880s, based on the same technology that was then used to create mechanical power from the steam engine. The author said that Russia is also rich in natural gas resources and suitable for gas power generation but ranks second in the world. Japan uses imported liquid field natural gas to boost its gas power generation.

The Main Points in Chapters 7, 8, & 9:

It is devoted to power generation from fossil fuels (coal, oil, and gas), which constitute the bulk of global electricity generation (63 % of the total, of which 36 % is from coal), 32 % is from gas, and 3 % is from oil.

These chapters explore the economics of power generation from hydro and its advantages as well as disadvantages. It described the characteristics of the three hydropower generation types (run of river, hydro storage, and pumped storage) and provided an overview of the future role of hydropower in modern energy systems.

The author in this chapter covers an increasing share of global energy demand as a renewable source of energy, which will play a major role in decarbonizing electricity supply. The chapter discussed the solar sector from an economic perspective; it described the technical characteristics of photovoltaic and the competitiveness of solar energy, and wind power also plays a major role in the decarbonizing electricity supply.

The Main Points in Chapters 10, 11, & 12:

These chapters provide an overview of the economics of wind energy, highlight global trends in the wind sector, describe the technical characteristics of onshore and offshore wind energy, and explain how these affect the economic competitiveness of the technology. The author describes how solar and wind power, as intermittent sources of energy, can be integrated into power systems. They also discuss how renewable energy support schemes contribute to fostering the development of solar and wind power.

These chapters talked about geothermal power generation. Geothermal energy derives from thermal energy that is contained within the Earth. The main sources of this energy are the radiogenic heat produced by the radioactive decay of isotopes in the mantle and crust and the primordial heat left over from the formation of the Earth. The total estimated thermal energy of the Earth is immense, but only a fraction can be recovered and utilized by humankind.

In this chapter, the author analyses two renewable sources of electricity, which presently play a very limited role but are believed to offer considerable potential (geothermal in particular). Geothermal energy is emerging as one of the most reliable sources of renewable energy because of its constant availability and sustainable nature, besides being a clean and renewable energy source with a low levelized cost of electricity.

The Main Points in Chapters 13, 14, & 15:

These chapters look at the economics of energy networks (both electricity and gas), including from a regulatory point of view, that is, how the power and gas industries may be organized competitively and what challenges this entails. The chapter describes the physical and economic properties of energy networks, focusing on their monopolistic nature and the implications for electricity and energy market participants. At the end of this chapter, the author explains how access to energy networks is charged and how network users exchange energy within a network.

In these chapters, the author focused on the challenges and opportunities of energy storage, with a specific focus on the economics of batteries for storing electricity. Storage technologies include a variety of solutions that have been used for different grid services, including frequency control, load following, and uninterrupted power supply.

The author provides that the feature of these technologies is to provide additional flexibility to the power grid through integration with other energy networks or sectors through the conversion of electricity into other energy carriers.

The Main Points in Chapters 16, 17, & 18:

These chapters review various potential approaches and discuss the challenge of reaching high levels of penetration of non-dispatchable renewables while at the same time maintaining the stability of the grid and avoiding recurrent blackouts. This chapter reviews the key steps in the financing of an energy project, from the project viability analysis to the choice of financing instruments and structures.

The author highlights how the source of energy and the other characteristics of a specific project impact and shape its financing using case studies from renewable and conventional energy alike and concludes by drawing attention to the innovations taking place across all energy segments.

In these chapters, the author focused on oil product prices, which are discussed. These obviously not only reflect the underlying price of crude oil but also respond to the peculiarities of production and use of each product, keeping in mind that all are joint products from a refinery, whose configuration may differ significantly but cannot change in the short run, creating imbalances in the equilibrium of demand and supply of individual products at any moment in time.

The Main Points in Chapters 19, 20, & 21:

These chapters explain why gas suppliers traditionally defended long-term oil-indexed contracts and analyze the main features of historical contracts. This chapter offers a historical perspective on the evolution of the international coal market to describe the current market as very dynamic and liquid, with an increasing variety of qualities.

These chapters discussed how the trading of electricity is conditioned by the need to constantly balance the grid, meaning that wholesale prices change almost continuously to reflect the changing balance of demand and supply. Therefore, in competitive markets, electricity is traded in intervals that tend to be shorter and shorter, as well as on a day-ahead basis.

The Main Points in Chapters 22, 23, & 24:

These chapters analyze the concept of carbon pricing, with a specific focus on the trading of carbon via an emissions trading system. The analysis starts with an overview of the main design options for a cap-and-trade system, presenting the experience of the European Union as a real-world example of how such systems work. The history of the EU ETS is thoroughly examined, as are the main challenges and benefits of the system and what lessons can be learned from the world's biggest ETS.

These chapters analyze the reasons that contribute to the success and failure of the energy market unbundling with the use of global examples. The new trends and policies in energy markets are discussed from a regulatory perspective, including active investor participation, technological innovation, and the growth of renewable energy.

These chapters attempt to disentangle the multiple contrasting interactions between economic conditions and energy transitions. It goes without saying that the net effect resulting from the balance of such multiple contrasting interactions is extremely variable country by country; it also greatly depends on the specific transition path pursued and especially the intended speed of the transformation.

The Main Points in Chapters 25, 26, & 27:

These chapters discussed the drivers of energy demand, which is one face of the relationship between the economy and energy (the flip face being how energy availability supports the generation of income).

These chapters discussed energy subsidies, which are widespread among OECD and non-OECD countries alike and exist for all energy types. Governments often give noble and legitimate rationales for the introduction and continuation of various energy subsidies, but the reality of energy subsidy policies is nearly always more complex than the stated rationale. The author discussed the reason why the United Nations included the achievement of universal access to affordable, reliable, sustainable, and modern energy among the sustainable deployment goals at the core of its 2030 agenda for sustainable development. Several hundred million people, especially in sub-Saharan Africa, still lack access to modern energy for cooking or electricity. What better income levels can they attain under these conditions? It is crucially important that energy transitions achieve the strategic goal of universal access to energy.

The Main Points in Chapters 28, 29, & 30:

These chapters argue that some disruptions are possible, especially in connection with the electrification of passenger cars and the increasing penetration of electricity in final uses. These chapters explore emerging technologies that may have a disruptive impact on the energy landscape. Disruption denotes an action that completely overhauls the traditional way an industry is working, for instance, by introducing a new technology or new standards. The shorter the transition, the more disruptive the event is considered. History shows that sudden disruptions are very rare in the energy industry due to the relatively slow diffusion process of new technologies, however.

The author talked about the simple reason that China is today the largest source of greenhouse gases and the country whose energy production and demand grow more rapidly in absolute terms. Despite its large domestic resources of coal, oil, and gas, the country has emerged as a key importer of oil and natural gas.

The Main Points in Chapters 31, 32, & 33:

The author's focus on Russia deserves attention. Not only because it is the most important exporter of gas as well as one of the three most important producers of oil, but Russia also ranks fourth in the world in primary energy consumption, and carbon dioxide emissions adhere to the strategy of business as usual and rely on fossil fuels. The challenge for Russia in the coming years is to develop a new strategy for the development of its energy sector, which enters the zone of high turbulence even in the absence of the influence of the climate change agenda due to COVID-19, increasing global competition, growing technological isolation, financial constraints, and, since February 2022, ostracism following the invasion of Ukraine.

The author talked about how the Middle East and North Africa are the regions richest in hydrocarbon resources, but these are very unevenly distributed between countries. The region therefore displays great diversity in opportunities and perspectives.

The author analyzed the fact that sub-Saharan Africa embodies a paradox. Although the region is blessed with energy resources and has long attracted the oil and gas industry, the majority of its population lacks access to energy, which hides their economic and social development agencies and economic actors. They have considered that the exploitation of their energy resources would prompt the economic growth of the continent by giving the countries the financial means to undertake development strategies, but unfortunately, the reality seems much bleaker as most energy-producing countries on the continent offer a dramatic illustration of this situation.

The Main Points in Chapters 34, 35, & 36:

The author analyzed the development of access to energy for the population. As a consequence, all over the continent, new initiatives have been put in place to boost access to energy for the local population. This access has at last been acknowledged as a key driver for economic development.

In these chapters, the author focused on North America and Europe. North America is characterized by levels of energy consumption per capita that are double those in Europe or Japan; thus, issues of energy efficiency are extremely important. High energy consumption rates in the United States and Canada challenge reaching climate policy goals under heightened public pressure and the search for alternatives to fossil fuels. Mexico will be more focused on economic development and private capital in commercial applications.

At the end of this book, the author analyzed that Europe has tended to occupy the moral high ground of decarburization and energy transition, not without contradictions and with outcomes not exactly in line with expectations.

Reports

The Crisis Between Israel and Gaza... and Possible Scenarios

Report: Hala Arafa

The escalation of conflict and bloody confrontations since October 7 raises questions about the fate of energy relations between Egypt and Israel and the future of conflicts in the region, experts say.

Brigadier General Dr. Khaled Fahmy
Professor of political science and international relations

Dr. Dalal Mahmoud
Professor of Political Science at Cairo University

Dr. Tarek Fahmy
Professor of political science and international relations
Vice President of the National Center for Middle Eastern Studies
Head of the Israeli Studies Unit

Dr. Wafaa Ali
Professor of Economics and Energy

Immediately after the outbreak of confrontations in the Palestinian territories, the escalation of the intensity of the conflict since October 7, and the entry of several parties into the line of events, in a way that prompted some to wonder whether the Middle East region is on the verge of being the scene of a comprehensive crisis, many questions have arisen about the effects of the "crisis in Gaza" on its regional surroundings in particular and on the international arena in general.

Due to the geographical proximity and historical connection to the conflict and its parties, a question arose about the fate of energy supplies and energy relations between Egypt and Israel and whether the crisis in Gaza could be a trigger for broader and more influential crises. In addition to asking about the fate of global energy and trade corridors and whether the effects of the conflict could push a party such as Hamas to move the conflict to another arena, which is the arena of conflict and piracy in the surrounding and nearby maritime arenas such as the Mediterranean Sea.

Regarding gas and energy supplies between Egypt and Israel, "despite Egypt's declaration in 2018 of self-sufficiency in natural gas and no need for imports, after operating the giant Zohr field, which has reserves estimated at 20 trillion cubic feet, over the past years it has continued to rely on Israeli gas imports," according to several studies and various media reports in this field.

Immediately after the outbreak of the conflict between Hamas and Israel on October 7, 2023, Tel Aviv announced the cessation of gas supplies coming from its fields to Egypt and attributed the cessation of natural gas production in the "Tamar" field to "safety concerns."

The impact of this appeared in Egypt when the official spokesperson for the Council of Ministers announced at the end of October the need for further load reduction, and he confirmed that the decrease in the quantities of gas supplied to Egypt from 800 million cubic feet of gas per day to zero coincided with the increase in electricity consumption.

Gas imports from Israel resumed after several weeks of conflict and gradually rose from 150 million cubic feet in late October to 350 million cubic feet at the beginning of November, reaching 450 million cubic feet per day in the middle of the same month, according to media reports.

We brought these questions—about the effects of the Gaza crisis on energy, trade routes, the future of the region, and other questions—to several senior professors of political science, international relations, and energy experts. Let us discuss it through the following lines:

The impact of the crisis on energy supplies between Egypt and Israel:

Dr. Tariq Fahmy, Professor of Political Science and International Relations, Vice President of the National Center for Middle East Studies, and Head of the Israeli Studies Unit, says that energy supplies between Egypt and Israel have certainly been affected by the current events in Gaza. Gas supplies between the two countries stopped at the beginning of the conflict and were then pumped again several weeks later, he says. Egypt imports gas from Israel, then it is re-liquefied in Edku in Beheira, and then it is sent, he adds, pointing to the resumption of gas supplies between Egypt and Israel after the stoppage that occurred, but without announcing the rates within which supplies were resumed.

Fahmy emphasizes the keenness of both Egypt and Israel on the success of energy supplies. Matters are going on in one way or another in this context, he says, pointing out the need for some time to develop economic energy cooperation in the Eastern Mediterranean region in a way that suits the higher interests between Egypt and Israel at this time.

Crises coming? Or just one crisis?

Regarding whether the events in Gaza could be a trigger for upcoming crises at the regional and international levels, the professor of political science and international relations confirms that Gaza is considered the main driver of stability in the region. Some believe, including me, that tension will return strongly in the region if the "Palestinian issue" is not resolved during the coming period, he says.

It is difficult to say that the Gaza crisis may lead to a complete escalation of the scene in one way or another; it will be linked to several motives related to the (proxy) war in the region, meaning the outbreak of confrontations, for example, between Yemen and Israel, Iraq and Israel, Syria and Israel, or Jordan and Israel. These conflicts and clashes will be limited, but things are now deteriorating within a tense climate in the region, Fahmy says. He adds that we may already be witnessing regional crises in the Middle East.

Maritime piracy operations in the Mediterranean:

The head of the Israeli Studies Unit at the National Center for Middle East Studies, Tariq Fahmy, ruled out the possibility of any piracy operations in the Mediterranean, saying that this is a very difficult and complex process. Piracy currently exists in the Red Sea, the Bab al-Mandab region, and the Gulf of Oman, but it is difficult for the same to happen in the Mediterranean, he explains.

Fahmy pointed out that the region has returned to the idea of threatening maritime navigation, whether for Israel and Iran or the United States of America and Iran. Therefore, there is a mutual conflict; of course, there are great security measures, and Israel and the United States of America are taking great measures to protect their maritime interests in the Red Sea. Israel will not stand idly if its maritime interests are threatened, and it has already sent naval vessels to the Bab al-Mandab region to confront any piracy operations carried out in this context, he adds.

Regarding the gas and energy clusters in the Mediterranean region and their impact on events in the region, Dr. Tariq Fahmy explains that there are new emerging markets to form a new structure for energy markets in the Mediterranean region, in Southeast Asia, in the Arabian Gulf, and in the southern regions. Here we are talking about the gas pipeline corridor project that the United States of America announced its establishment, he adds.

Eastern Mediterranean region, these have new details, which I explained in a comprehensive study to clarify the new gas pipelines and the position of Israel, Greece, Cyprus, and Turkey, all of which are linked to the new gas markets, he says. We also study the gas pipelines and their effects on the Suez Canal and how they can affect the corridors; all are very important topics in alternative energy markets, he added.

Regarding the impact of both the Chinese Silk Road and the American Corridor, Dr. Tariq Fahmy explains that the Chinese Silk Road faces major problems at this time due to its competition with the American Corridor project. The two projects confront each other. The new American corridor project is a major threat to China, and both China and the United States of America are in constant conflict in this context, he adds.

there is a third project on the discussion table, which is the European Gateway Project, which is being proposed by the Europeans. All of these projects are conflicting and overlapping, and they all take place in the Middle East or neighboring regions. These projects are of great importance at this time, and their goal is to search for new fields for everyone to secure gas pipelines and the large economic and financial forums that control them, he adds.

The next war is a war on energy, gas lines, and new or renewable energy, which the world is already witnessing in one way or another, Professor of Political Science and International Relations Dr. Tariq Fahmy emphasizes, pointing out that there are many studies in this field to work on these alternative markets.

The impact of the Gaza events on energy supplies between Egypt and Israel:

About the impact of the Gaza events on energy supplies between Egypt and Israel, Dr. Dalal Mahmoud, Professor of Political Science at the Faculty of Economics and Political Science at Cairo University, says that two main points could affect energy supplies. If Israel can force the population of the Gaza Strip to migrate to Egypt, or if it expands military operations outside the Gaza Strip to extend Egyptian interests directly or indirectly.

So far, there is no indication of either point; Therefore, I believe that the events in Gaza are not expected to affect the energy supply between Egypt and Israel, especially since the cooperation between them in the energy context takes place within a broader institutional framework, which is the Eastern Mediterranean

Gas Organization, Dr. Dalal Mahmoud adds.

She believes that it is important to emphasize the main points:

The energy sector is important to both Egypt and Israel, and the keenness of each of them to stabilize their 'energy' relationship.

The stability of the energy market is a regional and global requirement, not only because of the events in Gaza but also since the beginning of the Ukrainian war in February 2022.

The Eastern Mediterranean is important for the European Union countries, whose dependence on Eastern Mediterranean gas has increased after the heavy sanctions on Russia, meaning that there is a European and American interest in stabilizing relations between the countries of the Eastern Mediterranean Organization to ensure relatively stable gas supplies heading to Europe.

Settlement and stability:

Regarding whether the events in Gaza could be a spark for upcoming crises at the regional and international levels, Dr. Dalal Mahmoud says that the events in Gaza are an episode in a series of Palestinian issues. This is a main issue, not only because it is the longest conflict in the region, as it is the essence of the Arab-Israeli conflict, but also due to several other considerations, including the multiplicity of its parties and the complexity of their relationships. That makes it a complex strategic conflict that combines ideological, security, political, and social dimensions. The national, regional, and global levels intervene in it as well. Therefore, there is no room for actual regional stability except with a just settlement of this issue, and this is completely unlikely within the current reality.

The political science professor believes that the events in Gaza, with all their cruelty, inhumanity, and prejudices, are revealing reality and not the cause of the crisis. Therefore, it is expected that various crises will occur. For example, it is expected that there will be activity by some Iranian-affiliated groups against Israeli and American interests in the region. Some terrorist organizations also use the Gaza events in their Takfiri rhetoric to incite acts of violence and terrorism in the region. That will lead to expected crises due to the nature of the military deployment of major powers in the region and the related necessity of establishing clear security arrangements to secure regional sea lanes and straits, she adds.

Regarding the possibility of Hamas turning to piracy in the Mediterranean like the Somali Islamists, Dr. Dalal Mahmoud believes that this possibility is completely unlikely, as Hamas gained its popularity from being a resistance movement to the Israeli occupation based on a religious basis in its basic charter. However, piracy is a criminal act whose description is undisputed. Even in Somalia, a distinction must be made between the Somali Al-Shabaab movement (a terrorist organization) and the pirates and mercenary militias there. Regardless of agreement or disagreement with Hamas and its methods of resistance, it is a political movement, not a criminal one. Some of the tactics in its armed activity may be similar, but the goals are certainly different, she says.

The crisis and its repercussions on energy supplies between Egypt and Israel:

Regarding the extent of the effects of the events on the gas and energy clusters in the Mediterranean region, in which Egypt, Israel, and Turkey are located, she says, as previously mentioned, that the events in Gaza have not yet affected the Eastern Mediterranean Gas Organization. Therefore, Turkey remains outside the gas and energy group because it is far from membership in the organization. Although Turkey's ambition may push it to escalate its stance against Israel due to the events in Gaza to embarrass the rest of the organization's countries, including Egypt, it has not done this so far. She adds that she believes that it is keen not to spoil its relations with Egypt and the rest of the Arab countries after calming tensions with them not long ago. According to this perception, Turkey may exploit the events in Gaza to further its rapprochement with the Arab countries and regain its lost popularity in the Arab region by hardening its stance toward Israel. The closer they get, the more Turkey's interests and motives toward the Eastern Mediterranean and its gas discoveries and energy investments will be understood, she says.

Power lines:

Regarding the competition between energy corridors and lines in and around the region, Dr. Dalal Mahmoud says that although the Chinese Silk Project mainly focuses on enhancing transportation and trade in various sectors, it also includes aspects related to energy transportation, including oil and gas. It is expected that infrastructure will be developed to transport oil and gas across land and water, which enhances economic integration and regional cooperation, and this trend is part of efforts to improve economic communications between China and many countries in the region, she adds.

The Indian Economic Corridor project in the Arabian Gulf and Europe certainly focuses on the energy sector and is a promising project, she says. However, on the one hand, it has not been implemented, its implementation mechanisms and priorities have not been agreed upon, and there are important countries in the region that did not participate in it. On the other hand, it seems to focus primarily on green energy, and this is normal within the world's interest in the effects of climate change, she adds.

What is observed is that the competition between the two not-yet-completed projects is part of a larger geopolitical and geoeconomic

competition between the major global powers (China as a party and the United States through India as the other), she believes. As well as a regional influence competition. The countries of the Arab Gulf, led by the Kingdom of Saudi Arabia, which is the only Arab country in the G20, adopted the aforementioned economic corridor project. While many countries in the region adopted the Chinese Silk Project, including Iran, which has a strategic alliance treaty with China, this makes the corridor project, if implemented, a factor in increasing Saudi Arabia's influence over the rest of the countries participating in the Silk Project, she adds.

and all possibilities are open for them to be completed or not. This depends on the rest of the balance equation and competition between the competing global and regional powers, the political science professor concludes.

The comparison is in favor of the Chinese Silk Road, and the cost of establishing the Indo-European corridor is very high.

Brigadier General Dr. Khaled Fahmy Abdel Tawab, advisor to the Center for Strategic Studies of the Egyptian Armed Forces and specialist in international relations, says that the process of importing gas from Israel takes place in Egypt to complete the process of liquefying the gas and re-exporting it to Europe. Certainly and naturally, the events in Gaza will have an impact on the process of importing gas from Israel to Egypt. Due to the employment process inside Israel, since citizens there are required for conscription during many periods of their lives, the reservists in Israel were mobilized, and a large portion of citizens were called up to confront the crisis in Gaza. This had a major impact on the Israeli economy, and among the economic branches that were greatly affected was the gas supply to Egypt to re-liquefy it and then export again to European markets, he adds.

The development of the events taking place in Gaza, turning them into a fuse for future crises, will be at the regional level. Unless the events develop beyond the region, expanding to other countries and allowing greater interference by external parties in the conflict, in this case, the scope for war would expand and it would transform from a regional conflict into an

international conflict, the advisor to the Center for Strategic Studies of the Egyptian Armed Forces adds. If events continue at this pace and parties from the region become more involved, such as the Houthis launching several missiles and drones from Yemen toward Israel, in addition to the interference of Hezbollah and Iran, this will expand the scope of the crisis from within the Palestinians to other parties. Therefore, it may turn into a regional war whose consequences we do not currently realize, he explains. This crisis at the regional level opens the door to the possibility of intervention by other parties, under the pretext of defending their interests in the region or under the pretext of protecting the security and safety of Israel since it is surrounded by enemies from Arab countries, using that as a motive to intervene to defend Israel, he adds.

Dr. Khaled Fahmy completely excludes the possibility of Hamas turning to piracy in the Mediterranean, and this is due, according to his interpretation, to the fact that Hamas has a fundamental concern, which is protecting Palestine and repelling Israeli aggression against citizens in the Gaza Strip. In addition, Hamas does not have the capacity or strength that would enable it to fight on more than one front. It is now fighting inside Israel, in addition to some problems that have begun to increase recently in the West Bank, which led to the expansion of its fighting circle to include the West Bank beside the Gaza Strip. Therefore, I do not think that Hamas may resort to such acts of piracy in the end to fight Israel, but rather it will continue to fight internally only, he adds.

Brigadier General Dr. Khaled Fahmy points out that Israel will be the most affected by the events regarding gas and energy clusters in the Eastern Mediterranean region, while there is no significant impact on both Egypt and Turkey. Energy supplies that come to Egypt from Israel to be liquefied and re-exported to European markets will be affected, as previously mentioned, and these supplies are among the agreements signed between several countries. Therefore, the events will mostly affect Israel more than others, he explained.

As for the gas and energy clusters in the Eastern Mediterranean region, they are operating without any problems so far, and there is a constant attempt to adhere to the agreements signed at the level of countries and to commit to energy supplies to the countries that signed them, Fahmy continued.

of the Egyptian Armed Forces explains that the effects of the American corridor—from India to Europe, passing through the Arabian Gulf, Jordan, and Israel—on the Silk Road adopted by China are not strong, noting that the Chinese Silk Road path is a sea-land path. It is known that sea transport is the cheapest and safest of the types of transport. As for the American corridor to be established, it is more of a land route, then sea, land again, then sea, then ports. The transportation process takes place from land to sea and from sea to land, and it has a very high cost, in addition to the risks on the road, as the load of one boat exceeds thousands of tons, which is equivalent to the load of about a hundred trains or more, he says.

He adds that the cost in the proposed Indo-European corridor is for transportation by train, then stopping at a station in order to unload the load at the train station, then transporting it by trucks to a new shipping area inside the port to be unloaded from the trucks, to be transferred to the boats, and then again to be unloaded and loaded on trains, heading to the sea again and repeating the same thing. This is in addition to the danger and lack of sufficient insurance, and therefore there will not be a strong competition, as some believe, between the new American corridor from India to Europe and the Chinese Silk Road, which provides security as well as ease of transportation and logistics and, of course, reduces the economic cost. All of these advantages are in favor of the Chinese Silk Road. Therefore, the competition is very weak, especially since the construction of the new American corridor will cost huge sums of money, borne by several countries, and the matter will need to secure the land line to be established. Therefore, in the end, the competition may be in a simple sector, but the "balance" will be more likely in favor of the Chinese Silk Road.

The plight of the global economy:

Dr. Wafaa Ali, Professor of Economics and Energy, says that there is no doubt that the world had barely caught its breath from the Corona pandemic before the Russian-Ukrainian war caught up with it, followed by the events of the Al-Aqsa Flood. As the drums of war beat, the global economy witnessed a new ordeal, directly affecting the Middle East region and the world at all levels, at a time when the region is suffering from economic problems, rising inflation, and declining growth rates. Then things become more difficult and surrounded by uncertainty.

questions about the severity of the economic effects of the war. The countries in the region already have inflationary pressures and an accumulation of debt and are looking for economic stability. Here, the Gaza war came to overthrow all economic theories, and the details of the macroeconomics no longer coincided with the escalating events, which is what economic policymakers and financial and investment experts are trying to create a kind of balance with. Every source of economic uncertainty delays the progress of the Middle East region. Consequently, the infection spreads to the whole world and increases risks and their management, especially in this place where gas and oil are located, pointing out that the Middle East represents a third of the global supply of oil, and 20% of global supplies pass through the strategic Strait of Hormuz, which is equivalent to 30% of the total oil that is transported by sea, which are the places that suffer from fear and crises.

Dr. Wafaa Ali points out that the Middle East region is very important to the world, and it is at the epicenter of the conflict regarding supply chains and global shipping. The situation is getting darker, and the alarm bell is ringing with economic consequences. We are facing an economic dilemma in the Middle East region that is confusing the entire global economy, whether in the field of energy or investments, especially concerning the file of tourism, the financial market, and industry, and the world is spinning in closed circles, she adds. Investors have fears and a state of hesitation, as well as a rise in shipping and insurance costs for transporting goods, stressing that the expansion of the conflict will pose a threat to stability regarding the issue of economic reform at the level of Middle Eastern countries, she says.

About the gas file, the consequences of the expansion of the conflict seem more severe, as global gas prices are rising rapidly, the professor of economics and energy continues, pointing to the consensus of global gas analysts, including Stephen Innes. The events of the "Al-Aqsa Flood" pose a threat to the regional natural gas markets, which has an impact on the liquefied gas market globally and in the Middle East region, she says. If the war is prolonged, analysts expect oil prices to rise above $100, and with the advent of the New Year and the scarcity of supply due to the new OPEC Plus cuts, gas may also exceed the announced prices with the advent of winter, she explains, indicating that everyone has resorted to safe havens, which is gold.

What cannot be interpreted is that the conflict in Gaza represents economic pressure on the entire region, taking into account that economic diseases are an infection that will haunt the entire world, she adds.

She continues to say that some wonder about the Israeli gas that was arriving in Egypt for liquefaction and export to Europe. Here we point out that it is known that the European Commission agreed last June with Egypt to export gas to the European Union to avoid the crisis of Russian supply shortages due to the war and the Kremlin's imposition of preventing Russian gas from reaching Europe. Israel also temporarily stopped the Tamar field due to the escalating events in Gaza out of fear for the oil platforms from bombings, but it returned to

operate the field, and Egypt will be supplied with gas for liquefaction, as it is the only haven for Israeli gas and for the sake of their European allies who receive gas through Egypt.

Dr. Wafaa Ali agrees with the complete exclusion of the possibility of Hamas piracy in the Mediterranean, saying: This is impossible for many reasons, the first of which is that this is not their mission, and these operations have their experts, and the Mediterranean gas has a force that protects it. Egypt, for example, has its bases that protect Egypt's natural capabilities, and it has elements of striking power, in addition to the fact that the Mediterranean Sea has a geopolitical specificity and there is an Eastern Mediterranean Gas Forum with its military strength, so the matter is far from Hamas.

She ends by saying that we hope that the circle of conflict will not expand and that the war will not last long. Because it will expose the world to fiercer inflationary pressures, especially in energy, including oil and gas.

Before the Start of the COP28 Activities in the United Arab Emirates: Saif Bin Helal Center Surveys the Opinions of Experts and Analysts.

The second session of the climate conference in an Arab country after the Sharm El-Sheikh session... and the world continues to search for solutions and alternatives to reduce carbon emissions and support the green economy.

Experts and specialists answer questions about the importance of COP28 and a list of the most important issues that impose themselves on the discussion table.

Reported by: Hala Arafa

Dr. Maher Aziz, former advisor to the Egyptian Minister of Electricity, says: Achieving international ambitions of not exceeding the 1.5-degree Celsius ceiling is a top priority.

Dr. Ahmed Kandil, Head of the International Studies Unit and Head of the Energy Studies Program at Al-Ahram Center for Political and Strategic Studies: 3 important messages for 'COP28'... Industrialized countries must implement their commitments to provide $100 billion to developing countries to confront the negative effects of climate change.

Brigadier General Engineer Wael Abdel Hakim Al-Abd, Lecturer at the Military Academy for Postgraduate Studies: COP28 in the UAE confirms the influence of Arab society on global and regional issues.

Hani Mahmoud Al-Nakrashi, global energy expert: COP27 has established the right of developing countries to obtain some kind of compensation for the damage they have suffered due to development in industrialized countries, and work must be done to increase this compensation.

Dr. Amal Ismail, researcher in environmental and energy studies: The current session of the climate conference is the first 'global assessment' of the progress achieved since the 2015 Paris Agreement.

Once again, a new session of the climate conference is being held in an Arab country. The United Arab Emirates hosts the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28) in Expo City Dubai from November 30 to December 12, 2023, to unify climate action global efforts and identify available cooperation opportunities to find solutions to climate challenges. This is a year after Egypt hosted "COP27" in Sharm El-Sheikh, which was inaugurated by Egyptian President Abdel Fattah El-Sisi with the participation of about 110 world leaders, heads of government, and a group of international figures.

According to the consensus of experts, building on the results and achievements of the Sharm El-Sheikh Conference is necessary and important for 'COP28', especially since 'COP27' produced some important recommendations and decisions, which were monitored by a report issued by the Secretariat of the Convention of the Parties for the Climate Summit at its twenty-seventh session. These key outcomes include the launch of a new five-year work program at COP27 to advance climate technology solutions in developing countries and calling for accelerated efforts to relentlessly phase out coal-fired power and phase out ineffective fossil fuel subsidies. The resolution states that the unprecedented global energy crisis underscores the urgent need to rapidly transit energy systems to become more secure, reliable, and resilient by accelerating clean and just transitions to renewable energy during this critical decade.
Participating countries also launched a package of 25 new cooperative activities in five main areas: energy, land transport, steel, hydrogen, and agriculture. United Nations Secretary-General António Guterres announced a plan worth US$3.1 billion to ensure that every person on the planet is protected through early warning systems within the next five years.

A G7-led plan called the Global Shield Financing Facility was also launched at COP27 to provide financing to countries suffering from climate disasters. In addition, important progress has been made in protecting forests with the launch of the Forest and Climate Leaders Partnership, which aims to unify actions taken by governments, businesses, and community leaders to stop forest loss and land degradation by 2030.

At the gates of COP28:

According to what was announced by the Abu Dhabi Media Office, 'COP28' will witness the first global evaluation of the ongoing efforts over the past two years to determine the progress made by concerned governments in implementing climate action plans to address global warming and other high-priority environmental issues.

COP28 will also be a national opportunity to combine the efforts of all parties to cooperate, unify voices, and enhance climate action to ensure a sustainable future. This conference will also be a means to enhance the UAE's position on the map of the world's leading countries in leading the proposal of sustainable solutions to climate challenges. In addition, the conference provides an opportunity to discuss climate challenges, find solutions and alternatives by relying on renewable energy, present sustainable economic development

opportunities, and contribute toward global consensus to solve the climate crisis.

Emirati media also quoted state leaders as confirming that the UAE intends for its COP28 hosting to be effective and capable of producing solutions and alternatives that can reduce carbon emissions, develop what can contribute to sustainable development, and help rely on clean energy. The UAE has many strategies and plans that support the green economy.

COP28 in Dubai is scheduled to bring together a record number of 80,000 people or more, according to the UAE presidency of the conference, and the future of fossil fuels will once again form the core of the discussions at the conference.

The UAE presidency of the conference put forward several concrete goals to be achieved by 2030, most notably increasing the capacity of renewable energy in the world threefold, doubling the improvement of energy efficiency, and doubling hydrogen production.

Important topics:

COP28 is the first summit after the Paris Agreement in 2015, which will witness a global assessment of the progress of achieving global climate goals. Therefore, many topics imposed themselves on the agenda of the discussions, most notably the necessity of finding effective solutions that combat the repercussions of the climate change phenomenon and supporting developing countries and societies most affected by climate change. The UAE had previously directed the provision of $100 billion for this purpose.

In addition, there are other important issues, such as directing investments to clean, renewable energy projects and supporting green economy projects. For example, solar energy, carbon capture, and storage projects, and the use of hydrogen, and develop a road map to follow up on the implementation of efforts made to reduce emissions, protect the environment, confront climate change with innovations and creative ideas, and help the weakest countries.

Continuing efforts:

Also, according to Emirati media reports, the UAE prioritizes the issues of climate change and environmental preservation. Over the past years, the UAE has taken some important measures and steps in this regard; it ratified the Kyoto Protocol in 2005 on climate change and established Masdar City as one of the most sustainable urban clusters in the world, which relies on clean energy, and where the UAE hosts the headquarters of the International Renewable Energy.

Experts: Important issues

To determine the importance of holding the climate conference, the UAE hosting its current session, and the most important issues that should be on the discussion table, we surveyed the opinions of many experts, specialists, and those concerned with climate action and various issues.

Dr. Maher Aziz, a former advisor to the Egyptian Minister of Electricity and Renewable Energy and an energy, environment, and climate change consultant, says that the holding of COP28 in Dubai this year is a sharp warning to all of humanity that what was agreed upon in Sharm El-Sheikh in COP27 must be put into effect without delay.

Although the climate summit in Sharm El-Sheikh is an implementation summit, none of its recommendations were implemented seriously throughout the year 2023, except for several specialized meetings on sub-topics that added more recommendations that await urgent implementation, he explains, stressing that the recommendations that were accomplished in COP27 need the urgent initiation of implementation with all honesty and strength.

For example, the Sharm El-Sheikh Summit identified an approximately $5.9 trillion financing gap between what should be provided for the efforts of developing countries to achieve their specific national commitments and what they have already received; however, billions began to flow toward supporting the Ukrainian war and increasing carbon emissions associated with bombings, fires, and destruction, Dr. Maher Aziz continued.

The most important issues that should be raised at the Dubai Climate Summit this year are the same issues on which the United Nations Framework Convention on Climate Change and the developed countries leading global climate action have not made any progress during 2023. There are issues of pressing scientific facts, international ambitions not to exceed the 1.5-degree Celsius ceiling, energy, and climate change issues, the necessary efforts to mitigate greenhouse gas emissions, and the necessary measures to adapt to climate change. As well as how to implement compensation for loss and destruction, early warning, transformational pathways in various implementation processes, critical pressing issues of climate finance, technology transfer issues, and capacity building, the former advisor to the Egyptian Minister of Electricity and Renewable Energy, energy, environment, and climate change consultant, explained.

COP28 messages:

Dr. Ahmed Kandil, Head of the International Studies Unit and Head of the Energy Studies Program at Al-Ahram Center for Political and Strategic Studies, says that the importance of COP28 is that it is held in one of the world's largest oil-producing countries. This gives a set of messages to countries around the world, the first of which is that the UAE plays a pioneering role in shifting energy from relying on fossil fuels such as oil and natural gas to clean sources such as solar energy, wind energy, and others.

COP28's second most important message is that the United Arab Emirates presents itself as a reliable partner that can be relied upon to overcome the global crises that threaten the survival of humanity on planet Earth, including climate change, he adds.

COP28 has a third message of great importance, which is that the problem is not getting rid of traditional energy sources such as oil and natural gas, but rather what is important is to reduce the increasing emissions that lead to a significant rise in the earth temperature. Therefore, multiple projects and different alternatives can be relied upon to achieve the goal of carbon neutrality, including switching to new, clean sources of energy in addition to increasing green spaces, the head of the International Studies Unit at Al-Ahram Center for Political and Strategic Studies explained.

One of the most important major issues on the table for discussion in COP 28, which was issued by COP27, is the establishment of executive mechanisms for the Loss and Damage Fund, which Egypt succeeded in achieving consensus on between developed and developing countries last year, Dr. Ahmed Kandil emphasizes. There is still the issue of reviewing countries 'commitments regarding their emissions pledges, which unfortunately has not yet reached what the Paris Agreement aspires to in confronting the global climate change crisis, he adds.

Developed industrial countries need to implement their commitments to provide $100 billion to developing countries to confront the negative effects of climate change, provided that this financial aid is in the form of 'grants' and not in the form of new loans that increase the huge debt burdens of developing countries, Dr. Ahmed Kandil points out.

Importance of COP28:

Brigadier General Engineer Wael Abdel Hakim Al-Abd, researcher at Cairo University and lecturer at the Military Academy for Postgraduate Studies, refers to the importance of COP28 within the increasing climate challenges facing the world and how to build on what was achieved in COP27. The conferences of the parties are the largest and most important annual conferences on climate, he explains. In 1992, the United Nations organized the Earth Summit in Rio de Janeiro, Brazil, where the United Nations Framework Convention on Climate Change was adopted and its coordinating agency was established, which we now know as the United Nations Climate Change Secretariat, he notes.

In this treaty, countries agreed to "stabilize concentrations of greenhouse gases in the atmosphere to prevent dangerous interference from human activity in the climate system," he adds. It has so far been signed by 197 different parties through actions and negotiations on various annexes to the original treaty to set legally binding limits on emissions. For example, with the Kyoto Protocol in 1997 and the Paris Agreement adopted in 2015, all countries in the world agreed to intensify efforts to limit global warming to 1.5 degrees Celsius above pre-industrial temperatures and to enhance financing for climate action, he says.

He points out that since 1994, when the treaty entered into force, the United Nations has annually brought together almost every country on Earth to attend the World Climate Summits, known as "COP," which stands for "Conference of the Parties." The twenty-seventh session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27) proved that Egypt, through cooperation between the Ministries of Environment and Foreign Affairs, was able to mobilize votes within the African Union and submit the file to host the conference on behalf of the African continent. For a country to host the two largest international environmental agreements in a row, the United Nations Convention on Biological Diversity and the United Nations Convention on Climate Change is a precedent in the history of international environmental work that does not happen often, he adds.

Brigadier General Engineer Wael Abdel Hakim Al-Abd continues that at the African level, the conference highlighted Egypt's pioneering role in the African continent through activating the African Adaptation Initiative, which was launched by President Abdel Fattah El-Sisi after succeeding in obtaining financial support provided by the United States of America and developed countries amounting to 150 million dollars. As well as hosting the initiative management unit in Cairo and the United Kingdom's pledge to provide 200 million pounds sterling in support to the African countries most affected by climate change. In addition, the European Commission's pledge of £1 billion to a program to help Africa adapt to climate change and build its resilience.

COP28 has ambitious prospects that start with some important issues that COP27 has founded. Countries are expected to identify and evaluate the progress they are making toward strengthening resilience and helping the most vulnerable communities, and this means

countries making more detailed and ambitious commitments for adaptation in their national climate plans, he says.

UAE hosting COP28 confirms the influence of Arab society on global and regional issues, including the issue of the impact of greenhouse gases and its resulting serious challenges, he adds.

The most important issues that impose themselves on climate action in general and the current session of the climate conference are the need for more funding to confront the negative effects resulting from the increase in gases that cause global warming. As well as helping developing countries confront those effects and expanding the use of new and renewable energy issues, he stresses that Arab and international representation in the conference would provide an environment that is more committed to implementing the decisions, pledges, and initiatives that these leaders will sign. This is due to many reasons, the most important of which is that the conference is being held in a major and pivotal Arab country with an effective presence at the national level, he explains.

He points out the necessity of placing priority issues for developing Arab and African countries at the top of the conference's agenda, especially since any development, event, or transformation will have repercussions in their Arab surroundings, and perhaps definite geopolitical ones.

The second of these reasons is that Arab representation in the conference is at the highest levels of leaders of Arab countries, and this would provide an environment more committed to implementing the decisions, pledges, and initiatives that these leaders will sign, he says. Third, the Arab region is one of the most affected regions, he adds.

He believes that in this context, the Arab parties can benefit from the practical scenarios that Egypt has developed within its national climate change strategy 2050, which aims, among other things, to ensure the quality of citizens' lives, improve sustainable economic growth projects, and preserve natural resources while reducing emissions in a manner consistent with the Paris Agreement. As well as achieving continuing development projects while preventing the occurrence of climate and environmental disasters at the same time.

Egyptian solutions:

Hani Mahmoud Al-Nakrashi, a global energy expert and member of the Advisory Council of the President of the Republic, believes that hosting COP28 by a country whose budget depends mainly on oil exports, one of the main causes of air pollution and thus global warming, logically leads the conferees to demand a timetable to stop using and extracting oil. This will cause financial hardship for oil producers as well as confusion for its users because there is currently no equivalent alternative to it. Therefore, I expect that discussions on this topic will continue until another generation comes into decision-making positions—for many decades—without a quick result, he adds.

On the other hand, we find that Egypt has a promising solution called "Khamisa," which is based on the establishment of five solar thermal stations that work by concentrating solar radiation to obtain a temperature of about 550 degrees Celsius. Part of it is used to produce electricity, and another part is stored in an insulated tank for use after sunset to produce electricity, Al-Noqrashi says. This is to avoid using expensive, limited-storage-capacity batteries, he explains.

It also includes planning five completely identical stations, each with its thermal storage, each completely independent but connected, in a 100% renewable electricity sub-grid, ensuring operation 24 hours a day, 365 days a year, to pass through periodic maintenance periods and storm sandy waves, he says.

He believes that such a group can desalinate seawater without reducing its electrical output, which is later used in water electrolysis devices (previously desalted) to separate its components from each other and extract hydrogen, which is a suitable substitute for oil, whether in its gaseous form or after converting it into a liquid for transport and storage. All of this is practically possible and is being achieved on a small scale. Because of the two main obstacles: funding and appropriate technology, he explains.

As for financing, it is available from the proceeds of selling oil for previous decades, and the appropriate technology is "Khamisa." The biggest obstacle is the will of decision-makers, and this is what we expect from COP28 with the hope that it will be achieved before COP29, he says.

Regarding how to build on what was achieved in COP27, the global energy expert says: The discussions and recommendations of COP27 established the right of developing countries to obtain some kind of compensation for the damage they suffered due to the development that industrialized countries enjoyed. This compensation must increase, despite the procrastination of industrialized countries, to enable developing countries to convert their electricity production to renewable ones while increasing this production to desalinate seawater and then produce green hydrogen, because hydrogen is called green if its production is entirely renewable, he adds.

Oil-producing countries should be added to the list of donors of compensation to developing countries because they have benefited financially from air pollution caused by industrialized countries thanks to easy access to oil, he adds.

He explains that most oil-producing countries will be charged by the attending delegations for the profits they make from selling fossil fuels that are harmful to the environment. In COP27, this strategy succeeded in gaining promises from coal producers and users to reduce their use rates, he points out. Therefore, he believes that the turn will come in COP28 for oil, followed by ground gas in COP29. This comes along with increasing certainty that all the fossil riches that God has bestowed on humanity will inevitably disappear and that their existence has allowed humanity to search for a sustainable alternative. The ancient Egyptians also found that the wind could push their ships south in the Nile while the river current pushed them north, so it became the preferred means of transportation back and forth. Thus, humanity can use natural energies, the most abundant of which is solar thermal energy, to adapt them to serve the purposes of society, he adds.

Since most oil-producing countries are located in desert areas, and some of them are close to the coasts, such as North African countries, it is easy to produce clean electricity from the sun while benefiting from the presence of vast desert lands. After producing clean electricity, these countries have the option of producing green hydrogen, manufacturing it into liquid fuel, or transporting electricity to nearby markets, such as Europe, to be used there instead of exporting oil or gas, he says.

We pray to God Almighty to protect humanity from climate change disasters, some of which we have seen this past year, and scientists expect them to become more severe and frequent with increasing carbon emissions in the air, the global energy expert says.

Efforts in climate action:

Dr. Amal Ismail, a researcher in environmental and energy studies, says that this session of the climate conference is considered the first "global assessment" that provides a comprehensive assessment of the progress achieved since the 2015 Paris Agreement. The conference will focus on efforts related to climate action, including measures necessary to close gaps in progress, and will highlight climate adaptation initiatives in addition to mitigating its impacts under four main themes: health, water, food, and nature. In addition to serious negotiations to agree to establish a Loss and Damage Fund, she adds.

Despite the conflicting global events at all levels, politically and economically, climate action cannot wait any longer, Dr. Amal Ismail adds. She adds that the successive and strange climate phenomena that occurred this year include an unprecedented rise in temperatures that exceeded record numbers in some regions, abnormal droughts, high forest fires, floods, hurricanes, and sea level rise in multiple regions of the world, including developed and developing countries alike. All of this emphasized the necessity of holding COP28 on time and refocusing on the climate action paths agreed upon at the previous climate conference in Sharm El-Sheikh, COP27. This is also the first year to evaluate the progress made in the Paris Agreement and the extent of achieving the agreed-upon 1.5-degree Celsius goal to limit global warming and chart a course of action to significantly reduce emissions and protect lives, she adds.

Ismail believes that the most important issues that impose themselves are climate-financing issues. The large investments required to finance measures to limit climate change remain the greatest motivation toward moving forward, either in achieving climate goals or obstructing them. Increasing investments in supporting the transition toward renewable energy and achieving a low-carbon economy, as well as providing financing for adaptation and mitigation projects, especially in developing countries, are among the most important issues that need to be resolved and moved to practical implementation immediately, she adds.

Among the list of important issues also comes the necessity of phasing out fossil fuels, activating the Glasgow Protocol that was agreed upon in 2021, and the commitment of the major industrialized countries, especially oil-producing countries, to phase out fossil fuels by 2100, according to international climate reports, she says. Otherwise, we will face a clear challenge toward implementing the 1.5-degree Celsius scenario and increasing temperatures by more than two degrees, she adds.

Dr. Amal Ismail stresses the necessity of activating the establishment of the Loss and Damage Fund as a mechanism to compensate developing countries for the damage they have suffered due to emissions. Spending on management and work mechanisms would greatly improve climate action paths, she emphasizes.

The global momentum toward a green hydrogen economy and low-carbon hydrogen will make it an important part of the global energy transition, Ismail says. This is to achieve climate goals and reduce emissions, in addition to securing and diversifying energy sources, which is what Europe and a large number of countries are seeking, especially after the worsening energy crisis as a result of the Russian invasion of Ukraine and the fluctuation of gas prices, she adds.

In the end, there is no doubt that the United Nations Conference of the Parties on Climate Change (COP28) faces major challenges, most of which are related to activating the principle of binding agreement among member states, she continues. Although preparatory meetings were held before the conference over several months to try to agree on some important climate issues, every time the negotiations stop at a specific point, the climate action paths are hampered, she explains. Every country has its fears and interests that always stand by them, but no one notices that the effects have become rapid, extreme, and unexpected, and their costs have affected the economy, individuals, and the security of societies themselves. If action is not quick and binding, it will be a loss for everyone, she adds.

Emirati development initiatives:

Dr. Tahseen Shuala, Head of the Department of Environmental Biotechnology at Misr University of Science and Technology, says that the UAE has become accustomed to launching development initiatives with each session of the COP in the United Nations Framework Convention on Climate Change to enhance international efforts to confront the repercussions of climate change, especially in developing and poor countries. The development aid provided by the UAE to developing and poor countries, especially in Africa and Asia, plays a major and influential role in confronting the repercussions of climate change and mitigating its severe effects on people, he added in his statements.

During COP26 in Glasgow, Britain, in 2021, the UAE launched a global platform to accelerate the dissemination of renewable energy projects

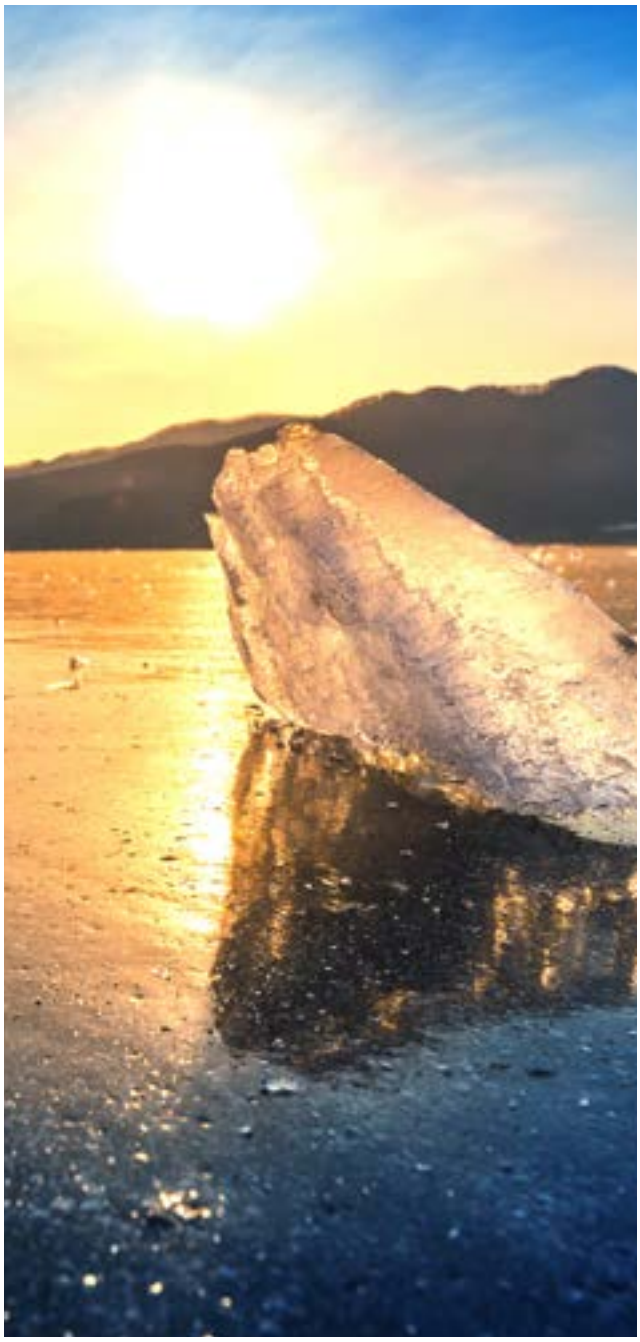
in developing countries in cooperation with the International Renewable Energy Agency (IRENA), he points out. It also pledged to provide $400 million through the Abu Dhabi Fund for Development to support the platform in raising financing of no less than one billion dollars, he adds.

The UAE has adopted about 78 initiatives to confront climate change and protect the environment. The most important of which is the national strategy for low-carbon and long-term development, the integrated waste management strategy all over the state, systems for measuring the carbon footprint of the health sector, and the initiative to regulate the issuance of green bonds and securities and sukuk, he said. The UAE's response to climate change was not limited to the local level, but it was keen to launch initiatives to reduce the effects of climate change at the regional and international levels, he adds.

Dr. Tahseen Shuala believed that COP28 enhances the UAE's leadership role in the areas of confronting climate change regionally and internationally, and in this context, it is possible to put forward a set of initiatives that attract all global parties to participate effectively during the conference.

Dr. Al-Sayed Sabri, a climate change and sustainable development expert, also appreciates the UAE's pioneering and pivotal efforts to confront climate change and mitigate its effects, whether at the local, regional, or international level, which represents one of the priorities of the UAE's general environmental policy. Climate change has serious repercussions that threaten the future of humanity as a whole.

He also praised the UAE's keenness to provide development aid that mitigates the effects of climate change in many developing and poor countries, which gives great momentum to the COP28 conference, which is expected to witness broad and effective participation from the majority of countries in the world.



Previous sessions:

The Conferences of the Parties to the United Nations Framework Convention on Climate Change are conferences held annually under the auspices of the Secretariat of the Convention and are the official meeting place to negotiate and agree on how to address climate change, reduce emissions, and limit global warming.

An essential task of the Conferences of the Parties is to examine national reports and emissions data submitted by participating countries, which provide basic information on each country's actions and the progress it has made toward achieving the overall goals of the Convention.

In 1995, the world was about to launch climate conferences. The first session of the Conference of the Parties (COP) was held in Berlin, Germany, in March 1995, and the headquarters of the Secretariat of the United Nations Framework Convention on Climate Change are located in Bonn.

A new session of the climate conference is held every year in a different city, and the conferences are called "COP," which stands for "Conference of the Parties" in English. The conference includes 198 parties and 197 signatory countries to the United Nations Framework Convention on Climate Change, in addition to the European Union. This agreement is one of three that were approved during the "Earth Summit" hosted by the city of Rio de Janeiro in Brazil in 1992.

In addition to the COP on climate, the so-called "Conference of the Parties to the Kyoto Protocol" and the "Conference of the Parties to the Paris Agreement" concluded in 2015, which includes 195 parties, are also being held.

In 2009, the COP15 climate change conference in Copenhagen failed to reach an international agreement, even though it approved, at the last minute, a political text agreed upon by both China and the United States. In COP12, which was held in 2015, the Paris Agreement was concluded, which was the first agreement that included the entire international community. It stipulates limiting global warming to 'less than two degrees Celsius' compared to the temperature that was recorded in the world during the period that preceded the industrial revolution, and if possible, to within 1.5 degrees Celsius.

The COP26 conference in Glasgow in 2021 also declared for the first time that 'fossil fuels' and 'coal' are the main causes of climate warming. However, under pressure from India and China, his final statement called for coal use to be 'reduced' rather than 'abandoned'.

The Secretariat of the United Nations Framework Convention on Climate Change, the United Nations entity charged with supporting the global response to the threat of climate change, was established in 1992 when countries adopted the United Nations Framework Convention on Climate Change. The Secretariat's original headquarters were in the Swiss capital, Geneva, after which it moved to the German city of Bonn in 1996.

The Secretariat initially focused on facilitating intergovernmental negotiations on climate change, but today it plays a critical role in supporting various bodies to implement the objectives of the Convention, the Kyoto Protocol, and the Paris Agreement. This support includes

providing technical expertise, analyzing climate change data provided by parties, helping to implement the mechanisms of the Kyoto Protocol, and maintaining the register of nationally determined contributions established under the Paris Agreement. The Secretariat also organizes and supports multiple negotiating sessions each year, including conferences of the parties.

On December 11, 1997, at the Third Conference of the Parties in the Japanese city of Kyoto, developed countries pledged to limit and reduce greenhouse gas emissions. This treaty is known as the Kyoto Protocol, and it is a legally binding agreement that entered into force in 2005 and was signed by 192 parties. It is a historic milestone in the fight against climate change.

Paris Agreement:

The 2015 Paris Agreement, adopted at the COP21 Conference of the Parties, is one of the most prominent milestones for multilateral climate action led by the United Nations. It aims to mobilize the collective effort of parties to maintain the possibility of avoiding global warming exceeding 1.5°C above pre-industrial levels by 2100 and to work to adapt to the already existing consequences of climate change.

The agreement calls on countries to review their commitments every five years and to provide the necessary funding to developing countries to help them mitigate the repercussions of climate change, support their ability to adapt to it and enhance climate resilience. The frequency and intensity of climate events are expected to increase in the coming years unless we take decisive action to limit the rise in global temperatures.

Emirati support:

Over the decades, the United Arab Emirates has adopted an approach to supporting global efforts in the arena of climate action by ratifying both the Kyoto Protocol and the Paris Agreement. Due to the harsh climate in the UAE, in terms of high temperatures and water scarcity, it looks at climate change as a challenge that we need to confront through concerted efforts and cooperation with the international community.

According to Emirati media reports, Dr. Sultan Al Jaber, President of COP28, participated in the activities of eleven previous Conferences of the Parties, and upon commission from the leadership in the Emirates, Al Jaber headed the country's delegation to the COP21 conference held in Paris in 2015.

The COP28 Presidency conducted extensive global listening and outreach tours, which are among the largest undertaken by a Conference of the Parties Presidency, and held the first open consultations of its kind to prepare the 'Specialized Topics' program extending during the two-week conference activities.

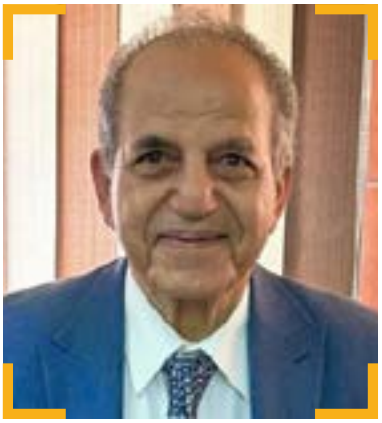
The COP28 action plan focuses on the clear main goal of maintaining the possibility of avoiding a rise in global temperature exceeding 1.5 degrees Celsius.

Issue Interview

Dr. Hisham Fouad, former Chairman of the Atomic Energy Authority:

The Arab world needs to possess "technological deterrence"

Interview by: Hala Arafa



Dr. Hisham Fouad

former Chairman of the Atomic Energy Authority

He said, "Egypt is one of the first African countries to adopt peaceful applications of atomic energy, and the path began in 1956 by establishing the first laboratory for the use of radioactive isotopes in Egypt at Ain Shams University to treat cancer."

I was one of the first to work on the production of radioactive isotopes in Egypt. I was sent abroad with a group of new graduates in 1959 to train and gain knowledge and experience. After returning, we established laboratories to produce radioactive isotopes from radioactive iodine, which is still used in the process of treating the thyroid gland.

The first research reactor in Anshas is the first stage of peaceful applications of atomic energy in Egypt, and its production capacity is 2 megawatts. The second research reactor was established in cooperation with Argentina with a capacity of 22.5 megawatts.

"Radioisotopes, the sesame mutation, and atomic seeds" from laboratories to "Fayoum Farms" after 17 years of research and study.

The political decision is very supportive of the 'Dabaa Nuclear Dream' file, and the site for constructing the stations is 100% safe. It is important to seek and benefit from research expertise and combine youth and expertise in implementing the program.

Atomic energy does not harm the climate, but it requires a lot of capital, and nuclear plants are now capable of operating for 60 years instead of 40.

There must be generational communication between Arab scientists, and there must be greater interest in scientific research.

Dr. Hisham Fouad's journey from 1959 until he received the Nile Prize for Science—the highest scientific award in Egypt—the State Encouragement and Appreciation Awards, the First Class Medal of Science and Arts, and other awards.

The interview is with one of the scholars of Egypt and the Arab world and one of the prominent figures in his rare field. The interview must branch out into two parallel directions, one of which leads to learning from the knowledge of the interview guest and the other is about his personal life to know the factors and circumstances that led to the formation of a great scientist, Professor Dr. Hisham Fouad Muhammad Ali, former Chairman of the Atomic Energy Authority.

Dr. Hisham Fouad received the Nile Prize for Science for the year 2019, which is the highest scientific award awarded in the scientific field in Egypt. Therefore, the Commission then held a ceremony honoring its distinguished scientist, during which the leadership of the Commission pointed out the great scientific role of Dr. Hisham Fouad throughout his scientific and practical life, which enriched the Atomic Energy Authority, in addition to his achievements in supporting the peaceful uses of atomic energy. It was also confirmed that Dr. Hisham Fouad has great scientific value.

Dr. Hisham Fouad also won many awards and was honored in many forums. The Nile Award in Advanced Technological Sciences, the most prominent state award, is the culmination of a long and rich scientific journey. The main theme is the abundant contributions in the field of 'energy sciences'. Dr. Hisham Fouad received the State Encouragement and Appreciation Awards, the First Class Medal of Sciences and Arts, and other awards. He has more than 200 research papers published in local and international scientific journals and periodicals.

Dr. Hisham is also one of the first generation of Egyptian scientists in the field of atomic energy and has an advanced position among atomic energy scientists and experts who keep working at all scientific, research, and applied levels. In addition, Dr. Hisham founded the Center for Hot Laboratories and Radioactive Waste Treatment and participated in setting specifications for the second Egypt Research Reactor.

Dr. Hisham Fouad assumed the presidency of the Hot Laboratories Center during the period from 1984 until 1991, he assumed the vice presidency of the Atomic Energy Authority from 1991 until 1994, and he assumed the presidency of the Authority's Board of Directors from 1994 until 1999.

Since 1972, he has supervised about 50 master's theses and 45 doctoral theses. He also contributed to the establishment of the Hot Laboratories Center, which specializes in managing and dealing with nuclear and radioactive waste of low and medium radiation, resulting from all activities in the fields of medicine, industry, research, etc., as well as his role in managing the establishment of Egypt's second research reactor, Anshas, until its opening.

Dr. Hisham Fouad began his work at the Nuclear Energy Authority in 1959 and rose through the ranks until he reached the presidency of the authority.

He founded the Hot Laboratories Center in Anshas, intending to develop Egyptian expertise in the fields of treating radioactive waste as well as producing radioactive isotopes used in various medical, industrial, agricultural, and scientific applications. He also played a prominent role in managing and establishing Egypt's second research reactor, Anshas, until its opening.

Dr. Hisham Fouad Ali was also one of 14 scientists from the Atomic Energy Commission who were included in the list of the top 2% of scientists around the world, according to researchers' composite citation index, according to the annual list issued by Stanford University in the United States.

The list is based on the database created by Stanford University in America, which includes the top 2% of scientists in the world from various fields, which are arranged based on the number of published research, as well as the number of total and qualitative citations in each specialty, the number of citations from references, reference research, and books, and the number of research papers that were peer-reviewed globally and internationally.

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Many 195,000 scientists participated in the professional database and about 200,000 scientists in the last year's data set, while the list for the current year 2022 is based on the latest data entered until September 2022 from Scopus.

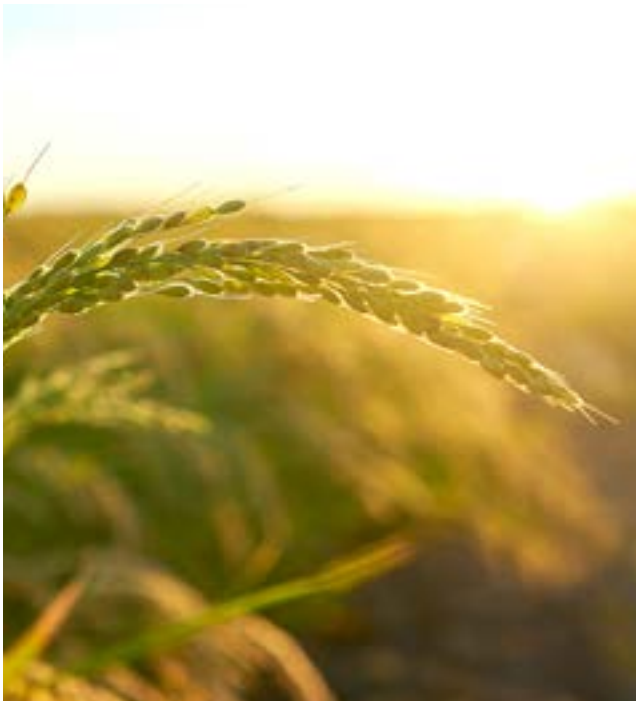
If we start with your educational and scientific journey... How does Dr. Hisham Fouad introduce himself to new generations?

I graduated from the Department of "Chemistry and Nature" at the Faculty of Science, Cairo University, in 1959. In the same year, I joined the Atomic Energy Authority, and then I traveled to Norway, where I was at the beginning of my scientific career. A year later, I returned to Egypt, worked in radioisotope laboratories, and produced radioactive gold isotopes to treat liver cancer at that time. Then I obtained a master's degree in 1965 from Cairo in nuclear chemistry and traveled to America to the Lawrence Laboratory, which is one of the largest laboratories in the world.

I established the Hot Laboratories Center in 1980 intending to develop expertise in the field of radioactive waste treatment. As well as the production of radioactive isotopes used in various medical, industrial, and agricultural applications and scientific research. The center has a group of facilities, which include a low- and medium-radiation liquid radioactive waste treatment plant, a radioisotope production plant, and a fuel processing plant.

The center includes a wide range of technical expertise in the divisions that make up the center, which are: The Isotope and Radioactive Sources Production Division, the Radioactive Waste Treatment Division, and the Nuclear Fuel Processing Division.

I also contributed to managing the construction of Egypt's second research reactor, Anshas, until its opening, especially in the stages of convincing state agencies of the project and the planning and implementation stages until its opening in 1998.



Throughout your busy scientific and practical career, you have played a prominent role in highlighting the issue of peaceful uses of atomic energy. How do you see what has been accomplished in this field?

Egypt was one of the first countries in Africa to introduce peaceful applications of atomic energy at the beginning of 1956; the first laboratory to use radioactive isotopes was established in Egypt at Ain Shams University to treat cancer. The beginning of atomic energy in Egypt was between 1956 and 1958 when a committee was formed to establish a research reactor in Anshas. The Anshas reactor, which began operation in 1963, was the second reactor in Africa after the South African reactor.

What are the uses that have been started?

Egypt began using atomic energy for peaceful purposes in the field of medicine and then moved on to utilize it in hospitals. In Egypt, as I mentioned, we were the first to establish and operate reactors. The first research reactor was in Anshas, in partnership with Russia. It was built in a desert area, and its production subsequently developed to produce radioactive isotopes to meet the needs of the local market and also for export. Egypt was also a pioneer in this field until we reached the local market's sufficiency for the national production of radioactive isotopes.

I was one of the first to work on the production of radioactive isotopes in Egypt. I and a group of new graduates were sent abroad in 1959 for training and taking courses to gain knowledge and experience and learn everything related to atomic energy and the production of radioactive isotopes. Upon our return, we built laboratories to produce radioactive isotopes of radioactive

iodine, which is still used in the process of treating the thyroid gland, and the use of gold to treat certain types of cancer, which was among the medical purposes that benefit from radioactive isotopes.

The first research reactor in Anshas is considered the first stage for peaceful applications of atomic energy in Egypt. The second stage is the decision to establish a second research reactor, after realizing that the first reactor, which had been operating for a long period, had become exhausted after it had been operating for more than 20 continuous years and its production capacity was 2 megawatts.

During that period, I was Vice President of the Atomic Energy Authority, and we succeeded in convincing the state to finance a new reactor for peaceful uses. Indeed, the second research reactor was established in Anshas in cooperation with Argentina this time. The capacity of this new reactor was much greater than the first reactor and reached 22.5 megawatts, bringing Egypt to a new stage.

Processes within Egyptian reactors have developed to produce very modern isotopes that are still being produced to this day, especially since the world is in dire need of them because their production is limited and, at the same time, their uses are in all aspects of medicine, whether in diagnostics or treatment.

The second research reactor for atomic energy was opened in Anshas in 1998 in the presence of Carlos Menem, President of the Argentine Republic at the time. I was honored to head the Atomic Energy Commission at that time, and it was a great joy when a person saw the outcome of his effort in reality before his eyes.

Radioactive isotopes... multiple benefits

It is clear that you are very interested in the topic of 'radioactive isotopes'. We want to learn from you about their various other uses.

As I said previously, there are many and various uses of radioactive isotopes. In addition to the medical benefit of radioactive isotopes, there are other uses, including tests of various materials as well as precise chemical analyses. In this way, they are used as a source of "neutrons," and this source is nuclear and is related to the design process of existing reactors.

Another application of the use of radioactive isotopes is to benefit from the radiation coming out of nuclear reactors. Radiation has benefits and harms like everything, and its benefits for medicine are well known. For example, in sterilization operations, 90% of the materials and tools used in medicine and surgery are sterilized by passing radiation coming out of the reactors over them to kill all microbes, sterilize them, and disinfect the tools used. This is done, of course, away from the human element to protect it from exposure to any harm.

This radiation resulting from the reactor is also used to increase the production of agricultural food crops by using some light doses to create mutations in them. A mutation is something that has a special quality and properties, and one of these mutations produced in Egypt occurred during my stay in the Authority and is called the "sesame mutation." It took 17 years of research, study, and experiments to produce and develop it to increase sesame production to three times its normal production. This shows the extent of the effort expended to produce these mutations. This was done during my presidency of the Atomic Energy Authority and in cooperation with the Ministry of Agriculture. This mutation was produced to increase production and disease resistance and was registered with the Ministry of Agriculture.

I remember a funny incident regarding this mutation, which is that I decided to plant the "sesame boom" on my father's land in Fayoum, and after that, one of the workers on the land produced seeds from the crop due to a large amount of production and called these seeds (atomic seeds).

Therefore, there are great benefits in terms of developing seeds for food crops, and there are many projects now in the Atomic Energy Authority working on developing wheat seeds, developing oils, etc., and these are among the important areas that the state must pay more and more attention to.

Another peaceful use of radiation coming out of an atomic reactor is to develop materials and increase their efficiency. For example, plastic undergoes a process called "irradiation," which consists of passing radiation using certain compounds on the materials to obtain certain shapes that are used for peaceful purposes, such as car tires and bumpers, which were originally made of iron and are now made of polymers.

Finally, it is used to produce electricity through nuclear energy, which is the most important. This was a dream that existed for many years, and there was a great ambition to achieve it, there was reservation about using atomic energy to produce electricity for some time, but the political decision prevailed to produce electricity from nuclear energy.

There are other benefits of using atomic energy, which is the heat generated by the reactors and is used to produce electricity. What remains of this heat is used to desalinate seawater, which is a beneficial process in all respects?

What about "nuclear safety" in these and other uses?

The role of nuclear safety began with the establishment of what was called the Nuclear Safety Agency in 1984, by benefiting from atomic energy scientists and forming basic and sub-committees in various fields of nuclear and radiation safety, which include: location and environment; design; employment and humanitarian factors; radiation safety; radiation protection; nuclear fuel cycle safety; quality assurance; regulations, emergencies, and nuclear law; and nuclear safeguards.

The National Center for Nuclear and Radiation Safety was established in 1990 as the fourth center of the Commission following the regulations of the Atomic Energy Commission. It includes three scientific divisions and nine departments.

In 2021, a decision was issued by the Chairman of the Atomic Energy Authority regarding procedures for implementing Law 201 of 2017, and thus the tasks of the Nuclear and Radiation Safety Research Center became primarily research tasks. This was a unique opportunity to make the Nuclear and Radiation Safety Research Center, with its multiple expertise, a distinguished center for providing scientific consultations and technical support to other Commission centers and local and external bodies. This is in addition to providing technical support to the Nuclear and Radiological Regulatory Authority, based on the multiple technical and scientific experiences in the fields of nuclear safety acquired from the licensing stages of all nuclear facilities.

About safety, waste, and radioactive waste, modern high technology has helped to complete processing in different ways. At the same time, atomic energy is an energy that fights the repercussions of the climate problem, as it does not produce carbon dioxide, which is one of the main causes of the problem of pollution and climate change that the whole world suffers from.

In terms of the duration of operation and validity of nuclear plants, the station has operated safely for 60 years. Previously, the validity of the nuclear station was 40 years, but the efficiency has now been raised to operate for an additional 20 years, resulting in very dense energy. An example of this is the stations being built in Dabaa, whether there are 3 or 4 stations, each of which produces 1.4 gigawatts, and this is dense energy that can be used in industry and many other fields.

Comparing the electricity production of nuclear stations to the production of electricity from solar energy, we find that producing one gigawatt requires large areas to place solar cells, which may be equivalent to covering the Western Desert, in addition to the ongoing maintenance of solar cells.

Although solar energy is good energy, it does not produce electricity intensively for use in industry. Rather, it is used in some simple processes, such as heating. The kilowatts of electricity generated by solar energy are few, in contrast to the intensity of nuclear energy production, which helps operate factories, motors, etc.

Nuclear energy dream

The Egyptian steps are close to achieving the 'Dabaa reactor' goal. Do you think that we are close to achieving the "Egyptian dream" in this regard?

The most important thing regarding the Dabaa is a political decision that is supportive. As for the place where the stations will be established in Dabaa, many studies have been carried out that have confirmed that it is a 100% safe location. In terms of building foundations and facilities for the stations, studies were carried out, and the decision to establish a Dabaa School for young students who have completed basic education (preparatory) was a positive step.

I prefer that research expertise be used and benefited from, and that youth and expertise be combined to prevent any accidents. Expertise has an important role in the research and scientific fields, and we have previously, with great experience, protected the country from 'radioactive food' after the radiation accident at the Chornobyl reactor, which resulted in the contamination of some foods in Europe that were exported to us. Therefore, we have implemented radioactive detection of radioactive materials to prevent any food-carrying radioactive materials from entering the country.

The presence of a special laboratory to detect radioactive materials in Egypt was also very useful in dealing with the Mit Halfa incident, when a radioactive body was found, and the authority was ready to store this radioactive body inside preservation cells.

As I said before, I am very convinced of what is being accomplished in Dabaa, especially since there has been a political will to achieve the nuclear dream. Attention must be paid to scientific research in the various fields of atomic energy as well as to everything related to technological developments in this regard. The nuclear station is a reactor connected to the station. Therefore, it is necessary to learn everything new about reactors and to be prepared for any surprise that may occur at any time. You must be ready and have long-term experience to encourage and guide new cadres.

Energy is one of the main things, especially nuclear energy; without it, there will be no development. Nuclear energy is now the project of the future, especially since oil prices, which are the main source of energy currently, have recently risen significantly. In contrast, the financing aspects of nuclear energy are not expensive.

Years ago, we were about to establish a nuclear power station for peaceful purposes, but the project suddenly stopped. I believe that the Supreme Council for Nuclear Energy must begin reviewing the existing plans, develop an implementation plan that avoids the previous negatives, and organize the nuclear bodies in Egypt by establishing their systems and cadres, and providing them with the necessary scientific and technical base.

There is a need to have a long-term program for building nuclear plants for peaceful uses of nuclear energy so that two or three stations will be built soon.

Generational communication

In your opinion, as a distinguished scientist, what do we need in Egypt and our Arab region to achieve continued communication between generations and different experiences in the arena of scientific research?

There is a need to pay attention to scientific research in these fields, use great expertise, and get more experts. This is done by constantly seeking the help of new scientists and researchers, rebuilding the organizational structure of the institutions concerned, and forming a committee to supervise all bodies and provide an adequate budget to finance all fields. Especially since there are peaceful products that are useful for civil life, agriculture, industry, etc., Moreover, there are reactors, and the fuel cycle that supplies the reactors with resources is available in Egypt.

Egypt therefore has the infrastructure and scientific capability; we have nuclear scientists who manage and operate the laboratories. We must coordinate and direct projects to serve the country, and we must have expertise in research reactors. So in the case of any danger, they can make the appropriate analysis and act properly.

I remember that the establishment of the second research reactor was necessary to keep pace with modern research. Egypt set the required specifications, and many major countries applied to establish the reactor, including America, Canada, and others. However, Egypt had one condition, which was that the Egyptians participate with the foreigners in all stages of building the reactor from A to Z, starting with the design and other stages of construction, but major countries refused to involve Egyptian specialists and offered to hand over the reactor in its final form without interference from the Egyptians. Therefore, the agreement was made with the State of Argentina after it accepted the Egyptian condition, and 60 specialists, including engineers and scientists, were sent there for training, practical practice, and learning about all stages of building the reactor, getting to know every major and minor part of it, and training in its operation.

This is exactly what happened to four of my colleagues and me when my professor, Dr. Al-Jubaili, sent us to Norway to learn how radioactive isotopes work. Upon our return, we built the first research reactor, and we knew everything related to the reactor and did not need anyone; in other words, "we knew every nail in the reactor." This brings us once again to stress the necessity of the presence of Egyptian cadres, especially young people, with the foreign side in all stages of projects to achieve expertise and communication between generations and expertise.

It is important to build human resources as well as modernize and renew the authority's facilities to keep pace with modern developments. Atomic energy projects are also significant to ensure the sustainability of the Authority's School of Nuclear Sciences, which was built over time by the Atomic Energy Authority to serve the peaceful uses of atomic energy and the Egyptian nuclear program, in addition to the great importance of communication between generations.

Energy and climate

How do you see the escalation of global interest in climate change issues and the holding of many climate conference sessions, the latest of which is the COP28 hosted by the United Arab Emirates, and how dealing with energy issues impose itself on the discussions in these forums?

When we link environmental energy and climate, we immediately find nuclear energy as the umbrella under which the three fields are gathering. Environmentally, the question that imposes itself on humans is, how can I be safe in the surrounding environment? What are the studies related to this? From this perspective of safety in environmental studies, atomic energy does not harm the climate.

There are radiation detection stations that continuously monitor changes in the radiation level nationwide through the 'Radiation Deterrence Network.' In addition to the role of this network to follow up on any external radiological activity, these networks were created in this way to protect the country. They are now affiliated with the Safety Center, and they measure the level of radioactive materials everywhere inside Egypt and outside it, such as in Sinai, to monitor activities around you, detect radiation, and achieve nuclear safety.

There is radiation detection in all the ports in Egypt. There are stations and laboratories to detect the percentage of radiation in all imports, even wood. There was a shipment of wood that was imported from the country of Lithuania,

one of the countries of the former Soviet Union, and we discovered that the wood was saturated with radiation. This was in the period after the Chornobyl reactor accident and the radioactive leak that occurred, so the decision was made to return the shipment and not to enter Egyptian territory.

Egypt imposes strict restrictions on food and other imports.

I remember that in the period after the Chernobyl reactor accident, dairy products came to Egypt in the form of aid from Europe, and radiological examinations proved that there was a high rate of radiation in the milk and that it was very harmful to children. At this time, the Atomic Energy Authority made its decision to stop the shipment and not allow it to enter Egypt. The Prime Minister at this time sent the head of the authority to inquire about the reason for the rejection. He told him that this was the decision of the Radiological Detection Committee, so the shipment was rejected and not allowed to enter Egypt.

Another role for radiological detection is to monitor the Suez Canal; nuclear submarines or carriers transporting nuclear materials pass through the Suez Canal, and the authority sends a mission to detect radioactive materials at sea. Because the cooling water from the reactors could leak into the canal, radiation detection operations are carried out to ensure that there is no chance of leakage into the seawater and to secure and protect the country and the Egyptian environment.

Radiation detection stations are located on the borders, the Suez Canal, and sea and airports, and they are the means of protection. These stations must be available for any country that has a nuclear program dream, and they must be available in the Arab countries if they have the desire to establish a nuclear program.

Despite the many benefits of atomic energy, it also has disadvantages, and in the case of a lack of knowledge and experience, it is possible to find yourself in "misfortune".

Countries around the world began to be more interested in nuclear energy. Because it does not cause a problem for the climate, and because there will be a tax on oil and fuel, which is a carbon tax, and the more burning is done, the carbon dioxide tax increases. The price of a kilowatt produced through nuclear energy is equivalent to when the price of a barrel of oil is $40, so it is very cheap energy.

As I said, nuclear plants are now capable of operating for 60 years instead of 30 or 40 years as they were in the past, and nuclear energy provides safety, although the only drawback is its need for large capital during construction, as a nuclear reactor costs more than 150 million dollars.

Therefore, my opinion is that the nuclear energy program is a very important program, but attention must be given to the infrastructure and scientific research in atomic energy and its bodies, restructuring them with a future outlook; in other words, structuring the existing and the available to be compatible with new and modern thought.

Technological deterrence

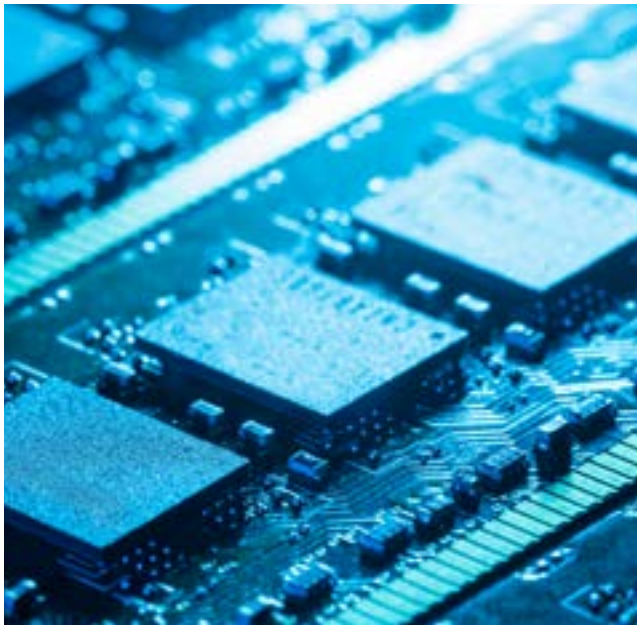
How do you see the Arab region's need for tools to protect itself in the turbulent regional and international environment over the past few decades?

There must be nuclear deterrence, and there must be technological deterrence. This means that, as an Arab country, I am aware of everything, and I can produce, manufacture, and operate existing nuclear materials, in addition to raising generations of cadres on various processes so that they are trained and operated practically.
It is sad to know that the budget of Israel allocated for scientific research is ten times greater than the budgets allocated for the same goal in all Arab countries. You find, for example, that the Kingdom of Saudi Arabia has a very large program file to operate very many fields, but there is no interest in the nuclear fields.

The United Arab Emirates is the first Arab country in the Gulf to use nuclear energy, although you are not fully aware of the terms of the agreement or the system of work carried out by other countries.

What about Arab-Arab cooperation in these fields? Is it sufficiently existing?

Concerning cooperation between Arab countries to exchange scientific expertise for energy uses, there is currently a body called the Arab Atomic Energy Authority, which is affiliated with the League of Arab States, and it needs to focus on a greater scientific, research, and technological approach. Because, as we said, we must have a "technological deterrent" in the Arab world, there must be generational communication between Arab scientists, and there must be greater interest in scientific research. Israel's power in determining and imposing political decisions abroad comes from its reputation among scientists and scientific research. It realizes that the world cares about the words of those with a good scientific reputation.



The Russian-Ukrainian war put energy issues at the top of the world's concerns, especially since they were used as a pressure weapon in this war. How do you see that?

Regarding the Russian-Ukrainian war, it was very difficult to resort to using nuclear weapons in the current situation. As a reminder, Ukraine has six nuclear reactors, and all of its energy is nuclear. In Europe, France is the highest country on the continent that resorts to nuclear energy for various uses and relies on it, for example, to produce electricity at a rate of 75% of its electrical energy, as it does not have energy sources, whether oil or otherwise. Therefore, the nuclear construction in France is very strong. I have previously visited France, as Egypt brought hot laboratories for atomic energy from France.

A life's journey

If we turn to the personal life of scientist Dr. Hisham Fouad, what aspects of life influenced the formation of the personality of one of the figures of scientific research in the field of nuclear energy?

I am from Fayoum, Egypt, and my father was one of the owners of property there, but he took the approach of teaching us to rely on ourselves and supported our science ambitions. We also learned from my mother all the meanings of belonging, kindness, and preserving family ties, as well as seriousness and diligence in the arena of knowledge and work.

I also met my Norwegian wife when I was studying nuclear chemistry in America. She is kind and warm, and we have a son and two daughters.

In addition, when I was a student at the Faculty of Science at Cairo University, I played Roman wrestling. I won the university championship for several years, won the gold medal for several years at the university, was president of the Romanian Wrestling Federation, and received the first-class sports medal. Moreover, the champion, Karam Gaber, who won the gold medal in 2004, is one of my students.

Issue Interview

Dr. **Mahmoud Mohieldin**

By Ms. Hend Al-Nawawy

Dr. Mahmoud Mohieldin

Dr. **Mahmoud Mohieldin**, professor at the Faculty of Economics and Political Science and former Minister of Investment, is considered one of the brightest and most prominent figures in the field of economics at the academic and professional levels, and currently, he is Executive Director of the International Monetary Fund. In addition, he was the climate lead for the Egyptian Presidency of the Conference of the Parties to the United Nations Climate Change Convention (COP27). He contributed effectively and made a significant impact at the COP27 climate summit, which was held in November 2022 in the Egyptian city of Sharm El-Sheikh.

Dr. Mahmoud Mohieldin has held many positions in the field of economics, including being Director of the Macroeconomic and Debt Analysis Unit at the Ministry of International Cooperation in 1995. He also served as an economist at the Egyptian Centre for Economic Studies from 1995 to 1996. This is in addition to being an economic advisor in the Office of the Minister of State for Economic Affairs from 1996 to 1997. Dr. Mahmoud Mohieldin also worked as a technical advisor to the investment policy project of UNCTAD from 1997 to 1998. He also held the position of advisor to the Minister of Economy from 1997 to 1999. He was a member of the Board of Directors of HSBC Bank in 1998. He was also a member of the Board of Directors of the Central Bank of Egypt in 1999, in addition to being an advisor to the Minister of Economy and Foreign Trade from 1999 to 2001 and an advisor to the Minister of Foreign Trade from 2001 to 2002. Dr. Mahmoud Mohieldin was chosen as Chairman of the Economic, Financial, and Plan Affairs Committee of the National Democratic Party in 2001. Then a decision was issued by the President of the Republic as head of the party, appointing him as a member of the party's General Secretariat in the same year. Then, after the eighth general conference of the party held in September 2002, he was chosen as a member of the party's general secretariat, a member of the office of the policy secretariat, and head of the economic committee.

Dr. Mohieldin was a member of the Board of Directors of the Egyptian Telecom Company in 2002 and a member of the Board of Directors of the Diplomatic Institute in 2003. He served as Minister of Investment in Egypt from 2004 to 2010. He was also a member of the Growth and Development Committee and was selected to be a member of the Young Global Leaders Group emanating from the World Economic Forum in 2005. His professional experience extends to the academic field as a professor of economics at Cairo University and a visiting professor at several prestigious universities. He was appointed a visiting professor at Yonsei University of Korea on February 15, 2019. He also worked as a consultant for the Egyptian Center for Economic Studies. Dr. Mohieldin worked as Managing Director at the World Bank in September 2010, the first Egyptian to hold this position. He was also the World Bank President's Envoy for the Millennium Development Goals and their financing operations from 2013 to 2014.

Dr. Mohieldin held the position of Corporate Secretary and Special Envoy of the President of the World Bank from 2014 until November 2015. He was also the World Bank's Senior Vice President for the 2030 Development Agenda, UN Relations, and Partnerships from November 2015 to January 2020. He was also the UN Special Envoy for the 2030 Finance Agenda from February 2020 to date. In addition to his membership in several boards of directors in the Central Bank of Egypt, the institutional sector, and the Board of Directors of Benha University, All of this is in addition to holding the position of economic advisor to the Egyptian Arab African Bank and economic advisor to the periodic banking magazine issued by the Egyptian Banks Association.

His fruitful and effective contributions to the COP27 climate summit are evident through dealing with three files, which are the climate-financing crisis, the Sharm El-Sheikh adaptation agenda, and climate change. Dr. Mahmoud Mohieldin stressed that the financing and nature crises can be dealt with through the unprecedented measures and initiatives that were reached through the conference. One of the most important measures that resulted from the conference is the Sharm El-Sheikh Adaptation Agenda, which is a comprehensive plan to support adaptation measures in various sectors, such as food, agriculture, water, nature, and infrastructure, with the participation of government agencies and non-governmental actors. It also represents a very important practical mechanism for achieving climate resilience in cities and enhancing their ability to confront climate shocks. Also among the initiatives reached during the conference were the Promoting Nature-Based Solutions to Accelerate Climate Transition Initiative, the Forest and Climate Leaders Partnership, and the Africa Forest Restoration Initiative.

Regarding the climate financing crisis, Dr. Mohieldin pointed out the importance of the role of cities, actors, institutions, and local agencies in financing climate action in its various dimensions at the local level and implementing climate change adaptation activities, noting that the COP27 climate summit witnessed crowding and great demand regarding cities' participation in the previous campaign towards resilience. He also hinted at cities benefiting from climate and development projects that resulted from the five regional forums initiative launched by the Egyptian Presidency of COP27 in cooperation with the United Nations regional economic commissions and climate pioneers. He explained that the smart green projects initiative in Egypt represents a model for localizing climate and development work at the local level.

He also pointed out, in the same context, that cities benefit from the climate and development projects that resulted from the initiative of the five regional forums launched by the Egyptian presidency of the twenty-seventh Conference of the Parties, in cooperation with the regional economic commissions of the United Nations and climate pioneers.

He mentioned several unprecedented steps that were among the most prominent outcomes of the climate summit in Sharm El-Sheikh. The most important of which was the appointment of the first youth envoy in the history of climate summits, Dr. Omnia Al-Omrani, in addition to launching the youth and children's wing and integrating them into the heart of climate action.

He also pointed out that seven children from different countries around the world shared ideas and solutions through books, podcast applications, and other innovative solutions.

Dr. Mahmoud Mohieldin participated in many

activities, from representing Egypt in international conferences and forums to heading a group of official missions and participating in them to negotiate and consult on economic issues with international institutions such as the International Monetary Fund, the World Bank, and the Organization for Economic Cooperation and Development. As well as in many bilateral discussions and negotiations related to investment, trade, and finance.

He visited Bangladesh with Guterres to support the Rohingya Muslims on July 4, 2018. He also participated in the activities of the Arab Summit: Arabs Need "Successful Shots" Toward Progress and Sustainable Development on January 20, 2019. He spoke at the UN General Assembly high-level debate on tackling inequality on June 3, 2019. He represented the World Bank Group at the 2019 Social Science and Innovation Forum on June 5, 2019, in addition to participating in the first Barclays Emerging Markets Conference on June 20, 2019. On June 26, 2019, he received a shield of honor from Sheikh Mohammed Al-Sabah, President of the Union of Arab Banks, and participated in the high-level session of the International Labor Organization conference. Finally, he participated in the UNCTAD Expert Meeting in Geneva on June 27, 2019.

Dr. Mahmoud Mohieldin has many publications and research contributions. He has more than 75 research papers and studies published in the fields of finance and investment economics, real estate finance, financial reform, analysis of the performance of financial markets, banking supervision, and the effects of the partnership agreement with the European Union. Moreover, he wrote in the fields of banking-system structure analysis, trade in services, management of state-owned assets, globalization, competition and monopoly prevention policies, governance rules, monetary policy, and the mechanisms of their impact on financial markets and economic activity. Among his books was "Europe: A Brief History," which was published on October 25, 2020. In addition to his book "On Progress: Confusions and Paths," which was recently published by Dar Al-Shorouk on March 1, 2022.

Energy News Around the World

Energy News Around the World

Prepared by the Research and Studies Department at Saif Bin Helal Center

Energy and its many sources—each has its pros and cons—have become the talk of the world at various levels and fields, especially since they are always linked to sustainability, reducing emissions, and mitigating climate risks. Accordingly, the Energy Risks Around the World department in this issue monitors several recent events to which the world has been exposed, regarding energy and related issues, in addition to the global and local Egyptian situation from the perspective of specialized international institutions and bodies.

Fossil fuel subsidies jump to unprecedented levels because of the Russian-Ukrainian crisis:

The Russia-Ukraine crisis led to more fossil fuel subsidies by governments for consumers and businesses during rising global energy prices; this made it jump to unprecedented levels estimated at more than $7 billion last year, exceeding the governments' annual spending on education (4.3% of global income) and about two-thirds of what they spend on health care (10.9%).

While the world is currently seeking to achieve the goal of containing global warming to 1.5 degrees Celsius, this subsidy, which costs approximately 7.1% of global GDP, would stimulate the demand for fossil fuel sources, which has been supported by recent evidence and events. Last July was declared the hottest month in the world.

The environmental cost resulting from the consumption of fossil fuels is very large due to air pollution, the rise in global warming, and the disasters that follow, which reached about 5 trillion dollars last year and may increase almost double. This cost is significantly higher in developing countries than in rich countries. Power plants, factories, and cars in developing countries often generate a greater amount of pollution due to the high population mass and thus the higher severity of pollution.

Although estimates indicate that eliminating explicit and implicit subsidies on fossil fuels will prevent 1.6 million premature deaths annually and increase government revenues by $4.4 trillion, this cancellation may be difficult from a scientific standpoint; therefore, implicit and regulatory policies must be adopted that reduce this subsidy and work to direct it in other, more important areas.

International Monetary Fund: The fragile African state is the most affected by climate change and the least contributor to it:

Fragile states have become the most affected by climate change crises and the damage they have caused, despite their lack of contributions to them or the decline of these contributions and practices compared to others. Especially in the region from the Central African Republic to Somalia and Sudan, which suffers from floods, droughts, storms, and other crises linked to climate change, Accordingly, studies have shown that the number of people affected by natural disasters in fragile states doubles every year, three times as much as in other countries and regions, which leads to the displacement of twice the proportion of the displaced population in other countries.

In terms of temperatures, which are already higher than other regions due to their geographical location, projections indicate that by 2040, fragile states will face temperatures higher than 35 degrees Celsius on average 61 days a year, four times higher than other

countries, which will affect human health and harm productivity and job opportunities in key sectors.

Expectations also indicate that drought waves in these countries will reduce their per capita GDP growth by about 0.2 percentage points every year.

This means further lagging behind other countries, and the Fund's estimates indicate, under the high emissions scenario, with other factors being equal, that the death rate due to conflicts will increase by 10% to the total population by 2060, in addition to the 50 million people who suffer from hunger by the same period.

Although climate change plays a major role in these disasters, other reasons and factors may stimulate their fate. The most important of which are the unrest these countries are witnessing and the weakness of their infrastructure.

The agricultural areas irrigated with water from canals and reservoirs do not exceed 3%. Thus, most agriculture is based on natural phenomena and the assumption of their constancy, and in cases where available structures are often poor because of neglect or destruction due to conflicts.

For example, one of the causes of floods along the Niger River is farmers fleeing conflicts, which has left the drainage channels in a dilapidated state. As well as the Al-Jazeera Irrigation Project in Sudan, which once covered 8,000 kilometers of fertile agricultural land but has shrunk to less than half of that area because of poor maintenance.

World Economic Forum: Current food systems threaten the future of green energy investments:

The World Economic Forum issued a report entitled "The Green Return: Unleashing the Power of Finance for Sustainable Food Systems," in which it explained that current food systems account for nearly a third of global emissions and were distributed as follows: 39% are related to agricultural production, 32% are related to land use, and 29% are for supply chain activities. He also explained that 80% of tropical deforestation is responsible for food systems, which portends a loss in biodiversity, in addition to 70% of global freshwater withdrawals.

However, the transition to net-zero carbon emissions and making food systems more sustainable remains underfunded. So far, less than 4% of climate finance for agriculture and food has been allocated globally. The forum therefore suggests paying attention to investments in how food is produced and consumed differently, which could lead to providing zero-carbon climate solutions with sustainable food for the world's population, which is expected to reach 10 billion people by 2050.

Norwegian company launches emission-free ship to sail in 2030:

Cruise Company Hurtigruten Norway first announced plans to launch the Sea Zero ship in March 2022. Since then, it has been collaborating with the Norwegian Research Institute Scientific and 12 maritime partners to explore technological solutions that can be applied to achieve the dream of zero-emission maritime travel. It is proposed that the design be based on batteries with a capacity of 60 megawatts that

can be charged in the port with clean energy, and their range will reach 300–350 nautical miles. This means that the 11-day round-trip will require charging one battery about seven or eight times during the trip, and in case of storms, reliance on the battery can be reduced through retractable sails, and it will be covered with about 1,500 square meters of solar panels to generate power and recharge the batteries while sailing. Its range may rise to a height of 50 meters, and its structure will be streamlined to reduce air resistance, which will help further reduce energy use. It will also be equipped with about 270 cabins to accommodate 500 guests and 99 crew members.

Over the next two years, the company will test its proposed technologies before finalizing the design in 2026, with the ship scheduled to enter Norwegian waters for the first time in 2030.

The Japanese government begins discharging the cooling water of Fukushima nuclear reactors into the Pacific Ocean:

News agencies recently reported that Japan had begun discharging treated radioactive water from the stricken Fukushima Daiichi nuclear plant into the sea. This angered fishing organizations and neighboring countries, although most experts and the United Nations International Atomic Energy Agency considered it safe. The Japanese government commented that discharging more than one million metric tons of treated radioactive water into the sea is vital to moving forward with the decommissioning of the Fukushima Daiichi nuclear plant.

At the global level, countries have placed restrictions on imports of Japanese seafood, such as South Korea, Pacific island states, and China, and the Hong Kong and Macau Declaration revealed plans to limit imports of Japanese seafood after the Kishida Declaration. Thus, it is likely to escalate diplomatic tensions between Japan and its neighbors.

The Fukushima Daiichi disaster is one of the world's worst nuclear accidents. It occurred after the strongest earthquake hit the coast of Japan in 2011, causing a tsunami that destroyed three nuclear reactors, killing more than 18,000 people and displacing about 160,000 people, including 40,000 who were unable to return to their homes, most of whom were from the areas surrounding the facility.

The Niger crisis threatens France's uranium investments:

Niger ranks fourth in the world in the production of uranium, the basic element in nuclear reactions and investments. Perhaps the biggest investor in Niger is France, and therefore Paris is currently facing the risk of stopping or harming its interests in Niger, especially since the uranium market has exceeded global demand for supply in the period from 2018 to 2022. This explains the volatility of its prices, in addition to some other factors.

The French nuclear company began mining uranium reserves in Niger in 1970, and by the end of 2020, approximately 35% of the uranium used in French reactors comes from Niger, and French nuclear power plants derive between 10% and 15% of the uranium they need from Niger. Accordingly, French companies continue their work in Niger amid political and security turmoil. For example, Orano Company, which runs uranium mining sites in northern Niger, announced that economic activities related to

uranium are continuing normally. Despite the coup authorities' announcement to stop the export of uranium to France, France explained that 99% of the workers are citizens of Niger, and therefore the lack of expatriates did not severely affect the progress of business. Given that, they work remotely from Niamey, the capital, and there are several individuals specialized in protecting uranium sites for about 300 Nigerian soldiers.

Orano is a French company that has been operating for nearly 50 years in Niger and has three uranium mines there, only one of which is operational.

Fitch: The renewable energy market in Egypt will witness remarkable development in the coming years:

Fitch issued a report on the status of the renewable energy market in Egypt and its expectations in the medium and near term. It expects accelerated growth in the non-hydroelectric renewable energy market and its generation, driven by the Egyptian integrated sustainable energy strategy, as well as economic reform measures and increased private sector participation in the field.

It is expected that the presence of wind energy in the market will grow more than solar energy. Given the government's target—the Egyptian Integrated Sustainable Energy Strategy—to reach 42% as a percentage of renewable energy sources' contribution to electricity generation by 2035, it is following its steps, reaching 20% by the end of 2022, and has adjusted its target to reach 42% renewable energy sources contributing to electricity in 2030 instead of 2035.

The report indicates expectations that the contribution of renewable energy sources to the energy mix in Egypt will increase to 19% by 2032, compared to 5.5% by the end of 2022. Non-hydroelectric renewable energy capacity will also increase from 4.5 GW in 2022 to 20.8 GW in 2032; that is, an increase of about 16.3 gigawatts over the next ten years. This means an increase in the contribution of renewable energy sources to the total installed capacity, from 7.3% in 2022 to 26.2% in 2032. Electricity production from non-hydroelectric renewable energy sources will also increase from 11.7 terawatt-hours in 2022 to 57.1 terawatt-hours by 2032.

News of the International Agency for Energy Security (IAFES)

News of the Saif Bin Helal Center for Studies and Research in Energy Science (SBHC)

News of the International Agency for Energy Security (IAFES)

IAFES begins intensive preparations for the International Energy Security Forum in Sharm El-Sheikh, September 2024

Intensive preparations have begun to hold the first session of the International Energy Security Forum, which is organized by the International Agency for Energy Security (IAFES) in the city of Sharm El-Sheikh in the Arab Republic of Egypt, in September 2024.

The forum is in line with the objectives of the International Agency for Energy Security (IAFES) and with its belief in providing serious scientific solutions to make energy one of the tools of international cooperation and sustainable development and for energy security to serve as the basic pillar of development issues at the humanitarian level.

The International Agency for Energy Security (IAFES) confirmed the international participation of organizations and companies concerned with energy, environment, climate, and energy security, in addition to specialized and concerned experts and academics. This is to shed light on various new energy issues during the activities of the first session of the International Energy Security Forum.

His Excellency Saif Bin Helal, the founder and CEO of the International Agency for Energy Security (IAFES), stated that 2,000 participants would participate in the activities of the International Energy Security Forum. Those participants who are concerned with the study and security of energy, including specialists, researchers, and scholars in the field of energy engineering at all levels (scientific, research, economic, strategic, humanitarian, development, etc.).

In addition to all media and journalistic bodies interested in studying energy and energy security and a group of government and public figures to learn about everything related to energy security science and research, 90 research bodies concerned with energy science and security, and 105 companies working in the energy field at the local, regional, and international levels, H.E. added.

The International Agency for Energy Security (IAFES) is an international business organization concerned with energy security and resources and studying risks and opportunities. To achieve excellence, leadership, and innovation in research, analysis, and scientific forecasting in the field of energy security and its areas of influence, energy security serves as the basic foundation for development issues at the humanitarian level.

Expanded African tour by Saif Bin Hilal; To launch the first investments of the International Energy Security Agency in Africa

in green lithium and hydrogen production, which is also considered within its planned work plan for the year 2024.

The African tour included extensive meetings with several specialists, workers, and those interested in studies and research in energy science and security within the African continent and at the international level.

This tour is part of the International Agency for Energy Security's plan to invest in the production of lithium and green hydrogen, which is considered within the International Energy Security Agency's planned work plan for the year 2024, the founder and CEO of IAFES stated on the sidelines of the tour.

The production of lithium and hydrogen is a more efficient solution for generating electricity than natural gas, and that has been confirmed by all international studies, H.E. added.

Many international reports confirm that the continent of Africa is witnessing intense competition between the major countries for lithium ore, a competition that the reports described as similar to the "Cold War." Many studies have also predicted that by the year 2050, North African countries will become major sources of green hydrogen, achieving profits exceeding $100 billion.

IAFES is concerned with studies of energy security, its political and geopolitical impacts, and the effects of energy security on stability in the international system and peace. As well as studying the political, economic, and social impacts of multiple energy crises, whether in energy-exporting, energy-importing, or consuming countries, through energy security programs, which in turn reflect on the political and social stability in these countries and different regions of the world.

News of the Saif Bin Helal Center for Studies and Research in Energy Science (SBHC)

Saif Bin Helal Center launches an extensive media action plan and a media office in cooperation with senior media professionals and specialists.

Nashwa Nashaat, Executive Director of the Saif Bin Helal Center for Studies and Research in Energy Sciences, has stated that the center will launch an expanded plan that includes many activities during the coming period. She also explained that the list of activities to be implemented includes seminars, annual forums, discussion panels, and training workshops, in addition to the center's publications, which include the "Energy Security" magazine and specialized brochures issued by the center.

This statement was made during her chairing the first meeting of the center's media office team, which includes several journalists and media professionals from Egyptian newspapers and satellite channels and those concerned with energy issues and energy security at all local, regional, and international levels.

The inauguration of the media office comes in light of the center's belief in the importance of the availability of information and the important role played by the various media outlets at all local, regional, and international levels, Nashaat added.

During the meeting, the Executive Director of the **Saif Bin Helal Center for Studies and Research in Energy Sciences introduced** the **"Energy Security"** magazine, noting that the magazine addresses various energy topics through diverse visions, such as sustainability and politics, engaging with several topics and articles from legal, economic, environmental, and other different perspectives and specializations.

The first issue of the magazine includes various articles and research topics by professors in political science. In addition to the interview, Thus, the magazine combines both academic and journalistic approaches, she said.

The "Energy Security" magazine issued by Saif Bin Helal Center for Studies and Research in Energy Science combines journalistic narration and academic presentation. Because it is edited according to a scientific methodology, and it also includes a journalistic touch concerning spaces dedicated to The Issue interview, and "The Issue's figure," in addition to the center and the International Energy Security Agency news, Nashaat said.

Due to the difference between journalistic and academic editing, the Center's magazine was keen to combine the two trends across its pages. The presence of graduates of the faculties of economics, political science, and law, as well as academics specialized in the fields of energy and environmental engineering, who support the magazine's topics related to the energy issue and its branches with the necessary data and information, she added.

There are auditors for the Arabic and English languages, in addition to a translator to translate the magazine, which is published in both the Arabic and English versions, Nashaat said.

The center is working on building a database of research centers concerned with energy, environment, and sustainability and a database of journalists and embassies so that the first ready issue of the magazine can be published and distributed on a large scale, she added.

On the other hand, Nashaat stressed the need to give the center a distinctive identity to achieve the center's goal of excellence and uniqueness in its activities in the field of energy. This was achieved through interaction with Egyptian, Arab, and foreign newspapers and with news agencies as well, she explained.

The center has communicated with several Arab writers and analysts specializing in energy to cooperate with them in writing articles, studies, or scientific research for the magazine to enrich its scientific presentation, Nashaat said.

The magazine issued by the center is a quarterly magazine, and there is a robust distribution plan for the magazine to distribute all upcoming issues on a large scale, she added.

Regarding the center's electronic publishing, the center's official website has been launched, as have its social media pages, Nashaat explained. Publishing on those sites will be supported by titles that will be used and viewed by the Egyptian or Arab press, she added. An electronic bulletin concerned with energy readings and analysis in Egypt and the Arab world had been added, she also said.

She emphasized the importance of linking the center with any news published about energy by reviving the news or information and linking it to the center. She also stressed the importance of forming a detailed vision for following all Arab and international news and developments related to energy so that the center is aware and up-to-date with everything new in the energy file, its issues, developments, and ramifications.

For his part, journalist Bashir Al-Adl confirmed that the effective presence on electronic media by a specific strategy and plans drawn up and studied on social media platforms (formerly Twitter, Facebook, Instagram, LinkedIn, and Quora) will allow the center to build cooperative relationships with all institutions, newspapers, centers, and platforms concerned with energy issues and their ramifications locally, regionally, and internationally.

The center's special touch must be displayed in the form of publications and news that are added to the website or on social networking sites, Al-Adl added. This will be achieved by researching and following up on how the world thinks about the issue of energy, obtaining everything new, and becoming familiar with all developments in that field. To adapt and modify it to suit and serve the interests of the center, he stated.

There should be specific sections on the site that include the following: news, reports, dialogues, articles, studies, renewable energy, and the center's publications, Al-Adl also suggested. The data that will be on the center's website must be up-to-date, as the website is the center's international window, he emphasized.

Muhammad Al-Jundi, the director of the center's media office, pointed out the start of implementing a strategic plan targeting the audience category that the center identified through its publications. This is done by using the appropriate method of dealing with and interacting with this audience, which requires specific words, to put the issue in perspective, so we will be able to achieve the desired strategic goals of the publications and media activities of the center as a whole, Al-Jundi added.

Symposium entitled "Energy Security.. the Gateway to Peace in the Middle East"

Experts and researchers participating, recommend the first seminar of "SBHC" in Cairo

Saif Bin Helal: Promoting scientific research in the Middle East and around the world on energy issues in all their political, geopolitical, economic, and social dimensions is an urgent necessity.

Entitled "Energy Security... the Gateway to Peace in the Middle East," the Saif Bin Helal Center for Studies and Research in Energy Science, the research arm of the International Agency for Energy Security (IAFES), held its first activities in Cairo in an expanded symposium held at the Grand Nile Tower Hotel. A group of experts, researchers, academics, journalists, analysts, and those concerned with the issue of energy security at all local, regional, and international levels participated.

Representatives of the ministries concerned with the energy issue also participated in the symposium, including Counselor Tagharid Anwar Al-Sayyid Al-Juwaili, Advisor at the Ministry of Foreign Affairs, and representatives of the Ministry of Electricity and Renewable Energy, the Ministry of Environment, and the Ministry of Petroleum and Mineral Resources.

Saif bin Helal Al Shehhi, founder and president of the International Agency for Energy Security (IAFES), founder and CEO of the center, stressed the importance of promoting scientific research in the Middle East and the world on energy issues in all their political, geopolitical, economic, and social dimensions and discussing the problems associated with them. He also added in his speech at the opening of the symposium the importance of shedding light on methods for achieving security to ensure the interests and security of the energy sector in the region in particular and the world in general.

The symposium addressed many important topics and issues, including the concept of energy security, the diversity of energy sources

in Africa, the Al-Durra field, and energy security in the Arabian Gulf region. It also discussed what was achieved from the recommendations of the climate change conference in Sharm El Sheikh, what to expect from the climate conference in the United Arab Emirates, and how the BRICS group will help ensure energy security.

The symposium concluded with many important recommendations related to energy security, climate change, the BRICS group, and the Durra field in the Arabian Gulf region. The center in return, announced that it would submit them to many concerned and competent authorities, whether decision-makers, the House of Representatives and the Senate, local, regional, and international civil society organizations, and various media.

The participants stressed that the issue of "Energy security" combines many economic,

political, security, environmental, and strategic variables and factors. Thus, it raises several geostrategic challenges at all internal, regional, and international levels, which is in line with the new concept of energy security, which includes environmental, security, and political fields in addition to economic aspects, which is what the Saif Bin Helal Center for Studies and Research in Energy Science will do during the next phase.

Working to diversify energy sources while reformulating the concept of energy security in light of the geopolitical challenges in the region is necessary, the participants stressed, among the recommendations issued by the symposium. They also stressed the need to work to increase investments in renewable energy projects from diverse sources. To achieve the environmental dimensions of climate change, as well as the economic dimensions of countries, and to secure their energy sources at prices lower than fossil fuels.

The participants called for international and regional partnerships regarding the technology used in the various stages of green hydrogen processes (scientific research, studies,

production, transportation, and storage) to reduce the total cost of the green hydrogen industry.

Participants also pointed out the importance of pushing work toward bringing more investments in research and development in these areas, in line with the goals and plans of countries in the region to reduce carbon emissions and produce environmentally friendly materials and renewable fuels, such as green hydrogen and green and blue ammonia.

The symposium also devoted a large part of its recommendations to the African continent. Its attendees pointed out the necessity of working to produce sufficient electrical energy, regardless of its sources, to cover the large deficit in Africa's per capita energy share, especially in sub-Saharan countries where the percentage of electricity supplied to the population does not exceed 50% of the population and it drops below 30% in Central African countries.

They also pointed out the need to expand and invest in electricity generation projects from solar and wind energy, whose share of the energy mix in Africa currently does not exceed 7.7% of the total energy production on the green continent.

Saif Bin Helal Center successful tour of the Ain Shams University Innovation and Entrepreneurship Center (iHub): A first of a series of visits to research and study centers

Saif Bin Helal Al Shehhi stresses the importance of combining the efforts of research and academic institutions with practical efforts and activities locally and internationally; to achieve the development of better energy economy and a better environment.

The Innovation Center is the first government-funded university center for innovative entrepreneurship and employability. Those in charge of it confirm that the center is a link between the fields of education, training, and academic research, on the one hand, and industry, services, and businessmen, on the other.

A delegation from the Saif Bin Helal Center for Studies and Research in Energy Science, headed by the founder and CEO of the center, His Excellency Saif Bin Helal Al Shehhi, visited the iHub Innovation and Entrepreneurship Center at Ain Shams University on Thursday, November 23, 2023. This is the first of a series of visits and cooperation meetings with research and study centers. This expanded tour is to discuss aspects of cooperation between the two sides during the coming period in everything related to the field of energy, for the benefit of both parties.

The Center's delegation also included the Center's Executive Director, Nashwa Nashaat, and the Center's former Executive Vice Presidents, Major General Muhammad Al-Hamshari and Major General Mahmoud Hassanein.

The visit of Saif Bin Helal Center for Studies and Research in Energy Science began with an introductory tour of the corridors of the Innovation and Entrepreneurship Center iHub. The tour was led by Dr. Weam Mahmoud, Vice President of the Center for Innovation and Entrepreneurship, during which she introduced the center and its activities, noting that, in addition to the center's main headquarters at the university, there are 20 offices spread across the university's various colleges.

Saif Bin Helal Al Shehhi, founder and CEO of the Saif Bin Helal Center for Energy Science Studies and Research, was greatly impressed by the activities of the iHub Center, which are in line with the vision of Ain Shams University in its adoption of green transformation issues. He also praised the center's efforts to support and adopt emerging projects by providing all services and methods available to support innovators, entrepreneurs, and their projects. Al Shehhi also appreciated all the efforts made by iHub.

In this context, Al Shehhi stressed the importance of combining the efforts of research and academic institutions with practical efforts and activities, whether local or international. He adds that this is to achieve the goal of developing a better energy economy and environment. He also stressed that he is working, along with his subordinates at the International Agency for Energy Security and its research group, the Saif Bin Helal Center for Studies and Research in Energy Science, to support all efforts aimed at supporting energy security, whether in the Arab world or all over the globe.

During the meeting, the Executive Director of the Saif Bin Helal Center, Nashwa Nashaat, introduced the center and presented its goals, mission, vision, plans, and work strategy in various energy fields and issues.

In turn, Nashwa Nashaat stressed the importance of the Innovation Center in linking the practical side, represented by industry, trade, and the private sector, with the scientific and academic side. She adds that the idea of transforming a scientific edifice into a practical edifice linked to the various activities on the ground is a great achievement. She also praised the effort made on the center's official website. As it resonates and spreads widely throughout the various Egyptian universities.

The Executive Director added that Ain Shams University has a head start and has left a mark in integrating young graduates into the labor market and in trying to create a new generation that deals innovatively with investment and development issues. It is important to have centers linked to the idea of investing, developing the scientific community, and enriching it by integrating with the practical aspect, so that each of them benefits from the other and achieves integration between the two sides, she added.

During the tour, Dr. Weam Mahmoud referred to the Center's interest in the field of wind by stating that the Center has made great strides in this field. She announced the possibility of concluding a future partnership with the Saif Bin Helal Center for Studies and Research in Energy Science, due to the points of convergence between the two centers in marketing and manufacturing in the iHub Innovation Center, as well as in R&D of ideas related to energy, and so on.

The center's scope of work is to be an innovation hub, she said. To achieve that goal, it includes three centers. The first is the Innovation and Entrepreneurship Center, the second is the Career Preparation and Employment Center for Students, which is concerned with the employment part; and the third is the Training and Skills Development Center, which is concerned with qualification and development by providing qualified courses for the labor market for faculty members and assistant staff, she explained.

She displayed several photos documenting the center's activity and history, including a photo at the opening of the building in 2021, along with photos of events illustrating the iHub Innovation Center's support for innovators and entrepreneurs, in line with the center's goal of being a think tank for innovators and entrepreneurs.

From 2021 until July 2023, the Innovation Center achieved record numbers in providing the necessary support and funding to beneficiaries of the services provided by the Center, whether to entrepreneurs or innovators, she explained. The number of beneficiaries of the activities, programs, and direct services they provide reached 13,000, in addition to the other actual services they provided during the previous period, which included webinars and awareness sessions, she added.

Hub Innovation and Entrepreneurship Center was established in 2014 and headed by a professor. Dr. Maged Ghanima, based at the Faculty of Engineering at Ain Shams University, is the first governmental university center in Egyptian public universities for innovative entrepreneurship and employment. Its idea is to contribute to raising innovative awareness among small entrepreneurs and university students across the Republic. The center is also a link between the fields of education, training, and academic research on the one hand and industry, services, and businessmen on the other.

SBRIC for Studies and Research in Energy Sciences

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