A Mediterranean Green Deal
For An Effective Energy Transition
As Part Of The Sustainable Post-Covid Recovery
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Main Takeaways

- The COVID-19 pandemic has impacted the world economy in countless ways, including through the energy sector which has seen a fall in demand (-5% in 2020) and investments (-20% in 2020). However, renewables are very resilient and overtook fossil fuels to become the main source of electricity consumption for the first time in 2020.

- In recent decades, all countries in the region have seen a marked increase in energy consumption, which is expected to continue growing substantially spurred in part by sustained population growth.

- South and Eastern Mediterranean (SEM) countries are endowed with natural resources that provide opportunities for the production of low-carbon energy. But the share of renewables in total energy consumption remains low, due in part to the prevalence of fossil fuel subsidies, regulatory constraints, and limited electricity interconnectivity (due in part to insufficient cross-border transmission capacity, but mostly to lack of harmonisation of rules/conditions of access to interconnectors). Clean energy still represents a relatively small share of trade between the North and the South.

- The timing seems right for a deeper Euro-Mediterranean energy market integration: As the European Commission unveiled its Green Deal, SEM countries could seize the opportunity to align with the EU’s objectives. As of now, SEM countries seem to be making some, though quite limited, efforts to
support green initiatives. For example, Morocco plans to accelerate the transition to renewable energy and Egypt has about 691 green projects in its fiscal plan for 2020-21. However, SEM countries need a much better balance between green and non-green spending, properly designed recovery packages, and well identified concrete sectoral opportunities in infrastructure development.

- **The EU Green Deal can help shape the post-COVID energy transition in the SEM countries.** Part of the EU’s Recovery and Resilience Facility (RFF) budget will be devoted to external action. The EU has also proposed a new Mediterranean policy framework accompanied by an Economic and Investment Plan (EIP) which identifies several flagship activities, among which technical and financial cooperation in Morocco to accelerate green hydrogen production, intensification of international cooperation in Egypt on energy research and technologies, and support to Algeria to diversify its economy and trade away from hydrocarbons.

- **The SEM countries need to design their own Med Green Deal,** and act now to attract more investments in renewables. Public sector strategies will be needed for an effective rapid development of the renewable energy sector. Policies need to target the exploration of innovative financing instruments, accelerate R&D support, and support leap-frogging and technology transfer. Meanwhile, private sector involvement is needed for implementing technological change and to develop skills including in management, especially in cooperation with the EU. International financial organisations can also contribute by expanding lending programs to assist in the rapid delivery of energy projects, act as technical assistance and capacity building.

- **In this context, the SEM countries should specifically capitalize on green and blue hydrogen as key elements of the decarbonisation strategy.** Morocco is leading the way, as it recently signed a bilateral partnership with Germany on green hydrogen, with two first projects announced in the declaration of intent. Egypt and Tunisia are also signing similar bilateral partnerships. However, developing green hydrogen effectively at a wide scale needs an important amount of renewable electricity (RE), which could be an issue in the South Med for the short-term, since RE is already needed to decarbonize existing electricity supply. Other forms of hydrogen (blue, turquoise, grey) using natural gas as an electricity source could thus represent interesting options in the short and medium run, serving as a stepping-stone for green hydrogen in the long run.

- **A Carbon border adjustment mechanism (CBAM), a key element in the European Green Deal, could prove a strategic tool for the SEM countries, but only if it is combined with an energy transition plan.** As designed, the EU CBAM could essentially result in additional tariffs, impeding on SEM exports to the EU in sectors such as cement, iron & steel, petroleum products and basic chemicals. **SEM countries should pursue policy harmonisation with the EU but this would not be straightforward.** It would require countries to, first, introduce symmetric policy instruments. Collaboration between the EU and SEM countries will be paramount, also taking into account that, in the short term, priorities of decision makers in the SEM countries may be to keep jobs, in sectors that do not necessarily favour the green transition.

- **Broadening regional electricity market integration to include the southern and eastern shores of the Mediterranean**
would make the EU goal of reaching carbon-neutrality easier and less costly to achieve. This would require substantial physical infrastructure (the “hardware” of regional integration) as well as “software”, also needed so that markets can interact and operate harmoniously. This means having, among other things, compatible market designs, interoperability of power systems, coordination of wholesale markets, adequate management of interconnection capacity, and regulatory convergence.

- By supporting the industrial development of its neighbours towards a greener direction, staying true to its Euro-Mediterranean partnership commitments for the construction of a zone of shared prosperity, the EU could accelerate the energy transition of its neighbours. This means the EU should also give its partners the tools to align with the European Green Deal’s requirements. For example, any green hydrogen subsidy scheme in the EU would need to be open in a non-discriminatory manner to green hydrogen produced in the SEM countries, a point which has not yet been addressed by Europe.

- On their side, SEM countries should focus on measures that will support regional energy market integration. This requires, among other things, developing the necessary physical infrastructure to enable energy trade across and around the Mediterranean, harmonizing market design and the interoperability of networks, and creating the necessary regional institutions. In order to capture all of the region’s potential in hydrogen, a regional strategy to establish a Mediterranean hydrogen market is needed. The CMI Forum on Energy and Climate Change could provide the space for all stakeholders to congregate and share knowledge in order to define such a hydrogen regional strategy.

- Future policies will also need to consider the social and employment dimension of the energy transition. SEM countries should design and implement well-informed and coherent fiscal, employment and industrial policies for the creation of long-term backward and forward links of the energy sector with the rest of the economy. Policy makers should also identify and implement education policies that timely address skill gaps, gender inequality, and lack of specific cross-cutting skills.

- The impact of climate change in a post Covid-19 context also calls into play the attractiveness of territories. A crucial issue for SEM countries lies in the need to strengthen the skills of local decision-makers. Local stakeholders need to be involved in the discussion on what the energy transition will mean for diverse groups of people in their country/region. A “Green Transition Knowledge & Policy Dialogue” at the territorial level should be facilitated. The CMI “Territorial Resilience and Climate Change Hub” can be the hosting platform of such dialogue.
Introduction

The Covid-19 pandemic has affected all aspects of the economies of Southern and Eastern Mediterranean (SEM) countries. Growth has become negative, unemployment has risen, current accounts and fiscal balances have deteriorated, and the livelihoods of populations have been severely affected. However, the impact of the pandemic has also increased determination for rethinking regional integration and offers opportunities, as its impact is also generating changes that may have favourable economic, social, and environmental effects.

One of such changes following the pandemic is related to energy. There are three essential initial points that provide an impulse for the analysis throughout this paper: first, the rapid population growth in SEM countries, together with the need for economic recovery and the digitalisation trend, means that electricity demand shall continue to increase rapidly in the coming years. Therefore, reliable electricity supply would need to increase in SEM countries going forward, with a priority for low-carbon electricity in order to meet increasing demand while achieving climate change goals. Second, renewable energy has shown remarkable resilience during the pandemic and therefore the energy transition has already started. Third, with the new European Commission project of the EU Green Deal, and the plans to implement a Carbon Border Adjustment Mechanism (CBAM), there is an opportunity to accelerate the energy transition in the SEM countries.

CMI is convinced that the timing is right to rethink and actively support the transition to a low-carbon economy in the Mediterranean region. This cross-cutting issue is common to all countries. In the face of increasing demographic pressures, as well as the progressive degradation of the environment, it is urgent to take action and agree on strategies for the Mediterranean energy transition, which necessarily includes regional energy market integration.

After a short presentation of the Mediterranean context (section I), we will discuss post-Covid opportunities and actions that would be required to seize them (section II). These include providing incentives to attract investment in renewables, grasping the potential of clean hydrogen, and harmonizing policies with the EU, as part of the Mediterranean “climate ambition” plans. The potential of regional cooperation and Euro-Med energy market integration is discussed in section III. In a final section (section IV), we present a set of recommendations to adopt and operationalize a Mediterranean Green Deal in the energy sector.

Section I
The Mediterranean Context

1. Overview of pre-covid energy sector: growing energy consumption, renewables potential underexploited

The starting point of the discussion on energy prospects in SEM countries needs to focus on demand. Indeed, energy demand in the Mediterranean has considerably grown in recent years, with primary consumption nowadays representing 2.6 times its 1990 amount, to reach more than 400 million tonnes oil-equivalent (mtoe) (see figure 1 below). With the exception of Syria, which has been facing unprecedented constraints due to conflict over the last decade, all countries in the region have seen their primary energy consumption grow. The frontrunners are Jordan (5.2% annual average growth in primary energy consumption), followed by Egypt (5%), Turkey (4.9%) and Lebanon (4.2%).
These growth rates are even more meaningful when compared to other regions. Indeed, in the SEM countries, primary energy consumption seems to have been steadily increasing at higher rates than in the rest of the world. Over the 1990-2018 period, primary energy consumption in the SEM countries grew by 3.3% p.a., compared to 2.8% p.a. for Africa and 0.3% for the EU over the same period. This high rate is primarily attributable to a major surge over the 90s and 00s, while in the 2010s we observe a deceleration in the Mediterranean average growth rate of energy consumption (1.9%). Still, the 2010s annual average growth rate of Primary Energy Consumption remains higher than the world average (1.6%) and energy consumption in the SEM is expected to continue growing rapidly over the next years spurred in part by sustained population growth.
One can reasonably expect that growing populations would probably further drive-up future energy demand in SEM. Electricity demand is expected to grow even more rapidly as the electrification trend accelerates, boosted by the digitalisation and decarbonisation trends. The SEM countries population is expected to keep growing on average by 1.3% in the next five years, then by 1% for 2025-2030 according to the medium-variant projection, which assumes a decline of fertility for countries where large families are still prevalent, a slight increase of fertility in countries where women have fewer than two live births on average, and continued reductions in mortality at all ages. In a high variant scenario, the population, and hence future energy demand, would grow by even more (see figure 4).

On average, the SEM countries population has been increasing during the 2010s at an annual rate of 2% (excluding Syria which, following the war, has seen its population decrease during the 2010s), which is higher than the annual average rate of the 2000s. As seen in figure 3, Jordan (3.7%), Lebanon (3.6%) and Egypt (2.1%) recorded the highest annual population growth rates throughout the recent decade. Unsurprisingly, they are also among those with the highest rise in primary energy consumption during the same decade.
Over the years, the final energy mix has shifted from oil to electricity and natural gas. The share of electricity in total final energy consumption has reached about 20% in 2018, versus 15.3% in 2000 and 11.3% in 1990. Between 2000 and 2018 electricity consumption in the region grew by an annual growth rate of about 4.8% (4.3% when Turkey is excluded). In comparison, in the same period electricity consumption in the EU28 grew by an annual growth rate of 0.5%. As for natural gas in the SEM countries, its share in total final energy consumption is now about 23.7%, versus 12.3% in 2000 and 8.2% in 1990. Meanwhile, oil, while still predominant in the energy mix, has seen its share in total final consumption decline, standing at 47.1% in 2018, versus 57.2% in 2000 and 62.5% in 1990.

Figure 5. Total Final Consumption of energy, by source, units ktoe

Several studies have underscored how the region should develop the sector of renewable energies (RE) to address the twin challenge of energy security and climate change mitigation (Ben Saad, 2019). Several authors have shown a positive link between the use of RE and economic growth, on the one hand, and the effects on the reduction of CO2 emissions on the other hand (such as Chien & Hu, 2007; Farhani et al., 2014; Bélaïd & Youssef, 2017; Kahia et al., 2017). Their findings confirm, at the regional level, the existence of a positive

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relationship between the production of RE and GDP. Yet currently, in terms of RE, only hydro power generation is relatively important in the electricity production mix of the SEM countries, particularly in Turkey (88886 GWh in 2018) and to some extent Egypt (12889 GWh in 2018). Other renewable energy sources such as solar, wind, and geothermal, have only marginally increased in the region’s electricity production mix, reaching 1.3% of primary energy use for power generation in 2018, versus 1% in 2000 and 0.7% in 1990. In 2020, South-Med (excluding Israel), Middle East, sub-Saharan and Central Asian oil-producing countries were at the lower end of the Energy transition Index, recording low system performance and transition readiness (Figure 6). This remains a paradox in the Mediterranean context, considering the region’s vast renewable energy potential.

Indeed, the region is endowed with natural resources that provide opportunities for the production of low-carbon energy, particularly solar and wind energy. The geographical position of the SEM gives it the advantage of having the best solar radiation worldwide, exceeding 2000 Kwh / m² / year, which is particularly favorable to the development of solar energy production technologies. Specifically, the Sahara Desert is the world’s sunniest area year-round. It has more than twice the

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7. The Energy Transition Index benchmarks countries on the performance of their energy system, and on their readiness for transition to a secure, sustainable, affordable, and reliable energy future. ETI 2020 score on a scale from 0 to 100%. The ETI 2020 ranks 115 countries. Sweden ranks first (1) and Haiti ranks last (115) in the ETI 2020. Ranking shows the order of the countries in the ETI 2020. The ETI is the average of the two sub-indices, System performance and Transition readiness. System performance provides an assessment of countries’ energy systems related to their delivery in three key priorities: the ability to support economic development and growth, universal access to a secure and reliable energy supply, and environmental sustainability across the energy value. Transition readiness assesses the presence of an enabling environment for the energy system’s ability to deliver on the transition imperatives. Energy transition readiness is captured by the stability of the policy environment and the level of political commitment, the investment climate and access to capital, the level of consumer engagement, the development and adoption of new technologies, etc. (WEF, 2020).
size of the European Union and receives, on average, 3,600 hours of sunshine yearly. A mere fraction of the Sahara’s area could generate the world’s entire electrical demand\(^8\). Moreover, it is located just south of the European continent, where infrastructure for energy trade, such as electricity interconnectors, oil/gas pipe-lines and tankers, is widely accessible. Meanwhile, the potential for the development of wind is also important. Wind speed reaches on average 7 m/s in the region. The Sahara Desert is also one of the windiest areas on the planet, with average annual wind speeds at ground level exceeding 5 m/s in most of the desert and reaching 8-9 m/s in the western coastal regions. Another example is Egypt’s Zaafarana region, which also has high and steady wind speeds (Van Wijk and Wouters, 2019). Lastly, the Mediterranean also has geothermal, biomass (including waste) and hydraulic resources that can be sources of low-carbon energy production.

Several explanations have been provided for why, despite such potential, the share of RE in total energy consumption had remained low in the SEM countries throughout the 2000s\(^9\).

- **The first explanation** is related to the cost of electricity production from RE vis-a-vis electricity production from conventional sources which benefits from subsidies. For some Mediterranean countries, which are major hydrocarbon producers (ex. Algeria and Egypt), fossil fuel subsidies traditionally contributed to widen the financial gap for RE projects. Fossil energy has traditionally been significantly subsidized, making the price of electricity produced from fossil fuels artificially more competitive.

- Another explanation relates to having the appropriate **regulatory framework** which is key for attracting investments in RE. Technical assistance and regional cooperation would be instrumental to achieve that goal.

- A third important explanation is related to the ability of electricity grids to accommodate large RE amounts, therefore requiring additional investments.

Nonetheless, the SEM countries have made efforts to cooperate with their European neighbours, especially in late 2000s, as the EU had invested in RE early-on to become a world leader in the sector. A notable initiative of regional cooperation is the Mediterranean Solar Plan (MSP), which was launched in 2008 to support Redeployment in the wider Mediterranean. It planned for the development of a renewable energy production capacity of 20 GW on the southern and south-eastern shores of the Mediterranean for local supply and for possible exports to Europe. One of its key elements was the promotion of a new regulatory framework aimed at further encouraging the development of renewable energies and at facilitating electricity trade between the two shores. In the years that followed, some investment projects were indeed implemented to increase RE production in the South/East Mediterranean. However, results could be qualified as underwhelming as RE investment remained modest throughout SEM countries. Furthermore, concrete

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actions did not always match political commitments, while clear strategies for different types of RE still need to be developed (Ben Saad, 2019). However, recent developments following the COVID-19 pandemic are more favourable to RE market development, as decarbonization accelerates.

2. Post-COVID landscape: New challenges and opportunities for an increased penetration of renewables in the Mediterranean energy mix

The unprecedented COVID-19 pandemic has impacted the world economy in countless ways. GDP growth has been severely impacted, current account balances have deteriorated and unemployment is projected to increase worldwide (see Annex Table1), and the Mediterranean region has not escaped this crisis. Its repercussions are being felt differently across sectors, including in the energy sector.

The pandemic is changing global production and trade value chains: As noted by Arezki et al (2020)\(^9\), Global Value Chains (GVCs) may be moving toward greater regionalization. As GVCs are reshaped, some SEM countries could seize nearshoring opportunities, provided they act now. Due to geographical proximity with the EU, the region can position itself as an attractive investment partner for enterprises looking to strengthen regional value chains and for small SMEs to benefit from this trend. An example is Morocco: its automotive sector is the likeliest beneficiary of the new trend because the country is home to subsidiaries of major car makers Renault and PSA, and has become a hub for automakers targeting African and EU markets. As stressed by Arezki et al (2020), it could significantly benefit from the carmakers’ reorganization after the pandemic, as their supply chains are already well developed across the country. Morocco’s larger labor force and relatively lower wages would give it an advantage over central and eastern European countries.

Energy demand and energy investment have temporarily declined: Electricity demand fell by 5% in 2020 compared to 2019. Oil, coal and, to a lesser extent, gas, primarily explain the reduction in the world’s primary energy demand, while it is interesting to note that renewables have shown remarkable resilience. The International Energy Agency (IEA) anticipated a 20% drop in investments in the energy sector in 2020\(^11\) and recovery could take longer than it did in past crises. This means that the energy sector has found itself in a “Global Reset”\(^12\) that could induce a series of shifts and repositioning by key players.

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The Mediterranean Context

The International Energy Forum and Boston Consulting Group (2020)\footnote{Benali L.R., Shatila S.Z. and Ramy Al-Ashmawy (2020), « MENA POWER INVESTMENT OUTLOOK 2020-2024 : Between fighting a pandemic and managing renewables », Arab Petroleum Investments Corporation, December.} emphasizes that “more fuel production now comes from less investment, as the industry has removed significant costs from upstream operations since the price downturn of 2014, twice as much production is available at $50 per barrel as was available prior to the downturn”\footnote{Joseph McMonigle, Alan Thomson, Christof van Agt, Rebecca Fitz, and Jamie Webster (2020), « Oil and Gas Investment in the New Risk Environment », An International Energy Forum report with Boston Consulting Group, December.}. Moreover, they found that projects are developing faster (the shale revolution increased supply and shortened timelines to initial production) and becoming smaller (delivering lower volumes, but also reducing financial risk and speeding-up investment decisions, which shortens the duration of any price spike). Lastly, fuel demand growth is likely to be lower over the next 20 years, which will reduce the amount of incremental production that companies must bring on-stream. In addition, several countries have increased retail fuel prices and/or reduced subsidies which means end-users are being impacted by the price changes.

On the supply side, renewables have proven to be resilient. In the case of the EU, renewables overtook fossil fuels to become the main source of electricity production for the first time, in the year 2020. RE’s share of EU power generation rose to 38% (compared to 34.6% in 2019), versus 37% for fossil fuels\footnote{https://ember-climate.org/project/eu-power-sector-2020/}. At a country level, Germany and Spain (and former EU-member the UK) also achieved this milestone for the first time.

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COVID has curbed carbon emissions in 2020, but additional measures are needed for the trend to last: According to CarbonMonitor, after rising steadily for decades, CO2 emissions fell by 4%, or -1365.8MtCO2 in 2020, as the COVID-19 pandemic impacted economic and social activities worldwide (figure 9). The United States contributed the most to this global trend, with a 9.4% decrease in its emissions, fuelled by a sharp decline in the power sector and ground transport sector emissions (respectively -10.3% and -9.3%). Meanwhile, India (-8.1%), the EU27 and the United Kingdom (-7.5%) also largely contributed to the decrease in carbon emissions. Across the world, the sector most affected by pandemic lockdowns and restrictions was by far aviation, where emissions fell by -31.9% compared to its 2019 total.

**Figure 9.** Variation in Greenhouse Gas emissions, 2020 relative to 2019, by main emitter

In the SEM countries, important falls in daily emissions of CO2 were attained in the periods of March-May and September-October 2020 depending on the country (see figure 10). The peak decrease reached -28% in Morocco, followed by Algeria, Egypt and Israel (all -27%) and Turkey (-24%). This decline was generally caused by the discontinuation of surface transport activity (including cars, national and international shipping etc). With the exception of Israel, all SEM countries experienced a slight increase in daily CO2 emissions from the residential sector during the early stages of the pandemic.
Figure 10. Plots of change (%) in emissions for selected Mediterranean countries in 2020

Change in daily fossil CO2 emissions, %
Algeria (peak decrease -27%)

Change in daily fossil CO2 emissions, %
Egypt (peak decrease -27%)
While the Mediterranean, and worldwide, decline in CO2 emissions is noteworthy, it remains smaller than what could have been expected given the scale of the pandemic. It might also not last for long if things are to revert to “business-as-usual” once the impact of the pandemic slows-down. However, things could be different if countries grasp the opportunity and go towards a “new normal”, using the pandemic as a stepping-stone to accelerate responses to climate change, to create new opportunities for green employment, and to achieve SDGs. **A key question is how the investments linked to economic recovery could lead to a real increase in low-carbon energies and a visible reduction in emissions.** In that respect, it is encouraging to see that some countries have started adopting more ambitious policy agendas aimed at achieving net-zero emissions, as have oil and gas companies in Europe, Asia, and the US. However, the important investment cuts and project postponements by private oil and gas companies risk destabilizing and/or slowing down policymakers’ post-COVID-19 strategies (International Energy Forum and Boston Consulting Group, 2020).

The timing seems right for a more integrated Mediterranean energy market: As the European Commission unveiled its Green Deal, a roadmap for making the EU’s economy sustainable and making Europe climate neutral in 2050, SEM countries could seize the opportunity to align with the EU’s objectives so that they can achieve their own objectives of green growth and CO2 emissions reduction. The Green Deal also sets out for the EU to use trade policy and build partnerships with its neighbours, including in the SEM region, to help them with their own transitions\(^\text{16}\).

Overall, the SEM countries and the EU will need to work together to ensure a win-win outcome. The energy roles of the EU and of the SEM are, and have always been seen as, complementary, as the EU is a major global consumer while the SEM countries have been, as a whole, net energy exporters. In the post-covid world, harmonized energy policies will be imperative, in order for the SEM countries to develop resilient energy sectors that can both respond to their own needs and contribute to supplying the EU market. Cooperation on energy can play a crucial role, as an integrated energy market between SEM and the EU could boost FDI in the SEM renewables sector, make the sector more efficient, and increase energy security in the SEM and in the EU. It could also contribute to social equity by making renewable energy more affordable and, of course, further reduce CO2 emissions in a sustained way. The timing seems right, as the changing GVCs and the transformation occurring in many sectors, including energy, are opening up new opportunities, including reshoring production closer to consuming markets, increased digitalization of the economy, and channelling investments into flourishing green sectors which drive energy transitions. Such opportunities will be further discussed in the next section, how they will be exploited will determine how fast countries recover and position themselves as clean energy leaders in a post-COVID-19 world.
Section II
Post-Covid opportunities and required “Green Strategies”

1. The need for green stimulus packages to create green growth and jobs, while reducing CO2 emissions

Around the world, governments are using stimulus packages to spur business growth. Part of these funds are being allocated to support employees who have lost their jobs or are unable to work. Depending on the country, a share of funds is also dedicated to creating a “green recovery” (as detailed in Box1).
As countries consider how best to restore economic growth, some of them are increasingly focusing on creating a “green recovery”, orienting funds towards industries that can create employment, all the while shifting the international economy away from fossil fuels.

Focusing on the world’s leading economies, the Greenness of Stimulus Index (GSI)\(^\text{17}\) depicted below (figure 12) shows which countries to date have (and have not) harnessed the opportunity presented by the Covid crisis to boost global resilience. The EU is one of the most notable examples. This comes as no surprise as, in May 2020, the European Commission announced its plan for an €750bn ($848bn) recovery fund, tied to the European Green Deal initiative. All spending under the plan will be guided by a “sustainable finance taxonomy”, which shall exclude investments in polluting infrastructure. As also shown in Figure 13, France, Norway, Germany and Denmark are essentially the current European “leaders” of the green transition.

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\(^{17}\) The Greenness of Stimulus Index examines 30 economies to assess the environmental orientation of their stimulus funding based on: the total stimulus funds flowing into environmentally-intensive sectors; the existing green orientation of those sectors, such as the share of renewables in the energy sector; and the green orientation of new stimulus measures.

\(^{18}\) https://www.globalgovernmentforum.com/reset-your-economy-the-power-of-green-stimulus-packages/
Figure 12. Greenness of Stimulus Index

Note: Updated on 1 February 2021

Figure 13. Green Recovery Spending across the world

Source: Hepburn et al. (2020)
In October, Canada also announced a new stimulus plan that mainly invests in climate-related infrastructure to address the economic implications of COVID-19. The plan calls for CAN$6 billion of new investment through the nation’s recently-created Canada Infrastructure Bank (CIB), which will flow into renewable generation, storage, building retrofits, zero-emission buses, and vehicle charging infrastructure. Meanwhile, South Korea is an example of “in-between”. It recently unveiled its New Deal, planning to invest about US$144 billion in creating 1,901,000 jobs by 2025. The South Korean plan focuses on a Digital New Deal and Green New Deal, and includes overarching policy support to strengthen employment and social safety nets. Its Green New Deal focuses on renewable energy, green infrastructure and the industrial sector. A green car subsidy programme offers up to US$17 million in subsidies to whoever buys electric cars in 2021 and up to US$33.5 million for hydrogen fuel-cell electric vehicles. But even though positive contributions are high, they are still outweighed by negative contributions in the South Korean stimulus plan. Overall, emerging economies most dependent on environmentally-intensive sectors and without sound regulatory supervision would have the greatest task to turn their stimulus green, which they failed to do until now. Meanwhile, as a whole, nature and biodiversity have been neglected in the stimulus packages post-covid. Where large green stimulus measures have been introduced, they have largely focused on reducing carbon emissions, with limited focus on preserving and enhancing nature (Vivid Economics 2021).

Lastly, after surveying more than 200 stakeholders, Hepburn et al. (2020) identified recent stimulus policies that are perceived to deliver large economic multipliers rapidly and shift emissions trajectory towards net zero. They identify five policies with high potential on both economic multiplier and climate impact metrics, these are: clean physical infrastructure, building efficiency retrofits, investment in education and training, natural capital investment, and clean R&D. Unfortunately, we lack the possibility of providing a complete picture as to how green the stimulus packages are in each SEM country. The stimulus index of Box 1 only provides data for Turkey, which seems to have made very little efforts to support green initiatives, instead supporting polluters in the transport sector (Vivid Economics 2021). For the rest of the SEM countries, one could mention some examples of “green support” recently provided such as:

- In Morocco, the national recovery plan “Le Pacte pour la relance économique et l’emploi” signed in August 2020 provides enterprises with optimal financing conditions to restart or strengthen their development. The programme plans to enforce the transition to renewable energy and the development of an environmentally-friendly water policy, to accelerate the digitalization of the economy, to promote sustainable tourism, to follow the path of sustainable land use and to preserve biodiversity (Danilina, 2020).

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In **Israel**, the national plan includes some environmentally friendly measures, focusing on greening the building sector, increasing solar energy production and energy storage, digitalizing the economy, developing mass public transportation in order to reduce the use of private vehicles, expanding waste management and circular economy approaches (Danilina, 2020).

In **Egypt**, about 691 green projects have been included in its fiscal plan for 2020-21, at a total cost of EGP447.3 billion ($28.4 billion). The projects represent 14% of the plan’s total public investment, with the aim to increase this figure to 30 percent for 2021-2022. Projects meeting environmental sustainability criteria are expected to be prioritized at the evaluation stage. Meanwhile, there are discussions to integrate environmental sustainability standards into development plans, including building the capacities of ministries’ teams and workers, and setting up a mechanism to follow up compliance with basic environmental standards before approving project financing. Also, Egypt launched its first green bond issue on the London Stock Exchange, worth $750 million for five years, the largest in the Middle East and North Africa. Egypt is also home to the Benban Solar Park, a huge complex of more than 41 solar power plants, spread over 37km – one of the largest solar photovoltaic parks in the world and the largest solar project in Africa.

Additionally, it should be noted that Egypt is also preparing a plan to eliminate electricity subsidies by 2024/2025 and is working on developing a national strategic framework for hydrogen and localizing its industry. While these are welcome efforts, much more needs to be done. For the SEM countries, unlocking a green recovery stimulus that can address the twofold objective of sustainable growth and job creation, while addressing the impacts of climate change, presents a huge opportunity. But SEM countries are not homogeneous, which means their strategic stimulus choices may differ (Mills, 2020). First of all, green recovery packages shall have different starting points due to prevalent socio-economic and political contexts in each SEM country. While in the long-term the real challenge lies in the need to diversify, oil-producers such as Algeria and Egypt have the challenge of maximising output, adjusting domestic consumption and monitoring costs. Others, such as Israel and Lebanon, have to manage the transition to being gas producers/exporters, in a market where local demand is limited, borders are tension-filled and, in the Lebanese case, governance issues are overwhelming. Finally the oil importers, Morocco and Jordan, find their outlook improved by the growing availability of reasonably priced gas, and competitive renewables.

Despite their heterogeneity, some sectors are to be prioritized in green stimulus packages in all SEM countries, such as transport. Currently, industrial activities and traffic, together with domestic fuel burning, are the most prominent contributors to CO2 emissions causing

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24. See: UNFCCC https://unfccc.int/blog/solar-projections
local air pollution\textsuperscript{27}. The energy-intensive \textbf{industrial sector} in South Med countries is also challenged by climate measures taken in the EU. As we will see in a later section, carbon border taxes on imports coming from South Med countries, or even bans on oil and gas imports, could become a reality if SEM countries do not take parallel measures in reducing their carbon footprint.

All in all, policy design will be key for recovery packages to be successful in delivering the much needed social, economic and climate outcomes. The “right” investments need to be identified to meet these goals.

Among the SM countries that provide useful examples on targeted investments, one finds Morocco, which is forming the next generation of green entrepreneurs by providing its youth in rural areas the opportunity to enter agri-smart enterprises, targeting the creation of 350,000 new farmers by 2030. Meanwhile, in Tunisia the development of community managed agricultural cooperatives and the restoration of vital irrigation infrastructure is renewing the country’s oases, diversifying livelihoods in local communities and creating additional income, especially for women. The World Bank-supported Oases Ecosystems and Livelihoods Project in Tunisia has brought sustainable land practices to more than 880 hectares of land, with more than 5,000 land users adopting new practices, including diversifying crops and utilizing water more sustainably\textsuperscript{28}. More than 226 micro-projects have contributed to an economic boost, through direct and permanent employment that benefitted more than 17,000 people, about a third of them women.

2. \textbf{The EU Green Deal: shaping the post-COVID energy transition in the Mediterranean}

\textbf{EU Green Deal: the backbone of the path to carbon neutrality, with reach beyond Europe}

The European Green Deal\textsuperscript{29} is a “new growth strategy that aims at transforming the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy, where there are no net emissions of greenhouse gases in 2050 and economic growth is decoupled from resource use”. As illustrated in Figure 14 below extracted from the Green Deal Communication, the European Green Deal is articulated around eight areas for actions, which are interlinked and mutually reinforcing, they are:

i. increasing the EU’s climate ambition for 2030 (reduction of 55% of GHG emissions compared to 1990\textsuperscript{30}) and achieving \textbf{climate neutrality by 2050}

ii. supplying clean, affordable and secure \textbf{energy}

\textsuperscript{27} https://www.oecd.org/coronavirus/policy-responses/making-the-green-recovery-work-for-jobs-income-and-growth-a505f3e7/#endnotea0z12


\textsuperscript{30} Target endorsed by the European Council on 11 December 2020.
iii. mobilising industry for a clean and circular economy
iv. building and renovating in an energy and resource efficient way
v. accelerating the shift to sustainable and smart mobility
vi. designing a fair, healthy and
environmentally friendly food system
(from ‘Farm to Fork’ strategy)
vii. preserving and restoring ecosystems and biodiversity
viii. a zero pollution ambition for a toxic-free environment.

Figure 14. The EU Green Deal

To implement the Green Deal plan, the European Commission (EC) proposed on 14 July 2021 the ‘Fit for 55’ Package, a set of policy, regulatory and legislative tools to updates the ‘Clean Energy for All Europeans’ Package to reflect the new objectives of 55% GHG emission reductions by 2030 and climate neutrality by 2050.

The package includes a proposal for a carbon border adjustment mechanism (CBAM). The main objective is to prevent carbon leakages and to preserve the competitiveness of Europe’s industry, as Europe adopts more stringent climate objectives. Under the current proposal, the CBAM system would initially target a selected number of carbon-intensive goods including cement, iron and steel, aluminium, fertilisers and electricity.

Several non-EU Mediterranean countries are interconnected with the EU power system and trade electricity regularly with EU countries. According to the current proposals, they would be subject to the CBAM, unless their electricity market is coupled with those of the EU, they have adopted ambitious CO2 reduction targets,
Post-Covid opportunities and required “Green Strategies”

An element of the EU’s New Industrial Strategy31 proposed in 2020 is the new hydrogen strategy32, that aims to create an enabling environment to scale-up renewable hydrogen supply and demand for a climate-neutral economy. The hydrogen strategy also includes a roadmap with actions under the following headings: investment, demand scale-up, regulatory framework, research & innovation and finally actions at international level. The EU Recovery Plan considers a budget of up to €30 billion for clean hydrogen. Although the EU sees the development of hydrogen as key to reach the objective of carbon neutrality, it recognizes that not all the required volumes can be generated within Europe without CO2 emissions. North Africa, as well as the rest of the MENA region, have been identified as favorable locations to supply Europe with green hydrogen. To help establish EU leadership in hydrogen technologies (in particular electrolyzers, which is the process used to produce green hydrogen using electricity produced from renewables), the EC has launched the European Clean Hydrogen Alliance consisting of stakeholders from industry, public authorities and civil society; the Alliance is expected to define the investment agenda and facilitate the realization of the actions in the strategy.

Achieving climate neutrality in the EU alone will not be sufficient to achieve the global objectives of the Paris Agreement. The external dimension of the EU Green Deal is critical for promoting the global public good and showing the way to carbon neutrality beyond the EU borders. Vice versa, achieving the ambition of the European Green Deal will not be possible without analogous efforts of third countries, in particular in the EU neighborhood which is already connected to some Member States through gas pipelines and/or electricity interconnectors, such as the Morocco-Spain, Turkey-Greece, Turkey-Bulgaria, and many others. In this context, the initiatives aimed at implementing the external dimension of the European Green Deal, such as the Green Agenda for the Western Balkans or the New Agenda for the Mediterranean, will be key to address the challenges arising in third countries.

EU Recovery Plans: some funds available for the Neighborhood

The EU “Roadmap for Recovery” from the COVID pandemic states that “the green transition and the digital transformation will play a central and priority role in relaunching and modernizing our economy” and calls for the Green Deal to be the main vehicle to articulate that strategy. The Recovery Package includes a new recovery instrument, Next Generation EU, with a budget of € 750 billion, to support, among other things, investment and reforms in Member States (MS), in particular as it relates to the green and digital transitions and the resilience of the national economies, as well as a reinforced Multiannual Financial Framework of € 1.1 trillion.

Next Generation EU includes a Recovery and Resilience Facility (RFF) providing MS with loans and grants to support reforms. In order to benefit from the RFF, MS should submit recovery and resilience plans outlining how they plan to use the funds to enhance economic growth, job creation and social resilience, while meeting the green and digital transition objectives. Every MS must ensure that at least 37% of the

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32. European Commission, A hydrogen strategy for a climate-neutral Europe, COM(2020)301
A Mediterranean Green Deal for an Effective Energy Transition as Part of The Sustainable Post-COVID recovery

A national recovery plan is devoted to the green transition, while the remainder should do “no significant harm” to the green transition, which de facto excludes fossil fuels from EU recovery funding. The National Energy and Climate Plans (NECP) act as eligibility criteria to qualify for RFF funding. The national recovery plans had to be submitted, using a template provided by the EC, by 30 April 2021.

The EU Roadmap for Recovery calls for particular attention to be devoted to the EU’s immediate neighborhood (which includes North Africa and the Balkans—both Mediterranean regions). Part of the RFF budget will be devoted to external action, including humanitarian aid and close cooperation with the EU’s immediate neighbors, so they can benefit from the EU green and digital transition and learn from the EU experience. The Neighborhood, Development and International Cooperation Instrument (NDICI), the main instrument for EU cooperation and development with partner countries, will be increased to € 87 billion to support, via the External Action Guarantee and the European Fund for Sustainable Development, the Mediterranean partners among others (the Western Balkans and the South Neighborhood) in their efforts to recover from the impact of the COVID pandemic.

EU Climate and Energy Diplomacy: cooperation with Mediterranean partners essential to the green energy transition

The January 2021 Council on Climate and Energy Diplomacy “Delivering on the external dimension of the European Green Deal” invited the Commission to further reinforce the external dimension of the European Green Deal, to make appropriate capacity available and to strengthen – together with the Member States – coordination and information exchange through, among others, the EU Green Diplomacy Network and the Energy Diplomacy Expert Group. EU energy diplomacy aims to accelerate the global energy transition, while ensuring affordability, safeguarding the environment and achieving the Sustainable Development Goals. To this end, EU energy diplomacy promotes the deployment of safe and sustainable low-carbon technologies, the increasing uptake and system integration of renewable energy (including through increased interconnections) and international cooperation on hydrogen. Moreover, the EU calls for a complete phase-out of fossil-fuel subsidies and an immediate end to all financing of new coal infrastructure in third countries.

In that context, the EC has proposed, in February 2021, a new policy framework “Renewed partnership with the Southern Neighborhood - A New Agenda for the Mediterranean”33. The framework is accompanied by an Economic and Investment Plan (EIP)34, for its Southern Neighborhood partners to address the many challenges facing the region. The EIP focuses on the long-term socio-economic recovery, aims to increase the region’s attractiveness towards investors as it is identified as an important partner in efforts to bring EU industrial supply chains closer in the wake of the pandemic. The EIP announces several flagship activities, among which technical and financial cooperation in Morocco to accelerate green hydrogen production, intensification of international cooperation in Egypt on energy research and technologies, support of the Jordan national...
energy strategy, in particular as regards the energy-water-food nexus, and support to Algeria to diversify its economy and international energy trade away of hydrocarbons.

The New Agenda for the Mediterranean proposes a range of actions in the following areas: (1) human development, good governance and the rule of law; (2) resilience, prosperity and digital transition; (3) peace and security; (4) migration and mobility and (5) green transition: climate resilience, energy, and environment. Under the energy heading, the Communication states that cooperation is essential, given that “Europe and the Mediterranean region have interdependent, complementary and converging energy interests”. The following priorities have been identified for cooperation: (i) massive deployment of renewable energy and clean hydrogen production; (ii) a stronger interconnection efforts and measures, with a focus on buildings and appliances and (iv) policies to address fugitive methane emissions from fossil fuel production, transport and use.

3. Investment in the renewables sector in SEM countries post-covid

Last year was a critical moment, as global investment in the “energy transition” (RES, electrification of transport, hydrogen, etc.) was higher for the first time than those in upstream oil and gas. In the oil and gas sector, investment in exploration-production collapsed by more than 30%, weighed down by the drop in prices following the pandemic. The decline in exploration-production investment was particularly noticeable in North America, where investment fell by 41%, while in the rest of the world, the decline was close to 24%.

Figure 15. Exploration / Production Investments, $ Billion

Source: BloombergNEF
With regards to foreign investment, the situation was similar, renewables were practically left unscathed from the 40% collapse in global foreign direct investment (FDI) and RE investment continued to increase despite low oil prices. In 2020, for the first time ever, greenfield foreign investment in renewables exceeded flows into fossil fuels (figure 16 below\textsuperscript{35}. Renewables FDI worldwide amounted to $85.5bn, down only 11.2% from 2019, while greenfield investment into coal, oil and gas plunged nearly 62.3% to about $44.1bn.

\textbf{Figure 16.} A paradigm shift in the make: Renewables overtake oil and gas in 2020

When looking at the wider MENA region, following the Covid19-related crisis, the private sector’s share in energy project investments, which had climbed to 22% in 2019, dipped to 19%. For 2020-2024, total committed and planned investments in MENA are expected to be in excess of USD792bn, down from USD965bn in last year’s outlook. These investments are driven in great part by Saudi Arabia’s gas and power programs USD41bn and by Iraq reconstruction efforts. However, the SEM countries also contribute to investments, notably with Egypt’s new petrochemicals drive of USD38bn, while Algeria’s committed oil & gas investments surpass the 10bn US$ mark (APICORP, 2020).

\textsuperscript{35} https://www.fdiintelligence.com/article/79429
In the post-covid landscape, the renewables sector in SEM countries harbours opportunities, most notably with regards to solar energy. Right before the pandemic, the Moroccan Agency for Sustainable Energy (Masen) had invited expressions of interest from developers for the first phase of its 400MW Noor PV II solar programme. The latter has been slowed down while an advisory team has yet to be appointed. Developers may be selected for each of the nine locations marked by Masen and a maximum of 40MW of solar PV would be developed at each site. Meanwhile, in Algeria, the government announced in May plans to launch its 4GW TAFOUK1 solar programme, which comprises new solar PV projects spread out across the North African state. The projects have a combined value between $3.2-$3.6 billion and TAFOUK1 is expected to be complete by 202436.

However, while the timing is right to revive the renewables sector and to increase integration of Mediterranean energy markets, we should also keep in mind that financing important energy infrastructure at the national and regional levels represents a considerable challenge, especially in a post-covid context and considering the limited fiscal space of SEM economies. Meanwhile, the SEM region is associated with additional risks, traditionally present in developing countries, which put a strain on the costs of capital for RES projects. These risks can be political (ex. deficits in institutional structures, country risks due to regional conflicts), financial (ex. inflation, liquidity risks) or other (ex. deficient infrastructure). Thus, the bankability or financing of RES projects is one of the main obstacles to the success of RES in a region such as the SEM and requires strengthened risk management37.

The International Energy Agency (2020) notes two key uncertainties that blur the forecast for SEM countries’ renewables:

- First, the pace at which contractual agreements under the various policy procurement processes occur. For competitive auctions, photovoltaic (PV) expansion depends largely upon how quickly governments announce and move through the various processes, which is arbitrary as many governments in the region do not publish auction timelines in advance and are thus unpredictable.
- Second, the possible impact of Covid-19 on near-term project development is ambiguous. In Tunisia for instance, projects have been delayed by supply disruptions and postponed grid connections.

The wind sector offers an example of the uncertainty, as annual wind additions for the region in 2020 were estimated to decline comparatively to 2019 (IEA, 2020). This was due to lengthy auction processes and delayed utility-owned development, postponing projects under development. The commissioning of late-stage IPP projects in Morocco and Jordan were expected to boost growth in the sector, though construction delays related to Covid-19 also brought uncertainty. Growth could recover in the following years, with most of the expansion to be expected in Egypt, more than 2 GW are currently under development stirred by bilateral IPP contracts between developers and the Egyptian power utility (IEA, 2020).

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Figure 18. Annual wind additions in selected South Med and MENA countries 2018-22 and average annual additions 2023-25 (left), and incremental growth by procurement type for selected countries 2020-25 (right)

Source: IEA (2020)38

38. IEA (2020), «Renewables 2020 : Analysis and forecast to 2025 ». 
Overall, a key challenge for SEM governments is how to fund such important renewable energy projects. While governments could take-on a share of financing for some new projects and for repair/maintenance projects, an effective private sector needs to lead the transformation. In addition, most SEM governments would need to create policies, regulations, and procedures that encourage private investors. Further, in order to maximise the regional benefit of renewable energy post-covid, Mediterranean grids should also be transnational, which will require bilateral dialogue and a regional approach. All in all, SEM energy sector financing needs to be supported by:

- **The Public Sector:** The public sector will always be needed to play a key role in promoting efficiency in the energy sector. National financing of renewables investments could further increase in volume and efficiency if cooperative approaches were adopted at the South-South and North-South levels. Policies also need to target the exploration of innovative financing instruments and accelerate R&D support. SEM governments have a unique opportunity to enact laws and regulations that contribute to a shift to renewable energy. COVID-19 recovery packages could also strengthen their energy efficiency components. Improving energy efficiency could reduce CO2 emissions and create job opportunities, first for workers in industries that are more labor intensive than average (ex. a retrofit project creating jobs in the labor-intensive construction sector), then by continuing to support jobs by saving energy (the energy savings generated by the investment being redirected into the overall economy). It could also contribute to increased firms productivity, electricity remaining the most important obstacle for firms’ development in countries such as Lebanon³⁹.

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**Figure 19.a. Public RE Finance Flows (2017 USD Million)**

- Algeria
- Egypt
- Tunisia
- Jordan
- Turkey
- Syria
- Lebanon
- Palestine
- Morocco
- Israel

**Figure 19.b. Public Solar Energy Finance Flows (2017 USD Million)**

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- Private Sector, PPPs and International Financial Institutions: Energy needs an increase in private sector participation for the development of technology, technical skills and management skills, as well as the transfer of technological know-how, especially in cooperation with the EU. Meanwhile, to raise financing from domestic or regional banks, it is useful if an energy project also gains support from international financial organisations. The latter can expand lending programs to assist in the rapid delivery of energy projects and can propose a wide range of risk mitigation and sustainable finance tools that increase sustainable energy financing (see table 1). They could also act as technical advisers and capacity builders. Incentives for private financing of PPP schemes as well as training and educational programs could also attract private investors. As part of the Government incentives, facilitated access to land, which remains a major obstacle in many SEM economies, could also strengthen private investment.

Table 1. Four key enabling sustainable finance tools to facilitate the energy transition

<table>
<thead>
<tr>
<th>TOOL</th>
<th>Description</th>
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<tbody>
<tr>
<td>Blended finance</td>
<td>Blended finance is a key enabler of accelerating capital flows towards sustainable energy. It combines commercial funding by investors and concessional funding provided by development partners. A strategic blend of development finance and philanthropic funds encourages private capital flows to emerging economies, reduces risks and creates lower blended costs. This offers security to private investors and addresses their concerns around market and project risks, particularly in developing countries. Blended finance has mobilized $140 billion in capital towards meeting the Sustainable Development Goals (SDG) in developing countries and almost one-third of the blended finance deals in 2018 were for SDG 7 – Affordable and Clean Energy.</td>
</tr>
<tr>
<td>Sustainable and green bonds</td>
<td>A sustainable bond is a financial instrument, the proceeds of which are applied exclusively to projects that make a contribution towards sustainability and climate. Such bonds typically have a fixed income return and are backed by project assets or by the issuing entities’ balance sheet. In 2018, nearly $521 billion in green bonds were initiated by governments and institutions, bringing the total climate bond market to $1.45 trillion. Green bonds can effectively scale up SDG-aligned infrastructure in developing countries, and commercial financial institutions are increasingly making commitments towards the SDGs as well as their own environmental, social, and corporate governance (ESG) targets. As mentioned above, Egypt successfully launched its first green bond issue on the London stock-exchange, the largest in the MENA region.</td>
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Like other infrastructure projects, clean energy projects must be bankable. Guarantees are sometimes required to attract appropriate funding, particularly for technologies and markets that are not yet mature. In many countries, governments and states provide off-take guarantees for real asset projects. These guarantees are often offered by a third party to hedge the project against default and loss of revenue. Guarantees thus reduce investor and finance risk, which helps to mobilise finance for project development with participation both by investors and lenders. In countries where a sovereign guarantee is not available, a third-party guarantee mechanism can be beneficial, this is often provided by development financial institutions and multilateral agencies such as the World Bank, the European Bank for Reconstruction and Development, and the African Development Bank.

Insurance companies can also play a major role in energy transition, hedging inherent project risks. They are also essential for rationalising the cost of funds. Large insurance companies have not only committed to the energy transition but have successfully contributed towards project implementation.


4. Capitalizing on green and blue hydrogen as key elements of the decarbonisation strategy

When produced with low carbon emissions, hydrogen would be a very efficient way to contribute to the energy transition (see figure 20). Its adaptability allows it to operate across the transport, heat, industry and electricity sectors, which altogether account for about 96% of global carbon dioxide emissions. Specifically, hydrogen fuel cells are emerging as a high-potential technology that has substantial energy efficiency and can bring massive decarbonisation benefits to a range of industries and to transport. A fuel cell works similar to an electric battery, converting chemical energy into electrical energy using the movement of charged hydrogen ions across an electrolyte membrane to generate current. There they recombine with oxygen to produce water, leaving only water vapour as emissions.

Figure 20. Hydrogen uses in the Energy Transition

1. Sources of energy
2. Backbone of energy system
3. End uses
4. Decarbonise transport
5. Decarbonise industry energy use
6. Serve as feedstock using captured carbon
7. Help decarbonise building heating

Hydrogen is a highly efficient renewable energy generator. It can be used as a feedstock to increase system resilience, distribute energy across sectors and regions, enable large-scale energy generation, and serve as a buffer to increase system resilience. It can also help decarbonise transport, industry energy use, and building heating.


A key element is that fuel cells can be efficiently associated with internal combustion engine technology, meaning they can also power commercial and public transport vehicles (buses, trucks, trains, and ships), on top of various other devices and power plants. The use of hydrogen vehicles can become totally carbon-free if the hydrogen has been sourced from “green” production methods such as renewable-powered electrolysis. Meanwhile, hydrogen fuel cell vehicles also have shorter refuelling times and longer ranges than electric vehicles. For such reasons, the European Union has included green hydrogen as part of its plans to meet decarbonization targets and rebuild its economies post-pandemic.

It is thus evident that there are several opportunities to grasp for the SEM countries, as they could become a possible source for a substantial amount of Europe’s future hydrogen supply. This could be facilitated by the fact that the cost of “green” hydrogen is set to decline over time, as cheaper and more efficient electrolyzers and fuel cells become available, and as the cost of renewable electricity continues to fall. Wind power of 23 USD/MWh, for example, can result in green hydrogen production cost of less than 2 USD/kg. Some countries with exceptional renewable resources such as Morocco are already betting on hydrogen, exploring the potential to produce local green hydrogen and ammonia to decarbonize their local industry and services (e.g. fertilizer production, steel production, freight transport) and to export compressed hydrogen, ammonia, and methanol to other countries (World Bank - CMI, 2020)\(^\text{43}\).

Overall, as part of their shift towards RE, SEM countries need to turn their attention to the potential of clean hydrogen, which could be a valuable input in their growth and decarbonisation strategies post-covid. But hydrogen can take other colors than green (see Box 2 below).

**Box 2. Understanding the different “shades” of hydrogen**

As hydrogen technologies are being considered in post-covid industrial plans worldwide, it is important to understand how they are codified. The main colors that have been attributed to hydrogen are the following:

- grey (or brown/black) hydrogen, produced by fossil fuels (mostly natural gas and coal), and causing the emission of carbon dioxide in the process
- blue hydrogen, through the combination of grey hydrogen and carbon capture and storage (CCS), to avoid most of the GHG emissions of the process
- turquoise hydrogen, via the pyrolysis of a fossil fuel, where the by-product is solid carbon
- green hydrogen, when produced by electrolyzers supplied by renewable electricity (and in some cases through other pathways based on bioenergy, such as biomethane reforming or solid biomass gasification)
- yellow (or purple) hydrogen, when produced by electrolyzers supplied by electricity from nuclear power plants.

However, within each “colour”, there may be a significant variability of carbon intensity, due to a large number of parameters. Hydrogen may be even carbon-negative, such as with pathways that involve bioenergy and CCS together.

Source: Noussan et al (2020)

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\(^\text{43}\) The Hydrogen Council, as seen in: https://www.lazardassetmanagement.com/de/de_de/references/fundamental-focus/hydrogens-role-in-the-green-economy#:~:text=Hydrogen%20is%20a%20highly%20efficient,of%20global%20carbon%20emissions.
The exact colour the SEM hydrogen strategies should privilege in the short and medium term is something that can be debated. Indeed, the choice of a specific solution is often related to geopolitical choices based on national strategies driven by the availability of resources, energy security concerns or the support to specific industrial sectors (Noussan et al. 2020). Developing green hydrogen effectively at a wide scale needs an important amount of renewable electricity, which could be an issue in the South Med for the short-term, since RE is already needed to decarbonize existing electricity demand. Meanwhile, the production of green hydrogen still has some technical and financial issues that need to be addressed. The combination of cheap renewable electricity and cheap electrolysers is what will ultimately allow green hydrogen to compete with natural gas and non-green hydrogen. But total global electrolysis capacity is currently limited and, for now, somewhat costly. It is expected that a significant increase in electrolysis capacity will reduce costs by about 70% over the next 10 years. Markets for green hydrogen also need to be developed. Depending on advances in technology, a market similar to that of liquefied natural gas could emerge in the coming decades. But again, time (and investments) is needed. It may take decades to reduce the cost of green hydrogen to competitive levels. Furthermore, fossil fuels, especially oil, are also an important source of revenue for several SEM countries. The energy transition needs to be well-planned, making sure it does not pose an existential threat to their domestic stability. Therefore, blue hydrogen could also represent an interesting option in the short and medium run, serving as a stepping-stone for green hydrogen in the long run.

Nowadays only 2% of hydrogen manufactured worldwide is produced by water electrolysis, the rest being produced from natural gas, which produces CO2 emissions. More than 90% of hydrogen is used as a building block for fertilisers or is consumed in the oil, refining and wider petrochemicals industry. The development of the hydrogen economy greatly depends on government investment in the initial phases. For SEM countries to seize the opportunity with regards to hydrogen in their post-covid recovery strategies, they need to start dealing with their own challenges which include: the requirement of specific knowledge and capabilities, the need for qualified engineers, high cost and poor efficiency of hydrogen technologies, lack of water and desalination requirements, the need for strategic infrastructure decisions between pipeline infrastructure or maritime transportation, and the need for national strategies to identify the green hydrogen development pathway (World Bank - CMI, 2020).

45. https://www.ips-journal.eu/topics/environment/eu-mena-hydrogen-4723/
46. https://www.iea.org/commentaries/the-clean-hydrogen-future-has-already-begun
The EU can play a key role in accelerating the SEM hydrogen transformation post-covid in SEM countries, as it recently announced it plans to provide targeted assistance to large-scale renewable and clean hydrogen production in North African countries, to facilitate exports to southern Europe. In an effort to strengthen its green power and hydrogen use to help meet the 2050 carbon neutrality goal, the EU sees great potential for low-cost production in North Africa and the South Mediterranean in general, given their ample solar and wind resources.

The EU could partner with Mediterranean countries on fostering investments in energy efficiency, renewable energy “and a new focus on clean hydrogen production”, including through financial incentives. Five planned projects for new power links between North Africa and the EU could add 4.3 GW of import capacity if all are built49. An additional 700 MW Morocco-to-Spain link is planned to be online in 2026, and the 600 MW Tunisia-to-Italy link in 2027. Three other projects each of 1 GW between Algeria and Italy, Algeria and Spain, and Morocco and Portugal are at the early study stages. To support investments in clean hydrogen in the European Neighbourhood, the Commission is expected to mobilize the available financing instruments including the Neighbourhood Investment Platform, which has financed for many years projects accompanying the clean energy transition of partner countries (EU Communication of 2020-07-08)50.

The EU should give its partners all the tools to align with the European Green Deal’s requirements and clean hydrogen is a good example where this can be achieved. Scaling-up production quickly in the SEM region can be straightforward. Cheap renewable electricity can help minimise the fiscal burden of any transitional subsidies needed to make green hydrogen competitive, until the electrolysers themselves have scaled up to become cheap enough. But to achieve this, any green hydrogen subsidy scheme in the EU needs to be open in a non-discriminatory manner to green hydrogen produced in the SEM region, a point which has not yet been addressed by Europe (Walters, 2020)51. Meanwhile, the EU is developing a green hydrogen certification system called CertifHy, which is intended to guarantee that any hydrogen claimed to have been produced as “green” actually has been (Walters, 2020). If SEM countries want to be eligible to export hydrogen to Europe, they will need to develop a CertifHy-compatible system soon.

The EU appears ready to support new hydrogen-related project proposals by international financial institutions, for potential co-financing. The EU Association Agreements (AAs) with South Med countries52, which were established with the objectives to promote harmonious

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52. The Association Agreements (AAs) between the EU and respectively Algeria, Egypt, Jordan, Lebanon, Morocco and Tunisia have been signed between 1995 and 2002 and entered into force between 2000 and 2006. They were in line with the « Barcelona Declaration », an attempt aimed at fostering political, security, cultural, human as well as economic and financial partnerships between the EU and the Southern Mediterranean partner countries.
economic and social relations, to gradually liberalize trade and capital flows and to encourage intra-regional integration, could provide a framework for their participation in joint hydrogen research and development programmes with the EU (EU Communication of 2020-07-08). Morocco and Tunisia could be the first to benefit from such agreements, as the EU wishes to deepen and broaden the AAs with the two countries by negotiating more ambitious DCFTAs (Deep and Comprehensive Free Trade Areas). The objective would be not only to liberalise goods and services trade but to also cover all other relevant trade-related areas including “Trade-Related Energy and Raw Materials”.

The EU has already signed such DCFTAs with eastern neighbours Georgia, Moldova and Ukraine. These agreements include commitments in the energy sector, on energy security and energy markets, including nuclear safety, regulatory reforms in line with the EU acquis and the establishment of open energy markets. They also aim at a more efficient use of energy and the development of renewable energy sources.

Meanwhile, on a bilateral level, Morocco is leading the way as it recently signed a bilateral partnership with Germany on green hydrogen, with two first projects announced in the declaration of intent. This agreement aims to develop the production of green hydrogen and to set up research and investment projects. The two projects are: i. the “Power-to-X” project proposed by the Moroccan Solar Energy Agency (Masen) for the production of green hydrogen and the establishment of a research platform for this energy source and ii. the transfer of knowledge and the strengthening of skills in partnership with the Research Institute on Solar Energy and New Energies (Iresen) in Morocco. This makes Morocco the first country to sign such an agreement with Germany, which recently unveiled its “German National Hydrogen Strategy”, a 9 billion euros initiative to make the country the leading supplier of modern hydrogen technologies. This funding includes €7 billion to promote and develop hydrogen technologies in Germany, and €2 billion to develop international partnerships. Morocco will be the first country to benefit from the international partnership component of the strategy. The industrial hydrogen plant to be built in Morocco is expected to transform the country’s renewable energy sector and thus reduce carbon dioxide emissions by 100,000 tonnes.

Morocco is banking on international cooperation as also evidenced by the signing of a declaration of cooperation with Portugal, with the plan to develop the partnership in the green hydrogen sector. Having set up its National Hydrogen Commission since 2019, Morocco is a pioneer in terms of R&D of green hydrogen on the African continent.

Egypt is also exploring green hydrogen in partnership with the EU countries. In early 2021, it signed an agreement with the German group Siemens to launch studies for the development of a green hydrogen production project.

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Meanwhile, in February 2021 Egypt also had talks exploring potential cooperation with Belgian companies to invest in green hydrogen production. Such cooperation could create renewed business opportunities for Egyptian ports and would provide access to the European energy market. A ministerial committee is also studying to integrate hydrogen into the Egyptian Energy Strategy 2035 and exploring its applications and production. Likewise, an MOU was also signed between Tunisia and Germany for the establishment of a green hydrogen alliance, aiming to develop the green hydrogen market in Tunisia.

5. The role of the carbon border adjustment mechanism and the need to choose the right economic policy tools for the energy transition

What a Carbon border adjustment mechanism would mean for SEM countries

Carbon border adjustment (CBA) policies are gaining momentum worldwide. As noted previously, the EU recently proposed a Carbon border adjustment mechanism (CBAM) for non European countries, as a key element in the European Green Deal, the justification of the proposal being that, as long as a large number of trade partners do not share the EU’s climate ambition, there is a risk of carbon leakage which would undermine EU efforts and leave global emissions practically unchanged. To encourage alignment of climate ambition with those of the EU, a carbon border adjustment mechanism has been proposed in specific sectors to reduce the risk of leakage.

Concretely, the CBAM will mirror the ETS in the sense that the system is based on the purchase of certificates by importers. Importers of the goods will have to, either individually or through a representative, register with national authorities where they can also buy CBAM certificates.

National authorities will authorise registration of declarants in the CBAM system, as well as reviewing and verifying declarations. They will also be responsible for selling CBAM certificates to importers. By ensuring importers pay the same carbon price as domestic producers under the EU ETS, CBAM will ensure equal treatment for products made in the EU and imports from elsewhere.

CBAM could prove a strategic tool for the SEM countries, but only if it is combined with a just energy transition. Right now, for SEM (and other) trade partners, the introduction of the EU CBAM could essentially mean additional tariffs, impeding on their exports to the EU. Under the current CBAM proposal, the mechanism will be phased-in gradually and sectors to be affected would include carbon-intensive goods such as cement, iron and steel, aluminium, fertilisers and electricity. In terms of absolute embedded CO2 emissions in exports to the EU, Libya and Algeria (both with more than 10 million tonnes of CO2 equivalent emissions embedded), followed by Turkey and Egypt would be among the most concerned (see figure 21).

Post-Covid opportunities and required “Green Strategies”

Figure 21. EU imports absolute CBAM exposure by country
Embedded emissions in leakage sector imports (tonnes of CO2 equivalent)

Source: Allianz Research (2020a)60

In a way, the EU could end-up also taxing its own companies (ex. Renault) which are installed in the SEM countries. Secondly, and more generally, how to reconcile the soft power of projecting the EU as a true partner to its Southern neighbours’ energy transition all the while imposing barriers to their exports? Developing economies of the SEM region could be particularly affected, as they lack the administrative/will requirements of the EU CBAM. Their exports would be sanctioned, even though on a global scale their participation in CO2 emissions is minimal. This is why thorough dialogue between the SEM countries and the EU is needed, one which should include the CBAM issue. The EU has announced that a reporting system will apply as from 2023 for the CBAM-concerned products with the objective of facilitating a smooth roll out and to facilitate dialogue with third countries. Meanwhile, importers would make SEM countries among the most exposed.

Economic policy tools for the energy transition: the role of environmental taxation and green procurement

While it is evident that SEM countries should commit to greening their economies and better align themselves with the EU it is much less obvious

Figure 22. Top 50 least developed and developing economies most exposed to EU carbon border tariffs

When it comes to relative exposure to carbon tariffs the ranking is slightly different. While for Asian economies only a small share of exports to the EU are exposed to carbon tariffs, for African and SEM countries the majority of export value is generated in a “brown” sector (carbon leakage sector) (Allianz Research, 2020b). This would make SEM countries among the most exposed.

Figure 22 lists the top 50 developing or least developed countries by declining country’s respective carbon tariff on “brown” exports to the EU, while the hollow bars indicate the worth of the tariff relative to total exports to the EU.

Countries in green are most likely to be exempted from carbon tariffs due to their least developed country status. Developing economies in blue would be the most exposed, including Libya, Algeria, Jordan, Egypt and to lesser extent Turkey.

This brings in multiple debates. Firstly, calculating embedded carbon may prove difficult. In a world of value chains, calculating this within a given product, with inputs originating from several different countries with different climate policies, could be extremely complex and expensive, especially for countries that do not have the EU’s technical capacity.

In a way, the EU could end-up also taxing its own companies (ex. Renault) which are installed in the SEM countries. Secondly, and more generally, how to reconcile the soft power of projecting the EU as a true partner to its Southern neighbours’ energy transition all the while imposing barriers to their exports? Developing economies of the SEM region could be particularly affected, as they lack the administrative/financial capacity to satisfy the regulatory requirements of the EU CBAM. Their exports would be sanctioned, even though on a global scale their participation in CO2 emissions is minimal. This is why thorough dialogue between the SEM countries and the EU is needed, one which should include the CBAM issue. The EU has announced that a reporting system will apply as from 2023 for the CBAM-concerned products with the objective of facilitating a smooth roll out and to facilitate dialogue with third countries. Meanwhile, importers will start paying a financial adjustment in 2026. However, in the meantime, it would be useful for discussions to also focus on cooperation schemes to protect SEM countries from potential job losses resulting from the CBAM impact.

Economic policy tools for the energy transition: the role of environmental taxation and green procurement

While it is evident that SEM countries should commit to greening their economies and better align themselves with the EU it is much less obvious

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what precise economic policy tools should be used to encourage achieving such a goal. Indeed, different environmental policies have been developed in different directions and have generated debates on their efficiency and results, both environmentally and economically. The SEM literature on this issue has also been scarce, the research of Danilina and Trionfetti (2019) is an exception, providing some useful insights as to what instruments could be used in the case of SEM countries, comparing Green Public Procurement (GPP) policies to Environmental Taxation (ET), two alternative but also compatible approaches to regulation that feature mandatory vs. voluntary participation and direct vs. indirect influence.

ET is widely included in key environmental policy instruments worldwide, while GPP has been constantly high on the policy agenda of different countries since the 1970s. In a closed economy, Danilina and Trionfetti (2019) emphasize a higher relative efficiency of GPP in comparison to taxation. One unit of purchasing power loss with GPP corresponds to, on average, a 6.7 times more significant environmental degradation decrease in comparison with taxation. In terms of absolute impact, taxation is more powerful than GPP because it results in a 1.8 times stronger decline in environmental degradation, but it brings about a 10.7 times stronger purchasing power reduction. But what happens when countries trade with one-another? In that case, the environmental and economic impact seems to be related not only to the type of instrument, but also to the stringency of environmental policy. There are three possibilities:

- **Trade and environment complementarity:** when environmental policies are identical both in type and stringency, trade integration leaves the environmental degradation level unchanged but incurs an increase in purchasing power across trading countries, with a “win-win” situation for all countries.
- **Pollution haven effect:** The country that applies more severe environmental taxation wins from trade integration with the country that introduces lower taxation or GPP. This is a “pollution haven effect” by which trade integration makes polluting industries move to countries with less severe environmental regulation.
- **The paradox of virtue.** If all countries opt for the GPP policy, the country of which the government spends more on green goods faces a purchasing power decline while the less environmentally virtuous country experiences the opposite effect. Meanwhile, environmental degradation is declining.

Overall, the authors support the wide implementation of GPP as an efficient

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63. Green Public Procurement (GPP) is defined by the European Commission as “a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured”. It is a voluntary instrument that pulls producers towards greening of the production process indirectly through market demand.

64. Environmental tax is defined by the European Commission as “a tax whose tax base is a physical unit (or a proxy of a physical unit) of something that has a proven, specific negative impact on the environment”. It is a mandatory instrument that pushes producers directly to eliminate negative environmental effects of production.

approach to environmental policy design in any country, regardless of the level of their development and/or eco-concerns. It can motivate firms to opt for green technologies even when the only incentive originates from the government. The effect can be amplified by taking into account the consumer’s eco-biased demand that, in its turn, can be boosted by the corresponding public policy. However, the absence of public monitoring can diminish the positive effect of the policy approach allowing firms to greenwash, or cheat on the environmental quality of their products.

They also stress how such instruments can act as complements compensating each other’s shortcomings. In the case of EU-Med cooperation, they highlight that the “first-best” strategy would be policy harmonisation, with the EU and SEM countries coordinating their environmental efforts without implicating any disproportional burden to any of them. This seems particularly relevant, considering the EU’s perspectives for a CBAM. However, such harmonisation would not be straightforward, as countries do not have the same level of economic and institutional capacity to introduce symmetric policy instruments.

Financial support from the EU would be particularly useful. The authors suggest that “coordinated” GPP, as a form of cross-country environmental support, could be a first step towards harmonization. A country that has higher financial and institutional capacity to develop GPP can increase its green public spending allowing a country that has lower financial and institutional capacity to develop GPP to benefit from the green demand of the partner country. More advanced countries are in the position to set the standards and quality control that allows to diminish or even avoid greenwashing and, at the same time, propagate the corresponding ecological standards to the recipient. This approach can be considered for the collaboration of EU and South Med countries in order to strengthen the environmental policies in the latter and establish a first step towards the coordination of green policy approaches.

The impact of such policies on employment should also be considered, choosing the right economic policy to go hand-in-hand with the energy transition will be key for SEM countries’ job creation goals. On a substantial level, job creation is a central argument because unemployment rates in the SEM countries, especially for the youth, are very high and are at the top of the list of political priorities. Indeed, transition towards a low-emission energy era could have profound effects on employment (Aldieri el al. 2019, Ram el al. 2020). Effects on employment, whether direct or indirect, can result from several and often contradictory forces. When a country “goes green”, an increase in employment is expected in the green energy sectors. At the same time, however, a decrease in labour demand is to be expected in the more conventional energy production sector. The net effect on employment remains unknown due to the impact of other factors such as the repercussions on energy prices, the deployment of


67 Ram, M., R., Aghahasosseini, A., Breyer, C. (2020). Job creation during the global energy transition towards 100% renewable power system by 2050. Technological Forecasting and Social Change, 151, Article 119682.
new capital-intensive technologies, or additional sector policies put in place to help the “losing” sectors such as for example training and social programs.

The potential impacts of energy transition on employment, stress the need for careful consideration of policies, which can strengthen the links between the energy sector and other sectors of production. The focus on employment translates not only into trying to create new jobs in the field of renewable energy but also into protecting existing jobs in the more traditional sectors (see also Pouffary, De Laboulaye and Tsakas 2018).

These policies are often denoted as “local content” policies which are also relevant for renewable energy projects (Rennkamp et al., 2017). Such policies may: i) have an accelerating impact on the political momentum for ambitious renewable energy policies, ii) support the move of the economic base away from consumption and rent-seeking closer to the creation of domestic value added, iii) “leap-frog” existing barriers to technological transfer, iv) bring more new mature players to the global market, which increase competition and innovation (Tsani, 2021). Economic policies and energy strategies should make sure developers plan for procuring locally manufactured components. Local industries should be able to invest, manufacture or at least assemble such components locally.

All in all, making use of economic policy tools that facilitate decarbonization, all the while encouraging investments in renewables and going towards integration of energy markets, could help shape the “climate ambition” position of SEM countries vis-à-vis the EU. A more technical description regarding the concrete benefits of Euro-Mediterranean energy market integration and what is needed to make such integration happen are presented in the next section.

But we should always keep in mind that, with the energy transition, countries are (or will be) moving towards an era of re-constructing complex, socio-technological systems that link energy to other systems (water, transportation, food production, housing etc). Therefore, this is a global challenge that requires the inputs from everyone, and requires developing new approaches to innovation that integrate both technological and human dimensions. The SEM countries will need time to do this the right way. With the EU as a partner, supporting the industrial development of its neighbours towards a greener direction, transformation nevertheless will take time due to the presence of important economic and social costs.

Section III
Regional cooperation and Euro-Mediterranean energy market integration

1. Benefits of Euro-Mediterranean energy market integration

Regional electricity market integration (REMI) has always been known to offer numerous benefits to the power systems and to the economies of participating countries: enhanced energy security and power system reliability, reduced need for back-up capacity thanks to reserve sharing, supply mix diversification, more efficient use of power plants, lower power system costs (both investment and operating), and therefore expected lower consumer prices. However, with more ambitious climate mitigation objectives in the EU, the climate benefits of REMI are increasingly acknowledged as being as important, if not more than the energy and economic benefits. Some of the climate positive externalities result from the increased efficiency of the power system because of regional integration, but most of them are derived from the fact that REMI facilitates renewable energy scale-up.

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71. ESMAP (2010), *Regional Power Sector Integration: Lessons from Global Case Studies and a Literature Review*
REMI facilitates the large-scale development of renewable energy (RE), by improving power system flexibility and optimizing investments. According to the International Energy Agency (2014), flexibility is “the ability of a power system to reliably and cost-effectively cope with the variability and uncertainty of demand and supply across all relevant timescales, from ensuring instantaneous stability of the power system to supporting long-term security of supply”. Two key solutions to increase flexibility are storage (batteries, thermal storage, pumped hydro, etc.) and regional market integration through interconnections. Whereas storage addresses the time dimension of flexibility, regional market integration is directed at the spatial dimension as well as efficiencies associated with the removal of national restrictions. It is easier to balance in real time a large power system with vast quantities of intermittent renewables, as wind is always blowing and sun shining somewhere.\(^72/73/74\). In summary, a more integrated market through interconnections reduces the need for investment in power generation capacity, optimizes the use of renewable energy capacity (for instance making better use of excess wind in Spain or hydropower in Nordic countries, and possibly solar in North Africa in the future) and reduces the need to stop RE production units for fear of endangering the power system security and stability.\(^75\).

As discussed before, the EU Green Deal and Recovery Plan emphasize the need for cooperation, partnership and REMI to achieve the goal of climate neutrality at least cost. Regional cooperation, coordination of national policies and of power system operations and REMI are also a central part of the EU ‘Clean Energy for All Europeans’ (CE4ALL) Package, which will be revised in mid-2021 to reflect the EU Green Deal objectives and the Energy Sector Integration Strategy. In particular, the Electricity Regulation of CE4ALL proposes the creation of Regional Coordination Centres (RCC) that will have the responsibility, among others, of sizing and procurement of balancing reserves, of assessing the maximum contribution of external resources in capacity markets and of tasks related to the risk-preparedness of the power sector.

\(^72\). Silvia Pariente-David, Successful Grid Integration of Renewable Energy: Integration is the Name of the Game, IAEE Energy Forum, Q1 2014


\(^75\). IEA, Seamless Power Markets- Regional Integration of Electricity Markets, 2014

\(^76\). European Commission, Communication from the Commission, Clean Energy for All Europeans, COM(2016) 860 final


Broadening regional electricity market integration to include the southern and eastern shores of the Mediterranean would make the EU goal of reaching carbon-neutrality easier and less costly, as it would give Europe access to a vast almost limitless reserve of carbonless energy. Indeed, as described above, the demographic, climatic, and geographical conditions of the SEM region confer it with significant advantages for large-scale renewable energy development, among which: plentiful low-cost solar energy resources and ample desert land to site solar power plants. An integration of the energy Euro-Mediterranean market would have benefits for both northern and southern countries, both in the short term and in the long term, by allowing the optimization of resources and infrastructures.

2. What is needed to make it happen

Regional energy market integration and cooperation between Europe and the Mediterranean are crucial to unleash the region’s RE potential for the purpose of cost-effective climate change mitigation. Successful regional energy market integration requires substantial physical infrastructure (the “hardware” of regional integration) but this is not enough. “Software” is also needed so that markets can interact and operate harmoniously.

For the moment, the two shores are interconnected electrically to the West, by a submarine cable of 1400MW under the Strait of Gibraltar connecting Spain and Morocco. The resulting exchanges have contributed to covering, on average, 20% of Morocco’s electricity needs over the last few years. However Morocco’s imports have recently declined largely due to the commissioning of several RE power plants and some coal plants. The networks are also interconnected in the Eastern Mediterranean, with Turkey connected to Bulgaria through two 400kV lines (for a total capacity of 2500 MW) and to Greece through a 400kV line with a capacity of 500 MW; since 2015, the Turkish electricity system has been synchronized with that of the European continent. Other interconnections between Europe and the southern shore of the Mediterranean are being planned or studied, in particular the Italy-Tunisia connection to the central part of the Mediterranean, which has now been granted the status of Project of Common Interest under the Connecting Europe Facility.

What kind of infrastructure is needed in the future to further integrate the European and South/East Mediterranean energy markets will depend on whether the interconnectivity develops through exchanges of electrons or molecules (hydrogen or other gases). A holistic approach to planning electricity transmission and gas transport infrastructure and to operating electricity and gas markets is needed. This is likely to be challenging, given the lack of institutional structure to overview the process. The coordination between the European Network of Transmission System Operators for Electricity (ENTSO-E) and the European Network of Transmission System Operators for Gas (ENTSO-G), with the help of the Agency for the Cooperation of Energy Regulators (ACER), to prepare joint scenarios and long-term development plans is barely starting in the EU, so it will take time before this practice extends to the Mediterranean.

The existence of interconnectors or pipelines connecting the two shores of
the Mediterranean is necessary but not sufficient to support the development of an integrated Euro-Med energy market. To operate a flawless integrated market where energy can flow freely with no hindrance requires more than physical infrastructure, it requires the "software" of regional integration, such as compatible market designs, interoperability of power systems, coordination of wholesale markets, joint balancing markets, flexibility assessments, adequate management of interconnection capacity, regulatory convergence, harmonization of pricing principles, and tariff setting, etc...

Experience around the world indicates that although full regional integration of neighboring electricity markets and the creation of regional power pools can take decades to realize, the good news is that partial integration that enables countries to begin reaping some of the benefits of a regional electricity market can happen relatively rapidly. The rate of progress is likely to depend on many factors, a key one being the institutional capacity for integration and the existence of a supranational institution to coordinate, monitor, and guide the overall effort. Integration could start in simple forms such as cooperation for reserve-sharing and mutual help in case of an emergency, and later evolve to more elaborate integration schemes, with multi-country power systems, technical and regulatory harmonization, formal common power exchanges, converging market design, and competitive trade across borders. Regional power pools often start with a small number of countries and expand over time as success attracts more participants.

In the case of the SEM region, a realistic intermediate step might be the creation of an integrated Maghreb electricity market (or at least integrating the power systems of Morocco, Algeria, and Tunisia as a start), given that the Maghreb Electricity Committee (COMELEC) already fulfills some of the functions of a power-pool-type coordinating entity. The process could be similar to the one under way in South East Europe, where the West Balkan countries—seven of which are Mediterranean countries—are at an advanced stage of integration with the EU single energy market. North Africa has all the characteristics needed to become a clean-energy hub serving the integrated EU-Mediterranean energy market, possibly including part of Sub-Saharan Africa in the longer term. In addition to its strategic geographical location, rich resource endowments, and its diversified mix of energy sources, the region has sufficient physical-transmission infrastructure to get started.

As discussed throughout the paper, the EU could draw in its wake the SEM countries on the Green Deal journey. First, the SEM countries can learn from the EU’s experience as Europe was the first region in the world to design massive green stimulus packages. Green fiscal stimulus packages can provide an immediate boost to the economy while building the foundation for long-term sustainable growth. SEM countries can orient their economic stimulus packages to make clean energy transitions part of the architecture of their economic recovery plans. This would allow the region to develop to its fullest potential its renewable energy treasure, while ensuring that the post-Covid-19 recovery unlocks the sustainable socio-economic benefits of a clean energy transition.

Secondly, as seen in section 2.b, the EU is allocating financial resources to support its neighbors in “building back better”. However, this financial assistance is likely to be tied to some conditions, such as phasing out fossil fuel subsidies and/or completely halting investment in fossil fuel infrastructure, be it extraction or transport. The CBAM working documents allude to the fact that countries that adopt climate neutrality objectives or consider setting up some form of carbon pricing would be exempt from that import tax. Similarly to what is done for the EU RFF, the use of the NDICI instrument could be made conditional on some of the measures in the national recovery plans being devoted to the green transition. The amount of commitment is subject to negotiation at the individual country level, recognizing the imperative need of the SEM countries to create new jobs.
Recommendations Towards a Mediterranean Green Deal:
the need for cooperation, coordination and market integration

Assistance, be it technical or financial, from the EU will be available to SEM countries for designing and implementing green recovery plans. Similarly to the NECP in Europe, the Nationally Determined Contributions (NDC) can provide guidance on green stimulus measures to include in recovery plans. The NDC partnership has set-up an Economic Advisory Support Service to assist countries in aligning their COVID recovery programs with their NDCs and Long-Term Strategies (LTS). IRENA\(^\text{80}\) provides practical recommendations for governments in the preparation of COVID recovery programs. The IEA\(^\text{81}\) has identified 30 actionable policy measures that would both boost economic growth and avoid greenhouse gas emission rebound. In another report\(^\text{82}\), the IEA reviews opportunities in North African countries and offers recommendations on how they can take advantage of the momentum from the crisis to build up a resilient and secure clean energy sector that will help deliver a transformative economic recovery in a post-Covid-19 world.

Post-COVID stimulus packages\(^\text{83}\) could encompass, among others: (1) massive investment in renewable power systems; (2) boosting the construction sector with green-buildings and green-infrastructure projects; (3) support to the automotive sector in the transition to electromobility; (4) recovery support to businesses conditional on climate commitments; (5) targeted support to innovative low-carbon activities, and (6) acceleration of the transition of the fossil fuels industry. Although those recovery plans are more likely to be defined and implemented at the individual country level, a beyond-the-border approach would be necessary for the SME countries to achieve their climate change mitigation and adaptation goals. Below we focus on measures that will enable regional energy market integration, which could be a component of a future Mediterranean Green Deal.

Naturally, we should keep in mind that other sectors should also be part of such Mediterranean Green Deal, including agriculture. Much can also be done to improve water and food security, particularly as the nexus between water, energy, and food security is likely to be affected. Water, energy and food security are closely interlinked in the region; water is needed to grow food, energy depends on water to generate power, while energy is also needed to extract and deliver water to users. Fossil fuel subsidies have contributed to expansion of pumping technology and often resulted in dramatic declines in water availability, which affects food security. Climate change has increased such challenges while COVID-19 has also exacerbated the burden of addressing the increasing demand for water and food in the region\(^\text{84}\). This requires reducing fossil fuel subsidies, more cost-reflective water pricing, regulation, as well as more environmentally friendly technology\(^\text{85}\). Such issues are however less regional in scope, and more local, and are beyond the purpose of this paper.

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\(^{81}\) IEA (2020), Sustainable Recovery, IEA, Paris


\(^{83}\) See also Oxford Energy Institute (2020), QUARTERLY ENERGY FORUM, Issue 123, July 2020 for examples of energy transition measures in COVID recovery packages


1. Building an integrated Mediterranean energy market in support of a green recovery

The massive RE scale-up necessary to reach the objectives of the Paris Agreement requires a propitious policy framework and market organizations that encourage the flexibility power systems need to integrate a high level of renewables. Euro-Mediterranean energy market integration provides that enabling environment. Developing a green integrated energy market requires:

1. The massive development of renewables: this is already happening, as RE costs are falling rapidly. Accelerating that trend even further requires policies that support the development of RE projects. Most of those policies are developed at the country level. However, regional policies to support this process are still needed, such as, for example, harmonizing regulations, cross-country auctions for large new RE power generating projects (as is developing in Europe under the Renewable Energy Directive), and creating an enabling framework for cross-border Corporate PPAs.

2. The development of the necessary physical infrastructure: in order to enable energy trade across and around the Mediterranean, in support of energy market integration, additional physical infrastructure may be needed. However, those are costly investments, and they should be undertaken using a solid cost-benefit approach. The first phase is to identify what interconnectors and pipelines are required. To avoid stranded investment and to take into account the increased interlinkages between the electricity and gas systems, the planning should be undertaken jointly for electricity and gas infrastructure as is done now in Europe by ENTSO-E and ENTSO-G when they prepare joint scenarios for use in their Ten-Year Network Development Plans (TYNDP).

3. The harmonization of market design and the interoperability of networks: as seen in section 3, it is not enough to have physical infrastructure to ensure that regional market integration will be effective and energy trade can take place unhindered. Market design in different countries needs to be aligned so that electricity can flow across borders in the most efficient way. The network codes also need some harmonization to ensure the system reliability and stability.

4. Regulatory convergence: collaboration and some harmonization at the regional level of regulation are required, so that a regional market can function and regional integration can become a reality. In particular, the allocation of cross-border transmission capacity needs to be defined, as well as the cost of such allocation. Most SEM countries still do not have energy regulators in place, but regulation at regional level can help the process of preparing harmonized national regulations.

5. Appropriate governance: institutional support at the regional level will be needed to coordinate the national entities and ensure efficient operation of the regional energy market. Under the auspices of the European Commission and the Union for the Mediterranean, institutions have been established to enable coordination and cooperation of Mediterranean stakeholders, in particular the Association of Mediterranean Transmission System Operators (Med-TSO) and the Association of Mediterranean Regulators (MEDREG). The creation of Regional Coordination Centers (RCC), modeled on what is proposed in the EU Governance
Directive, is under consideration. Additional institutional support might be needed as the hydrogen market develops.

6. A regional green certification system: when European countries buy electricity or gas from countries on the south and east shore of the Mediterranean, they need proof that they are buying decarbonated energy. A harmonized guaranteed of origin system for the Euro-Mediterranean area is necessary to create an integrated energy market where green energy can move freely. Regional implementation of such system could be explored on a gradual basis (such as stipulating that a quota of the energy comes from green sources).

7. Positioning as a front-runner in hydrogen, including preparation of a regional strategy to establish a Mediterranean hydrogen market: the Mediterranean region is both a region of potential high demand and possible high capability of supply for hydrogen and of high supply potential, given its huge renewable potential. A local market already exists in countries with a large phosphate sector and with a refining industry. In the medium run, new demand could develop for shipping in the cement, steel, and other industries. The development of a hydrogen sector could also contribute to flexibility in the electricity system, enabling a massive RE development. Hydrogen transport infrastructure could be initially established through existing natural gas pipelines, before dedicated pipelines are developed. Trading hubs could be created at industrial ports, which are major hydrogen demand centers, as well as nodes of transport infrastructure. Creating a Mediterranean Hydrogen Alliance, including European and MENA Hydrogen Alliances, would congregate all the stakeholders to define the Euro-Mediterranean strategy, and then implement it.

2. The need for policies that also consider the social and employment dimension of the energy transition

Energy transitions are primarily about people and, as noted by Miller et al (2013) “without understanding this, policy-makers, researchers, activists, and investors hoping to direct energy transitions are likely to encounter political opposition and may contribute to unintended adverse impacts.” From a social perspective, the energy transition can first and foremost expose SEM countries to the risk of abrupt shocks in their primary sectors and their labour markets. If parallel sector policies are not implemented timely, the SEM region runs the risk of being left with outdated/low skills for their human capital, low mobility and low diversity in the labour markets, and poor job prospects. There is thus an opportunity to couple their energy transition with policies and initiatives that induce an inclusive labour transition.

86. MEDREG (2021), Regional Integration: sub-regional regulatory convergence
Specifically:

1. Policies need to clearly define the targets to be met, the end beneficiaries, as well as the present and future capacity of the domestic economy to meet evolving needs. A CMI-FEMISE brief by Tsani (2021) highlights that SEM countries should design and implement well-informed and coherent fiscal, employment, and industrial policies for the creation of long-term backward and forward links of the energy sector with the domestic economy. Meanwhile, an assessment of the costs and benefits of implementing policy measures, at the regional and national level, should be undertaken to ensure that any political intervention does not impose management costs and bureaucratic burdens that outweigh the benefits (Tsani, 2021).

2. SEM policy makers could promote legislation that contributes to the transition towards renewables, such as eliminating fossil fuel subsidies, and introducing carbon pricing measures. This would also send a strong signal to their EU neighbours as to their “climate ambition”. As recommended by the UNEP and Inter-Parliamentary Union (2020), such measures would increase national revenues, which can then be reinvested in COVID-19 recovery. Governments could also better prioritize budget allocations and enact legislation on low-carbon activities that promote energy efficiency, including energy-efficient public infrastructure and industrial equipment, and clean technology research and development. Monitoring as to evaluate what the government has done to implement the Paris Agreement should be strengthened and nationally determined contributions with concrete emission reduction measures, such as clean energy initiatives, should be prepared. Last but not least, the transition offers opportunities for introducing laws that incentivize green investment and the creation of green jobs (ex. in sustainable transport and energy efficiency). SEM policy makers should enact legislation on green jobs training programmes, including jobs related to ecosystem restoration, particularly for people who have been displaced or severely affected by COVID-19.

3. The energy transition calls for overcoming systemic weaknesses of human capital and technology, such as lack of scientific approaches, engineering knowledge and cross-cutting skills. It is recommended that the SEM countries identify and implement education policies that timely address skill gaps, gender inequality, and industry needs for specific cross-cutting skills. Collaboration through partnerships and clusters for the establishment of common approaches and collaborative actions can leverage a just transition in the energy and labour markets alike. Therefore, cooperation programs should be implemented, between countries, regions, and sectors (e.g. education, public administration, energy) that facilitate technology, know-how and skills transfer (e.g. exchange programs, internships, close collaboration between education institutions and foreign investors).

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Creating clusters is especially important for the energy sector that is dominated by large companies that invest significant time and capital in technological upgrading and innovation (Shakya, 2019). Meanwhile, fiscal measures post-covid should also actively seek for a combination of financial, training, and education support packages that can ensure resilience of the most vulnerable under the current conditions as well as readiness for future uncertainties and skill requirements (Tsani, 2021).

4. Overall, reverting to “business as usual” policies would be the worst option. Another CMI-FEMISE brief by Zachariadis (2021)

89 focuses on designing realistic green economic recovery plans through a multi-criterion and multi-stakeholder lens. Its results highlight possible trade-offs between immediate and long-run effects, between economic and environmental objectives, and between expert evidence and societal priorities. Actions related to sustainable mobility had a good score on long-term environmental performance. Conversely, measures which mainly target businesses (Virtual net billing for encouragement of photovoltaic installations, subsidy to loans of green businesses, grants to enterprises up to 2030), got the highest scores regarding long-term economic effectiveness. Most importantly, the brief stresses that a ‘return-to-normal’ economic stimulus is not only environmentally unsustainable but also economically inferior to most green recovery schemes.

3. Setting-up a platform for cooperation and knowledge exchange at the territorial level

In the Mediterranean, the impact of climate change calls into play the attractiveness of territories; therefore it is essential to place the issue of decarbonization and energy transition at the center of the post-covid cooperation strategy between Mediterranean territories. A crucial issue for countries of the SEM region lies in the need to strengthen the skills of local decision-makers and of all of their services (Quefelec et al. 2018

90). Energy debates are needed and local stakeholders need to be informed by successful examples, as well as robust empirical and theoretical work into what the energy transition will mean for diverse groups of people in their country/region. Needed actions to be implemented at the territorial level can range from small actions in an urban district or on an agricultural field, to national and international policies in matters of agriculture and trade relations, including preconception of peri-urban dynamics, or capitalizing on the use of renewable energies. To achieve such actions,


experience-sharing between Mediterranean territories would be needed and a “Green Transition Knowledge & Policy Dialogue” at the territorial level should be facilitated. The CMI “Territorial Resilience and Climate Change Hub” can be the hosting platform of such dialogue. It would act as a structure that centralizes, transcribes, and shares knowledge on energy transition at the regional level, allowing to better inform decision-makers in SEM territories and providing increased visibility at the different parts of the Mediterranean energy ecosystem. It would also be key to facilitate the rapprochement between the results of science and decision-makers, for the latter to have access to latest knowledge on local development and energy transition issues, which need to be tackled at home.

Furthermore, for SEM territories, monitoring, reporting and verification (MRV) approaches are crucial for a potential access to international funding for energy-transition projects to scale-up. Understanding measurement issues, data requirements, methods of identifying and developing indicators, conceptualization and scenario tools, are among the essential prerequisites for setting-up successful projects. A “CMI Green Transition Technical Platform” at the service of the SEM territories could be set-up as part of the Energy and Climate Change CMI Forum, and be supported at the regional level. Among other services, it would offer technical assistance and the possibility of capitalizing, training, and exchanging with the world of regional statistics.

4. The need for Europe to sincerely accompany its neighbour’s energy transition

In closing, there is great potential in developing the green economy in the Southern and Eastern Mediterranean. However, it requires improved regulation as well as greater technological capability. This means having the right mix of public procurement, grant, and tax incentives to correct for distorted market signals (such as prices not reflecting environmental costs) and promoting more environmentally sustainable firms.

Europe can play a key role here and deepening interdependencies will be of critical importance. By supporting the industrial development of its neighbours towards a greener direction, staying true to its Euro-Mediterranean partnership commitments for the construction of a zone of shared prosperity, the EU could accelerate the energy transition of its neighbours. The EU and its partners, together with the financial and technical support of all other partners and IFIs, could quickly start working on a regional strategy that clearly identifies trade opportunities and infrastructure requirements along with harmonized regulations and human capital development, and the establishment of carbon policies aligned with the Paris agreement. Coproduction partnerships between European and South–Eastern Mediterranean companies in the region should be explored. IFIs could also contribute through funding in specific renewables projects that focus on economic and socially sustainable development. They could also provide technical and advisory assistance and also cooperate directly with sub-national government entities, as well as with the private sector.

As a final statement, let us note that more targeted and operational
recommendations are always needed. To formulate them, it would be essential to carry-on more in-depth analyses of the main issues raised in this paper and to take better account of the specific situation of each SEM country. Nonetheless, the recommendations that have already been presented in this paper have the advantage of providing main directions that would be useful to all Southern and Eastern Mediterranean countries, and highlight possible avenues of research for future studies.
Table A1. Mediterranean Economies: Real GDP, Consumer Prices, Current Account Balance, and Unemployment (Annual percent change, unless noted otherwise)

<table>
<thead>
<tr>
<th></th>
<th>Real GDP Projections</th>
<th>Consumer Prices Projections</th>
<th>Current Account Balance Projections</th>
<th>Unemployment Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
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<td>3.4</td>
<td>1.9</td>
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<td>3.3</td>
<td>5.2</td>
<td>5.7</td>
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<td>Israel</td>
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<td>7.1</td>
<td>4.1</td>
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</table>
