

Mitigating climate change in the MENA: shifting to a new paradigm

RETHINKING **SECURITY** IN THE 2020s SERIES – *Policy Brief*

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INTRODUCTION

Published in April 2022, the latest IPCC report displays once again worrying conclusions on the trajectories of global warming and pleads for immediate mitigation actions. The Middle East and North Africa region must play its part: while its contribution to the world's emission is quite low, the region records some of the highest greenhouse gases emissions per capita globally. To mitigate and meet its climate pledges, the region must exploit its high renewable energy potential by shifting towards green energy and improving energy efficiency. For MENA oil and gas exporting countries, the green transition is also about finding new sources of revenues now that the world will progressively move away from hydrocarbon energy. This policy brief will examine the state of play and perspectives of mitigation in MENA, and what could be the cost of inactions for fragile oil-dependent countries.

In April 2022, the IPCC released its latest report *Climate Change 2022: Mitigation of Climate Change*, stating once again a worrying verdict on the trajectories of global warming. The world has almost exhausted the amount of cumulative greenhouse gases (GHG) to be emitted to limit the increase of global temperature to +1.5°C. Despite global pledges of decarbonation, global warming will unlikely be prevented from exceeding this threshold after 2030. Yet, it is still possible to maintain climate change to +1.5°C by the end of century if – and only if – climate mitigation processes are accelerated. To do so, total emissions must peak in 2025, then

decrease by 43% by 2030 and turn net-zero after 2050¹. This requires immediate global commitment, with everyone up on deck.

The MENA region represented 5% of global GHG emissions in 2019, a relatively meagre contribution when compared with other parts of the world, such as Eastern Asia which produced 27% of the world's emissions. However, when taking the broader picture of carbon emissions, human activities in the MENA region are ones of the most carbon intensive². Indeed, MENA's GHG emissions per capita are among the largest in the world, with 13 tons of CO₂ emitted per capita per year; below the levels of North America (19 tons), above Europe (7.8 tons), but similar to Japan, Australia and New Zealand's heights³. In 2020, the Gulf States were ranked as the biggest emitters per capita, with Qatar appearing to be the country with the highest GHG emissions per person in the world⁴. This is not only due to the production of fossil energy; it is also related to urbanization trends since urban GHG emissions per capita increased by 30% in the Middle East between 2010 and 2015⁵.

Facing the upcoming climate crisis, MENA countries have therefore all raised their ambitions to decrease their emissions of gas ahead of COP26 in November 2021: Israel, Lebanon, the UAE, and Yemen pledged to decarbonize by 2050, while Turkey set its commitment to 2053, and Saudi Arabia and Bahrain to 2060. Jordan, Morocco, Palestine, Tunisia, and Qatar also renewed their engagements by submitting more ambitious climate goals through their Nationally Determined Contributions (NDC). They have as well enhanced their willingness to foster [regional cooperation during the first edition of the MENA Climate Week](#) in March 2022, by discussing prospects of both climate mitigation and adaptation.

The settlement of this new green paradigm brings new challenges for the region with varying consequences between the countries. For all, mitigation means rationalizing energy intensive sectors - electricity, buildings, agriculture, industry, transports – by using energy more efficiently and sustainably. For oil and gas

¹ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2022, Mitigation of Climate Change*, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (AR6), 2022

² T. Herzog, J. Pershing and K. A. Baumert, 'Navigating the Numbers, Greenhouse Gas Data and International Climate Policy', *World Resources Institute*, 2005

³ *Climate Change 2022, Mitigation of Climate Change*, op.cit.

⁴ Global Carbon Project, 2021

⁵ *Climate Change 2022, Mitigation of Climate Change*, op.cit.

exporting countries however, deeper transformations are at stake. Now that the world is moving away from fossil-based energies, the carbon rent economic model is to be reshaped, along with the social contract between the states and the populations that have come with it for decades⁶. The Gulf States, Algeria, Iraq, and Libya need to prepare to find alternative sources of revenues. The Gulf States have already laid the foundation by investing in the production of green energy as well as by promoting other economic sectors, such as tourism⁷. Algeria, Libya, and Iraq are nonetheless ill-prepared to withstand the loss of their oil and gas rents.

Getting greener is for oil-producing economies as much a matter of surviving a post-oil dependent world as a question of tackling climate change. But the glass is half full, not half empty. The entire region benefits from high mitigation potential, whether it be in terms of prospects for green energy or rooms for energy efficiency. This policy brief intends to display what are the region's perspectives for mitigation but warns what could be the result of inaction in fragile fossil-fuel producing countries.

1. LAND OF GREEN GOLD

By owning 59% of the world's oil reserves and 45% of the global gas stock, the MENA region has always been a key player in the geopolitics of energy⁸. To ensure now that the world's temperature does not excessively increase, the world must shift from fossil fuels to low carbon sources of energy. The region is richly endowed with renewable resources, and it appears that the green transition could be more a blessing than a curse.

In MENA, the sunshine rate is one of the highest of the planet: according to the World Bank, 'the region receives between 22 percent and 26 percent of all solar energy striking the earth. This translates to a potential for solar energy per square kilometre per year equivalent to the energy generated from 1 to 2 million barrels of

⁶ M. Al-Hussein, E. Alhussein, 'The Social Contract and Post-Oil Dilemma in Saudi Arabia and the UAE', *Carnegie*, 05/08/2021 and M. Loewe, A. El-Haddad, M. Furness, A. Houdret, B. Trautner, T. Zintl, 'A new social contract for the countries in the Middle East and North Africa (MENA)', *German Development Institute, The current Column*, 05/12/2016

⁷ J.-F. Seznec, S. Mosis, 'The Energy Transition in the Arab Gulf', *Global Energy Center*, Atlantic Council, July 2021

⁸ M.C. Aoun, 'Oil and Gas Resources of the Middle East and North Africa: A Curse or a Blessing?', in: *The New Energy Crisis*, J.M. Chevalier, P. Geoffron (eds), Palgrave Macmillan, London, 2013

oil⁹. As for the wind, there is as well a high potential for generating wind-based energy, notably in Morocco, Jordan, and Saudi Arabia. Shifting to renewable energy is at a very high potential and appears to be more a matter of political willingness than feasibility: for instance, Egypt has set to achieve 42% of its electricity through a mix with renewables by 2035, a project that is assessed to be more than achievable and even underestimated, as Egypt even possesses the ability to produce electricity from a 53% share from renewables by 2030¹⁰.

Primary energy coming from renewables is still very low in the Middle East national energy mix: it accounted for merely 0.25% in Algeria in 2020 and 0.09% in Saudi Arabia, way below the 5.56% in Egypt and 8.21% in Morocco¹¹. But now that the renewable potential is acknowledged, projects for the implementation of the energy transition have been launched almost everywhere across the region. The MENA region's biggest wind farm was built in Saudi Arabia, in Dumat Al-Jandal, and has operated since August 2021 to provide sustainable energy to 70 000 households¹². Other renewable projects are ongoing, mainly with the construction of solar farms in Dubai - the Mohammed bin Rashid Solar Park -, in Abu Dhabi, in Morocco - the Ouarzazate Solar Power Station -, and in Egypt - in Aswan with the building of 41 solar plants¹³.

Along with this large quantity of renewable resources come many socioeconomic advantages. Solar energy has now become the cheapest electricity source in the world¹⁴. In the Gulf States in particular, the solar business is getting more and more profitable, and could, in the future, be a more affordable source of energy than fossil fuels¹⁵. This does not only favour the use of renewable energy domestically; it also enhances perspectives for green energy exports. In the same way it shifts its

⁹ International Finance Corporation, 'The Potential of Renewable Energy in MENA' in *IFC KNOWLEDGE SERIES IN MENA*, issue 5

¹⁰ International Renewable Energy Agency (IRENA), *Renewable Energy Outlook*, Abu Dhabi, 2018

¹¹ BP Statistical Review of World Energy, 31/03/2022

¹² 'Largest wind farm in the Middle East produces electricity', *Windfair*, 30/08/2021 and 'Dumat Al-Jandal wind farm turbine trial run begins', *Saudi Gazette*, 04/08/2021

¹³ J. Gnana'These are the five big solar schemes that anchor the Middle East's pivot to a greener future', *The National News*, 26/10/2022

¹⁴ Victoria Masterson, 'Renewables were the world's cheapest source of energy in 2020, new report shows', *World Economic Forum*, 05/07/2021

¹⁵ H. Apostoleris, A. Al Ghaferi, M. Chiesa, 'What is going on with Middle Eastern solar prices, and what does it mean for the rest of us?', *Photovoltaics*, vol.29, issue 6, 2021

carbon-dependent economy into a greener society, the MENA region could also transform its fossil fuel external supply into providing its neighbours, especially Europe or Central Asia, solar and wind energy¹⁶. This can be achieved via existing energy roads connecting the continents, especially from Morocco to Spain or from the to-be-constructed road between Greece, Cyprus, and Egypt¹⁷.

Investing into sustainable energy offers a wide range of other benefits; it can fulfil some gaps the region is struggling with, meeting electricity demands, and providing jobs. In the Middle East, while electricity consumption increased by 190% in the region between 1999 and 2019¹⁸, fragile countries – Lebanon, Iraq, Libya, Yemen¹⁹ – are failing to meet their electricity demands and power shortages are common features in the region²⁰. But as fast as the population will grow and society keeps developing, energy and job demands are projected to climb as well.

Investing in renewables is therefore a two-sided solution: it can ensure permanent electricity supply, even to off-grid remote areas that are lacking stable access to electricity, as well as being domestically more independent from oil and gas external – or internal – supply²¹. To this end, Egypt managed to fill its electricity shortage by generating 25% of surplus with new energy capacity, including solar and wind capacities in its mix²². In terms of jobs, investing in the energy transition could create 207 000 jobs in the GCC by 2030²³. In Saudi Arabia, Iran, Iraq, Kuwait, Qatar and the UAE, the number of jobs in renewables will increase by 169% between 2017 and 2050²⁴. By then, 2.1 million jobs from the energy transition will be created across

¹⁶ M. Zubair, A.B. Awan, 'Economic viability of solar energy export from the Middle East and North Africa to Europe and South Asia' *Environment, Development, Sustainable* 23, pp.17986–18007 (2021)

¹⁷ 'Greece, Egypt sign deal for first subsea power link between Europe and Africa', *Reuters*, 14/10/2021

¹⁸ Calculations made by the author thanks to IAE Data Services

¹⁹ Lebanon and Yemen are ranked among the worst suppliers of electricity in terms of quality in the world by the World Economic Forum, *Global Competitiveness Report*, 2019

²⁰ R. Wright, 'The Lights Are Going Out in the Middle East', *The New Yorker*, 21/05/2017

²¹ D. Ramin Jalilvand, 'Renewable Energy for the Middle East and North Africa Policies for a Successful Transition', *Friedrich Ebert Stiftung*, February 2012 and IRENA, *RENEWABLE ENERGY MARKET ANALYSIS, The GCC Region*, Abu Dhabi, 2016

²² A. Rovzar, 'North Africa's pathways to clean energy transitions', *International Energy Agency*, October 2020

²³ *RENEWABLE ENERGY MARKET ANALYSIS, The GCC Region*, op.cit.

²⁴ IRENA, *Measuring the Socio-economics of Transition: Focus on Jobs*, Abu Dhabi, 2020

the MENA region, which is projected to account for 5% of the global green energy job creation²⁵. This responds both to short-term and long-run needs.

2. THE ENERGY TRANSITION, MITIGATION, HYDROGEN, AND CARBON CAPTURE

Now that most of the region is ready to embrace its potential in developing renewable energy and efficiency, new promising markets can be opened. With the energy transition and climate-related policies, come a variety of green innovations that will shape the future of energetic geopolitics. Mitigation should be seen as a global and large-scale manoeuvre that does not include only the energy transition, but any projects that may mitigate emissions of carbon. For all of them, MENA has an enormous potential.

Another type of promising energy than the conventional renewables – solar, wind or hydropower – can be produced and traded from the MENA region. Green hydrogen – hydrogen produced by renewable energy instead of fossil fuel – is considered as a game changer of the energy shift: this energy could substitute hydrocarbons in energy intensive sectors such as industry, building, electricity or transport, notably aviation. Indeed, hydrogen is one of the most abundant resources in the planet and the process of turning it to fuel does not emit any carbon²⁶. IRENA estimates that under a +1.5°C carbon emission pathway, the share of green hydrogen in global energy production in 2050 will be 12% – it is 0% today²⁷. ‘Net-zero’ objectives would raise the global demand for green hydrogen by 40% in the industrial sector by 2030²⁸.

As the opportunities for green hydrogen production is particularly high in countries with high and cheap renewable capacities, the MENA region has the highest potential for production of green hydrogen behind Sub-Saharan Africa²⁹. The Gulf States, Morocco and Egypt have therefore launched projects and action plans to produce green hydrogen, not only for domestic consumption but also for export purposes: Morocco plans to export hydrogen to Europe by 2035, the UAE aims to

²⁵ Ibid

²⁶ IRENA, *Geopolitics of the Energy Transformation: the hydrogen factor*, Abu Dhabi, January 2022

²⁷ Ibid

²⁸ IEA, *Hydrogen*, Paris, 2021

²⁹ *Geopolitics of the Energy Transformation: the hydrogen factor*, op.cit.

account for 25% of the global clean hydrogen market by 2030, production of green hydrogen would start in 2026 in Saudi Arabia, while hydrogen is to be added to Egypt's Energy Strategy for 2035³⁰. Whether it be towards Europe, Africa or Asia, the MENA region is at the confluence of green hydrogen trade roads, which places the region as one of the nodes of the world's energy transition and climate mitigation possibilities.

Not only shifting to green energy will enable achieving net-zero objectives, other mitigation strategies such as carbon capture technologies will also be critical. To remove carbon emissions from the Earth's surface, CO₂ could be buried and sequestered underground, mainly in saline aquifers³¹. It is estimated that the Middle East has the capacity to store 6% of the world's carbon³². One carbon capture and storage technique is Enhanced Oil Recovery (EOR), a manoeuvre that captures CO₂ in order to reinject it directly into oil reservoirs. While this technique must be proceeded with effective regulations to avoid environmental degradation, it is also considered as a critical measure for global decarbonation³³. It appears that the Middle East itself owns 50% of the world EOR potential, according to the IPCC³⁴. To participate in this global effort, Abu Dhabi built the first carbon capture technology EoR in an iron and steel firm in 2016³⁵. Saudi Arabia has now launched a fund to develop carbon storage as part of its net-zero strategy 2060³⁶.

3. FRAGILE OIL STATES: A MATTER OF SURVIVAL?

Most of the countries of the region, the Gulf States, Egypt, Jordan, Morocco, and Tunisia, are on their way towards sustainable plans for the mitigation of climate

³⁰ Royaume du Maroc, *Feuille de Route, Hydrogène Vert, vecteur de transition énergétique et de croissance durable*, Janvier 2021; D. Saadi, 'Engie eyeing Saudi Arabia, Oman green hydrogen projects amid \$5 bil UAE deal', *S&P Global*, 20/01/2022; S. Al-Atrush, 'Can Saudi Arabia become the world's biggest hydrogen producer?', *Financial Times*, 14/02/2022; 'Green hydrogen to be introduced in Egypt's 2035 Energy Strategy', *Egypt Today*, 20/10/2021

³¹ D. Roberts, 'Pulling CO₂ out of the air and using it could be a trillion-dollar business', *Vox*, 22/11/2019

³² J. Kearns and all, 'Developing a Consistent Database for Regional Geologic CO₂ Storage Capacity Worldwide', *Energy Procedia*, Volume 114, 2017, pp.4697-4709.

³³ V. Nuez-Lopez, E. Moskal, 'Potential of CO₂-EOR for Near-Term Decarbonization', *Frontiers Climate*, 2019; D. Roberts, 'Could squeezing more oil out of the ground help fight climate change?', *Vox*, 06/12/2019

³⁴ *Climate Change 2022, Mitigation of Climate Change*, op.cit.

³⁵ S. Shaikh, 'Abu Dhabi's ADNOC joins global Hydrogen Council', *Gulf Business*, 13/07/2021

³⁶ V. Nereim, 'Saudi Arabia to Start Investment Fund for Carbon Capture', *Time*, 25/10/2021

change. Libya, Algeria, and Iraq, however, are oil-dependent fragile countries which might not survive the energy transition if nothing is done to find substitutes for hydrocarbon revenues. Mitigating climate change comes for them with consistent challenges: Libya is still in the middle of a protracted conflict, while Iraq is recovering from thirty years of war and Algeria has been failing to diversify its economy for years now. But, moving towards a post-oil era is not just a question of tackling climate change, it is more than ever a question of getting ready for the next three decades ahead. Currently, they are the most heavily dependent MENA countries on hydrocarbon rent, and therefore subject to all the political and economic instability associated with the volatility of fossil fuel prices. Oil rents represented 40% of the domestic GDP in Libya and Iraq in 2019³⁷. In 2018, 95% of Libyan exports, 96% of Algeria's total exports in 2017, and almost 100% of Iraqi exports, were fossil fuels while other rentier states like the Gulf countries have managed to diversify their exporting merchandise in the last few years³⁸.

The global pledge of decarbonation and the energy transition has never been so tangible historically, the most optimistic mitigation scenario for climate change is therefore, without policy actions, the worst scenario for Libya, Algeria, and Iraq. Their entire economic system is at risk of collapsing. By 2050, the International Energy Agency plans that the world oil demand will be four times lower than the one in 2020 under a 'Net-Zero scenario'; fossil fuel trade between the regions would diminish by 40%³⁹. The EU has set a net-zero objective by 2050, while 8% of EU consumed gas comes from Algeria; Libya sold almost all its petroleum to EU countries in 2020⁴⁰. Turkey, China, and India account for more than 65% of Iraq's petrol exports which all target to decarbonize by 2053, 2060 and 2070, respectively. As they have low-resilient economies and the demand from their major buyers is forecasted to decline, those three countries are considered as the most vulnerable to the energy transition and among the least prepared to stomach what is to come⁴¹.

A lack of preparedness and a failure to diversify their economies would inevitably lead them to bankruptcy. With the collapse of the oil rent, the states will fail to

³⁷ World Bank data

³⁸ World Bank data

³⁹ International Energy Agency, *World Energy Outlook 2021*, Paris, 2021

⁴⁰ Eurostat, 'From where do we import energy?' and OEC data

⁴¹ World Bank, *Diversification and Cooperation in a Decarbonizing World: Climate Strategies for Fossil Fuel-Dependent Countries*, Washington DC, 2020

supply public services. In 2019, in Iraq, 65% of oil revenues were used for the payment of public salaries, pensions and social services⁴². The public sector is the first employer in the region – in 2018, 3 million of people worked for the public sector in Iraq, 37% of the labour force in Algeria in 2017, and 85% in Libya – the state bankruptcy would deprive income of millions of people and of those depending on public subsidies for a living⁴³. With this failure from the state to honour its duty towards its population, an increase in popular grievances against public institutions are to be expected, and in the worst case, an increase of violence⁴⁴. In Iraq and Libya, extended periods of conflict are a major obstacle to diversifying the economy and attracting foreign investors and capital needed for the flourishing of the private sector. There is an urgent need to break the ‘conflict trap’ and the uncertain future that impedes the development of reforms towards the energy transition. In return, absence of preparedness would only protract or cause a resurgence of conflicts⁴⁵.

As for the rest of the region, Iraq, Libya, and Algeria have a high potential of renewable resources. Algeria projects to develop renewable facilities to meet its ambition targets. By 2030, 30 to 40% of Algerian domestic electricity is expected to come from solar energy⁴⁶. Iraq has recently secured Foreign Direct Investments for the construction of renewable farms. The French firm Total Energie invested a 1 billion US\$ project for solar energy generation in the country in 2021, as well as the Chinese company PowerChina. The country is also negotiating with its neighbours in the Gulf, Saudi Arabia, and the UAE, for renewable and electricity partnerships⁴⁷. In Libya, while the energy transition has been impeached for years by the civil war, the election of the Government for National Unity has enabled the launch of two

⁴² N. Alhassan, ‘Once again, Iraq is at a crossroads’, *Middle East Institute*, 03/05/2021

⁴³ A. Al-Mawlawi, ‘Analysing Growth Trends in Public Sector Employment in Iraq’, *London School of Economics* (LSE), 31/07/2018 ; European Training Foundation, *Algeria, Education, training and employment developments 2018, 2019* ; World Bank, *Labor Market Dynamics in Libya, Reintegration for recovery*, Washington DC, 2015,.

⁴⁴ World Bank, *World Development Report 2011 : Conflict, Security, and Development*, Washington DC, 2011

⁴⁵ World Bank, *Breaking the Conflict Trap: Civil War and Development Policy*, Washington DC, 2003

⁴⁶ International Energy Forum, *Algeria Powers Ahead with Huge Renewable Energy Plans*, 21/06/2021

⁴⁷ R. Mills, ‘UAE and Saudi Arabia Cut Renewables Deals to Improve Iraq Relations’, *The Arab Gulf States Institute*, 12/11/2021

projects for solar energy in 2021, but energy and climate remain as not a political priority⁴⁸.

Despite those recent efforts, those measures will clearly not be sufficient to navigate both the consequences of the global energy transition and the mitigation of climate change⁴⁹. Support is needed from the international community to help or assist in the implementation of those reforms, from the onset of an effective energy transition towards the diversification of their sources of revenue⁵⁰. External aid should therefore focus more on supporting fragile oil-dependent countries such as Libya, Iraq, and Algeria. From the European Union, there should be a moral *imperatus* to assist its neighbours and current oil and gas suppliers to overcome their fragilities in the global fight against climate change. The holding of COP27 and COP28 in the region in 2022 and 2023 brings opportunities to discuss climate justice and the outline of a fair regional energy transition for the MENA countries⁵¹.

⁴⁸ A. Liga, 'North Africa: Transition Beyond Myths', *Italian Institute for International Political Studies*, 25/01/2022

⁴⁹ A. Allawi, Dr F. Birol,, 'Without help for oil-producing countries, net zero by 2050 is a distant dream', *International Energy Agency*, 05/09/2021

⁵⁰ M. Ilardo, 'Curse or blessing: How cheap oil influences conflict dynamics', *Conflict Series*, EU Institute for Security Studies, April 2021

⁵¹ S. Hegazi, 'Egypt to focus on developing countries during COP 27', *Daily New Egypt*, 09/02/2022

Recommendations

To MENA countries:

- Analyse, investigate and exploit the renewable energy's full potential by elevating mitigation ambitions, investing in the construction of renewable energy facilities as much in urban as in remote areas.
- Engage with international partners for green exports of renewable energy or green hydrogen by exploring possible trade and foreign investments agreements and potential trade roads.
- Invest more in innovative and promising mitigation strategies, such as carbon capture storage by promoting and investing in research and development and knowledge sharing.

To oil-dependent countries:

- Overcome the challenges and consequences of the energy transition by investing in economic diversification with foresight strategic planning.
- Secure assistance and financial support for effective mitigation and energy transition by engaging with the international community – states, international organisation, banks, development agencies etc. – to attract external aid and climate finance.
- Promote a fair regional energy transition and climate justice by engaging in climate diplomacy within the arenas of international climate events such as COP27 and COP28 (taking place in the region) future MENA Climate Weeks and Stockholm+50.

To the international community:

- Support and assist highly vulnerable countries to the energy transition and the post-oil era with external aid and financial supporting tools.
 - Include clauses regarding energy transition and the fight against climate change in peace processes for conflict-affected countries, such as building and using renewables as a promoter for development, peace, and common values, while taking into account the local socioeconomic and security context⁵².
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About the BIC

The BIC is an independent, non-profit, think-and-do tank based in the capital of Europe that is committed to developing solutions to address the cyclical drivers of insecurity, economic fragility, and conflict the Middle East and North Africa. Our goal is to bring added value to the highest levels of political discourse by bringing systemic issues to the forefront of the conversation.

Rethinking Security in the 2020s Series

This project takes critical aim at yesterday's approaches to security and defence, with a view towards developing proactive solutions to the evolving nature of insecurity and hybrid warfare. The series has three overarching themes, namely "New Geopolitical Landscape in the MENA Region", "Peacebuilding and Conflict Prevention" and "Transnational Challenges to Water and Energy"

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