

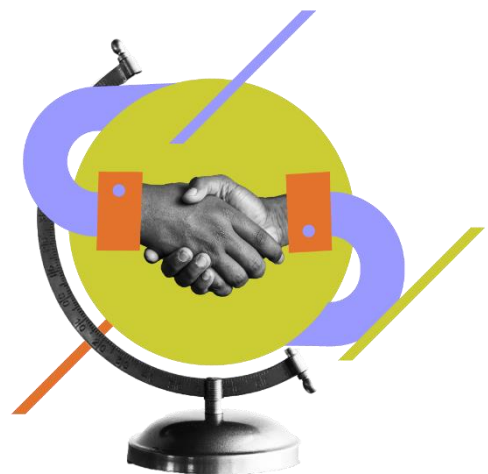


THE ITALIAN CLIMATE CHANGE THINK TANK

# GAS-TO-CLEAN TRANSITION IN THE MEDITERRANEAN: TOWARDS NEW PARTNERSHIPS WITH ALGERIA AND EGYPT

POLICY PAPER  
APRIL 2022

Annalisa Perteghella  
Elena Corradi



# TABLE OF CONTENT

<b>1 EXECUTIVE SUMMARY.....</b>	<b>3</b>
<b>2 INTRODUCTION: THE ENERGY SECURITY-CLIMATE SECURITY NEXUS.....</b>	<b>5</b>
<b>3 THE ROLE OF THE MEDITERRANEAN.....</b>	<b>8</b>
<b>4 A NEW PARTNERSHIP FOR THE GAS-TO-CLEAN TRANSITION IN ALGERIA AND EGYPT.....</b>	<b>11</b>
<b>5 THE DEVELOPMENT OF RENEWABLES IN ALGERIA AND EGYPT: OBSTACLES AND OPPORTUNITIES.....</b>	<b>14</b>
<b>6 WHAT ROLE FOR HYDROGEN?.....</b>	<b>17</b>
<b>7 CONCLUSIONS: NEW PARTNERSHIPS TO UNLOCK JOBS AND INVESTMENT.....</b>	<b>19</b>
<b>ABOUT ECCO.....</b>	<b>22</b>

## 1 EXECUTIVE SUMMARY

The Russian invasion of Ukraine has made it imperative for the European Union to break free from its energy dependence on Moscow. European gas purchases bring an average of approximately €400 million per day into the Kremlin's coffers, including around €92 million per day from Italy. The REPowerEU action plan drawn up by the European Commission to tackle the energy crisis and end dependence on Moscow by 2030 outlines a strategy based on two pillars: diversification of supplies, with a view to increasing emancipation from Russia, and acceleration of renewable energy and energy efficiency, with a view to reducing Europe's dependence on fossil fuels. According to the REPowerEU plan, European gas demand will in fact decrease by 40% in 2030 compared to 2021. The Commission's plan therefore seems to correctly combine the concepts of energy security and climate security. The energy crisis is not the only crisis Europe is called upon to tackle. Equally urgent is the response to the climate crisis, as recently recalled by the latest IPCC report on Mitigation. In the search for alternative suppliers to Russia, the EU and Italy have identified the Mediterranean – and especially Algeria and Egypt – as a region of primary importance. At present, however, for these countries to increase their gas exports to the EU and thus help close the Russian gas gap, large investments would be needed to significantly increase production. Such investments would either tie the EU and its member countries to the region and to natural gas well beyond the time limits set for decarbonisation, or condemn the producing countries to investments that would not be repaid by the decreasing demand for gas in Europe.

Cooperation with Algeria and Egypt should instead include the creation of a partnership for the gas-to-clean transition: this means increasing the share of renewables in the electricity mix of these two countries so as to free up more gas for export. Considering that the electricity generation of these countries depends almost exclusively on gas, with the exception of oil and hydroelectric in Egypt, increasing the share of renewables in the electricity mix to 20% in one year would "free up" 11.5 bcm of gas for export (7.9 bcm in Egypt and 3.7 bcm in Algeria). An additional 13.5 bcm of gas could be included by capturing "gas flaring" and "gas venting" (gas released into the atmosphere) in Algeria – the fifth country in the world for flaring – helping to reduce CO<sub>2</sub> emissions. Adding the latter 13.5 bcm of captured wasted gas to the 11.5 bcm of gas "freed up" for export by generating electricity from renewable resources, and taking into account the remaining export capacities of the two countries, would result in 24.5 bcm of extra gas available for export.

Initiating the clean transition in the energy sector in North African countries can entail complex challenges regarding political reforms, significant financial resources and technological expertise. Replicating what happened in 2021 when support was offered to kick-start the transformation of South Africa's energy sector and accelerate its exit from coal, the EU and Member States bordering the Mediterranean could offer support to establish collaborative platforms to secure know-how and drive public, private and philanthropic investments to embark on an accelerated process towards a clean and just energy transition in line with the climate ambitions of the beneficiary countries. Algeria and Egypt, as demonstrated in this paper, may be the first two Mediterranean countries with which to undertake this type of partnership. In particular, building on the strength of its geographical, political and diplomatic profile, Italy could play a leading role in coordinating European support for the energy transition in Algeria, together with the European Commission.

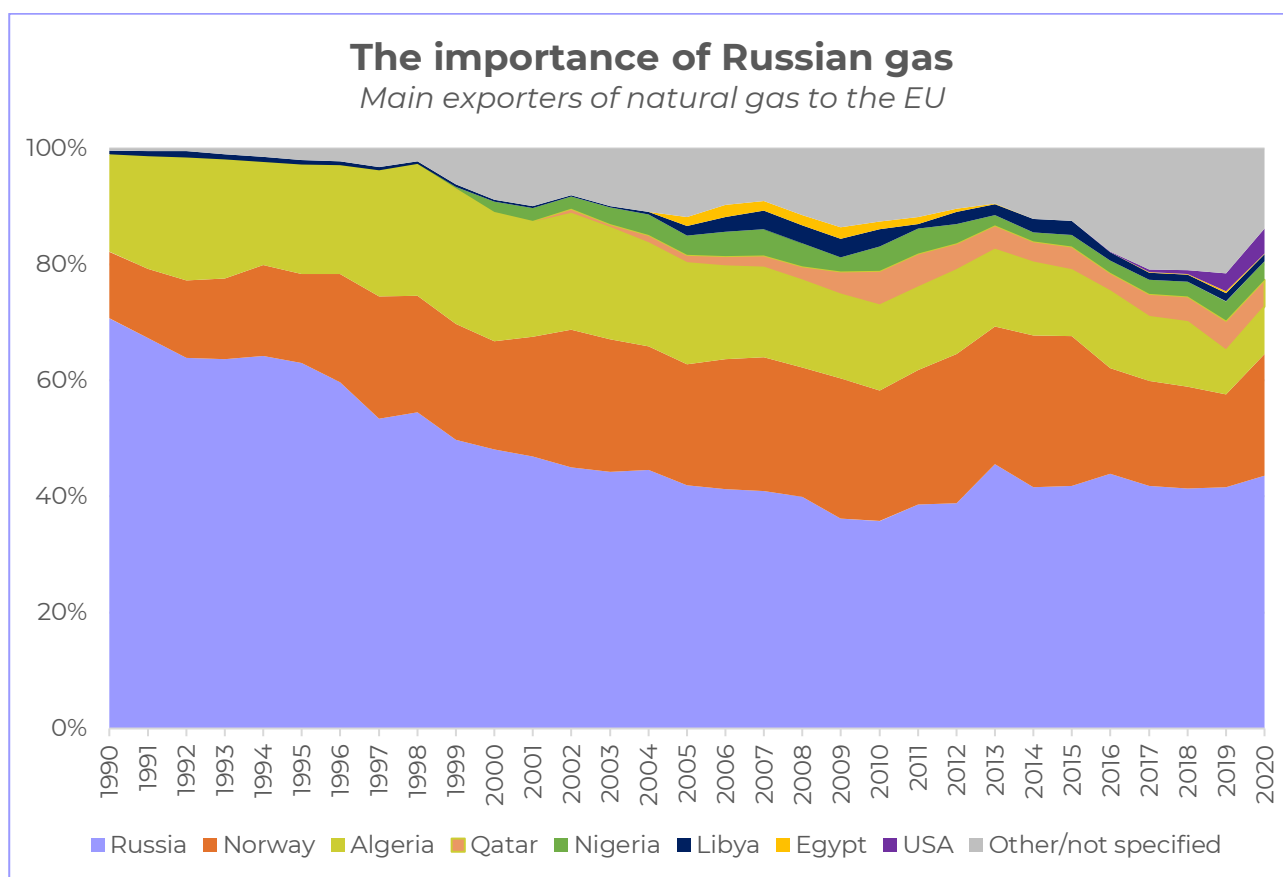
The realisation of a partnership between Europe and the Mediterranean for the gas-to-clean transition would benefit both sides:

- ◇ Europe would receive more gas supplies, for a total of 24.5 bcm, thus covering a significant part of the additional supplies identified by the REPowerEU plan as necessary to free itself from dependence on Russia. In Algeria and Egypt, the possibility of exporting greater quantities of gas at current prices (which are expected to remain high over the next two years) would allow for higher revenues than those obtained on the domestic market, where subsidies (especially in the case of Algeria) remain and turn into unproductive public spending.
- ◇ New investments for the expansion of gas production and its transport would commit Europe to fossils for a long time. In this way, the EU would make itself dependent on a region, the Mediterranean, with a high geopolitical risk and risk of supply disruption. On the contrary, investments in the Mediterranean energy transition would be valuable investments in the long run because they would contribute to reshaping the region's socio-economic systems in a more inclusive way, while sheltering governance systems from the destabilising consequences of the decrease in oil and gas revenues resulting from European decarbonisation policies. According to RCREEE estimates based on IRENA data, achieving national renewable energy targets in Algeria and Egypt would create 60,060 and 147,378 new jobs respectively.
- ◇ Through the development of renewables, mitigation policies are put in place, which the latest IPCC report identified as necessary to prevent global warming from exceeding the Paris targets. The Mediterranean is particularly exposed to the impacts of climate change such as sea level rise (which endangers coastal ecosystems, human settlements, infrastructure and tourism), water scarcity and soil drying, with consequences on agriculture, water supply for housing and industry. These impacts can lead to economic, social and political instability, with consequences also for Europe.

## 2 INTRODUCTION: THE ENERGY SECURITY-CLIMATE SECURITY NEXUS

The Russian invasion of Ukraine has rekindled the debate on the necessity for the European Union to free itself from its energy dependence on Moscow. This is not the first time the discussion takes place: following the outbreak of the crisis in Ukraine that later resulted in the Russian annexation of Crimea, the European Commission presented in May 2014 the [European Energy Security Strategy](#), recognising the foreign policy implications of its energy policy and the need for a common and coordinated energy policy. The Commission's subsequent [Communication on the Strategy for an Energy Union](#) presented in February 2015 indicated the need to diversify gas supplies to increase Europe's resilience to possible supply disruptions, and pointed in particular to the Southern Corridor, Algeria and the Mediterranean, as the strategic route for diversification.

Over the years, however, dependence on Moscow has not decreased; on the contrary, EU imports from Russia have shown an [increasing trend](#) since 2010.



Source: Eurostat, calculated on total imports from non-EU27 countries

In the meantime, moreover, with the launch of the [Green Deal](#) in December 2019, the European Union has reaffirmed its willingness – already acknowledged in 2009 with the launch of the [20-20-20 Plan](#) – to link its energy policy to the achievement of climate objectives. The European Green Deal, conceived as a plan for the economic transformation of the EU into "a modern, resource-efficient and competitive economy", has since become an integral part of the EU's post-pandemic recovery plan, with 30% of Next Generation EU devoted to adapting Member States' economies to climate targets. In its [Fit for 55 package](#) presented in July 2021, the EU outlined the policy actions needed to achieve its

decarbonisation targets, including reaching 40% renewables in the energy mix by 2030 and raising the energy efficiency targets.

This premise is necessary to understand what actions are to be taken today, in the face of the obvious need to put an end to European energy dependence on Russia, responsible for the invasion of Ukraine and the violation of the security system in force in Europe since the end of the Cold War. [Europe's gas purchases](#) from Moscow bring an average of about €400 million per day into the Kremlin's coffers, including about €92 million per day from Italy<sup>1</sup>. The objective declared by European leaders at the [informal Versailles summit](#) of reducing and, in perspective, eliminating gas imports from Russia is therefore key not only to European energy security but also to stopping European financing of the Russian war effort.

This objective has been well received by the European Commission, which on 8 March presented the [REPowerEU](#) action plan to tackle the energy crisis and end dependence on Russian gas by 2030. The new strategy is based on two principles: the diversification of supplies, with a view to increasing emancipation from Russia, and the acceleration of renewables and energy efficiency, with a view to reducing European dependence on fossil fuels. European guidelines therefore make clear that the search for alternative suppliers to Russia should not compromise the EU's climate commitments set out in the [European Climate Law](#): a 55% reduction in net emissions by 2030 and the achievement of climate neutrality by 2050. The REPowerEU plan accelerates Europe's efforts to reduce its dependence on gas: while the Fit for 55 package reduced demand by an equivalent of 100 bcm by 2030, REPowerEU requires an acceleration up to 160 bcm, equivalent to a 40% reduction in 2030 compared to demand in 2021<sup>2</sup>.

It is thus necessary to prevent the search for alternative supplies to Russian gas from turning into new investments in this sector, which would bind the Union and its Member States well beyond the time limits set for decarbonisation. This is not the time to slow down the ecological transition: on the contrary, it is the time for a serious acceleration.

The energy crisis is not the only crisis Europe – and the rest of the world – is to act upon. Just as urgent is the response to the climate crisis. As shown by the IPCC's February 2022 report "[Impacts, Adaptation and Vulnerability](#)", the impacts of climate change are already manifesting themselves beyond what was expected: heat waves, droughts and floods are already putting lives, biodiversity and infrastructure at risk, with knock-on effects on water and food security and economic growth. According to the Swiss Re Institute's [Climate Change Economic Risk Index](#), rising temperatures by 2050 could erode between 11% and 18% of global GDP. The [latest IPCC report on mitigation](#), presented in April 2022, confirmed that the window to stop climate change is closing. According to the report, without a change of course and a halt to the construction of new fossil infrastructure, current policies would lead to a [warming of 2.7°C or more](#) by the end of the century, while current net emission reduction commitments would still produce a warming of around 2.2°C.

---

<sup>1</sup> To estimate the Italian expenditure on natural gas imports, we considered the daily physical flows from 24 February to 22 March at the Tarvisio entry point published by [Snam](#) and the spot price at the Dutch TTF hub published by the European Energy Exchange ([EEX](#)). While a part of gas sales is bought on the spot exchange, a part is sold with long-term contracts indexed to oil and gas prices.

<sup>2</sup> Calculations made by ECCO based on gas savings from increased renewables and energy efficiency shown in the REPowerEU Plan as additional to Fit for 55 (see table page 6 of the [Communication](#)). For EU gas consumption in 2021 see [IEA](#).

It is therefore no longer possible or useful to distinguish between energy security and climate security. On the contrary, a true resilience strategy must integrate the two concepts.

### 3 THE ROLE OF THE MEDITERRANEAN

Since the beginning of the Russian invasion of Ukraine, the European Union and its Member States have been searching for alternative suppliers to Russia, identifying the Mediterranean and sub-Saharan Africa as preferred areas. As the two regions are characterised by different levels of development and needs, they are to be approached in two different ways. This paper focuses on the approach to the Mediterranean. In particular, Italy and Europe seem to be focusing on strengthening energy cooperation with Algeria and Egypt to emancipate themselves from Russian gas. Together these two countries hold three quarters of the [natural gas reserves](#) in the Mediterranean<sup>3</sup>.

Even before the Russian invasion of Ukraine, on 17 February, on the sidelines of the joint European Union-African Union summit, EU Energy Commissioner Kadri Simson [met](#) Egyptian Oil Minister Tarek El-Molla to discuss future EU-Egypt cooperation on energy, including in the "short and medium term on LNG and in the long term on renewables and hydrogen". A few days after the outbreak of war, on 28 February, Italian Foreign Minister Luigi Di Maio paid an official visit to Algiers, [announcing](#) "a stronger energy partnership" with Algeria "in the short, medium and long term". The next day, Spain's Minister for Ecological Transition Teresa Ribera Rodríguez [said](#) that "Algeria is ready to supply more gas". On 29 March, the [Strategic Dialogue](#) between Italy and Algeria was held in Rome, with more than 60 representatives of ministries and organisations from both countries present. The Dialogue was divided into three working groups dedicated to political and security cooperation, economic cooperation and cooperation on global issues and the protection of common goods in the Mediterranean, and represents a clear sign of renewed Italian interest in Algeria.

The current situation shows a clear imbalance in the concept of energy security, understood only as security – and therefore diversification – of supplies, hence the risk of new investments in gas to expand existing production. This dimension of energy security, however, does not take into account either [the clean, higher impact and readily available alternatives to gas](#) – such as savings, efficiency and renewables – or the projected reduction in European gas demand by 2030 (40% less than in 2021), if the Fit for 55 and REPowerEU packages are implemented. Moreover, since the Mediterranean region is far from being an area of stability and cooperation, tying European energy security to this region risks being a short-sighted strategy.

There are several risk factors in the region today:

- ◇ **Geopolitical risk:** More than ten years after the outbreak of the Arab Springs, the deep-seated motivations behind the uprisings have not been addressed or resolved. The conflicts in Libya, Yemen and Syria are far from being resolved. Elsewhere, authoritarian restoration has only provided a cloak of apparent stability over extremely fragile social, economic and political situations, with increasing restrictions on freedom of expression, civil, political and social freedoms. This basic fragility has been compounded firstly by the economic crisis triggered by the pandemic and now by the wave of hyperinflation and the crisis in commodity prices, which threatens to

---

<sup>3</sup> Libya, covering 18% of natural gas reserves in the Mediterranean, is the third largest country in the region in terms of quantity of reserves, but political instability and insufficient infrastructure prevent it from increasing gas exports significantly.

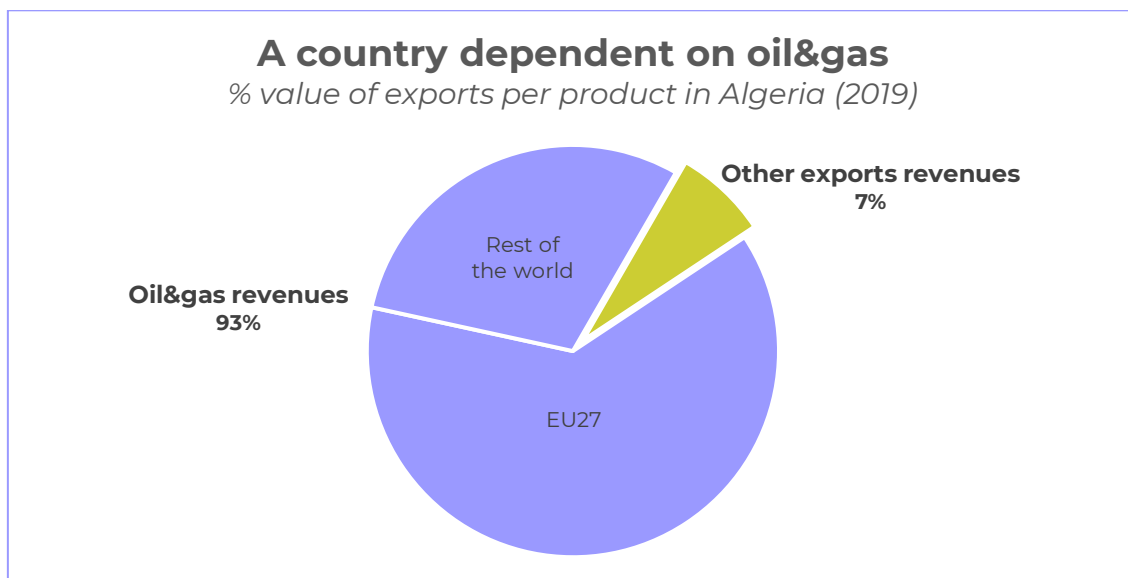


derail the already precarious post-Covid recovery. There is also a food crisis looming due to the dependence of countries in the region on food commodity imports from Russia and Ukraine. Egypt, in particular, which imports over 80% of its wheat from Russia and Ukraine, has seen bread prices rise by 25% in the first three weeks of the conflict. In the medium term, therefore, several elements of fragility present in the region today could combine to form a perfect storm and give rise to a new wave of instability.

- ◇ **Risk of supply disruption:** Increased dependence on the Mediterranean would not protect Europe from risks of supply disruptions and future conflicts. In 2010, before the outbreak of war in Libya, 85% of Libyan oil exports were destined for the European market, with Italy, France and Spain dependent on Libyan crude for 22%, 16% and 13% respectively. Dependence on natural gas was even higher: 100% of Libyan natural gas exports were destined for Europe. The fall of Gaddafi and the long civil war that followed severely jeopardised our energy security: Libyan natural gas exports to the EU plummeted from 10 bcm in 2010 to 2.4 bcm the following year. In January 2013, a terrorist attack by al-Qaeda on the In Amenas gas plant in Algeria interrupted production ([9 bcm of gas per year](#)), which was only restored in January 2014. A more recent example, also involving Algeria, dates back to November 2021, when, due to the breakdown of diplomatic relations with Morocco, Algiers cut off the supply of gas to Spain via the Maghreb-Europe pipeline (13.5 bcm) transiting Moroccan territory, allowing only the supply via the Medgaz submarine pipeline (10.5 bcm) that directly connects Algeria and Spain..
- ◇ **Economic risk:** The current record level of gas prices follows the alteration in supply and demand due to the post-pandemic economic recovery and geopolitical tensions. However, from 2008 up until autumn 2021, gas prices were following a downward trajectory, having reached €4.65/MWh in May 2020 at the TTF (Title Transfer Facility) in Amsterdam, the reference market in Europe. This figure, combined with oil price volatility, meant that Algeria reported a [public deficit](#) of 9.3% of GDP in 2021 (after a peak of 15.3% in 2015). Although uncertainty about the course of the war in Ukraine does not currently allow forecasts to be made, in the medium to long term, a return to pre-crisis prices or a repetition of periods of volatility would make it highly risky for producing countries to continue to rely on gas revenues. In this context, the [announcement](#) by the CEO of the Algerian energy company Sonatrach, Toufik Hakkar, that Algeria intends to invest USD 40 billion in oil exploration, production and refining and gas exploration and extraction between 2022 and 2026 is particularly risky. Indeed, such investments risk not to ensure an adequate return. On the contrary, they take capital and political attention away from projects that could have a better impact on the country's energy and climate security.
- ◇ **Climate risks:** According to the International Energy Agency (IEA), to achieve climate neutrality by 2050 and keep the global temperature rise within the 1.5°C limit set by the Paris Agreement there should be no new oil and gas development project beyond those already approved in 2021. This recommendation was confirmed by the April 2022 IPCC report "Climate Change Mitigation". The risk of failing to meet mitigation targets adds to the risk of extreme climate impacts which, according to the February 2022 IPCC report on "Impacts, Adaptation and Vulnerability", is particularly high for the Mediterranean basin. In fact, the region has elements of vulnerability such as a large and growing urban population, a growing number of people living in settlements affected by sea level rise, severe water scarcity, increasing demand for water for irrigation, high economic dependence on tourism. These vulnerability factors contribute to amplifying the impacts of climate change, which the IPCC report identifies as:

- Sea level rise with consequent risk of coastal flooding, erosion and salinisation that threaten coastal ecosystems, human settlements, infrastructure and tourism.
- Water scarcity and soil drying up, affecting agriculture, water supply for housing, industry. In rural communities, desertification can lead to social and, eventually, political instability.

◇ **Non-transition risk:** As outlined above (see Economic risk), new investments in these countries' fossil sector, without equivalent energy transition interventions, risks reinforcing a relationship of dependence on oil and gas rent. This dependence is resulting problematic in the face of falling prices and will be even more so when Europe reduces its imports as a result of its decarbonisation strategy. The disappearance of rents in countries whose socio-economic and political systems are based on them risks giving rise to new instability. This risk is [particularly high](#) for Algeria. The country receives over 90% of its [export revenue](#) from the sale of oil and gas; 68% of this revenue comes from Europe. It is therefore clear that there is an urgent need to put in place a plan to diversify the country's economic structure that can guarantee economic and social stability in a scenario of severe rent reduction.



Source – UNCTAD

## 4 A NEW PARTNERSHIP FOR THE GAS-TO-CLEAN TRANSITION IN ALGERIA AND EGYPT

As argued in the Introduction of this paper, in outlining the new energy partnership with Algeria and Egypt, and more generally in responding to the need to end dependence on Russia, it is necessary to start from a revision of the concept of energy security. The latter should go beyond the traditional meaning of security of supply – which risks supporting other forms of insecurity – and include other dimensions crucial to the construction of truly resilient economies and systems. It is therefore necessary to integrate energy security and climate security.

It is within this new concept of energy and climate security that the role of natural gas must be understood: a precious resource, but one whose use, [as the IEA points out](#), must gradually decrease until it ceases. Therefore, the existing quantity already accounted for in climate compatibility scenarios must be exploited as rationally as possible. This means extracting the maximum value for all parties from existing gas, without increasing production. For importing countries, especially Europe and Italy, this maximum value is provided by the possibility of importing larger quantities in order to diversify supplies. For exporting countries, in this case Algeria and Egypt, this means maximising revenue by exporting larger quantities of gas, especially at times of very high prices. This win-win strategy can be made possible through the creation of a partnership for the gas-to-clean transition of Algeria and Egypt: this means increasing the share of renewables in the electricity mix of these two countries in order to free up more gas for export.

Current gas production in Algeria and Egypt is sufficient to fill part of the export quotas to the EU that would be missed in the event of an embargo on Russia, identified by the REPowerEU plan as an additional 10 bcm of pipeline gas and an additional 50 bcm of LNG<sup>4</sup>.

Algeria is connected to Europe by three pipelines: the Maghreb-Europe Gas Pipeline (MEG), which has been shut down since November 2021 due to tensions between Algeria and Morocco and has a capacity of 13.5 bcm, the MedGaz and the TransMed. [The latter](#) exports an average of 22 bcm of natural gas per year, but has a capacity of 32 bcm, while the capacity of the MedGaz has been [expanded](#) from 8 bcm to 10.5 at the end of 2021. In addition, Algeria exports some gas to Europe through its LNG facilities, which are also not used to their full potential: out of a capacity of 34.7 bcm, it [exported](#) 15.6 bcm in 2021 (i.e. 45% utilisation rate)<sup>5</sup>. The remaining LNG capacity therefore equals to 19.1 bcm, which can be added to the remaining capacity of 10 bcm of the TransMed pipeline for a total of 29.1 bcm.

---

<sup>4</sup> In addition to Algeria and Egypt, the REPowerEU plan envisages potential increases in gas via pipelines from Azerbaijan, Norway, and via LNG from Qatar, the US and West Africa. In addition, the EU has reached an understanding with the US to increase the amount of imported US LNG by 15 bcm by 2022 and by 50 bcm per year until at least 2030.

<sup>5</sup> ECCO calculations based on [ICE Agency](#) and International Gas Union data using a conversion factor of 1 Mt LNG = 1.36 bcm.

Egypt, in turn, exports gas through two LNG liquefaction plants that were used at about 51% of their capacity in 2021. Out of a total capacity of 16.6 bcm per year, Egypt has in fact exported 9.2 bcm of gas in 2021<sup>6</sup>. The remaining capacity therefore equals to approximately 7.3 bcm<sup>7</sup>.

Both countries, however, are already producing close to their maximum capacity. Moreover, a large part of production is intended to meet domestic demand. This is especially true for Egypt, which in 2020 [produced](#) 58.5 bcm of gas and consumed 57.8 bcm. Algeria, on the other hand, produced 81.5 bcm of gas in 2020 and consumed 43.1 bcm.

Considering that gas represents 77% of electricity production in Egypt and 99% in Algeria, replacing part of that gas with renewables (in particular solar and wind power given the [vast potential](#)) would free up new quantities of gas that would become available for export, without the need to increase exploration and current production and/or resort to new infrastructure.

In 2019, renewables (hydro, solar and wind) accounted for 9% of electricity generation in Egypt and only 1% in Algeria<sup>8</sup>. If the shares of solar and wind were to increase to 20% of the electricity mix in one year, 11.5 bcm of gas would be "freed up" for export (7.9 bcm in Egypt and 3.7 bcm in Algeria), equivalent to 20% of the bcm of natural gas identified by the REPowerEU plan to be imported by 2022 from alternative suppliers to Russia<sup>9</sup>.

In addition, a [second pillar](#) of exportable gas can be derived through the capture of "gas flaring" (the waste gas burned), "gas venting" (the gas released into the atmosphere) and leakages during the various processes, treatment and transport. [Algeria](#), in particular, is the fifth country in the world for flaring. 13.5 bcm of this gas could be captured per year, equivalent to 23% of the additional bcm calculated by the REPowerEU plan. Capturing this wasted gas, which would otherwise end up in the atmosphere, would also significantly reduce emissions. Adding these last 13.5 bcm that can be captured from wasted gas to the 3.7 bcm of gas "freed up" for export through electricity generation from renewable resources would result in 17.2 bcm of extra gas available for export.

The sale of gas on European markets follows the prices of the Dutch TTF. Today, gas spot prices are very high (around €100 per MWh, after peaking above €200) and, according to [ARERA](#), future gas prices will remain around €100 per MWh throughout 2022, before falling to €65 in 2023 and €45 in 2024 – in any case well above pre-crisis prices<sup>10</sup>. By gradually but increasingly replacing gas with renewables, the greater quantity of exportable gas would translate into greater revenues: if already today – with an average European price of €100 per MWh<sup>11</sup> – the electricity mix of Algeria and Egypt were covered at 20% by renewables, gas exports would translate for these two countries into €11.8 billion in extra revenues in a year

---

<sup>6</sup> Exports from the Damietta LNG terminal began on 22 February 2021.

<sup>7</sup> ECCO calculations based on [MEES](#) and [International Gas Union](#) data using a conversion factor of 1 Mt LNG = 1.36 bcm.

<sup>8</sup> Latest IEA available data.

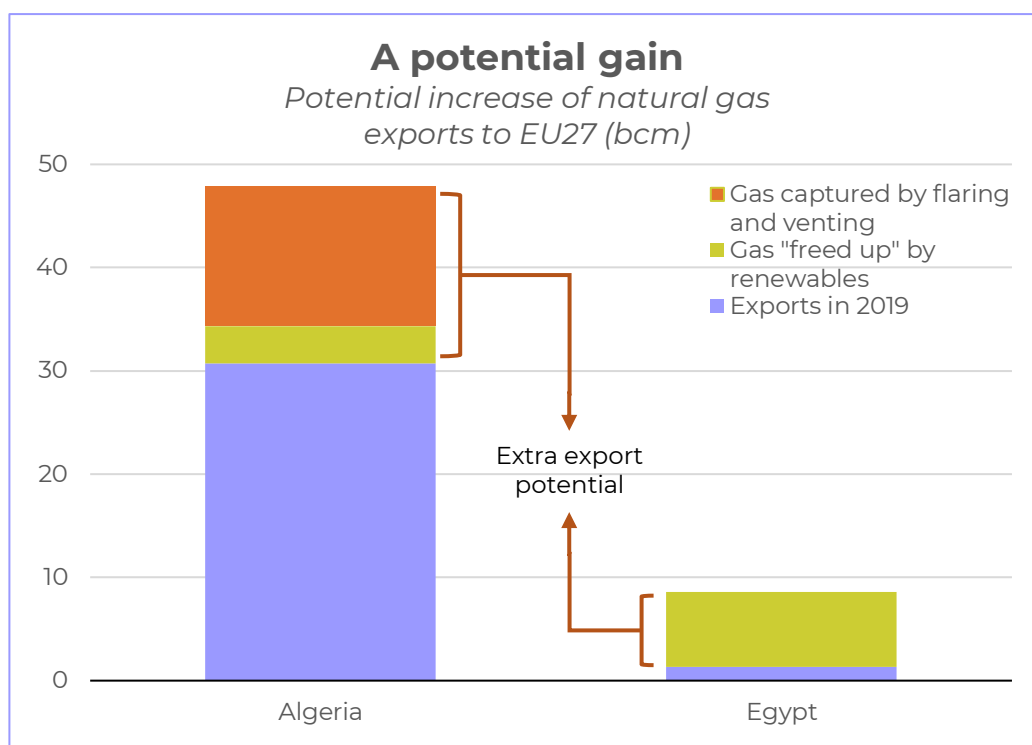
<sup>9</sup> Number of bcm of natural gas "released" calculated on IEA data, considering a producibility of 1,750 GWh/GW, a conversion factor of 1 mc = 10.69 kWh and a gas power plant efficiency of 40%.

<sup>10</sup> In the Conclusions of the European Council of 24-25 March, the Heads of State and Government mandate the Commission to assess by May the possibility and modalities of introducing a cap on gas prices.

<sup>11</sup> Revenue calculated using a conversion rate of 1 cubic meter = 10.69 kWh.

(€7.8 billion in Egypt and €4 billion in Algeria)<sup>12</sup>. If the share of gas that can be exported thanks to flaring and venting capture is also taken into account, revenues for Algeria, which has a greater residual export capacity, would rise to €18.4 billion.

The same quantity of gas, in fact, would have a higher value for Algeria and Egypt if sold on the international market than on the domestic market, since prices on the first one are, in all probability, higher than those on the second one. In these two countries, the price of gas is mainly dictated by the price of domestic production. Natural gas production is mainly subsidised in Algeria, where [subsidies for electricity and gas](#) exceeded \$2.5 billion in 2020, including \$1.2 billion for gas alone. The [wholesale price of gas](#) in Algeria in 2020 was in fact one of the lowest in the world, after that of Venezuela and Libya, at around \$0.5 per MMBTU, below the price of production of \$0.7 per MMBTU estimated by [Oxford Economics](#). In Egypt, on the other hand, the wholesale price in 2020 was much higher, at around \$4 per MMBTU, higher even than in Italy. In recent years, the Egyptian government has in fact cut fuel subsidies, as required by the IMF loan programme, and instead increased the share of gas prices set to cover "costs of service", including investment recovery and rates of return.



**Source** – Eurostat, Capterio & Columbia University, IEA - The extra export potential takes into account the remaining export capacity of the two countries.

<sup>12</sup> This figure has been calculated taking into account the amount of gas that can be "freed up" from the electricity mix through renewables and the remaining export capacity of Egypt and Algeria.

## 5 THE DEVELOPMENT OF RENEWABLES IN ALGERIA AND EGYPT: OBSTACLES AND OPPORTUNITIES

To reach 20% renewables in the electricity mix in Algeria and Egypt, it would be necessary to install about 19 GW and 9 GW extra of renewable energy from solar and wind power plants respectively, starting from a base of about 0.5 GW in Algeria and 3.1 GW in Egypt according to the [latest data](#) from the International Renewable Energy Agency (IRENA) in 2020. It would therefore mean significantly accelerating the growth of solar and wind installations in the two countries, well above the growth recorded in recent years. However, a total of 22 GW of electricity generated from renewable sources in Egypt would not be too far off the target set in Egypt's [Integrated Sustainable Energy Strategy](#) (ISES to 2035) of 15 GW (or 20% of the electricity mix) by 2022 and around 52 GW (or 42% of the total) by 2035. Also in Algeria, a total of 9 GW of electricity produced from renewables would be in line with the target of 22 GW (or 27% of the total) by 2030 outlined in the [Plan for the Development of Renewable Energy and Energy Efficiency 2015-2030](#).

The current emergency must lead to an acceleration in the development of renewables that will allow the two countries to realign themselves with their own targets.

To date, in fact, neither country is in line with its targets: Egypt has 9% renewables in its electricity mix, while Algeria is stuck at 1%<sup>13</sup>. This situation reflects the great paradox of renewables development in the entire Mediterranean region: despite a very high potential, the penetration rate remains lower than in other areas of the world less rich in natural resources such as solar radiation and wind. The lack of development in this sense is therefore not due to the lack of potential, but to the lack or insufficient implementation of regulatory measures, policies and incentives. This is compounded by the lack of support from diplomacy, cooperation policies and businesses in importing European countries, which continue to give top priority to the oil and gas sector, where most investments are concentrated.

Some progress has been made in the development of renewables in [Algeria](#) and [Egypt](#): both countries have adopted laws and regulations that transpose and translate their respective strategies for the development of renewables. Both Algeria and Egypt have also adopted [instruments to support](#) the development of a renewables market in their respective countries. Egypt, in particular, has adopted instruments such as loans, grants and subsidies, procurement processes, net-metering and tax incentives, while Algeria has currently only introduced the first two.

[Detailed studies](#) on the development of renewables in Algeria reveal a significant growth between 2014 and 2017, thanks to the introduction of feed-in tariffs and, above all, the creation of the Renewables Fund, granting non-repayable or low-interest loans for investments in the sector. Since 2017, the development of renewables slowed down significantly, following the introduction of a procurement system; the first contract was launched only in 2019. The inefficient design of this system, [according to experts](#), may have contributed to uncertainty or even disincentives that ended up discouraging investment in the sector.

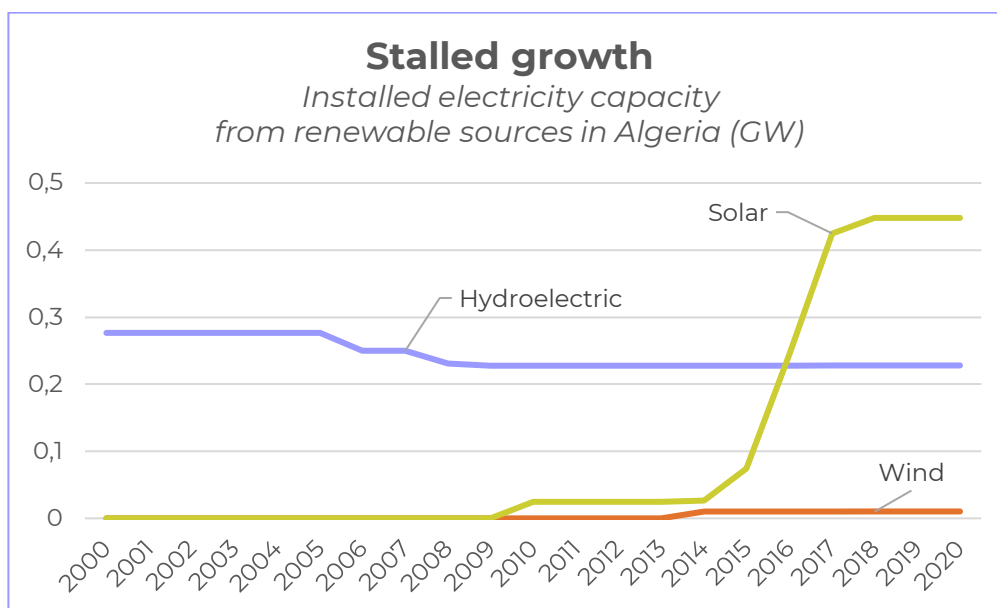
Inadequate enforcement of the regulatory framework and ineffective policy design are considered among the major obstacles to the development of renewables in the region,

---

<sup>13</sup> The figure refers to the latest available IEA data (2019).

along with technical barriers such as obsolescence and poor grid integration, lack of technical skills (but not human capital), and poor regional cooperation. These obstacles are significantly greater in Algeria than in Egypt. In addition, fuel subsidies in Algeria contribute to price distortion and, consequently, to the low competitiveness of renewables compared to oil and gas. At the end of 2021, the Algerian government had approved [the reform](#) of the subsidy system – with an expenditure of \$17 billion in 2020 alone – in favour of a more efficient redirection of subsidies to the poorer end of the population. The Finance Act that came into force on 1 January 2022 included a chapter on reforming the subsidy system, which was supposed to result in savings in public spending from 2022 and the coming years. However, the sharp rise in oil and gas prices, due to the post-Covid recovery and, above all, the outbreak of war in Ukraine, offered the Algerian government the opportunity [to shelve the reform](#). The higher oil and gas revenues from high prices have in fact provided relief to the public purse and prevented the government from having to proceed with a reform that, combined with the soaring cost of living, especially the price of food commodities, and stagnant wages, could have given rise to social unrest.

It is clear from these considerations that what is preventing a serious acceleration in the development of renewables in Algeria is the lack of political will towards a paradigm shift, especially from a system based on maintaining social peace through fossil fuels' rent redistribution, to a system based on renewables with a diversified economy.

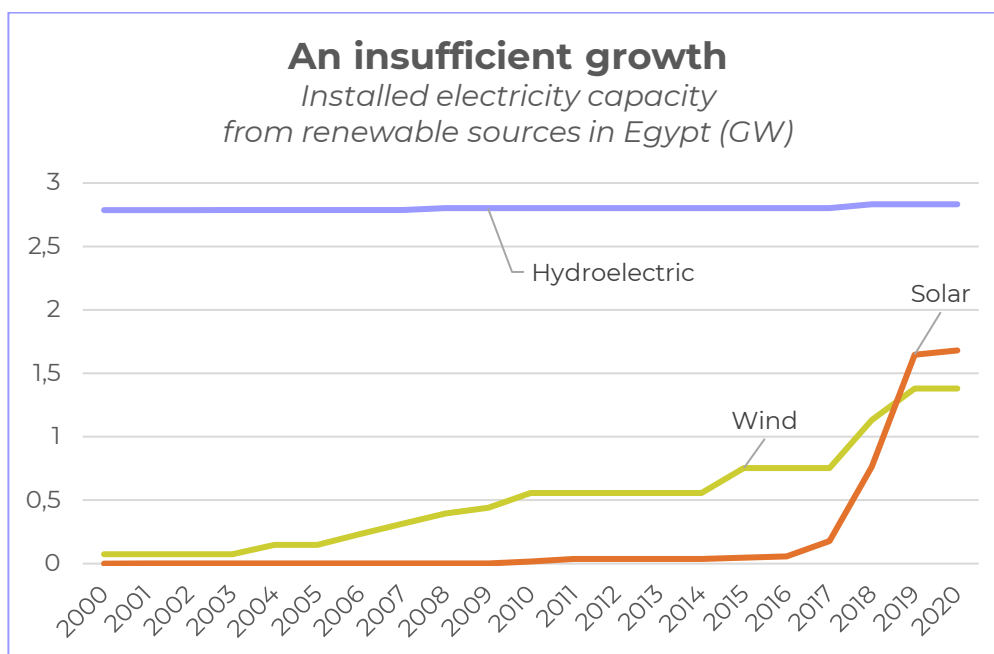


Source – IRENA

On the other hand, as far as Egypt is concerned, according to [a 2018 IRENA study](#), the ISES to 2035 strategy is not ambitious enough: the study estimates that 53% of electricity could be produced from renewable sources by 2030, instead of 42% by 2035 as envisaged by the Egyptian strategy. In particular, IRENA estimates that solar power plants, followed by wind power, could be the second most important source of electricity after natural gas, partly due to the low cost of these technologies. According to IRENA, replacing fossil fuels with renewable technologies would reduce the cost per MWh of electricity used by \$14, in addition to savings due to the effects of less air pollution and lower CO2 emissions. Savings per MWh drop to \$7 when the replacement of fossil fuels with renewables is taken into account also in the transport, industry and buildings sectors, further than in power

generation, for total savings of \$900 million per year until 2030. To achieve the IRENA 2030 targets, \$6.5 billion should be invested per year, including \$0.9 billion redirected from fossil fuels to renewables. Compared to current investments of approximately \$2.5 billion per year, IRENA 2030 targets would thus require \$3.1 billion a year in new investment. Egypt's extra revenues from gas exports to Europe would cover part of these investments.

IRENA also points out that the renewable energy strategy ISES to 2035, developed in 2014, does not take into account the decreasing costs of renewables since then and thus the relative ease in financing them compared to nuclear and coal. Moreover, despite a regulatory framework that formally encourages the private sector to invest in the installation of solar and wind power plants, in practice it requires following complex administrative procedures, which ultimately discourage those who want to undertake these projects. The electricity market liberalisation process introduced by Electricity Law 87/2015 to maximise the share of renewables in the electricity mix has made [little progress](#) so far. Finally, there is a lack of clear research and information on the benefits of renewables and how they can be maximised, as well as on how to adapt the electricity grid to an increase in renewables in the mix.



Source – IRENA

As this brief analysis of the potentials and limitations of renewable energy development in Algeria and Egypt shows, there are many opportunities. The current emergency should act as a spur to undertake a decisive acceleration in the development of renewables, so as to help both countries meet their own decarbonisation targets. To do this, however, partner countries – the EU and its Member States, starting with Mediterranean countries – should offer decisive support in this direction, refraining from actions that go in the opposite direction, namely that of strengthening the fossil sector.



## 6 WHAT ROLE FOR HYDROGEN?

The REPowerEU action plan assigns a very important role to hydrogen, indicated as an energy source that can help the EU diversify Russian gas supplies: if the Fit for 55 package indicated as a target the production of 5.6 Mt of renewable hydrogen to replace between 9 and 18.5 bcm of gas by 2030, REPowerEU quadruples this target, planning to increase production and hydrogen imports to 20 Mt by 2030, adding savings of 25-50 bcm of gas compared to the Fit for 55 targets.

The additional 15 Mt of hydrogen compared to the Fit for 55 package would consist in 10 Mt of imports and 5 Mt of increased European production. The Mediterranean would play a central role: the REPowerEU plan expresses the intention to support pilot projects for the production and transport of renewable hydrogen in the EU neighbourhood, starting with the Mediterranean ("Mediterranean Green Hydrogen Partnership"). The REPowerEU Plan therefore introduces even more ambitious targets for the import of hydrogen from the Mediterranean than those already included in the [European Hydrogen Strategy](#), which aimed at installing 20GW of electrolyzers in the Southern Neighbourhood by 2030<sup>14</sup>. While recognising the high level of ambition of these targets, some caution must be exercised.

First of all, a substantial amount of renewables is needed to produce green hydrogen. Already meeting the EU Hydrogen Strategy's target of 20GW of imports from North Africa by 2030 will require far more renewable energy capacity than currently installed. Increasing the import targets further will therefore require a clear acceleration of renewable energy development in North Africa. However, the renewable energy developed must first be used to meet domestic demand for power generation, and then be used to produce hydrogen for export. Moreover, even before being exported, the green hydrogen produced will have to be used for the on-site decarbonisation of hard-to-abate industrial sectors, primarily heavy industry (e.g. Egyptian cement, steel, refining and petrochemical plants), air and sea transport, as well as fertiliser production. When planning hydrogen infrastructure, these domestic needs must be taken as a starting point: production should be close to renewable energy plants, directed towards local industrial clusters, and developed as a function of the electricity grid rather than the gas grid. In addition, decarbonising the industrial sector in these countries will enable them to avoid a possible future loss of competitiveness with the EU of industrial products, including steel and cement, covered by the Carbon Border Adjustment Mechanism (CBAM), one of the proposals contained in the Fit for 55 package.

Exports to Europe must take into account the complexity and high prices of transport, either by pipeline – which must be converted to transport hydrogen – or by sea. According to IRENA's [World Energy Transition Outlook 2022](#), pipeline transport is cheaper than sea transport for distances of less than 3,000-5,000 km. This type of pipeline would therefore be more suitable for flows between North Africa and Europe, as noted in [a report](#) by the German think tank Agora Energiewende. However, it would take time for this type of flow to become competitive: according to the Agora study, North Africa could supply Europe with around half of its hydrogen needs by 2050 alone, making use of a much lower production price and a competitive transport price. In the short to medium term, the most efficient allocation of

---

<sup>14</sup> The European Hydrogen Strategy 2050 foresees the installation of 40 GW of electrolyzers in the EU and another 40 GW in the Eastern Neighbourhood, namely in Ukraine (20 GW), and in the Southern Neighbourhood (20 GW).

the scarce hydrogen molecules available is likely to remain in those processes – on-site – where more efficient alternatives are not available.

A further element of caution is the [amount of water](#) required for electrolysis in a region already characterised by water scarcity. The construction of desalination plants will also have to be included among the costs of green hydrogen production, bearing in mind that desalination is an energy-intensive process.

Finally, before setting such ambitious production and – even more so – export targets, Europe should quantify its future needs for green hydrogen as accurately as possible, starting with identifying the sectors in which it intends to use it. For the heating and light transport sectors, for example, cheaper and more efficient options than hydrogen already exist, such as electrification and energy efficiency. In addition, infrastructure development should be planned following the most cost-effective and efficient approach. At the moment, the approach favoured by the EU seems to be upgrading existing pipelines or constructing new pipelines that are also suitable for transporting hydrogen. Blending hydrogen into gas transmission networks and transporting hydrogen over long distances seems to have priority. But one has to be realistic about the actual technical potential and costs this option entails. To date, blending stands at rather low rates; moreover, both the conversion of existing pipelines and the construction of new infrastructure dedicated to hydrogen transport are very expensive. In view of this, as a [CESI study on the Italian case](#) also found, "the most economical solution is represented by high-flexibility electrolyzers in a decentralised and grid-connected configuration" compared to a scenario of widespread hydrogen transport. Totally on-site production, i.e. producing hydrogen where it is used, minimises transport costs while ensuring maximum flexibility.

## 7 CONCLUSIONS: NEW PARTNERSHIPS TO UNLOCK JOBS AND INVESTMENT

The benefits of a gas-to-clean transition strategy for the Mediterranean, beginning from Algeria and Egypt, are manifold. Europe, by exploiting its existing infrastructure, particularly that of Italy and Spain, would be able to secure up to 40% of new gas supplies in the short to medium term to compensate for Russian gas, thanks to new investments in renewables and gas flaring in Algeria and Egypt. Exporting increasing shares of gas in the short term at current price levels would allow producing countries to maximise their returns, providing the state coffers with the economic resources necessary to cope with the transition and diversify their economies, thus averting the many risks of future instability. Similarly, if European countries were to invest in the development of renewables and the capture of waste gases, the value of their investment would be long-lasting. The large-scale development of renewables would contribute to climate change mitigation and job creation.

According to [UN projections](#), by 2050 North Africa will be home to 111 million young people under the age of 25. More than 50% of young people in the Mediterranean region will be concentrated in just five countries: Morocco, Libya, Algeria, Tunisia and Egypt. Hence the need to transform the economies of these countries and encourage job creation. In Algeria, the [unemployment rate](#) in 2020 was 12.6%, in Egypt 9.2%. Traditionally, in these countries most of the population is employed in the public sector or in the informal economy, causing low productivity and low competitiveness. However, the economic crisis aggravated by the pandemic and the necessary cuts in public spending are undermining this model. For Algeria in particular, the deep dependence on natural gas revenues has meant a collapse in revenues during year 2020 due to the collapse in global energy demand. The expected phase-out of fossil fuels in the target markets reinforces the need to create jobs in sectors that are competitive in the long term. The renewables sector represents an opportunity in this regard, carrying high job creation potential along the entire value chain: project development, manufacturing, transport and logistics, sales, construction, installation and maintenance. In 2020, there were 12 million jobs globally in the renewables sector, for a [total installed capacity](#) of 2,799 GW. Of these jobs, only 23,000 are located in North Africa, despite the huge potential for renewables development there. According to [IRENA projections](#), in a development scenario compatible with the Paris Agreement, the total number of jobs in the global renewables sector could reach 38 million in 2030 and 43 million in 2050, increasing especially in the solar PV sector, which is estimated to provide 19.9 million jobs in 2050, up from 4 million today. According to [a study](#) by the RCREEE (Regional Center for Renewable Energy and Energy Efficiency), the first to conduct an analysis of the job creation potential in the renewable energy sector in the Mediterranean region, the estimates for Algeria and Egypt are as follows:

	Current situation (2020)		Potential scenario by 2030-2035	
	Renewables in the electricity mix	Jobs	Renewables in the electricity mix	Jobs
<b>Algeria</b>	0,7 GW	2.348	22 GW (2030)	60.060 (2030)
<b>Egypt</b>	5,9 GW	3.920	52 GW (2035)	147.378 (2035)

Sources:

Renewables in the electricity mix: [IRENA](#)

Current jobs: [IRENA](#)

Potential jobs: [RCREEE](#), solar and wind only

Embarking on a clean energy transition in North African countries can involve complex challenges involving policy reforms, the availability of significant financial resources, especially in the early stages of the process, as well as the skills and technology to quickly find solutions that ensure access to renewable energy sources. Achieving a rapid, effective and just transition that benefits all sectors of society and the economy therefore requires multilateral and coordinated efforts that feed into and assist domestic action in this field.

Replicating the support offered in 2021 to kick-start the transformation of South Africa's energy sector and accelerate its exit from coal, the European Union together with its Member States that border the Mediterranean could offer support for the creation of collaborative platforms to secure know-how and drive public, private and philanthropic investments to accelerate a clean and just energy transition, in line with the climate ambitions of the beneficiary countries.

The partnerships could provide large-scale financing for tangible mitigation actions, allowing for a significant reduction of GHG emissions and the parallel promotion of the region's renewable potential. This will enable these countries to embark on an energy transition to meet the climate targets set out in the Paris Agreement in the name of the "Common but differentiated responsibilities and respected capabilities" principle. In addition, the strengthening of economic, energy and technological ties between the two areas offers an opportunity for development and long-term stability for the region.

Algeria and Egypt, as demonstrated in this paper, can be the first two Mediterranean countries with which to undertake this type of partnership. In particular, building on the strength of its geographical, political and diplomatic profile, Italy could play a leading role in coordinating European support for the energy transition in Algeria, together with the European Commission. Similar support could be offered to Egypt by the European Commission and the United Kingdom, promoting an ideal transition from the presidency of COP26 in Glasgow to COP27 in Sharm el-Sheikh.

These partnerships (Just Transition Energy Partnerships or JTEPs) are currently under consideration by the German G7 Presidency. Italy, in view of its G7 Presidency in 2024, could contribute to this reflection by committing itself to progressively build a Partnership for a gas-to-clean transition in the Mediterranean. This would make it possible to follow up on the statements by [Prime Minister Mario Draghi](#) at COP26 in Glasgow, which stressed the importance of "country-based platforms" for sharing risks and mobilising public and private capital for each country.

The Russian invasion of Ukraine marked a watershed, calling into question the effectiveness of economic interdependence in maintaining peace. On the contrary, in the current multipolar context, what fuels interdependence risks being weaponised in the competition between great powers. This is particularly true for energy, which has become a tool of blackmail by Russia, as well as the main source of revenue for financing its war effort.

The European response to the invasion of Ukraine, which showed unity from the very first days, marks a clear awareness on the part of the EU of the need to review this relationship of interdependence and, with it, Europe's role in the world.

The REPowerEU plan goes precisely in this direction: renewable sources are recognised as a fundamental tool for pursuing greater autonomy in energy choices. But energy security, as argued in this paper, cannot be separated from climate security: as the IPCC reports periodically remind us, there is another existential crisis – the climate crisis – that must be

addressed with the implementation of a resilience strategy. Through the instrument of the Gas-to-Clean Transition Partnerships in its Southern Neighbourhood, Europe and its Member States have the opportunity to integrate energy security and climate security, while strengthening Europe's role in the world.

## ABOUT ECCO



THE ITALIAN CLIMATE CHANGE THINK TANK

**ECCO** is the first independent Italian, non-profit climate change think tank. Founded in 2021 with the mission to accelerate climate action in Italy and around the world, ECCO uses its independence and expertise to identify and promote transformative science-led climate solutions and implementation strategies. ECCO is an active agent of change, deploying strategic communication, advocacy and diplomacy to shape climate and energy politics in all forms. [www.eccoclimate.org](http://www.eccoclimate.org)

Authors:

**Annalisa Perteghella**, Senior Policy Advisor, Diplomacy, Resilience and development programmes ECCO [annalisa.perteghella@eccoclimate.org](mailto:annalisa.perteghella@eccoclimate.org)

**Elena Corradi**, Policy Advisor, Diplomacy, Resilience and development programmes [annalisa.perteghella@eccoclimate.org](mailto:annalisa.perteghella@eccoclimate.org)

The views expressed in this report refer exclusively to ECCO think tank as the author of the research. For interviews or further information on the use and dissemination of the contents of this policy paper, please contact:

**Andrea Ghianda**, Head of Communication, ECCO

[andrea.ghianda@eccoclimate.org](mailto:andrea.ghianda@eccoclimate.org)

+39 3396466985

[www.eccoclimate.org](http://www.eccoclimate.org)

Published on 11 aprile 2022