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The social, economic and employment impacts of decarbonization and green industrial growth scenarios for the Middle East and North Africa region

► Summary for Policy Makers



Executive Summary

Today, the world finds itself in the middle of an accelerating global energy transition. Driven by geopolitical shifts, security concerns and climate targets, more than 100 countries have pledged a shift to renewable energy and net zero emissions by 2050. Investments in low carbon technology outpaced investments into fossil fuels for the first time in 2023. Strong industrial policies around the world have seen renewable energy investments reach \$1.7 trillion overtaking the \$1 trillion in unabated fossil fuels (IEA 2023). The implications of the accelerating global energy transition are particularly profound for MENA countries.

This report analyses the employment and socio-economic impacts of national and global climate and energy policies in the MENA region. Four main findings are drawn.

First, in a global net zero emissions scenario where countries in the MENA region remain passive by-standers in the energy transition, they may face welfare losses. Under such scenario countries implement the declared Nationally Determined Contributions (NDCs) but fall short of climate neutrality. The effect on jobs is negligible but GDP by 2050 is projected to be 2.2% lower relative to a current policy baseline scenario.

Second, however, in a scenario in which MENA countries actively drive the global energy transition, significant gains in jobs and GDP may be achieved. Such scenario implies strong industrial and just transition policies in addition to enhanced climate policies. Industrial policies are in the field of green hydrogen, solar power and electric mobility. They are combined with Just Transition policies to enable up- and reskilling and skills training for young people in new low-carbon technologies. Social Protection and relocation programs are required for fossil fuel workers. In this scenario, employment and GDP levels are 3.5% and 4.8% higher than baseline, respectively. A net total of 6.6 million jobs are created in MENA.

Third, if in addition to strong industrial policies, MENA countries link climate to development policies and further invest into climate resilience, green water desalination, reforestation and waste management, GDP would accelerate to 7.2 % and employment to 5.3% above baseline by 2050. Such a resilience scenario also relies on strong just transition policies targeting investment in human capital, social protection and unskilled and low-income workers. This translates into just under 10 million new jobs across economic sectors created in MENA.

Fourth, employment and socio-economic impacts vary across MENA countries and sectors. Countries with a high dependency on oil and gas would be the biggest winners in a strong industrial policy scenario, but - in the absence of enhanced industrial, climate and just transition policies - also the most negatively impacted in terms of GDP and job losses. Job gains in a strong industrial policy scenario are largest in the construction and green hydrogen sectors, with some 2.8 and 1.9 million jobs created respectively, followed by motor vehicle manufacturing (1.5 million jobs) and electric engineering (900,000 jobs). Jobs losses would hit sectors in Oil and Gas/Fuel supply and Plastics industry most, with each sector requiring support to some 700,000 and 460,000 jobs respectively to reskill and transition into other occupations.

From the above results following the policy conclusions are sketched.

In the unfolding global energy transition MENA could become a new leader. With strong industrial and just transition policies in place, significant welfare gains could be achieved as compared to a

business-as-usual scenario. MENA has the potential to catch up in the energy transition and pull alongside currently leading countries who are harnessing first mover advantages, clean-tech monopolies, export markets and some 13.7 million renewable energy jobs created globally. With their comparative advantage and expertise in fossil fuel energy technology, abundant renewable resources and youthful labour market, countries in the MENA region have the potential to replicate and enact best practice green industrial and just transition policies.

This would require a shift in gear. A combination of strong industrial and climate policies matched with Just Transition policies are key to enable positive economic and labour market outcomes. The reskilling of fossil fuel workers and their social protection to ensure frictionless industrial restructuring is a precondition. Technical and vocational education and skills training for the young matched with investments into eco-innovation, incubation and green entrepreneurship would enable the restructuring and create a vibrant private sector.

Skills gaps may emerge as the MENA region is currently dominated by medium- and low skilled migrant workers. In a low-carbon transition national and migrant workers need technical and vocational training and reskilling as technologies continue to evolve and new industries which did not exist before emerge in the region. There are likely growing demands for highly skilled workers. All displaced workers in fossil fuel extraction industries, 10% of the remaining workforce in other sectors and 20% of youth are assumed to receive training. This is equivalent to a minimum of 16 million trainees in the ambitious net zero scenarios by 2050 (including 300 thousand fossil fuel workers, 7.9 million workers in other sectors and 8 million young people).

Importantly, significantly higher demands for labour mean increased opportunities for all, including marginalized groups with impacts on the distribution of jobs across sectors, age, gender and citizenship. To address potential mismatches and ensure a frictionless restructuring, targeted active labour market policies are required. They could address the region's high levels of youth unemployment, and low levels of economic participation among women. As a result potential wage increases will improve pay for existing workers and create incentives for inactive working-age population to join the workforce. This will need to be supported by investment in training as well as additional social protection and active labour market policies.

Financing is crucial as higher productivity levels in 2050 can only be achieved with productive investments into human and clean-tech capital such as modelled in the strong industrial policy scenario. Domestic and international options include fiscally neutral and progressive energy tax and subsidy reforms, royalties from green hydrogen and clean energy exports, sovereign wealth funds' investments into green funds and bonds and redirection of investments from oil and gas into clean tech.

Key findings

Macroeconomic impacts

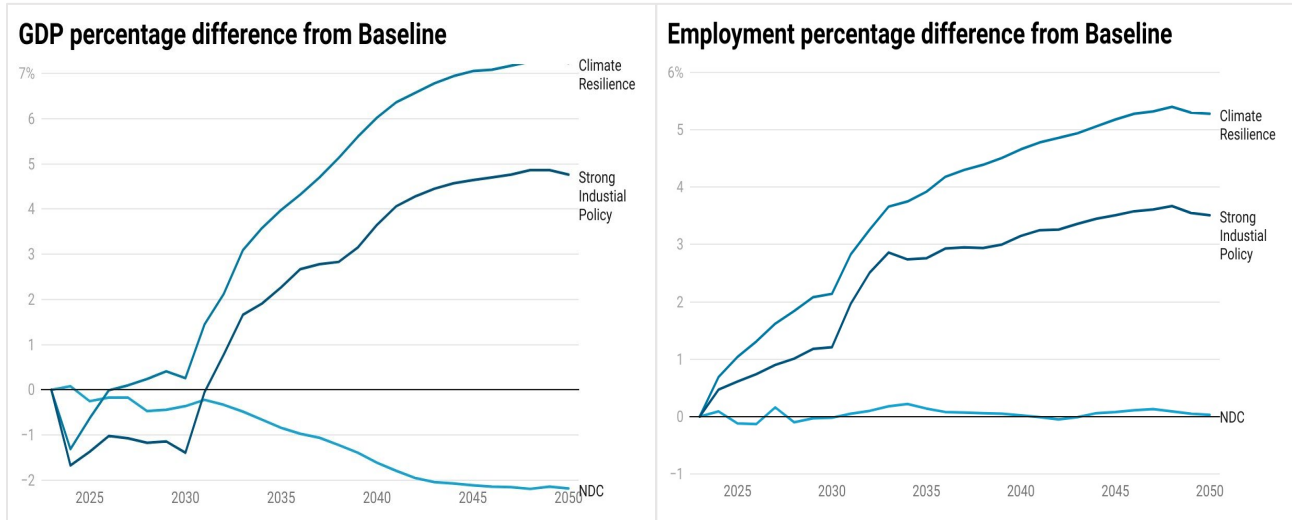
In a scenario in which the MENA region remains at the lower end of climate ambition in the global net zero transition (the **NDC** scenario), GDP by 2050 is projected to be 2.2% lower for the region as a whole, relative to the Current Policies baseline.

Still, there are important increases in investment in all countries in the region, particularly in Saudi Arabia in the years to 2030, reducing thereafter as investment is frontloaded to deploy new technologies and build infrastructures in the medium term. This positive impact, however, is offset by a worsening of the net trade balances relative to baseline, due to losses of oil & gas and manufactured fuels exports which has been a specialisation of the region. This significant reduction in fossil fuel exports is driven strongly by reduced demand for fossil fuels in the rest of the world. Total employment is marginally higher (0.03%) by 2050 compared to baseline for the MENA region (equivalent to 55,000 jobs). This is due to the higher labour intensity of clean-tech industries as compared to capital intensive Oil and Gas production.

In the **Strong Industrial Policy** scenario, the MENA region's GDP is 4.8% higher than baseline by 2050, albeit slightly below baseline in the years to 2030. The short-term negative impacts are due to higher prices, which result from increased costs of electricity (as carbon prices are introduced when there is still a noticeable share of fossil fuels in the power mix) and higher costs of production in sectors that are expected to make large investments to create new export industries (solar power and green hydrogen supply and electric motor vehicles (EV)).

The long-term positive impacts are driven by continued investment and prices coming back down over time, with positive effects for household consumption. The easing of price pressures over time is due to endogenous learning-by-doing effects which reduces costs of low-carbon energy and technologies as deployment scales up. After 2035, the model also projects significant gains in export revenues from green hydrogen (also EVs and solar power to a lesser extent), which more than offset the loss in fossil fuel exports and contributes to positive GDP impacts. In this scenario, employment levels are 3.5% higher than baseline by 2050, and are higher than baseline in all MENA regions.

The employment impacts are also positive but smaller than GDP impacts in relative terms, due to wage and productivity improvements resulting from investment.



In the **Climate Resilience** scenario, GDP and employment move in a similar direction with even higher differences to baseline than in Strong Industrial Policy (7.2% and 5.3% higher than baseline by 2050, respectively). This is mainly due to increased investment in water desalination and reforestation (with relatively small changes to consumption and net trade). In parts of the region with high GDP per capita levels (including UAE, Saudi Arabia, Iraq and Kuwait), contributions to a regional fund for mitigation and adaptation means that tax increases are introduced in these countries, leading to a small negative impact on household consumption relative to the baseline (which however is offset by increases in nominal income due to increased investment).

In both Strong Industrial Policy and Climate Resilience scenarios, the long-term positive impacts are dependent on the assumption about the availability of innovative and international financing. In the modelled scenarios, a significant proportion of additional investment and policy costs (relative to baseline) is funded by overseas investments and resources at no cost to local populations.

Net employment impacts

Comparing the impacts on employment in absolute terms across scenarios and sectors in 2050, the net impacts are positive but there are winning and losing sectors. Job gains in a strong industrial policy scenario are largest in the construction and green hydrogen sectors, with some 2.8 and 1.9 million jobs created respectively, followed by motor vehicle manufacturing (1.5 million jobs) and electric engineering (900,000 jobs). Jobs losses would hit sectors in Oil and Gas/Fuel supply and Plastics industry most, with each sector supporting some 700,000 and 460,000 jobs respectively, with half of those who may need to reskill and transition into other occupations with social protection and relocation programs to ease frictions and labour mobility. In the strong industrial policy and climate resilience scenario a net total of between 6.6 million to 10 million jobs are created in MENA respectively.

Sectoral employment impacts

In the **NDC** scenario, there is an increased demand for electricity supply, construction and manufacturing sectors supplying inputs to infrastructures. This is accompanied with lower demand for oil & gas, manufactured fuels (as a direct result of falling demand for fossil fuels, domestically as well as from the rest of the world) and consumer goods and services sectors (due to loss income and consumption, linked to the negative impact on oil & gas and initially higher energy prices given the introduction of carbon pricing). This is similar in all MENA countries, but the magnitude of impact is different for each country and sector.

Employment trends closely follow output. However, job losses are more concentrated in public services sectors, because of reduced public spending in these activities as a result of governments bearing the burden of lost oil and gas royalties.

In the **Strong Industrial Policy** scenario, significant employment gains are achieved in green hydrogen supply, solar power generation and construction. This is the result of investments and new low-carbon industries being created (green hydrogen and solar power export and EV manufacturing). There are strong employment increases in supplying industries, notably electrical equipment and land transport which directly support the new industries (electrical equipment provides batteries for EVs, whereas land transport helps distribute the new industries' products to other countries).

Higher employment and output in hydrogen supply is particularly strong after 2030, driven by the region's ambition to significantly scale up production from that point. As a result, higher activity in the electricity and hydrogen sectors offsets losses in oil & gas, manufactured fuels and gas supply.

In the **Climate Resilience** scenario, sectoral impacts are similar to those of the Industrial Policy scenario, yet demand for 'consumer goods and services' is higher due to stronger economic growth. By design, there is also a noticeable shift of activity from rubber & plastics to water supply & waste (to reflect higher recycling rates), as well as positive impacts on forestry as a result of reforestation measures.

Employment - absolute difference from Baseline

(Thousand jobs)

	NDC	Strong Industrial Policy	Climate Resilience
Hydrogen supply	0.3	2,867.5	2,802.1
Construction	229.6	1,034.8	1,913.5
Motor Vehicles	83.3	366.5	1,481.3
Electrical Engineering & Instruments	33.5	805	813.7
Electricity	391.5	462.3	779.7
Mechanical Engineering	67.6	192.6	551.4
Electronics	88	249.6	536.2
Other Manufacturing	192.4	499.4	513.5
Forestry	0	-1.3	405.8
Basic Metals	300.8	328	390.5
Health & Social Work	78.5	245.4	266.3
Distribution	-637.2	-377.5	248.7
Land Transport	21.8	151.3	240
Agriculture	97.3	328.1	199.9
Non-metallic Mineral Products	94.8	217.6	181.7
Food, Drink & Tobacco	44	190.8	152
Professional Services	11.4	44.1	96.9
Water Supply & Waste	4.1	1.4	77.8
Wood & Paper	-9.6	25.3	44.7
Public Administration & Defense	-290.1	44.7	42.8
Other Transport Equipment	-13.8	87.1	38.1
Insurance	29.4	39.7	27.5
Banking & Finance	6.4	24.8	24.2
Education	-299.1	19.1	17.7
Textiles, Clothing & Leather	4.8	4.5	9.7
Computing Services	1.1	4.2	6.1
Water Transport	0.8	7.8	4.9
Coal	0	0	0
Other Mining	0	0	0
Air Transport	45	-10	-0.1
Hotels & Catering	29.7	72.5	-3.6
Other Business Services	-3.8	-2.3	-14.7
Communications	-8.2	7.7	-16.5
Printing & Publishing	17.5	-65.5	-36.4
Miscellaneous Services	-1.3	24.9	-62.3
Chemicals	17.5	-15	-69.1
Manufactured Fuels	-125.2	-125.1	-125.1
Oil & Gas	-128.5	-158.8	-162.7
Pharmaceuticals	30.7	-189.6	-190
Metal Goods	345.6	-405.8	-204.2
Retailing	-392.1	-169.2	-257.9
Gas Supply	-309.3	-358.7	-404.6
Rubber & Plastics	5.4	77.1	-462.3

In terms of skills and occupational profiles, gaps may emerge as the MENA region is currently dominated by medium- and low skilled and often migrant workers. There are likely growing demands for highly skilled workers in a low-carbon transition. Technical and vocational training

and reskilling is a precondition as technologies continue to evolve and new green industries emerge in the region. Around 300,000 workers in fossil fuel extraction industries may require reskilling and training. However, this is small compared to the 10% of the remaining workforce (or some 8 million workers) in other sectors and the 20% of youth (or some 7.9 million) who are assumed to require training to match the skills demand in the new green industries. This is equivalent to a minimum of 16 million trainees in the ambitious net zero scenarios by 2050.

Regarding gender and labour market participation, if no dedicated policies are introduced, existing structural labour market inequalities are likely to be perpetuated into the future. Notably, the male dominated energy sector may attract few women. Dedicated training programs for women and disadvantaged workers may change the picture nevertheless.

Conclusions

Summary of results

The global energy transition poses potential opportunities and risks to economic welfare of the MENA region, depending on today's policy choices. Due to high dependency on fossil fuel use and exports, and the potential negative effects of climate policies enacted outside the MENA region, there is a need for the region to adapt and invest in its own low-carbon economy in order to take advantage of the transition.

The analysis demonstrates that:

- As a passive by-stander to the global energy transition, MENA faces potential losses in jobs and welfare. This is shown in the NDC scenario which features only modest emission reduction ambitions and is not accompanied by any employment and industrial policies.
- Higher decarbonisation ambition and corresponding investments would lead to positive economic benefits for the MENA region in the medium and long term, creating low-carbon industries to diversify and eventually replace the oil and gas industry at a higher level of economic and social development.
- In all scenarios, each country and sector is impacted differently with winners and losers from the transition. Notably, the fossil fuel value chain would be restructured towards growth opportunities in clean electricity and hydrogen supply and export, electric vehicle manufacturing and construction, to name but a few. In the net zero scenarios, potential gains in opportunities in new low-carbon industries and their supply chains can outweigh potential losses in fossil fuel related sectors.
- The cost of investment and the cost of stranded assets are high, but are paying off and yield higher productivity and employment levels in 2030 and 2050. This implies that outcomes are sensitive to the financing assumptions made. In a scenario with substantial international financing the benefits are high while the costs for the local population low. Without such funding the transition would but higher strain on governments' financial balances, and outcomes are most likely less positive.

Policy implications

The economic and employment outlook for MENA countries will be determined by the following overarching trends of the global energy transition.

- Geopolitical, energy security and climate concerns are fast tracking the global energy transition. With more than 100 countries having pledged to net zero, investments in low carbon technology outpaced investments into fossil fuels for the first time 2023. Driven by strong industrial policies around the world renewable energy investments are set to reach \$1.7 trillion overtaking the \$1 trillion in unabated fossil fuels (IEA 2023).
- Leading countries in the energy transition are harnessing first mover advantages, clean-tech monopolies, export markets and some 13.7 million renewable energy jobs created globally. Countries in the MENA region – with their comparative advantage and expertise in energy technology, abundant renewable resources and youthful labour market – have the potential to catch up and enact best practice green industrial and just transition policies. MENA could become a new leader in the energy transition. Significant welfare gains could be achieved as compared to a business-as-usual scenario. This would require a shift in gear.

The main policy implications for MENA countries to catch up and become active drivers in the accelerating global energy transition are following:

Integrated climate, industrial and just transition policies.

- Strong industrial and climate resilient policies, matched with just transition policies, will yield significant positive results in terms of social, employment and welfare. Thus, integrated climate, industrial and social policies which are bold enough to fast track and leapfrog the energy transition in MENA would make it a winner in the energy transition to net zero 2050.
- This reflects export potentials and new job opportunities for the local population and the private sector, who will require training to address ongoing labour market challenges as well as upskilling to adapt to an evolving low-carbon environment. In MENA countries where the labour demand cannot be met nationally labour mobility may be
- Skills needs assessment system are required to target green sectors, provide career guidance and employment services and upgrade market relevant skills delivery for green sector occupations with flexible skills training and certification systems.

Just transition policies

- To ensure a just transition that brings about the most employment and economic benefits, policies should include a combination of climate, energy, industrial, economic and social elements. A mixed industrial and economic policy basket that includes incentives for low-carbon technologies and industries, disincentives for fossil fuels, public investments, redirection of investments from oil and gas into clean-tech and regulatory measures are recommended.
- To achieve social and employment gains, the economic and industrial policies need to be matched with strong just transition policies. Key to enable positive labour market outcomes are the reskilling of fossil fuel workers and their social protection to ensure frictionless industrial restructuring. Technical and vocational education and skills training for the young

matched with investments into eco-innovation, incubation and green entrepreneurship would create a vibrant private sector.

- Skills gaps may emerge and need to be addressed with technical and vocational training and reskilling to match the likely growing demands for highly skilled workers. Importantly, significantly higher demands for labour mean increased opportunities for all, including marginalized groups with impacts on the distribution of jobs across sectors, age, gender and citizenship. To address potential mismatches and ensure a frictionless restructuring, targeted active labour market policies are required. They could address the region's high levels of youth unemployment, and low levels of economic participation among women.
- To address existing structural inequalities in the labour market, inclusion, and equity a particular focus on gender, migrant workers and most vulnerable groups may be required. Dedicated programs may link disadvantaged workers to big green initiatives.

Financing and Just Transition Fund

- A key question exists around the financing of new clean tech investments, and offsetting of losses in oil & gas revenues and asset values. Alternative options to reduce reliance on international sources of funding may include royalties from green hydrogen and solar exports, progressive environmental taxes (in addition to progressive carbon prices), energy subsidy reforms matched with social transfers to those most impacted, IMF special drawing rights, Central Bank Green Bonds at reduced or no interest rates and sovereign wealth funds investments into green and climate funds. Each option would impact the results in different directions which need to be assessed.
- A Just Transition Fund could be set up channel national and international revenues into specific just transition programs, notably low-carbon investments, skills, social protection and economic diversification and enterprise development.

Regional integration

- There are noticeable benefits from regional collaboration, as increased decarbonization in one part of the region will support cost reductions in others. The establishment of a regional investment and just transition fund for financing skills training and entrepreneurship, reskilling and social protection, mitigation and adaptation measures would facilitate this process.
- A just transition emphasizes a participatory approach to environmental and social sustainability through social dialogue. Social dialogue gives voice to the concerns and needs of workers, employers, and communities affected by the transition towards net zero emissions, helps build trust, and form consensus. Social dialogue among ministries and organizations representing both workers and employers is crucial in drafting decarbonization strategies and plans to address the labour issues inherent in decarbonization.