



جمهورية العراق
وزارة البيئة



برنامج الأمم المتحدة الإنمائي
UNDP

المساهمات المحددة وطنيا للعراق بشأن تغير المناخ

Nationally Determined Contributions of Iraq (NDC)



يقدم العراق هذه الوثيقة وفقا لمتطلبات الاتفاقية الاطارية لتغير المناخ
واتفاقية باريس المشرع تحت مظلتها

Executive summary

This document is a voluntary national contribution and a vision that represents Iraq's highest policy in dealing with the problem of climate change nationally and internationally. This document comes in response to the Paris Agreement, which was adopted at the 21st Conference of the Parties to the Framework Convention on Climate Change.

As a developing country, Iraq believes that the solutions to the problem of climate change can only be achieved with the active participation of all countries and within the principles of the United Nations Framework Convention on Climate Change and the Paris Agreement, which are based on common but differentiated responsibility, national circumstances and possibilities and the historical responsibility for the problem.

However, most of these projects have come to a complete halt as a result of the fierce confrontation with the terrorist gangs of ISIS, which has caused disastrous results that have affected all sectors of life, threatened security and social peace, completely destroyed infrastructure, and displaced hundreds of thousands of people. This is in addition to the damage inflicted on the economic sector, which is already affected by the fluctuation and decline in oil prices, the terrorist group's control over a number of oil wells and oil and industrial facilities, and Iraq's need to allocate a large part of its financial budget to finance military operations to confront this extremist group, liberate occupied cities, and rebuild areas liberated from its control 220 To date, they have greatly affected the health situation, which is already suffering from the fragility, weakness and lack of staff of various types, in addition to the cracking of the infrastructure as a result of the confrontations that have been mentioned, which led to an increase in the level of unemployment and poverty.

However, Iraq is presenting this ambitious plan, in which all national plans and strategies related to climate change have been adopted. These plans are in line with the national needs and development orientations of all sectors, in order to ensure the desired goals are achieved nationally and internationally in order to make gradual and radical transformations, in accordance with available national capabilities, if security and peace are achieved and economic resources are provided to ensure a decent life for the Iraqi people.

Chapter (1)

National circumstances and possibilities:

Iraq is located in the dry and semi-arid regions of South-West Asia and has acquired a subcontinental climate influenced by the climate of the Mediterranean Sea. Iraq's climate is characterized by an increase in daily and annual temperature, due to the lack of large bodies of water that reduce the cold of winter and summer heat, and the lack of rainfall moving from northeast to southwest.

However, the Iraqi economy and work in normal patterns were not at the level required to meet the needs of the Iraqi citizens, as it was fluctuating distinctly and for a long time has been reduced to low levels due to exceptional circumstances of wars and conflicts and economic blockade during the previous regime and after, and the huge numbers of displaced and displaced persons due to ISIS terrorist attacks. It is difficult for the Iraqi national budget to provide the necessary funds for the reconstruction and the return of displaced and displaced persons to their homes, as ISIS and the war it waged on Iraq caused serious damage to infrastructure and property, estimated at \$54 billion of national investments, despite the fact that it supports national investment in Iraq and the impact of its efforts to address the global climate change. The Paris Agreement, which aims to preserve the planet, calls upon the major developed and industrialized countries to commit to the promises of mitigation, financial and technical support, transfer of technology, and implementation with transparency towards developing countries, in order to help them implement their national contributions, achieve the goals of sustainable development within their territories, and enable them to survive by establishing a diversified and resilient economy that is responsive to current and future climate changes. Therefore, Iraq's desire to rebuild the destroyed cities according to modern systems of construction to become sustainable green cities that are friendly and serve as living peace markers in Iraqi society, to encourage the use of renewable energy and green construction to ensure sustainability in the face of the risks of climate change, especially after the circumstances of the Coronavirus pandemic, which have worsened the situation, as Iraq's future economic prospects pose significant challenges; The collapse of international oil prices is expected to lead to the contraction of its economy, especially in light of the presence of a single-source rentier economy linked to highly volatile global oil markets, with the absence of concrete reforms to strengthen the participation of the private sector, it will be difficult to revive the economy. Growth is expected to gradually return to its low potential of between 1.9% and 2.7% in 2021-2022. However, the resurgence of successive waves of the coronavirus pandemic (COVID-19) may threaten this relatively mild scenario for 2021. The greatest risk to the economy lies in the unpredictability of future trends of the epidemic. This may directly affect the country's potential to enable the health sector to shift away from many

available resources Preventing its collapse as a result of the coronavirus pandemic and the major health problems it has created has been a great burden on this important sector, and the economic situation is still unclear and unpredictable.

Iraq has natural ecosystems rich in biological diversity, but its geographic location within arid and semi-arid regions has made it one of the countries most vulnerable to the effects of global climate change. This is evident in weather events that are unprecedented, such as low rainfall, low levels of water levels in lakes and rivers, and unprecedented warming rates, more than twice the world average, fires, dust storms increase in intensity and frequency, and the time periods for their occurrence. Desertification has caused pressure on the ecosystems and the balances they create, which has contributed to reducing the spread of many types of endemic plants, and reducing the numbers or extinction of wild animals. According to the International Union for the Conservation of Nature (IUCN), these ecosystems are considered a threat, although these are not widespread Many of Iraq's protected areas are of global and local importance, such as the marshlands, which have been included in the World Heritage list for their importance. In addition, many of the protected areas are declared to be of natural wealth, and the environmental services they provide have an important economic impact.

Surface water is Iraq's main water resource and consists of the Tigris and Euphrates rivers, their tributaries, and the Shatt al-Arab. Iraq's water resources have been greatly diminished due to the many dams and irrigation and development projects that have been built on these rivers in neighboring countries to secure their water shares and use them to generate hydropower. This has affected Iraq's share and quality of water, and the effects of climate change have caused a decrease in the quantities of water reaching its rivers, as the water sector is among the most vulnerable sectors in the face of climate change.

The rising sea level, acidity, and temperature of sea water is a matter of great importance to Iraq, even though our country's coast on the Arab Gulf is very narrow. However, rising sea level may threaten the southern region by drowning, especially Basra province, which overlooks the Gulf and where Iraq's economic potential is concentrated.

The agricultural sector is one of the most water-consuming sectors in Iraq (about 35 billion cubic meters per year), with 85% of water consumption. Due to the use of open and old irrigation canals, the fragility or weakness of the management of water resources and worn-out infrastructure, and the use of old irrigation techniques (surface irrigation) for some crops such as rice and traditional farming patterns, the amount of irrigation water has increased from the specified water quotas and has led over time to higher water levels, flooding, and salinization of the soil.

The transport sector is an important sector in any country's economy. Moreover, all economic and life activities, such as shopping, housing, and entertainment, cannot function without linking to transport lines, due to the influence of other economic sectors, such as industry, commerce, and tourism. This sector suffers from a deterioration in infrastructure, which is considered the basic pillar for developing means of transport, due to the lack of laws, legislation, and projects that support a trend towards sustainable, collective, and environmentally friendly means of transport.

Iraq suffers from a severe weakness in the infrastructure supporting the industrial sector, due to the lack of cities and industrial zones with the necessary infrastructure to build various industries. In addition, the infrastructure supporting industry and investment weakened, contributing to the deterioration of this sector. The weakness of the comprehensive knowledge infrastructure of communication and information technology networks, as well as the infrastructure of standards, standards and quality, and the weak efforts to support the private sector to become an essential partner in economic development through clear and advanced programs, have had a tangible impact on the reality of the industrial sector and its inability to keep pace with the global march of progress.

Environmental laws and regulations:

After 2003, the Iraqi state issued numerous laws aimed at protecting the environment. However, the country's security conditions did not help in their full implementation.

Environmental awareness:

Environmental awareness is considered to be the dissemination and deepening of environmental knowledge among all segments and categories of society through appropriate environmental means and messages and motivating them to contribute, individually and collectively, to the protection of the environment and the preservation of its resources. Given that climate change is the problem of our time, women and children are the most vulnerable among men to the problem of climate change, which requires full environmental awareness of climate change and the development of strategies, plans, laws and legislation to raise environmental awareness among all segments of society, especially vulnerable groups.

Research and Development:

Addressing climate change requires strengthening scientific research and technological development in several areas, including technology transfer, the economy, industry, oil, energy, transportation development, and other areas related to climate change and citizens' lives, in order to mitigate the effects of climate change and adapt to it. It is necessary to attach importance to this aspect and provide an opportunity to prepare broad and deep studies on climate change and its multifaceted effects, and to support graduate students (M.S. and Ph.D.) in adopting research and studies on climate change topics and increasing knowledge, which can embody new and advanced research that can turn into projects that serve the Iraqi environmental, economic, and social realities.

Chapter II

Impacts of climate change, vulnerability and adaptation

The effects of climate change on various Iraqi sectors have become known to all, and have cast a shadow over all life in Iraq, especially in light of the fragile conditions of the country and the country's dilapidated infrastructure. The results of these effects have been clear on sectors with direct impacts on the lives of citizens and their economic, water and food security. The effects of these effects have been evident in the economic, health and life aspects in general. Projections based on national numerical climate models indicate a steady increase in temperature, ranging from 0.9 m°m) since 2007 to 3.5°m (m) by 21000, according to the above-50°m (m) projection. This increases the situation in a country where temperatures are clearly higher than 50°A00°A00000000000 per year For example, there are large droughts that led to an increase in the area of desertification, which affected the increase in dust and dust storms during the year. The severity, frequency, and duration of these storms led to a noticeable increase in the number of asthma cases in Iraqi society, especially among children and the elderly. The spread of diseases and cancers significantly in recent years, as

well as in recent years, as the Bank of Iraq has noted a significant increase in the severity of the climate change problem 2011 reports a major shortage of renewable water sources in Iraq in comparison with actual needs from 2000 to 2009. This percentage is expected to reach 37% between 2020 and 2030, and it will increase to 51% from 2040 to 2050. This explains the reason for the major collapse in agriculture, which has had a clear impact on agricultural production, Iraq's economy, natural systems, biodiversity, the loss of vegetation cover, and the threat to the coastal areas of the Arab Gulf, particularly in the southern Iraqi province of Basra, as a result of sea level rise, coral coral discharge, the loss of marine land and the impact on the marine environment This has created pressure on the national economy, threatened the stability of the country, and made it difficult to achieve sustainable development in all of its vital sectors, impeding our aspirations for sustainable development and developing the economy. This calls for rapid intervention and the creation of natural solutions to save these natural systems, which have been and continue to be the main contributor to the stability of the climate in Iraq and the world, especially in the last ten thousand years. All of this has added to the fragility of the national situation, making Iraq one of the five most fragile countries in the world in the face of climate change, according to the Sixth Forecast State of the Global Environment for the Western Asian Region (GEO-6).

Iraq is preparing the National Adaptation Plan (NAP) with funding from the Green Climate Fund (GCF) in cooperation with the United Nations Environment Program (UNEP) which will be among the basic plans the country will rely on to implement this policy to ensure flexibility for all vulnerable national priority sectors over the next three years to reduce potential risks and find efficient ways to sustain water sources and address acute water scarcity and quality. As a result of the difficult economic conditions Iraq is going through, especially after the coronavirus pandemic and the accompanying unprecedented decline in oil prices, implementing this policy will require regional cooperation and international support to enable it to establish strong health systems that are resilient to difficult circumstances, to protect human health, to protect natural systems and biodiversity, to enhance resilience to the effects and risks of disasters associated with local climate change scenarios, and to promote adaptation in fragile sectors.

Given the synergistic relationship between sectors, the preparation and implementation of an action plan for adaptation and benefits for each of the key sectors affected by climate change within the framework of national and sectoral strategies, such as the National Water Strategy, the National Agriculture Strategy, the National Biodiversity Strategy and the National Framework for Integrated Drought Risk Management in Iraq, will lead to the strengthening of national capacity to address the impacts of climate change on various sectors, particularly those most sensitive and vulnerable, as follows:

1. Water resources sector:

Top Axes :

1. Sustainable investment in groundwater and its conservation for future generations; harvesting of water and reducing water losses; use of modern technologies to monitor and observe aquifers and determine their quality, while maintaining the hydrogen balance of groundwater in general.

2. seawater desalination (and river water when required), the use of renewable energy to power alternative desalination plants and the development of new technologies.
3. The construction of many dams and underground reservoirs to collect water, avert flooding risks, provide water rations during dry periods and recharge and sustain underground aquifers.
4. Increase the efficiency of the use of irrigation water, work on the creation of modern and efficient irrigation methods, reduce water consumption in a manner consistent with crop quality, soil nature and climatic conditions, with a view to adapting to the sharp decrease in water resources; rehabilitate major irrigation projects and gradually connect canals to major drainage areas or vaporizers to avoid being returned to rivers; use non-traditional water sources to provide water rations for agricultural, industrial, and service uses, such as oil well-irrigation, green belts, and to reduce the quantity and quality of water.
5. Enact national policies, laws, and legislation that encourage citizens to rationalize their use of water. However, there must be specific measures against those who intentionally waste water.
6. The countries bordering the Tigris and Euphrates rivers and their tributaries (Turkey and Iran) are urged to respect Iraq's rights to their common waters and to strengthen regional cooperation with them to achieve water and climate security. This requires assessment of regional risks, joint crisis management, sharing of damage, and taking into account the country's demands for water from common rivers to meet its water needs for development sectors to achieve security and peace.

Overarching objective: To increase the resilience of the country's water resources sector through an integrated approach that addresses the increasing future need for water demand and reduce potential shortfalls through developing water uses in a manner that is consistent with the challenges of climate change and implementing the axes mentioned in the Water and Land Resources Strategy to 2035 through the provision of financial and technical support and the introduction of alternative and non-conventional sources, taking into account improved infrastructure and efficient supplies and the preservation of water sources from pollution as part of their sustainability.

2. Agriculture:

Top Axes:

1. Reduction and rehabilitation of soil, pastures and vegetation degradation; improvement of land management practices and adoption of smart and conservative agriculture, especially in agriculture and forestry
2. Modernization, improvement and development of agricultural practices and livestock development in accordance with the principles of adaptation to climate change.
3. Establishing greenhouse and plastic farms and tissue-breeding laboratories for climate-resistant varieties.

Overarching goal: Increase the resilience of the agricultural sector to climate change to protect and enhance the country's food security, reduce land degradation, increase agricultural revenues to achieve economic diversification, reduce poverty and support rural women through the use of modern technologies and technologies as part of achieving the Sustainable Development Goals.

3. Health Sector:

Top Axes:

1. Enhancing the resilience of the health sector by preventing diseases caused by climate change.
2. Rehabilitating and resilient health-fragile and poor communities at risk of health and adapting to the negative effects of climate change.
3. Raise health awareness in communities vulnerable to climate change-related diseases and support the health and family program.
4. Combating endemic and epidemic diseases caused by climate change.

Overarching goal: Increase the resilience of the health sector to address climate change by providing necessary and comprehensive support to health institutions and infrastructure to strengthen national response, rehabilitate vulnerable communities, and build resilience and resilience that will contribute to the achievement of the Sustainable Development Goals.

4. Natural systems and forests:

Top Axes:

1. Increase the number of nature reserves and consider the diversity of these reserves to ensure the protection of the greatest possible extent of endangered species and fragile ecosystems, while enacting laws and legislation to achieve such protection. The rehabilitation, extension and sustainable management of forests to contribute to enhancing their role in environmental protection and carbon capture, with the need to enact laws and legislation to ensure the achievement of such protection.
2. Conservation and use of ecosystems providing environmental services to avert environmental risks and disasters.
3. The genetic enhancement of productive plant species for access to high-yielding, harsh-conditions tolerant species.
4. Creating oases in desert and dry ecosystems to protect biodiversity from climate change.
5. Fill in the gaps in the laws and regulations in force to protect this vital sector.

Overarching goal: Protect and preserve ecosystems by increasing their resilience to adapt to the effects of climate change and adopt nature-based climate solutions to protect fragile, rare and most vulnerable environments.

5. Coastal areas and sea level rise:

Top Axes :

- 1- Repairing the environmental damage to the coastal areas in southern Iraq, treating the spread of the salt tongue from the sea water toward the Shatt Al-Arab and the city of Basra, and restoring the marine environment to its former state.

2-Protection of coasts, reduction of coastal erosion and conservation of ecosystems by encouraging the cultivation of erosion-reducing plants and trees.

3-Protect coastal natural resources and develop reef rehabilitation programs.

4- Use modern information systems, modeling, and climate scenarios to assess the future impacts of sea level rise and temperature rise, enhance the capacity for strategic planning and proactive adaptation to this phenomenon, and protect the coastline south of Basra.

Overarching objective: To develop strategies for the protection of the marine environment, biodiversity and coastal areas to reduce erosion, increase their resilience to sea level rise, increase their carbon absorption potential, conserve relevant natural environments and address risks and threats to marine life and infrastructure.

6. Sanitation and waste sector:

Top Axes :

1. Treatment and recycling of wastewater and wastewater for use in agriculture for restricted and unrestricted irrigation through tertiary treatment as well as in industry and energy.
2. The provision of modular wastewater treatment plants in villages and rural communities to produce irrigation-friendly water and mobile onsite organic waste treatment plants to produce biogas and compost.
3. Support and backing industrial sewage treatment plant projects for large and medium-sized industrial enterprises to provide alternative and non-traditional water sources and reduce river water pollution.
4. Rehabilitate the sanitation sector with a view to increasing the resilience of the water sector and mitigating the negative effects of climate change.
5. Encouraging investment and preparing all the requirements thereof, while involving the private sector in the process of sound management, recycling and treatment of solid waste by technical means and using modern technology to benefit from it in the production of electrical energy and gas fuels in order to preserve natural resources.

Overall objective: Support integrated waste management and strengthen and improve the management and recycling of solid waste energy production, environmental conservation, improved quality of treated water and reduction of energy consumption as part of the achievement of the sustainable development goals.

7. Climate, events and the recurrent and slow-onset risks of climate change:

Top Axes:

1. Build and develop a monitoring and early warning system and build capacity to monitor extreme and severe climate events such as droughts, floods, rainstorms, dust and dust storms in order to make necessary preparations and minimize human and economic losses.

2. Preparation of an atlas (deaths and economic losses due to extreme events due to climate change in Iraq) and establishment of a nationwide network of weather stations to monitor and provide antenna and hydrological information.
3. Provide financial and technical support for the processing of computer technologies, remote sensing, analysis and forecasting of climate variability according to IPCC scenarios as part of proactive adaptation to minimize the maximum loss and damage that may result and to establish future climate models and scenarios for Iraq by the end of the 21st century.
4. Strengthen national and regional partnership to manage crises and climate change disasters and reduce associated risks.
5. Enhancing the resilience of ecosystems to extreme events (floods, torrents and droughts) to reduce the risk of natural disasters related to climate change.

Overarching goal: The country aims to increase the predictability and readiness of government institutions' infrastructure by reducing exposure to climate risks and increasing the resilience and resilience of sectors affected by the adverse effects of climate change.

8. Higher education, scientific research, science and technology

Top Axes:

1. Creation of scientific departments on climate change in the relevant universities, colleges and institutes.
2. Work to adapt academic projects and dissertations for graduate students to the national needs in the field of climate change in accordance with the adopted international standards.

Overall objective: Scientific research and technological development should be the cornerstone of success through joint action between national sectors to achieve the objectives of this document.

9. energy sector

Top Axes:

- 1- Use a nature Base solution method to plant the land surrounding power plants.
 - 2- Improve efficiency of transportation, distribution and modern technological methods that help adapt to rising temperatures.
 - 3- Change the specification of electrical equipment used in the electricity sector in line with the increase in temperatures.
 - 4- Achieve a balance and integration between the different means of transport, making it an integrated system for maximizing the volume of transport in Iraq and establishing regulations for doing so.
- Develop and provide mass public transport and infrastructure to avoid traffic congestion and improve living conditions, including the provision of railways to

transport passengers, goods and equipment between provinces and improve efficiency.

- Provide advanced transport technologies that are flexible and resilient to the negative impacts of climate change.
- Strive to develop airports, land, sea and river transport centers, and walk in modern, environment-friendly trains, such as electric-powered trains.
- Supporting maritime transport and its importance in linking Iraq with the world, as well as its impact on international trade and raising the standard of living of individuals.
- Conduct comprehensive studies to assess the impacts of climate change and temperature rises on the transport sector.

Overarching objective: Increase the resilience of the energy sector to climate change through support for adaptation programs and simultaneous action with mitigation hubs to strengthen national response to climate change and increase the percentage of the population benefiting from electricity and transport services.

10. Tourism and world heritage (natural and cultural)

Tourism (spatial, archeological, religious, environmental), museums of antiquities and heritage, various display houses, buildings, markets, treasures, heritage houses, festivals, conferences, cinematic and theatrical works, fine arts, fashion, publications, exhibitions, advertising, handicrafts and literary heritage, such as poetry, prose, stories, stories, proverbs, music, institutions concerned with childhood, culture and community awareness, are considered an important source of national income and a source of fossil fuel as they have been activated, as well as sites of important monuments such as historical capitals and the need for their maintenance, promotion and exploration of important new sites. We have a list of tens of thousands of archeological sites whose role is affected, and many of which are directly affected by the present-occurring archeological excavations or by the present-ruinous developments .

Top Axes:

1. Encourage the traditional knowledge of local people to reduce poverty and improve social and economic reality.
2. Work to preserve heritage by registering archeological, heritage and cultural sites in Iraq as World Heritage Sites to protect them from the negative effects of climate change and the international community's contribution to protecting them.
3. preserving natural ecosystems from the negative impacts of climate change, protecting the services of economic ecosystems of local populations and sustaining exceptional universal values at the World Heritage Site.
4. Southern Iraq's marshland World Heritage Property Management Plan strengthened with the addition of a section evaluating the negative effects of climate change on its exceptional value as a world heritage property.

Overarching goal: Increase the resilience of the tourism sector and world heritage and promote it as one of the most important sources of diverse economic resources in the

country, protect sites, monuments, world heritage and indigenous peoples from climate change threats and promote sustainable ecotourism.

Chapter III

Mitigation measures and co-benefits:

The main objective of mitigation policies is to reduce greenhouse gas emissions through actions and plans to prepare a document that balances the requirements of the Framework Convention on Climate Change and the Paris Agreement with respect to diversification of the economy, sustainability of fossil fuel exports and stability of the global market for this type of fuel, to ensure the achievement of the Sustainable Development Goals until suitable alternatives are found and to limit the impact of the response measures taken by developed countries on the economies of developing countries and the negative social and environmental repercussions that will overshadow the national economy if such measures are taken.

The reduction will be determined by nationally appropriate mitigation actions (NAMAs) that Iraq will submit to the UNFCCC Secretariat in the future in the form of plans, strategies, programs and projects, which will depend on the amount of baseline business as usual for each project involving a reduction in emissions and by the major emitters, targeting the main gases in the IPCC Greenhouse Gas Regulations - carbon dioxide, methane and nitrous oxide.

The most important sectors through which Iraq will work to achieve the goals of its national contribution to reducing greenhouse gas emissions and diversifying its economic sources are the oil, gas, electricity, industry, trade, agriculture, transportation, waste and housing sectors.

Pathways for mitigation of emissions of CO₂ and other greenhouse gases may be described as follows:

- Widely disseminate the culture of environmentally friendly low-emission technologies to include all types of target gases with a focus on mechanisms for improving energy efficiency.
- Mobilize mitigation measures to include all emitters.
- Dissemination of knowledge and capacity-building with support from developed countries to developing countries to ensure coherence among States Parties to ensure balance and fairness of opportunity, taking into account national circumstances and the needs of each country.

Early on, Iraq joined the agreement and signed the Paris Agreement. Iraq worked on completing projects and strategic studies to introduce clean and renewable energies, improve energy efficiency, sound environmental management of carbon, and increase green areas. Projects to introduce liquefied petroleum gas (LPG) fuel as fuel for vehicles were also started, in addition to the traditional fuels used, as well as other pioneering projects in these fields. In addition, there are many national sectors, including working to transform lighting in many of Baghdad's main streets for solar energy, drawing up future plans to convert some electric power plants into circuit stations to reduce fuel use and increase production, and taking a number of measures and policies to reduce greenhouse gas emissions, including:

- Raise awareness about the importance of energy conservation.
- Spread the culture of using LED lighting on all government and commercial buildings.

- The issuance of energy efficiency labels by the Central Organization for Standardization and Quality Control to ensure the use of environmentally friendly goods and services.
- Recycling of tires by the Ministry of Industry to achieve a reduction in emissions.
- Issuing green building codes is a policy for the creation of smart green buildings.
- Promulgation of the Solar Energy Act.
- Basra Gas Company to Invest in Companion Gas.

In addition, projects have been implemented in the Kurdistan region of Iraq, such as the construction of LPG power plants instead of heavy fuel, the construction of brick plants that use LPG instead of black oil, as well as iron production plants that operate on gasoline instead of black oil. There are also many projects in progress, such as the gas investment project, the cement plants that operate on waste-processing technology and converting it into energy, the gas project that accompanies the production of electricity, and the sewage treatment and reuse project for irrigating green belts, which is carried out in cooperation with the Japanese Jica Organization in Erbil province. In addition, there are afforestation and increasing the areas of green forests, bearing in mind that the cities of the Kurdistan region depend on the use of the sewage and re-drainland to increase the green areas and more.

International support and technology transfer are of exceptional importance in preventing the waste of associated gas, which is considered an important economic resource if invested, in addition to achieving a significant reduction in greenhouse gas emissions. The International Energy Agency estimates that leaks of methane gas (a key component of natural gas) in Iraq could be reduced by more than 80% using existing technology. The financial value of Iraq's methane emissions is estimated at more than \$600 million, representing a significant economic loss. In addition to the economic benefits that this gas will bring to Iraq, reducing methane emissions protects human health by improving air quality at the local level.

The pathways adopted by national sectors are described below:

1- Energy sector (oil, gas, electricity and transport)

Through this vital sector, Iraq seeks to voluntarily reduce its emissions if, on the one hand, security and peace prevail. On the other hand, developed countries fulfill their commitments to finance, transfer environmentally-friendly technology, and build capacities, on the other hand. The highest rate of greenhouse gas emissions results from this sector, according to the first national communication document, and contributes to 75% of Iraq's total emissions.

- Reduction of the levels of concomitant gas combustion and its investment in oil and natural gas extraction.
- Investment in and development of petroleum industries to reduce resource depletion and reduce emissions simultaneously, and in particular to improve associated gas combustion and monitoring technology to reduce methane emissions and avoid "venting" (venting) by good design, including by gas recovery and recycling.
- Conduct programs to periodically detect leaks of methane gas in oil and gas facilities for the purpose of repairing them (LDAR) in cooperation with international partners (GMA-Global Methane Alliance) and oil and gas companies operating in Iraq.
- Combined cycles to increase electrical power production

- Changing the type of liquid to gaseous fuel in an electric power plant and improving the quality of the fuel used, thereby contributing to a reduction in carbon emissions.
- Reduce emissions through energy efficiency and conservation mechanisms .
- Conversion of heavy fuel power plants to the use of LPG and dry gas fuels, which can be provided by capturing associated gas and reducing methane emissions.
- The use of hydroelectric energy, which is a clean source of energy.
- Use of CCS or CCUS capture, storage and use techniques to reduce carbon emissions and make use of carbon in industrial processes.
- Renewable energy technologies, especially with regard to solar energy, are becoming localized due to Iraq's strategic location, which is considered a promising area for the localization of this type of technology.
- Use of advanced and sustainable public transport and environmentally friendly technologies, such as the construction of the elevated train project and the gradual transition to sustainable transport.
- a gradual shift toward hybrid and environmentally friendly vehicles.
- more fuel-efficient engine aircraft and a more efficient operating system.
- Review and update existing laws and identify the need for new laws regarding trade, industrial investment and customs tariffs.
- Electricity is produced from wind in promising areas, especially in the Kurdistan region.
- Support the participation of the private sector in the development of the public transport system in accordance with participatory mechanisms with the public sector.

2- Industry:

The public, private and mixed industrial sector is one of the components of the non-oil economy in Iraq. The contribution of this sector to the gross domestic product reached an average of 2.4% during the years 2008-2011. The Ministry of Industry and Minerals seeks to manage this sector, one of the sectors contributing to greenhouse gas emissions through a series of measures:

1. Developing and qualifying industrial processes in existing projects for the introduction of low-carbon technologies (Developing and qualifying industrial processes in existing projects), such as in the cement, brick, fertilizer and petrochemical industries.
2. Recycling and waste management (Recycling and waste management), such as recycling of heat and gases from industrial furnaces and recycling of plastic and tires.
3. Support the private industrial sector in reducing emissions through the application of mechanisms mentioned in the industrial strategy, such as small and medium-sized enterprises, to support technological development, innovation and transfer of environmentally friendly industrial technologies.

3- Agriculture sector

The agricultural sector is one of the important economic sectors in the country and one of the main contributors to greenhouse gas emissions. Most of Iraq's grain crops, such as wheat, barley, rice, and maize, as well as horticulture and palm tree crops, are important measures in managing this sector to ensure a meaningful reduction in emissions.

- Control the cultivation of crops that produce a large quantity of methane gas, such as rice cultivation; curb its consumption of a large amount of water; and combat soil erosion and rehabilitate its degraded land.
- The use of alternative energy units such as solar and wind energy in the agricultural sector to operate irrigation pumps and to use efficient irrigation systems.
- Implement integrated management of natural forest fire control and the rehabilitation of burning and degraded forests. Establish a system for the protection and maintenance of natural and industrial forests, increase their areas and establish green belts to reduce CO₂ emissions.
- Raising environmental awareness about climate-smart agriculture. Improving techniques for using nitrogen fertilizers to reduce emissions. N₂O and promoting no-till farming to reduce emissions from the use of agricultural machinery has been successfully implemented in the Kurdistan region.
- Reduction of intestinal fermentation emissions in livestock and sheep by identifying and improving their feed.

4- Waste sector:

Iraq is seeking to diversify its economy through the following measures:

- 1- Promulgation of the Solid Waste Management Act, which encourages the recycling of waste and the conversion of waste into energy, and the elimination of waste incineration.
- 2- Use of plasma technology to produce electricity from waste.
- 3- Implement an integrated waste management system.
- 4- Investing methane from landfills in electricity production.
- 5- Tire Recycling Project.
- 6- The production of energy by treating waste for electricity generation and for heating, especially in modern cities adjacent to sewage treatment plants.

5- Housing sector:

The housing sector in Iraq seeks to implement the concepts of rationalizing electricity consumption and moving towards low-emission pathways based on the localization of principles to stimulate the use of renewable energy in Iraq. These principles are as follows:

- 1- The use of energy-saving lighting techniques.
- 2- Use of thermal insulation techniques.
- 3- Issue green building codes and modern techniques for thermal insulation, lighting and sustainable cities.
- 4- Use effective building design to maximize lighting and solar energy.
- 5- Implementation of photovoltaic technologies for distributed electricity in small regions and cities.
- 6- Integrated design incorporating the use of smart meters technology in buildings.
7. Orientation towards integrated solar photovoltaic in buildings.

- 8- Promote the production and use of building materials and local environmentally friendly products.
- 9- Use modern construction techniques such as GRC and ICF which reduce the amount of rebar and cement material used in construction

Chapter IV

Monitoring, reporting and verification:

The monitoring, reporting and verification system is one of the most important requirements for building a transparent system that reflects our needs according to a sound methodology through which we can draw clear pathways for the description of legislation, laws and instructions necessary for mitigation and its impact on adaptation. The system will also help to assess a country's national needs for technology and capacity-building to promote

emission reduction pathways in measured quantities that can be reported with numerical measurements based on a legislative floor covering all sectors.

Through the support mechanisms of the Framework Convention on Climate Change and the Paris Agreement, and in cooperation with the United Nations Development Program and UNDP, Iraq is seeking the necessary support to design the required monitoring format according to each sector, covering all types of activities and all sectors in a flexible and scalable manner. Iraq is aware that these systems will improve the framework of transparency in:

- National inventory and reporting of greenhouse gas quantities for each emitting activity.
- Motivate oil and gas companies operating in Iraq to report methane emissions within well-known transparent frameworks, such as the Oil, Gas and Methane Partnership (OGMP)).
- Collaborate on live measurement campaigns of methane quantities emitted from oil and gas installations and use satellite data to establish a baseline emissions.
- Assessment of progress made in implementing the nationally determined contribution.
- Identification and assessment of the adverse effects of climate change on vulnerable sectors.
- Characterizing the benefits shared by mitigation and adaptation.
- Impact of the implementation of response measures on the national economy.
- Assessment of national needs and the type of climate technology that contributes to the achievement of the Sustainable Development Goals.
- Identify what capacity needs to be built to ensure meaningful national mitigation actions in green jobs.
- Identify the type of financing and investment that ensures the implementation of the national contribution in accordance with the country's national policy.
- Localization of technologies and software with the ability to design predictive models for mitigation and adaptation
- Characterize the features of the verification of actions taken to mitigate and adapt to climate change.
- Determine the type, form and level of institutional structures required in accordance with international and national climate change trends.

However, the National Center for Climate Change, which represents the institutional structure responsible for managing climate change at the national level, still needs more support and backing in order to build and manage an integrated and transparent system for measuring, reporting, and verifying climate change in particular. International support must be provided financially, technically, and diplomatically to improve the type of climate capabilities and skills to enable the Center to participate in international, regional, and national policies, so that the international community can participate in its measures to curb climate change.

Time frame and implementation requirements:

Iraq aspires to implement its nationally determined contributions for the period of time from 2021 to 2030, to achieve an expected reduction between 1%-2% of its total emissions, in accordance with national greenhouse gas inventories, at the national effort and 15% upon the availability of international financial and technical support, and to achieve security and peace in accordance with the paths and orientations set forth in this document, in a way that ensures the realization of the benefits of the shared to enable its fragile sectors to adapt to the adverse effects of climate change, after its people enjoy the provision of electricity for 24 hours a day, just like the peoples of the world. The NAMA document will include details and executive measures. Priority will be given to the electricity sector through investment of up to 12 gigawatts in renewable energies based on the 2021 economic decisions of the Council of Ministers.

Iraq can achieve emission reductions and adjust its sectors after the following requirements are met:

- International financial support of up to \$100 billion in accordance with the time frame referred to in this document through grants and the settlement of sustainable investment in the public and private sectors.
- Support innovation and transfer of environmentally friendly technology in line with national needs.
- The stability of the oil market in particular, to ensure that the national economy does not fluctuate to achieve development plans under the Sustainable Development Goals