

ECONOMIC DIVERSIFICATION, ENERGY TRANSITION, AND THE LABOR MARKET IN IRAQ AND THE GULF

A CONFERENCE REPORT BY THE MIDDLE EAST
INSTITUTE AND IRAQ POLICY GROUP

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ABOUT THIS REPORT

The articles in this report were prepared for the Workshop on the Challenge & Imperative of Reform, Good Governance & Energy Diversification in Erbil, Baghdad & the Region. Convened by IPG and MEI, this workshop was held on November 15, 2022 as part of the Middle East Peace and Security Forum 2022 at the American University of Kurdistan in Duhok, the Kurdistan Region of Iraq.

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Cover photo: The Siba oil field in Iraq's southern Dhi Qar Governorate, on Aug. 22, 2022. [Photo by ASAAD NIAZI/AFP via Getty Images.](#)



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INTRODUCTION

As part of a continued collaboration with the Middle East Peace and Security Forum held in Iraqi Kurdistan at the American University of Kurdistan, we held a workshop in November 2022 focusing on challenges of economic diversification, energy transition, and impacts on labor markets in Iraq and the Gulf region. Our one-day workshop included representatives from local government, economic and energy experts, international development specialists, and a youth cohort who presented their own views and experiences, especially on expectations of job creation and inclusion in clean energy production. Our conversations were frank, open, and an opportunity to talk about policy recommendations as well as on-the-ground understandings of fiscal challenges and future growth. These kinds of collaborations are vital to scholarship, but more important to build bridges between regional experts, institutional linkages, and to young people experiencing the day to day, the dramatic changes in energy security and economic governance of Iraq.

— Karen Young

Dr. Karen E. Young is a political economist focusing on the Gulf, the broader MENA region, and the intersection of energy, finance, and security. She is a Senior Research Scholar at the Columbia University Center on Global Energy Policy. She was a Senior Fellow and Founding Director of the Program on Economics and Energy at MEI and remains the chair of the program's Advisory Council.

KURDISTAN GAS AND DIVERSIFICATION

ROBIN M. MILLS

On the journey from Dubai to Erbil by plane and Dohuk by road for the MEPS Forum, the energy, environmental, and economic challenges of Iraq and the Kurdistan region are written in the landscape. Gas flares around Basra, Kirkuk, and Dohuk mark the site of major oil fields. Harnessing that natural gas productively is the first step to a cleaner and more diversified national economy.

The participants at the MEPS Forum discussion on energy included students from the American University of Kurdistan in Dohuk and elsewhere in the Kurdistan Region of Iraq (KRI), and from the rest of the country. They were keenly interested in the role of oil and gas in their national economy, the implications for the future of Iraq, and the “resource curse.”

Without revisiting the extensive literature on the “resource curse,” its reality, and manifestations, it is undeniable that Iraq displays several of the classic signs associated with high dependence on petroleum exports. Oil makes up [99% of Iraq’s exports](#). The government sector is heavily overstaffed, often in patronage-based and unproductive roles; corruption, rent-seeking, and the ethno-sectarian and partisan allocation of political and civil service positions are endemic. A truly independent private sector barely exists.

Non-oil activities, such as agriculture and industry, have been neglected. At the same time, sectors that in some petro-states are well-funded and effective, such as electricity, public education, and health care, are also in very poor shape. Kurdistan Prime Minister Masrour Barzani, interviewed at the MEPS Forum by Karen Young, senior research scholar at Columbia’s Center on Global Energy Policy, recognized these problems: “Iraq and Kurdistan Region shouldn’t only rely on oil and gas.” He pointed to diversification in agriculture, tourism, and other sectors. The KRI already attracts a reasonable level of tourism from the rest of Iraq and from Iran.

Iraq faces other problems that are not caused by its petroleum dependence, but which its ineffective government struggles to solve: a legacy of violent conflict and insurgency, the lack of

a state monopoly over paramilitary groups, interference and intervention by its neighbors (mostly Iran, but also Turkey), water shortages, and land degradation.

The KRI is in many ways better off than the rest of Iraq, with better infrastructure and greater safety and security. Nevertheless, it displays many of these symptoms in microcosm. It suffers from several other problems beyond those of Iraq as a whole. It does not have its own currency and cannot issue sovereign debt. As a landlocked entity, it is dependent on problematic neighbors — war-torn Syria, sanctioned Iran, federal Iraq, and Turkey — for imports and exports.

The legality of its own hydrocarbon sector and exports have been a topic of debate and dispute ever since the ratification of the 2005 constitution. In February 2022, the federal Supreme Court, in a ruling widely seen as politicized, [declared](#) that the Kurdistan Regional Government’s (KRG) own oil and gas law of 2007 was unconstitutional. Apart from the KRG’s own oil sales — which are under episodic legal pressure from Baghdad — it relies on transfers from the federal budget, which are often late or entirely absent, unpredictable in size, and subject to political wrangling. It has 1.3 million public servants from a population of about 6.3 million. It has accumulated debts variously quoted at \$17-31 billion, to public employees in unpaid salaries, oil traders and producers, electricity companies, Iraqi banks, and others.

Mr. Barzani remarked that the KRG was assembling a team to go to Baghdad and “settle all outstanding issues” with the new federal government formed in October. He complained of “illegal actions” taken by the government, and said they should work together to write a new national hydrocarbon law, which has been a perennial sore point since a draft in May 2007, followed by two further drafts in 2011, none of which were ever approved.

The KRI is also damaged by an increasingly deep and bitter division between the two leading parties — the Kurdistan Democratic Party (KDP) based in Erbil in the north, to which



Photo above: Workers at the Kawergosk refinery, situated a few kilometers away from Erbil, capital of the Kurdistan Region of Iraq, in 2015.

Photo by Reza/Getty Images.

Mr. Barzani belongs and which dominates the government and the oil sector, and the Patriotic Union of Kurdistan (PUK) in Sulaymaniyah in the south of the KRI. Most of the KRI's major gas fields are located in areas controlled by the PUK. Although the two parties have exercised a fairly constructive duopoly over the KRG since 2003, and worked together to promote Kurdish interests in the federal authorities in Baghdad, their relationship has deteriorated as the PUK has gradually declined in power and influence. Regional elections due in October 2022 have been delayed for a year, and activists and observers complain of a worsening situation for democracy and independent media.

The issue of diversification is difficult but urgent, given increasingly tight global climate policies, the advances of non-fossil technologies, and the limited lifespan of the KRI's oil resources.

Iraq as a whole has a ratio of oil reserves to production of almost 100 years, and could make substantial new finds with additional exploration. It will be one of the world's leading oil producers out to mid-century and beyond, when the world is supposed to be nearing net-zero greenhouse gas emissions to meet its climate goals.

But within this, the KRI produces about 400,000-450,000 barrels per day of oil, that is, about a tenth of the national total. Its fields are smaller and more geologically challenging than those in southern Iraq and there have been almost no sizeable discoveries in recent years. It is therefore faced much more imminently with the challenge of diversifying its economy, exports, and government budget revenues.

Using natural gas productively is an essential first step in that diversification. It might sound paradoxical, given that many

hydrocarbon-dependent countries group the fossil fuels together, and seek to move into renewables, hydrogen, and other new energy systems. But Iraq is at the stage its Gulf neighbors were in the 1970s; it has to walk before it can run.

Iraq produces about 3 billion cubic feet per day of associated gas — the gas dissolved in oil that bubbles out when the oil comes to surface. Only about half of this is captured and used productively, mostly for electricity generation. The rest is burnt off, damaging the health of neighboring communities with air pollution, and releasing the greenhouse gases carbon dioxide and methane. Yet at the same time, Iraq suffers from chronic power deficits and shortages of gas that oblige it to burn oil for power — cutting its export earnings — and to buy expensive and unreliable gas from neighboring Iran. Peak power demand in “federal” (non-KRI) Iraq is estimated at more than 34 gigawatts (GW), but the country struggles to generate more than 20 GW, and much of this disappears in an antiquated grid.

Only the KRI produces significant quantities of non-associated gas — that is, gas extracted independently of oil. The Khor Mor field in the south of the region provides gas to power plants and is currently being expanded. Several other major fields have not been developed yet. The KRI does not suffer as badly from flaring as federal Iraq, but several oil fields are still not connected to processing facilities and pipelines. In January 2022, power equipment company Aggreko announced completion of a project to use flared gas from the Sarqala field in southern Kurdistan to generate 165 megawatts (MW) of electricity.

The KRI’s priority is to ensure reliable power generation and then the supply of gas to industry. A pipeline is under construction from Erbil to Dohuk that would bring Khor Mor gas to the under-utilized power plant there, which relies on expensive diesel. However, a number of rocket attacks on Khor Mor, probably intended by Iran-linked groups to pressure the Kurds during the period of government formation in Baghdad, and the KDP-PUK dispute, have held up the project.

The development of the region’s gas sector has also suffered from long delays in approving field developments, apparently arbitrary regulatory decisions from the Ministry of Natural Resources, lengthy waits for payment to international oil companies, the lack of infrastructure to gather associated gas, and legal disputes with companies such as the Pearl

Petroleum consortium (which operates Khor Mor) and Genel Energy (which held the contracts for the large Miran and Bina Bawi gas fields). These fields contain “sour” gas, that is, gas with a high content of toxic, corrosive hydrogen sulfide. The KRG would need to secure a large, technically-skilled partner to play its intended role of processing and selling such gas resources. And at the moment, the region has no systematic gas market, from which companies can buy and sell with transparent prices and conditions.

After satisfying domestic demand, the development of Khor Mor and other fields could give the KRI a gas surplus by the mid to late 2020s. This makes it one of the few regions adjacent to Europe that could supply significant additional quantities of gas by pipeline, helping to replace Russian supplies (Algeria, Libya, the Eastern Mediterranean, and Azerbaijan are the others, but all face various constraints when it comes to politics or resource availability).

Gas from the KRI could go to federal Iraq, helping ease its chronic gas and power deficit and reliance on Iran; it could fuel the region’s under-utilized power plants and so facilitate electricity sales to federal Iraq; or it could go to Turkey and, via Turkey’s pipeline network, to south-eastern Europe and Italy. Once the Khor Mor-Erbil-Dohuk connection is complete, it is only about another 70 kilometers to the Turkish border, and a short distance beyond to the Turkish gas grid. Exports of about 5 billion cubic meters (bcm) per year by 2030, and ultimately about 15 bcm annually, are feasible. This would be a helpful if not huge contribution compared to the 155 bcm [supplied by Russia](#) to Europe last year.

At recent crude prices, the KRG earns about \$10-12 billion per year from oil exports. It might bring in about \$2-4 billion annually from large-scale gas exports, after the cost of pipeline tariffs to get to markets in Turkey and beyond — a useful complement to oil, but not transformational.

The gas would be important beyond the immediate financial impact, though. It would create a long-lived revenue stream to help replace an eventual — and perhaps imminent — decline in oil output. The domestic use of gas would build the local economy, offering opportunities in areas such as oil refining, cement, ceramics, glass, food processing, and other local industries. More reliable and cleaner electricity would save government and private funds spent on diesel, and improve

business and living conditions. Electricity provision is not just a question of gas: The KRI has potential to rehabilitate its hydroelectric dams, and to install more solar power. And becoming a significant gas supplier to Turkey and Europe would heighten the KRI's geopolitical importance.

Given the legal battles, and an ongoing arbitration case between Baghdad and Turkey over use of the Iraq-Turkey oil pipeline, gas exports would almost certainly require both Erbil-Baghdad and Erbil-Sulaymaniyah accords. Those are very thorny political disputes. Outside mediation by the U.S. and EU is likely essential. Both these governments have internal policy barriers to funding fossil fuel projects, but they should recognize the unique circumstances and strategic importance of the Iraqi-Kurdish gas and power sector.

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THE GEOPOLITICS OF ENERGY TRANSITION IN MENA: MITIGATING RISKS, EXPLORING NEW OPPORTUNITIES

YOUNES ABOUYOUB

Energy remains at the heart of the geopolitical chessboard. Despite recent advances in the development of renewable energy sources, and the advent of electric vehicles, their share in the energy mix remains limited as oil still meets [most of the transportation sector's needs](#). The development of renewable energies — wind, solar, and geothermal — is not yet able to drastically change this reality. Fossil fuels still predominate in the global energy mix. Oil accounts for [34% of global energy consumption](#), gas for 23%, and coal for 28%. The Middle East, including the Gulf region, contains almost half of the oil that is easily accessible. Russia, the Middle East, and now the United States are the main sources of gas. Until after the second half of the 20th century, the world economy benefited from relatively cheap oil, and this critical commodity shaped the era's geopolitics. In the aftermath of World War II, oil became the main source of energy at the global level. Developed economies realized their strong dependence on this energy source, the main proven reserves of which are in the countries of the Global South and more particularly in the Middle East. This reality has had a strong impact on international relations and the geopolitics of the region. Oil has become a source of wealth and prosperity, but also conflict and misery.

Energy policies underwent a systemic shock beginning in 1973. These policies had been based on the logic of the quest for energy since World War I, and over time this became a major component of diplomacy and international relations, with oil companies playing a substantial role. The first oil crisis, by destabilizing the main world market, constituted a real break, leading to a rethinking of pricing methods. A change in market logic took place, with a transition from a stable price relationship to a volatile one that is increasingly becoming prevalent on the various markets, concomitant with the rise in power of international finance. There are at least three main actors in the oil industry that have unequal

bargaining power: oil-producing countries, consumer countries, and transnational oil companies. More often than not, the interests of these three actors do not converge. Conflicts of interest are often first played out at the economic and financial level, with ideological considerations a factor as well (e.g., liberalization, privatization, state control, and deregulation). These conflictual interests lead at times to geopolitical confrontations.

At the national level, for the oil-producing countries of the Middle East and North Africa region, hydrocarbon-based economies and oil rents have long been seen as a blessing. However, the role that oil rent has played in most of the region's economic systems has been detrimental to the politics of the region. Because of oil rent, economic dysfunction and authoritarian modes of governance have prevailed. It fundamentally altered the relationship between the political and economic spheres, and undermined prospects for democratic social contracts and rule-of-law-based governance systems. Rentierism, insofar as it has provided significant budgetary revenues to the state apparatus, blocked political and economic reforms and, most of all, the establishment of a real fiscal system capable of bringing about a compromise with various social groups. What is more, the rentier mode of governance has been able to co-opt elites and redistribute part of the rent in order to silence social and political demands. This contributed to the development of political clientelism as political logic takes precedence over sound economic policies.

This situation makes it difficult to put in place a real economic policy based on a revision of the tax and banking system. The strong dependence of the region's oil-producing countries on their exports regularly leads to macroeconomic instability due to fluctuations in the international oil market. The development of a real national entrepreneurial class is difficult because the



Photo above: The first cargo of LNG delivered by Qatar Petroleum for China's Sinopec is unloaded at Tianjin LNG Receiving Terminal on Jan. 15, 2022 in Tianjin, China. Photo by VCG/VCG via Getty Images.

economy is so protected and rent-seeking behaviors are so prevalent. In parallel with the development of unsustainable consumption patterns, this rentier system is incapable of creating employment opportunities in line with demographic growth. Moving away from rentier forms of governance implies effective economic diversification, which needs to address the political-economic realities of the governing social contract, in which governments rely on specific economic channels to transfer hydrocarbon wealth to their citizens. These channels often stand in the way of necessary reforms. A process of economic diversification has serious implications in terms of the power structure for ruling elites, who realize this reality only too well. Structural changes demanded by economic diversification would undoubtedly empower business constituencies that could be tempted to challenge the ruling elite. Establishing a new social contract will not be easy even as oil revenues decline.

At the global level, in addition to the economic and socio-political aspects internal to the exporting countries, with oil as the foundation of political and economic structures of several MENA polities, hydrocarbon resources are also a factor of power and influence at the international level. The region, as the [largest net crude exporter in the world](#), home to half of global proven oil reserves and more than a third of gas reserves, has relied heavily on energy in shaping its geopolitical status. The clearest example of this is the enduring political and security alliance between Saudi Arabia and the United States since the 1930s around the export of its oil. This strategic alliance, known as the "Quincy Pact," became an essential pillar of American foreign policy in the following decades. It has also allowed oil-producing countries to exert relative political pressure for political gains at times. Yet, the gradual decrease in imports since the beginning of the 2010s and [the prospect of the United States becoming a](#)

[net oil exporter well before 2030](#), thanks to the exploitation of unconventional resources, are sources of economic and political concern for the Gulf countries, particularly Saudi Arabia, which may fear a weakening of their alliance with Washington. Qatar is another example: Its liquefaction and regasification capacity has provided the country with a substantial portfolio of international oil company partners and therefore strong political leverage in terms of foreign policy. This has allowed Doha to pursue ambitious foreign policy goals regionally — and at times globally — while shielding itself from major geopolitical shocks, the most recent of which was the Gulf blockade.

The gradual U.S. strategic disengagement from the MENA region, as well as its confrontation with states such as the Russian Federation, Iran, and Venezuela, among others, allowed for the deepening of relations between Moscow and a number of oil and gas-producing MENA countries, thus introducing both a diversification and expansion of energy diplomacy in the region. While several MENA states are traditionally aligned with American positions, they are not ready to alienate Russia. The UAE's [abstention](#) from the U.N. Security Council vote condemning Russia's invasion of Ukraine in February 2022 demonstrates a certain desire for independence, despite its later support for the (legally non-binding) March 2, 2022 General Assembly resolution entitled "Aggression against Ukraine." With the exception of Kuwait, victim of an invasion by Iraq in 1990, which distinguished itself by [explicitly denouncing](#) Moscow, a majority of MENA countries have chosen to be more nuanced in their respective positions. After 2011, with the upheavals in the Middle East and their tense relations with the Obama administration, as well as the sudden withdrawal by the United States from Afghanistan in 2021, certain MENA countries seem to follow geopolitical developments closely and wish to diversify their diplomatic relations. This is all the more important for countries like Saudi Arabia and the UAE, which are mired in the conflict in Yemen. Finally, with [oil demand reaching its peak in Europe in the middle of the 2000s](#), MENA crude exporters accelerated their shift towards Asian markets, charting new paths with immense geopolitical implications.

Against this backdrop, it is widely assumed that MENA producing countries will be negatively affected by the energy transition, and hence their energy-based strategic geopolitical

clout would fade away. In fact, as the energy transitions are mostly dictated by concerns over climate change, it is expected that oil demand will decline, and the pattern will shift across geographies, with strategic geopolitical implications. Alongside a decline in fuel oil, demand for liquefied gas and ethane is expected to grow. The new energy mix will also include other types of renewable energies, as all previous energy transitions have been more of a stratification, with the addition of new sources of energy, rather than an all-out shift from old sources to new ones. The global energy transition could help reduce the political benefits that some countries derive from the export of their hydrocarbons. As with coal from the 1960s onwards, oil will continue to be consumed but its economic and geopolitical value will eventually decrease progressively.

While several energy-related factors may contribute to the erosion of the region's geopolitical status, the strategic loss remains relative and should be construed with nuance. All regions of the world will be impacted one way or another by the energy transition process. For now, in the midst of the ongoing Ukraine war, with sanctions imposed on the Russian hydrocarbon industry, the MENA region's fossil-fuel producers have become valuable partners. Furthermore, the geostrategic role of gas in the MENA region is set to grow, as this valuable commodity will become an increasingly important part of the MENA energy sector. Iraq, a major flaring country, is working on developing fields in its western region and Diyala Province, while Saudi Arabia is increasingly betting on unconventional gas development in Jafurah and South Ghawar. As for Qatar, it is probably the best example of growing — not diminishing — strategic geopolitical power, with its increasing share in the energy mix, the decarbonization of the gas value chain, and the strengthening role played by gas in the transition phase.

Thanks to unconventional hydrocarbons, U.S. energy production has increased over the past two decades, allowing the country to practically achieve energy self-sufficiency. This changes the geopolitical balance and the close relationship that the United States, given its long-standing dependence on energy imports, had developed with MENA countries since World War II. The United States is now free of this dependence and has a great deal of latitude in its foreign policy. China, by contrast, is now the [world's largest net](#)

[importer of oil](#). With its reserves in the Middle East, China is developing in-depth relations by investing in oil and gas exploration and production projects in Iran, Iraq, the UAE, and Qatar. China is therefore set to play a growing role in geopolitical issues in the region. The turn of MENA energy-exporting countries towards the Asian market, with the growing economic and political power of states like China and India, has created new opportunities for exporters to impose themselves as major players as clean energy geopolitics grow in importance, thus mitigating as much as possible the potential loss in terms of geopolitical influence induced by the energy transition.

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IRAQ NEEDS RENEWABLES, BUT THEY WON'T SOLVE ITS POWER PROBLEMS WITHOUT BROADER REFORMS

JESSICA OBEID

Two decades on from the 2003 U.S. invasion of Iraq, efforts to improve the country's electricity infrastructure have lagged. Despite massive hydrocarbon reserves, including the [world's fifth-largest proved crude oil](#) and [12th-largest proved natural gas reserves](#), Iraq struggles with chronic electricity shortages. Citizens do not have access to reliable electricity service and have to rely on expensive neighborhood diesel generators to cover some of the gap. There is a clear need to explore cleaner alternatives, such as renewable energy systems, yet the deployment and integration of these systems would be hindered by the same structural woes that have crippled the electricity sector, and which go far beyond generation issues.

Overview of the Power Sector

Iraq is one of OPEC's largest crude oil producers, second only to Saudi Arabia, with [17% of Middle Eastern oil proven reserves](#) and [8% of global reserves](#). As a major producer, Iraq's electricity sector is almost entirely dependent on fossil fuels, which [account for more than 80% of power generation](#). Despite its vast energy resources, the performance of the country's power sector is sub-optimal.

Iraq's power sector suffers from a double whammy: unsustainable growth in power demand, coupled with under-investment and a lack of reforms in generation, transmission, and distribution. The result is a growing mismatch between power supply and demand.

Although there has been significant progress in the expansion of installed power generation capacity, the additions have not matched the announced plans and the growing demand and losses. Installed power generation capacity is approximately 30 GW, while the available capacity is only 23.4 GW. The peak demand, however, is estimated to have [reached 34.18 GW](#) in summer 2022. This figure may be an

underestimate considering that a significant share of the supply gap is covered by neighborhood diesel generators, an informal economy which goes largely unaccounted for. These generators are prevalent across Iraq — so much so that the country ranks [fifth highest globally](#) in terms of the number of diesel generators per capita.

On average, 1 to 2 GW of power generation has been added per year, amounting to an annual growth rate of 5%; 1.4 GW was added between 2021 and 2022. A massive [13 GW](#) was added between 2012 and 2018. But growth in power demand has outstripped the 5% annual growth in installed capacity, [averaging 8%](#) compared to a global average of 5%. The unsustainable growth in power demand is largely linked to wasteful consumption driven by high subsidies. The residential and commercial sectors are the largest power consumers, in line with regional trends, with low implementation of power conservation or efficiency measures.

The shortage is further aggravated by transmission and distribution losses, deemed elevated by international standards. The electricity infrastructure is [weak](#) owing to poor maintenance due to conflicts and corruption. The grid losses alone amounted to [8 GW](#) in 2015. Additionally, the electricity tariff is substantially below the recovery cost. Iraq [records the highest rates](#) of subsidies and uncollected and unbilled electricity in the Middle East. The total losses, including grid losses, non-billing, and non-collection, are among the highest in the region and reportedly range between 40% and 50%, [similar to Lebanon](#). Meanwhile, the losses in Saudi Arabia are [less than 7%](#) and the global average is [8%](#). A large share of these losses is untraceable, under-reported, and falls within the social contract. While there are several measures to reduce these losses, government officials may choose to ignore them due to concerns over losing political and electoral support.



Photo above: Rows of solar panels at a solar farm in Konya, Turkey on Sept. 13, 2018. [Photo by Chris McGrath/Getty Images.](#)

Power generation is also non-resilient and is aggravated by the impacts of climate change. Iraq is considered [the fifth-most-vulnerable country](#) to the impacts of climate change globally, including soaring temperatures, drought, floods, and sandstorms. The soaring temperatures increase electricity demand while reducing supply due to lower efficiencies. Middle Eastern countries have been facing skyrocketing peak demand due to high temperatures during the hottest summer months. Egypt and Kuwait recorded all-time highs in peak electricity demand in July 2021, as temperatures soared to 53°C in some cities. In Iran, [electricity crunches](#) were aggravated by drought, which affected available hydropower plants. The opposite holds true when temperatures are lower than anticipated. Iraq [recorded an improvement](#) in available power generation capacity from 16.25 to 18.6 GW in summer 2020 because of lower temperatures.

Renewable Energy Integration

Considering the need to diversify the energy sector, and the growing shortages in power supply and reliance on generators, the need to explore alternative resources, particularly renewable energy, may seem evident. In practice, however, the issues that cripple the overall power sector would hinder the integration of renewable energy into the system. Large-scale projects would be hampered by the high transmission and distribution losses, weak business investment climate, and vested interests, whereas distributed renewable energy would have to overcome the absence of regulation, customer protection, and incentives.

Iraq boasts a strong potential renewable energy base: It has significant solar irradiance levels, economically-viable wind

speeds in some areas, and hot springs that could present an opportunity for the geothermal development (pending technical assessments). Power generation from renewable energy sources would increase Iraq's energy security and reduce the power sector's greenhouse gas emissions, which [account for almost half](#) of Iraq's total emissions, due to its high dependence on fossil-fuel-fired power plants and the heavy deployment of polluting diesel generators.

However, integrating variable renewable energy systems such as solar photovoltaics and wind turbines creates a set of challenges to grid stability. Solar and wind energy sources are intermittent and do not generate fully-dispatchable electricity as power generation is available when weather conditions allow — when the sun is shining and wind is blowing — and not necessarily when demand requires. Mitigating this involves flexible power systems, expanded and modernized grid capacity, and energy storage systems, among other measures. Significant transmission capacity is also required to carry the generated electricity over large distances from the renewable energy farms to the load centers.

As previously discussed, Iraq's grid is weak and suffers from under-investments and losses, thus restricting this integration and leading to a costly curtailment of a significant share of renewable power generation. Without grid-scale storage, the renewable energy produced would only be injected into the grid when the latter is available, leading to further curtailment. Thus, the government may find itself paying for electricity that is not consumed. Globally, renewable energy projects have been increasingly developed through independent power producers by signing long-term power purchase agreements. These agreements often include take-or-pay clauses forcing the off-taker — the government in this case — to pay for the generated power, regardless of whether it has been dispatched.

The need for grid reinforcements, flexible power systems, and storage will grow in direct proportion to the share of renewable energy in the power mix. But these require hefty capital investments, and therefore, a favorable business investment climate to attract developers and optimal financing costs. In its current state, the [Iraqi business climate](#) is only attractive for companies with a high risk appetite, due to the weak political system, heightened concerns over security and corruption, and the slow pace of economic reforms. The subsidies and wide gap between tariffs and recovery costs further hinder

investments, as these investments would not be recovered but would add to the existing strains on the state budget in the single-buyer market.

The renewable energy industry's great capital investment requirements entail heightened risks of corruption and lower value for money. This is especially true where institutions are weak and accountability mechanisms are lagging, such as in Iraq. Similarly to the oil industry, the long tenure and complexity of contracts in the renewable energy industry can lead to rent-seeking behavior and can yield quasi-monopolies where contracts are awarded to one dominant developer for political and vested interests.

Apart from large-scale renewable energy, smaller, distributed systems emerge as institutions weaken and power outages increase in frequency and duration. Consumers resort to alternatives to the state's weak electricity service provision in the form of expensive generators and small-scale renewable energy, particularly solar photovoltaic rooftop systems. Globally, drivers for distributed generation have included laws and regulations and policy and financial incentives; by contrast, the driver in Iraq is institutional and regulatory failure. As a result of this failure, the distributed renewable energy market may develop without solid regulation, standardization, or consumer awareness or protection rights.

Renewable energy system components are highly complex and include various types and quality, especially for inverters and batteries, which the consumer may not necessarily be well informed about. In light of this and as the determinant sale factor for most consumers would be cost and purchasing power, it is expected that the market will be flooded with low quality components and installations. Consequently, many consumers may end up paying a substantial cost in terms of safety and operation and maintenance for these systems. Moreover, various models of distributed power generation, including power wheeling — whereby electric power is transported from a generation site to an electrical load through the grid — would be hindered by the weak and unreliable power grid.

Recommendations

While renewable energy systems are vital for energy security and diversification in Iraq, broader power sector reforms are

critical for ensuring the viability, sustainability, and optimization of these systems. Investment climate reforms are also required to attract the necessary financing for these capital-intensive systems and to ensure low cost of financing. Ten additional policy recommendations are listed below:

1. Develop a renewable energy expansion plan and implement a transmission master plan, focusing on refurbishing and upgrading substations to account for rates of demand growth per area and major new load additions, including renewable energy farms.
2. De-risk renewable energy investments through measures addressing the power market and counterparty/off-taker risks, procurement risks such as transparent auctions risks, and political uncertainty risks.
3. Auction renewable energy, including solar plus storage projects, with clear pre-qualification, selection, and award criteria.
4. Promote energy efficiency measures, especially for buildings.
5. Develop an awareness and communication plan for small-scale renewable energy.
6. Adopt a renewable energy law and establish a dedicated institution.
7. Establish a one-stop shop for licensing requirements for large-scale renewable energy, including production licenses and environmental permitting.
8. Restructure the electricity tariff to reduce subsidies and adopt a time-of-use tariff, incentivizing consumption during daylight hours when the sun is shining.
9. Implement private distribution service providers with billing and collection mandates, with authority to cut non-paying consumers.
10. Implement a green investment facility for residential and commercial consumers, providing long-term financing with low interest rates for small-scale renewable energy plus storage.

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THE GCC AND THE ROAD TO NET ZERO

AISHA AL-SARIHI

According to [the latest report](#) from the United Nations' Intergovernmental Panel on Climate Change (IPCC), the world has already warmed by around 1.1°C compared to pre-industrial times and will likely approach 1.5°C within the next two decades. Every corner of our planet has already experienced the impacts of climate change, from extreme heatwaves and floods to devastating droughts. According to the IPCC report, to avoid the catastrophic impacts of climate change, global greenhouse gas (GHG) emissions will have to be cut by half by 2030 — relative to 2010 levels — and reach net zero around mid-century. To date, [over 130 countries](#), covering 83% of global emissions, have acknowledged this urgency by committing to achieving such net-zero targets. These include five Gulf Arab states: Bahrain, Kuwait, Oman, Saudi Arabia, and the United Arab Emirates.

The gap between where the world stands today and where it needs to be in 2050 is substantial, however. For instance, in a net-zero emissions pathway, the [share of renewables](#) in total electricity generation globally should increase from the current 29% to over 60% in 2030 and to nearly 90% in 2050. Similarly, clean hydrogen production should increase six times from the current levels of 0.87 million tons (Mt) to 530 Mt in 2050. Achieving these targets will require incremental increases in clean energy investments, [approximately \\$2-4 trillion per annum](#) between 2022 and 2030, roughly triple today's levels of \$755 billion. Closing this gap will require collective efforts from both the developed and developing worlds, but the speed with which countries can close this gap will depend on many factors, including political will; availability of natural resources; institutional, financial, and technical capabilities; and readiness.

The Gulf Arab states, while major oil and gas producers, can play a significant role in supporting global efforts to close the gap and achieve net-zero goals. That is because the Gulf Arab states are not only endowed with great potential for renewable energy resources as well as some of the world's lowest carbon content fuels, but also with, to varying extents, sizable financial resources. Yet, to unlock such huge potential, the Gulf Arab

states will need to systematically identify and address the various challenges in their path to net zero.

The GCC's Net-Zero Technological Mix & Where Countries Stand Today

Different organizations such as BP and the International Energy Agency (IEA) have published projections of energy supply and demand in a net-zero scenario, consistent with the objectives of the Paris Agreement to keep global warming within 1.5°C. BP's [2020 net-zero scenario](#) (suggesting a 15% decline in emissions by 2050 consistent with a 1°C rise in temperatures) and the IEA's [2021 net-zero emissions \(NZE\) scenario](#) (suggesting around a 40% decline in emissions in 2030 and to net zero in 2050 for global energy-related and industrial process emissions) suggest a dramatic increase in the share of new and clean energy — including hydrogen, renewables, and nuclear — and a significant decline in that of hydrocarbons — coal, natural gas, and oil — in the future energy supply. Yet, in both scenarios, hydrocarbons will continue to play a role in meeting energy needs in a net-zero future, albeit a declining one. BP's net-zero scenario suggests that the share of hydrocarbons will be between 20% and 70% by 2050. The IEA's NZE posits that the share of fossil fuel will be just over 20% in 2050, falling from 72 million barrels per day (mbpd) in 2030 and to 24 mbpd in 2050.

Available reserves-to-production figures suggest that Gulf Arab states will continue to have access to oil and gas reserves for the next 20-100 years (Figure 1). While the future energy outlooks suggest that hydrocarbons will continue to play a role in a net-zero future, they also suggest that the emissions generated by these fuels should be minimized using technologies such as carbon capture and storage (CCS) or by converting hydrocarbons to hydrogen or ammonia, which are free of global warming emissions.

The Gulf states have made strides in rolling out low-carbon energy investments and initiatives. Yet, the gap between the

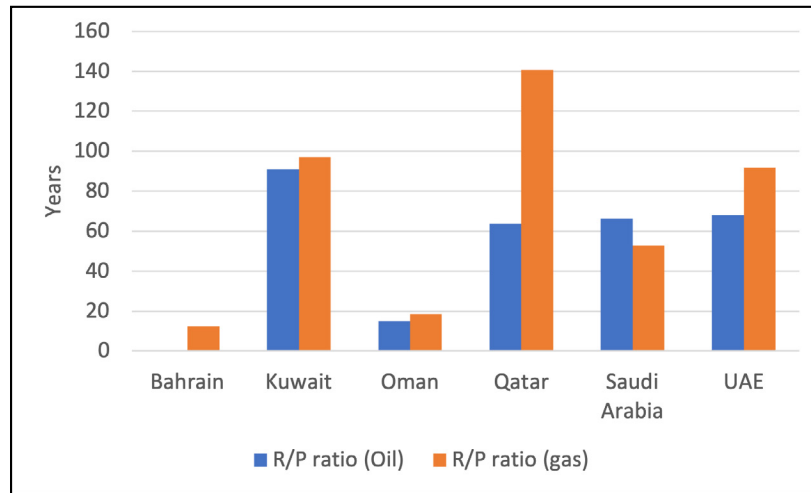


Figure 1: Gulf reserves-to-production ratios for oil and gas

current scale of these developments and where the countries want to be in a net-zero future is relatively substantial. For instance, at present, the Gulf Cooperation Council (GCC) is home to three major CCS facilities – in Saudi Arabia, Qatar, and the UAE – which together account for around 10% of global CO₂ captured each year, at 3.7 million tons per annum (mtpa). By 2030, Qatar targets 7 mtpa captured and the UAE 5 mtpa, while by 2035 Saudi Arabia intends to reach 44 mtpa. Similarly, Saudi Arabia aims to produce 650 tons per day (around 0.5 mtpa) of hydrogen and 1.2 mtpa of ammonia by 2025 for export; Oman and the UAE’s Abu Dhabi National Oil Company (ADNOC) target 1 mtpa of green hydrogen output by 2030; and Qatar aims to produce 1.2 mtpa of blue ammonia by 2026. Assuming that these projects will run on renewable energy, the current scale of renewable energy generation, which is less than 1 gigawatt (GW) – around 4,000 megawatts – is far below what is required to meet the announced targets. It is estimated that producing 1 million tons of hydrogen would require around 6-9 GW of electrolysis capacity, operating with an efficiency of 75% for 5,000 hours per year, and around 10-16 GW of renewable energy capacity. This means that renewable energy capacity in the GCC needs to increase to almost 40-60 GW – a nearly 60-fold rise – by 2030 to meet the region’s hydrogen targets.

Are GCC Governance, Regulations & Policies on Track to Reach Net Zero?

The Gulf Arab states have already taken strides and developed institutional architecture conducive to mitigating the effects of climate change. Before the announcement of net-zero

commitments, each GCC state launched initiatives, regulations, and programs intended to mitigate different aspects of climate change impacts (Table 1).

- **Bahrain:** In 2007, Bahrain established a Joint National Committee on Climate Change, chaired by the Supreme Council for Environment, to oversee climate issues, including mitigation and adaptation measures.
- **Kuwait:** Kuwait established a [National Committee on Ozone and Climate Change](#), chaired by the Environment Public Authority, with representatives from the General Secretariat of the Supreme Council for Planning and Development, Ministry of Oil, Kuwait Petroleum Corporation, Ministry of Electricity and Water, Ministry of Foreign Affairs, and General Directorate of Civil Aviation. It also issued a [National Adaptation Plan 2019-2030](#) in 2019 and aims to reduce its emissions of the equivalent of 7.4% of its total emissions in 2035 on a voluntary basis.
- **Oman:** Overseen by the Environment Authority (previously the Ministry of Environment and Climate Affairs), Oman launched a national strategy in 2019 to mitigate and adapt to climate change and announced a national hydrogen economy strategy in 2020. In November 2022, ahead of the United Nations Climate Change Conference (27th Conference of the Parties, COP27) the Omani government announced its strategy to reach carbon neutrality by 2050.
- **Qatar:** In 2021, Qatar’s Council of Ministers approved the [National Climate Change Plan](#) to inform climate-conscious

Country	Net-zero target	Renewable Energy targets	Emissions reduction target	National Climate Strategy	Other climate initiatives/governance entities
Bahrain	Yes, by 2060	5% by 2025 10% by 2035	N/A	No	<ul style="list-style-type: none"> Joint National Committee on Climate Change (2007)
Kuwait	Yes, by 2060	15% by 2030	N/A	No	<ul style="list-style-type: none"> Kuwait National Committee on Climate Change
Oman	Yes, by 2050	10% by 2025 30% by 2030	Reduce greenhouse gas (GHG) emissions by 7% relative to a business-as-usual (BAU) scenario by 2030	<ul style="list-style-type: none"> National Strategy for Adaptation and Mitigation to Climate Change, 2020-2040 National Carbon Neutral Strategy 	<ul style="list-style-type: none"> Regulations for the management of climate affairs (2016) National Climate Strategy Oman Sustainability Centre
Qatar	No	20% by 2030	Reduce 25% of GHG emissions by the year 2030	Yes	<ul style="list-style-type: none"> National Climate Change Committee (chaired by the Ministry of Environment)
Saudi Arabia	Yes, by 2060	50% by 2030	Reduce, avoid and remove GHG emissions by 278 million tons of carbon dioxide equivalent (MTCO2e) annually by 2030	Yes (National Circular Carbon Economy Program)	<ul style="list-style-type: none"> National Committee for the Clean Development Mechanism/Designated National Authority(2009) Saudi Green Building Forum (2010) Saudi Energy Efficiency Center (2012) PIF Regional Voluntary Carbon Market Company
UAE	Yes, by 2050	Clean energy 50% (44% RE, 6% Nuclear) by 2050	31% reduction compared to the business-as-usual scenario for the year 2030	Yes (2017: Green Growth Strategy/UAE Green Agenda 2015-2030)	<ul style="list-style-type: none"> Dubai Integrated Energy Strategy 2030 Abu Dhabi Carbon trading exchange and carbon clearing

Table 1: Climate-related strategies, policies, targets and initiatives in the six Gulf Arab states

decision-making across sectors. In October 2021, Qatar formed an Environment and Climate Change Ministry to address climate-related issues.

- Saudi Arabia:** In 2020, as part of its G20 Presidency, Saudi Arabia, led by the Ministry of Energy, put forward the concept of the Circular Carbon Economy (CCE) and placed it at the center of its climate mitigation plan. The CCE aims to achieve a pathway towards net-zero emissions by pursuing the “four Rs”: Reducing emissions in the first place (through energy efficiency, renewables, and nuclear); reusing carbon as an input to create feedstocks and fuels (including through mobile carbon capture technology for transportation and CO₂-enhanced oil recovery); recycling carbon through the natural carbon cycle with bioenergy or natural carbon capture processes, such as forests and oceans, and the use of hydrogen-based synthetic fuels to recycle CO₂; and, removing excess carbon by storing it through carbon capture utilization and storage (CCUS).
- The UAE:** The UAE was the first Gulf state to announce a national climate strategy in 2017 and was also the first to link its climate strategy with its economic development plans, for which the UAE Green Agenda 2015-2030 was established as an overarching implementation framework. The UAE Council on Climate Change and Environment, established in 2016, is the committee responsible for overseeing the implementation of the Green Agenda.

To date, however, only Oman and the UAE have put forward an economy-wide strategy paving the way to achieving their net-zero targets. These strategies set out objectives for each economic sector to achieve decarbonization goals by mid-century. These, however, lack detailed information on how – financially, technically, and institutionally – the decarbonization of each sector can be achieved. Given that net-zero objectives have been only recently announced, other Gulf states are expected to follow suit and roll out dedicated and detailed strategies to achieve their net-zero targets. These strategies need to be aligned with economic development plans and state budgets so that economic development and net-zero goals are not treated as separate agendas. Such alignment will also help to mitigate the possible unintended socio-economic consequences associated with implementing different climate policies, such as carbon pricing.

How Will the GCC Finance the Net-Zero Transition?

At present, most climate-related projects are financed on an ad hoc basis. Earlier this year, for example, Saudi Arabia said it would invest [up to 1 trillion riyals \(\\$266.40 billion\)](#) to generate “cleaner energy.” Back in 2015, the UAE announced a [\\$163 billion financial commitment](#) to achieve its 44% clean energy target by 2050. These finances are mostly sourced from the sales of hydrocarbon exports. With the exception of the UAE, none of the GCC states has put in place a dedicated climate

finance framework. In 2015, the UAE government established the Green Finance and Investment Support Scheme, launched as part of the UAE Green Agenda 2015-2030. In 2021, the UAE released its [Sustainable Finance Framework \(2021-2031\)](#) to encourage the private sector's involvement in the supply and demand for sustainable finance and strengthen the enabling environment for climate and green investments through strong stakeholder collaboration.

There are signs that financial institutions are increasingly participating in financing sustainable and climate-friendly projects. In 2016, more than 30 UAE-based financial institutions signed the Dubai Declaration on Sustainable Finance to promote sustainable financial practices in line with the UAE Green Agenda. In 2015, UAE national banks contributed to 10 sustainable finance initiatives, including the National Bank of Abu Dhabi targeting \$10 billion over 10 years to lend and invest in environmentally sound activities; HSBC Bank Middle East funding the UAE's first water research and learning center; sustainable integration frameworks for national banks that incorporate environmental and social risk assessment into new project finance; and green loans to incentivize customers' climate action, such as promoting the driving of electric cars. In 2019, Oman's core financial services provider, Bank Muscat, established the country's first green finance scheme with scope to support rooftop solar panel installation, and in 2022, it introduced a green finance program focusing on rooftop solar for the residential market.

The region's sovereign wealth funds have also been a key part of efforts to support green investments. In 2022, Saudi Arabia's Public Investment Fund (PIF) developed a [Green Finance Framework](#), under which it aims to raise capital to support the financing and refinancing of environmental activities, covering the period 2021-25. Thus far, the PIF has released two green bonds — a financing instrument specifically earmarked to raise money for climate and environmental projects that comply with environmental, social, and governance requirements — including [an initial tranche of \\$3 billion in 2022](#) and [a second, larger one of \\$5.5 billion this year](#). The issuance of green bonds is aimed at supporting Saudi Arabia's green agenda, including green investments in Neom, the Saudi Green Initiative, and the kingdom's net-zero goals. Given the prospects for a net-zero future in which an oil-based economic model might not be as viable as it is today, Gulf countries should start developing

and diversifying climate finance instruments dedicated to addressing climate mitigation and adaptation goals.

Carbon Offsetting: Are Nature-Based Solutions Viable in the GCC's Net-Zero Pathway?

Evidence increasingly suggests that nature-based solutions (NBS) — a suite of actions or policies that aim to protect, restore, or sustainably manage natural ecosystems, biodiversity, seascapes, watersheds, and urban areas so they can tackle challenges such as food and water security, climate change, disaster risks, and human health — [could contribute up to 30%](#) of the climate mitigation needed by 2050 to meet the Paris Agreement's objective of limiting global warming. Examples of NBS include restoring wetlands, conserving mangrove forests, protecting salt marshes, restoring forest habitats, or managing landscapes and urban areas through tree planting.

Conserving mangrove ecosystems and planting trees are two NBS that are currently pursued in the Gulf. In March 2021, Saudi Arabia announced [two NBS initiatives](#): the Saudi Arabia Green Initiative and the Middle East Green Initiative. These aim to plant 10 billion trees in Saudi Arabia during the coming decades, with hopes of increasing the area covered by trees by 12 times from current levels and reducing carbon emissions by more than 4% of global contributions, as well as planting 40 billion trees across the Middle East. Given that the region is classified as [the most water-stressed on Earth](#), planting trees might not be an optimal carbon offset solution for the GCC.

Gulf countries should explore other innovative carbon offset solutions that are in harmony with the region's natural environment. [Carbon capture and mineralization](#), a process that permanently mineralizes carbon dioxide within peridotite rock formations, could be a cost-competitive solution and compatible with the GCC's arid natural environment, given the abundance of peridotite rock formations across the region.

The Way Forward

Five Gulf Arab states — Bahrain, Kuwait, Oman, Saudi Arabia, and the UAE — have committed to achieve net-zero goals



Photo above: UAE Minister of Climate Change and Environment Mariam Almheiri speaks during the opening ceremony of the Saudi Green Initiative forum on Oct. 23, 2021, in the Saudi capital Riyadh. Photo by FAYEZ NURELDINE/AFP via Getty Images.

by or around mid-century. While the Gulf states have taken strides to flesh out their climate strategies and initiatives, this paper revealed that the GCC pathway to net zero, without timely and innovative intervention, could be quite difficult to achieve. Without dedicated and systematic implementation efforts to close the gap between the current state and scale of technological, financial, and institutional efforts and where the GCC countries need to be to ensure a net-zero future, the region's ambitions might not become a reality. Timely implementation of climate policies that support net-zero goals, while challenging, will be imperative to support countries' economic diversification efforts and mitigate the future implications of global climate policies that could imperil their hydrocarbons riches.

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YOUTH DYNAMICS AND IRAQ'S ENERGY FUTURE

SALAM JABBAR SHAHAB

The next few decades will be crucial for Iraq and the Kurdistan Regional Government (KRG) as global changes reshape the energy sector. The push for sustainable development, the Paris Agreement climate goals, and associated efforts in areas like renewable energy, climate change, and environmental protection will bring about a transition across the sector, affecting everything from employment and working patterns to governance. These changes will likely present a number of challenges for Iraq, especially if the country fails to take the radical steps needed to adapt to the energy transition.

In 2035, oil-consuming countries, including the U.S. and nations across Europe, will begin to reduce their demand for fossil fuels to cut back on harmful emissions. As a result, forecasts suggest that demand will [decrease to about 70% of what it is now in 2050](#), at the same time that the population of Iraq will reach 75 million, up from around 42 million at present. This suggests there is a looming crisis on the horizon, as Iraq's economy is still heavily dependent on oil revenue, which accounts for [around 94.4% of its total revenue](#). Moreover, Iraq still flares gas associated with oil production, the cost of which is [estimated at \\$2.5 billion per year in lost revenue](#), and this burning also contributes greatly to exacerbating climate problems, environmental pollution, and [the spread of disease](#).

Serious work is needed to address these issues and better prepare for the coming changes in the energy sector, and especially the energy transition. With this in mind, Baghdad and Erbil will need to take a number of targeted steps and enhance their level of coordination.

Fix the lack of disaggregated data: There is a need to develop better and more transparent data, as one of the biggest problems hindering energy sector governance is the lack of available, accurate, and properly categorized data, including on workers and broken down by age. Although the energy sector is the main financier of all government institutions and other types of public expenditures, the nature

of employment in the sector is affected by the government's financial situation and general approach. Prime Minister Mohammed Shia al-Sudani's government, for instance, has expanded state spending by increasing the number of jobs in the public sector and the beneficiaries of social protection. Making it easier for young graduates to work in the energy sector is essential and will also help to ensure that new technologies and applications are continuously absorbed and implemented in production processes.

Better governance will strengthen the incentive system:

Building productive formulas that include employees, equipment, and other types of expenditure and revenue, whether in the electricity or the oil sector, will help to increase revenue and provide greater flexibility for existing workers. Currently, consumers pay for just 8% of electricity consumed, and the payment of wages to employees is affected by broader issues with government expenditures, leading at times to [months-long delays in payment](#). Meanwhile, improvements in the power supply have not been reflected in salaries for sector workers, contributing to a broader morale problem and creating a lack of enthusiasm on their part to provide better service or further develop their skills.

Create an indicator for youth employment in the energy

labor market: Iraq needs to create an innovative indicator capable of providing detailed information about the number, type, and condition of workers in the energy labor market. The governments in Baghdad and Erbil need to work together on this issue given the importance of the energy sector, and especially renewable energy and energy transition measures. This is essential to improve governance in the sector and will help decision makers to make better informed choices.

Make it easier to transition science, technology, engineering, and mathematics (STEM) graduates into the energy sector:

STEM graduates face difficulties accessing the energy labor market, which underscores the need to bridge the gap between



Photo above: A picture shows employees at a control center of the al-Gharraf oil field in Iraq's southern Dhi Qar Governorate, on Aug. 24, 2022.

Photo by ASAAD NIAZI/AFP via Getty Images.

educational institutions and the energy sector. Making it easier to transition graduates to work in the sector and start businesses is a must. Addressing this issue will require understanding global contexts, amending laws, and adopting new policies to strengthen the links between graduates and the energy labor market.

Provide vocational training for young people, especially in renewables: Renewable energy projects can take many different shapes and forms, ranging from small to large scale. Carrying them out, however, requires significant specialized training and skills. Installing renewable energy stations, for example, necessitates a number of technical skills, in addition to knowledge of mathematics and software. This, in turn, requires vocational training centers that can provide the necessary training as well as entities that can offer project financing.

Expand financing for clean energy projects: In January 2022, the Central Bank of Iraq (CBI) [launched a financing initiative with capital of \\$685 million](#) to encourage renewable energy projects. These initiatives need to consider a number of different factors, including the nature of the beneficiaries, the type of projects, and the benefits they provide for young people, including by gender, geography, and type of business. It will also be important to involve state-owned and private banks in financing clean energy projects and to have financing facilities available for young people and STEM graduates.

Address gender-based barriers to sector employment: Women make up half of the population in Iraq and the KRG, around 21 million out of a total of 42 million. However, [only 1.5 million women are involved in the labor market](#), in both the public and private sectors. Women tend to work largely

in traditional jobs or areas dictated by social custom. The energy sector is considered non-traditional work for women and they generally do not participate in energy projects; if they do, it is often to perform clerical or secretarial work. In certain areas, Iraqi law also limits women's ability to work in the sector. Labor Law No. 37 of 2015 in federal Iraq and law No.71 of 1987 in the KRG prohibit women from working in difficult conditions or at night. Such legislation needs to be amended or abolished. Providing safe, secure transportation is another important issue that must be addressed as well. Sometimes women do not have the ability to reach work sites because they are located in the countryside or other difficult-to-access areas. The authorities need to ensure access for working women by securing highway transportation routes and addressing legitimate safety concerns. Women also face other difficulties in the workplace. There is often not much concern for their privacy, as working environments in Iraq are generally designed with men in mind. Access to childcare is frequently an issue, for instance.

The governments in Baghdad and Erbil need to work together to put in place policies, legislation, and capabilities to create a suitable ecosystem to promote the growth of businesses in non-traditional energy sectors. Better governance will help create opportunities for sustainable development, including business sustainability, and make it easier for youth to enter the workplace. But if these governments are unable to keep up with global developments in the field, the Iraqi economy may face significant risks going forward, reducing opportunities for economic diversification, increasing dependency on non-productive government jobs, adding to the burden on state spending, and making it more difficult to reduce emissions and halt environmental degradation. The results will be painful, especially for youth, and could lead to displacement, migration, conflict, and social unrest, potentially putting society at large in danger.

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THE ROLE OF YOUTH IN IRAQ'S ENERGY TRANSITION: OPPORTUNITIES AND CHALLENGES

MOHAMMED AL-HALAWANI, ALI ABDUL RAHEEM, SAIF WAHHAB, DUMOAA QASIM, AQEEL MISHAAN, NOOR SAAD, AND DIANA HUSHAM

Both Iraq and the Kurdistan Regional Government (KRG) face a pressing challenge when it comes to youth employment in the energy sector. With an [estimated 60%](#) of Iraq's population under the age of 25, providing more sustainable and more numerous job opportunities for the largest number of young Iraqis possible will be a central item on both Baghdad and Erbil's agenda. This will require finding a way of transitioning young people from the education system into the energy sector workforce and from a focus on traditional sources of energy to renewables, as well as addressing gender-based barriers to employment in the sector.

Speaking at the MEPS Forum workshop on economic diversification and the energy transition, youth members of the Iraq Policy Group laid out the challenges and opportunities facing Iraq's renewable sector, highlighting a series of proposed solutions to better integrate youth and remove the restrictions that prevent women from working in the sector. Energy plays a key role in economic and social development, one the United Nations recognized when it said that energy is central to every major challenge and opportunity facing the world today, from job creation and security to climate change and food production. The [U.N.'s 2030 Agenda for Sustainable Development](#) lays out five main goals related to energy and the labor market:

1. Ensuring universal access to affordable, reliable, and modern energy services;
2. Substantially increasing the share of renewables in the global energy mix;
3. Doubling the global rate of improvement in energy efficiency;
4. Enhancing international cooperation on clean energy research and promoting investment in energy infrastructure and clean energy technology; and

5. Expanding infrastructure and upgrading technology to supply modern and sustainable energy services in all developing countries.

Iraq is still far from achieving these goals, however. Oil continues to dominate the economy, accounting for more than 90% of revenues and 65% of GDP, but providing just 2% of jobs.

The problem is that thousands of young Iraqis enter the labor market every year, but the government is unable to find jobs for them in the public sector, especially in the energy sector, and the private sector simply isn't capable of handling anywhere near this volume.

Moreover, the Iraqi labor market also suffers from widespread discrimination, as many businesses and companies exclude women from work, especially in the oil, gas, and renewable energy sectors. The Ministry of Oil, for example, employs nearly ten times as many men as women: 119,496 vs. 13,325. This is a result of both prevailing social norms and a lack of legislation supporting women's right to work in such areas. Labor relations in Iraq are subject to Labor Law No. (37) — except for in the KRG, where Iraqi Labor Law No. (71) of 1987 remains in effect — and this prohibits women from working at night or in difficult conditions like those often required by the energy sector. As a result, women's ability to work in the sector is frequently limited to performing office work.

To address these challenges while further developing the renewable sector in both Iraq and the KRG, better integrating youth into the labor market, and removing gender-based barriers to women's employment, the following proposed solutions should be implemented:

1. Establishing a transition phase to move from traditional energy sources to renewables.
2. Using technology to improve the working environment in Iraq and the KRG and ensure it is safe, sound, and free of risks.
3. Investing in the talents of young people and developing their ideas, especially when it comes to renewable energy.
4. Improving the social environment by creating institutions that are free of divisions and prejudice.
5. Reducing the gap in women's enrolment in labor market training courses — at present, 89.9% serve men — by making it a clear government priority, allocating funding to develop institutional capacity and programs, and monitoring the business environment.
6. Creating laws to ensure women's freedom to work and serve in relevant positions.
7. Providing more opportunities for training women, especially in modern technology in the energy sector.
8. Creating public awareness of the status and importance of women's work and the need to give them the opportunity to work in all fields.
9. Getting the backing of social leaders to support youth and integrate them into the labor market.
10. Creating a safe working environment in which women feel free to express themselves and develop their skills and knowledge to make decisions that affect their lives.
11. Taking in consideration the special needs of women and their social circumstances in giving them the opportunity to work.
12. Investing in human and social capital, especially since Iraq has a large youth population.
13. Developing young people's capabilities to work on renewables and the energy transition, including by supporting small-scale projects and implementing special training programs.
14. Establishing institutes dedicated to renewable energy and cooperating with relevant governmental organizations, like the Ministry of Industry and Minerals, the Ministry of Environment, the Ministry of Higher Education and Scientific Research, and other research centers, to create and propose policy papers.

of available job opportunities for youth, they will need the strong and determined support of the international community.

Mohammed Al-Halawani, Ali Abdul Raheem, Saif Wahhab, Dumoaa Qasim, Aqeel Mishaan, Noor Saad, and Diana Husham are all youth members of the Iraq Policy Group.

Iraq and the KRG face a difficult road ahead. If they are to succeed in taking a qualitative step forward in the transition from fossil fuels to renewable energy and doubling the number



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