



# Algeria

Solar investment opportunities



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## Foreword

The SolarPower Europe Emerging Markets Workstream launched in March 2018 to identify new avenues for business and cooperation, and to contribute to the global energy transition. Since its creation, the workstream has continued to grow and now comprises 150 experts from more than 70 companies, with a significant portfolio of investments in emerging markets around the world.

Since March 2020, the workstream has operated exclusively online, though the strong hope is that this will soon change. Member companies are involved in other Africa-focused initiatives such as the EU-Africa Sustainable Energy Investment Platform, the renewAfrica initiative, and the International Renewable Energy Agency's (IRENA) Coalition for Action. Recently workstream members have been engaging with the European Commission on trade, development finance instruments and international energy diplomacy. They have also been working with the IRENA, the International Solar Alliance, GET.invest, and various renewable energy associations to shape the global energy transition.

In this report we are proud to present our findings on solar investment opportunities in Algeria. The report provides a snapshot of Algeria's business environment and, major macroeconomic trends, while analysing issues related to foreign investment barriers and the country's political situation. Moreover, it maps out the Algerian energy sector, including the energy mix, key stakeholders and developments, and the policy and legislative framework governing investment. The research finds that, whilst Algeria has strong solar potential, there are several substantial financial, regulatory, technical, administrative, and political roadblocks to harnessing it. Therefore, the report puts forward recommendations for policy makers, investors, development finance institutions and Algerian firms involved in renewable energy to take into consideration as the sector matures.

The Algeria report is the ninth in a series of SolarPower Europe market reports including: Mozambique; Senegal; Cote d'Ivoire, Myanmar, Kazakhstan, India, Tunisia, and Latin America. All reports can be downloaded from [www.solarpowereurope.org](http://www.solarpowereurope.org), free of charge.

If you would like to be part of our activities, discover new solar business opportunities, and have a say in shaping EU global policy, join Solar Power Europe's Emerging Markets Workstream.

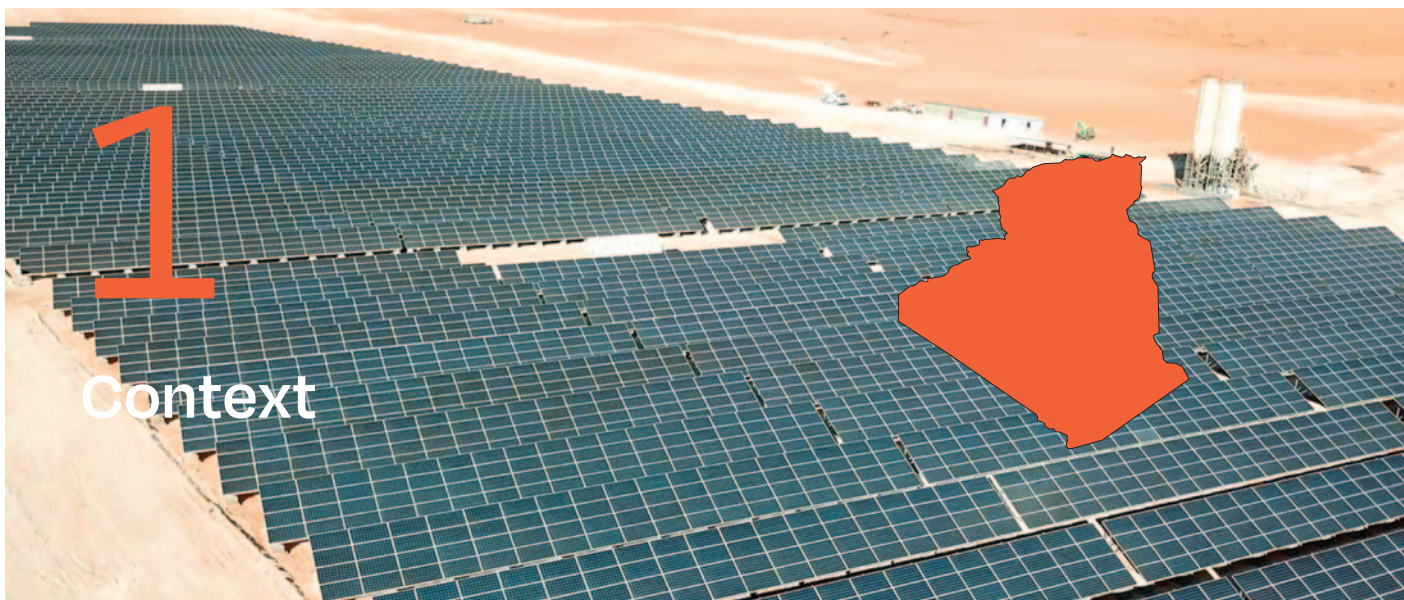


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Eni and Sonatrach Bir Rebaa North project, Algeria. © Eni

TABLE 1 MACROECONOMIC DATA OF ALGERIA

Official languages	Arabic, Berber or Tamazight (official), French
Capital	Algiers
Currency	Dinar (DZD) 1 US\$ = 133.7 DZD as of Apr. 5, 2021
Surface area	2,381,741 km <sup>2</sup>
Population (2020)	43.85 million
Population density (2020)	18 person/km <sup>2</sup>
Employment in agriculture (2020)	10%
GDP (2020)	US\$ 1.42 billion
GDP per capita (2020)	US\$ 3,310
GDP growth (2020)	-5.5%
Literacy rate (2018)	81%
Internet connections (2019)	58% of population
Mobile phone connections (2020)	104 subscriptions per 100 people

SOURCE: Worldbank 2019, 2020.

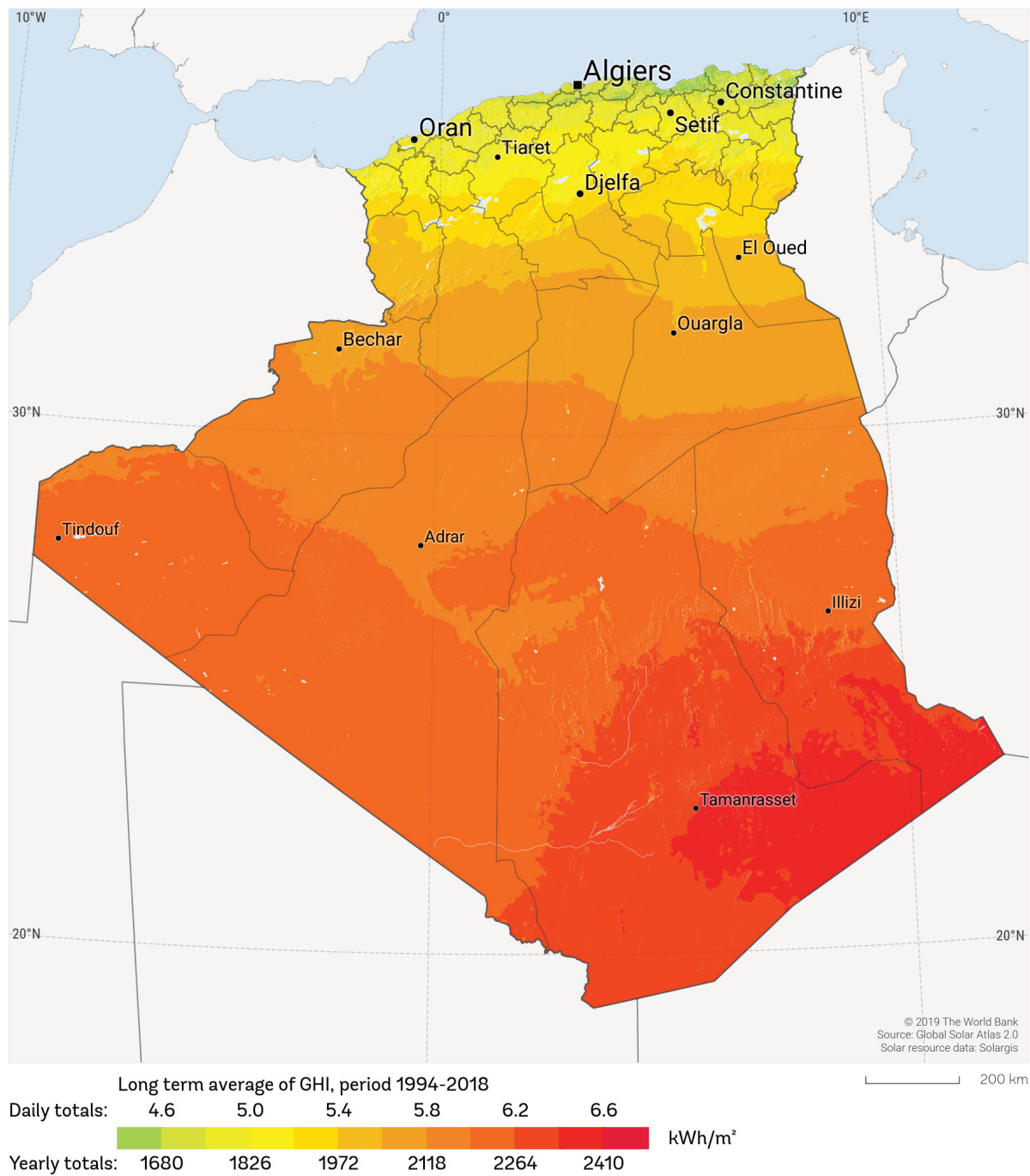
### 1.1. Energy geography

Algeria has vast potential for renewable energy development, especially solar PV. Thanks to its geographical position in the solar belt, the solar potential is one of the highest among MENA countries, and this is also reflected in the clean energy targets of

the country which focus heavily on solar. The average yearly irradiance value of the country is 2,000kWh/m<sup>2</sup> with high values especially in desert areas (over 2,400kWh/ m<sup>2</sup> in some cases). The highest irradiance can be found in Illizi district, where connection infrastructure is limited compared to the northern part of Algeria.



FIGURE 1 IRRADIANCE MAP OF ALGERIA



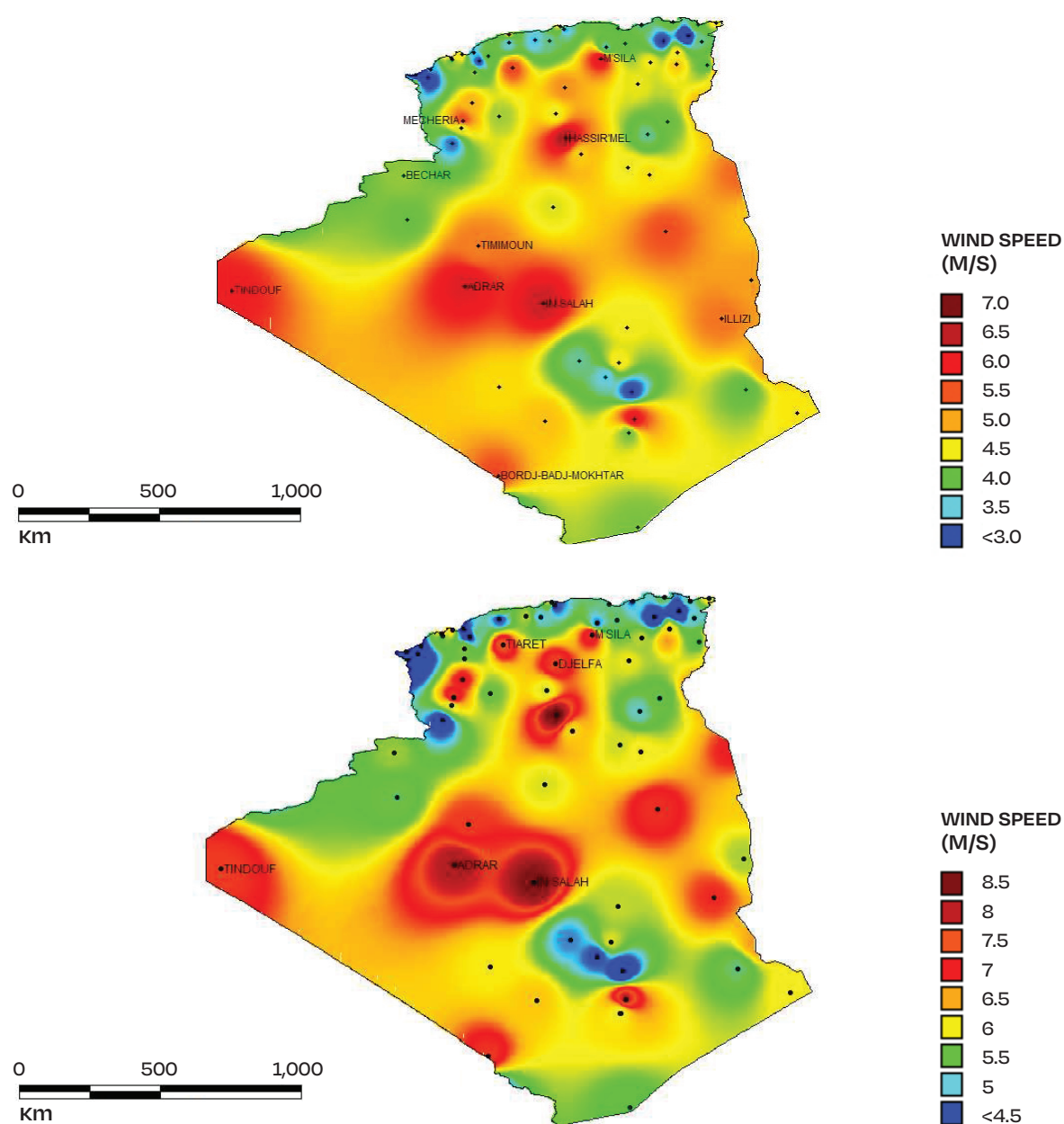
SOURCE: SolarGis 2020.

## 1 Context / continued

Based on a Global Wind Energy Council (GWEC) assessment, Algeria has the largest onshore wind resources in Africa in terms of potential total installed capacity and net generation with 7,717.4 GW and 24,980.2 TWh/year respectively (Whittaker, 2020).

The latest version of the Algerian wind atlas (Daaou Nedjari et al, 2018) provides good insights about Algeria's windiest regions such as Hassi R'Mel, Adrar or In Salah with average wind speeds of over 6.3 m/s (at 10m).

FIGURE 2 MAPS OF WIND SPEED IN ALGERIA AT 80M (TOP) AND 10M (BOTTOM)



SOURCE : H. Daaou Nedjari, S.Kheder Haddouche, A.Balehouane, O.Guerri. Optimal windy sites in Algeria: potential and perspectives, 2018.



## 1.2. Demographics

The population of Algeria was estimated at 43.85 million in 2020, with a growth rate of 1.85% (World Bank Group, 2019). The median age is 28.5 years, and life expectancy at birth is 76.9 years (2019). About a decade after independence from France (in 1962) the fertility rate fell dramatically, from 7 children per woman in the 1970s to about 2.4 in 2000, which can be linked to improvements in women's access to education and their increased participation in the labor market. The fertility rate has since risen again, standing at 3 children per woman in 2018.

73% of the population live in urban centres. Based on the UN Human Development Index (HDI), Algeria is classified as a high-human development country, ranking 91<sup>st</sup> out of 189 countries in the 2020 Report, and having made gradual but steady improvements since 1990. However, Algeria suffers particularly from inequalities in access to education and personal income which prevent it from scoring higher. GDP per capita was estimated at 11,100 US\$ dollars at purchasing power parity (PPP) in 2020, slightly below the MENA regional average (IMF, 2020).

Algeria ranks 69<sup>th</sup> in the Huawei's Global Connectivity Index 2020, which measures the degree of digitalisation across 79 countries (Huawei, 2020). According to the World Bank's latest available data, in 2019 60% of Algerians had internet connections (World Bank Group, 2019).

Resource-wealthy Algeria continues to struggle with the same socioeconomic challenges it has faced for a decade – overdependence on hydrocarbon exports leading to a volatile economy and social unrest. Since 2020, the country's economic standing has been further complicated by the coronavirus pandemic and the drop in oil prices. The former has slowed investment and consumption, while the latter has decreased export revenues and government income, exacerbating economic hardships and fueling social discontent.

## 1.3. Macroeconomic context

In 2020, the Algerian economy is estimated to have contracted by 6% (IMF, 2020), after three years of sluggish growth. The sharp downturn is the result of the twin shocks of a dramatic fall in domestic demand

and a 40% slump in hydrocarbon export receipts, brought about by the COVID-19 pandemic. Domestic demand is mainly driven by imported goods and the regulations on importing are liable to change as they are used to protect foreign exchange reserves. They also aim to balance against volatility in oil and gas prices in the short term and so have an impact on export revenues.

A recovery is expected in 2021 with 2.9% GDP growth predicted (IMF, 2020). Nevertheless, for the next five years the projections continue to point to weak and decelerating growth, to an average rate of 1% between 2023-26. This is mostly due to the structural decline of the oil and gas sector.

The hydrocarbon industry accounts for 19% of GDP, 41% of budget revenues, and 93% of export revenues (2019). A decline in government income means that the current level of public spending can no longer be sustained. Over the past two decades, up until the price collapse in 2015, the boom in the sector enabled Algeria to make important advances in economic and human development. The country cleared its external debt, invested in infrastructure projects, and implemented redistributive social policies that contributed to a significant reduction in poverty, as well as improvements in human development indicators.

Algeria's low share of non-oil exports ranks it as one of the most hydrocarbon-dependent countries in the world and reforms to foster economic diversification appear urgent. Existing oil reserves will assure current levels of production until the mid-2040s, while for gas the horizon extends beyond the 2050s.

The country's high unemployment rate continues to reduce domestic demand and fuel popular protests. In 2017, the unemployment rate stood at 13.6% (World Bank Group, 2017). This level is expected to rise to 14% in 2021 and increase further in subsequent years as a result of COVID-19. Youth unemployment is above 29%, and this figure rises to 45.5% amongst women who are progressively falling further behind men (World Bank Group, 2019). Underemployment, temporary jobs, and informal-sector employment remain high, meaning that those in employment are often in precarious situations. The government is expected to register a fiscal deficit for the 13<sup>th</sup> consecutive year in 2021. Despite significant

expenditure cuts, the fiscal deficit is estimated to have widened in 2020 to -7.7% of GDP (from -5.6% in 2019) and is projected at -13.6% in 2021. The structural current-account deficit is set at -7.7% of GDP in 2021 from -10.5% in 2020, owing to expected recovery in export revenues.

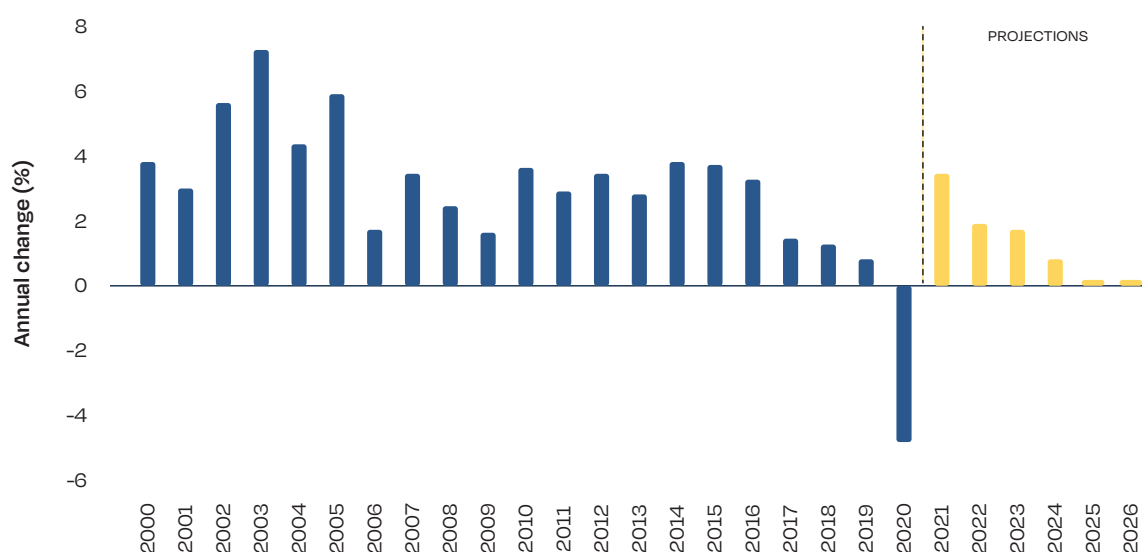
In recent years, Algeria's growing financial needs have been increasingly met by resorting to international reserves. These reached a maximum of 194 billion US\$ in mid-2014, or around three years' worth of imports. Since then, foreign exchange reserves have been eroded by high import spending as well as a sharp drop in global crude oil prices, declining to 45.5 billion US\$ as of January 2021 (IMF, 2021). Although this is equivalent to 13-months of import cover, the pace of depletion since 2014 is concerning. Nevertheless, the government is unwilling to resort to the IMF or other international creditors to meet its urgent liquidity needs, as issuing external debt remains politically undesirable. It is likely to issue more domestic debt financed by the central bank, a practice used in the past and discontinued in 2019 to avert inflationary pressures

## 1.4. Business environment

The country suffers from several structural issues that compound an unfavourable business environment. On the World Bank Doing Business 2020 report, Algeria ranks 157<sup>th</sup> out of 190 countries, far behind the rest of the MENA region. Its neighbours, Morocco, and Tunisia, were in 53<sup>rd</sup> and 78<sup>th</sup> respectively (World Bank Group, 2020). The country scores especially poorly in access to credit, protection of minority investors, trading across borders and property registration. Such constraints limit investments that are badly needed to sustain private sector growth and absorb the working age population. Moreover, the economy is overly dependent on oil and gas and is dominated by a bloated public sector, which has constrained the business environment and economic development.

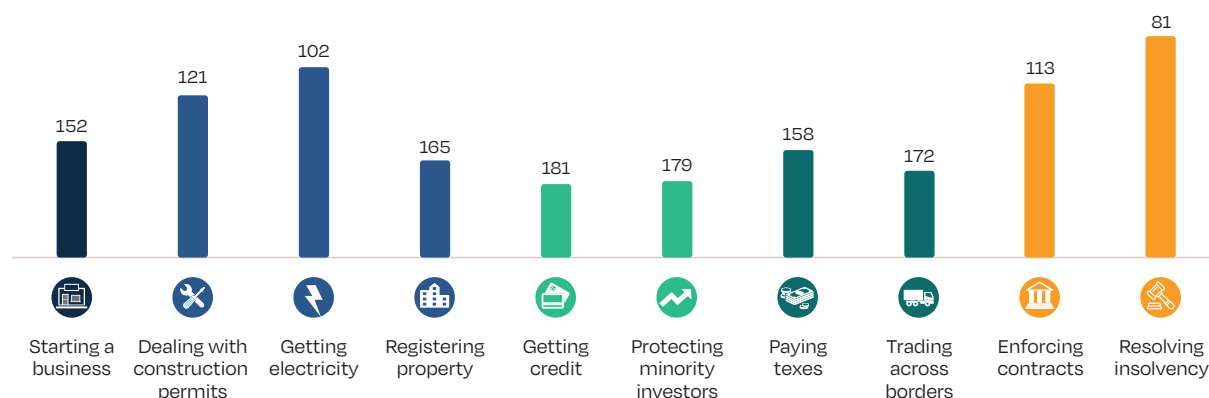
To improve the business environment and to prop up hard currency reserves by attracting inward foreign investment, President Tebboune's government introduced a number of measures in 2020. These included exempting non-strategic sectors from the majority ownership '49/51 shareholding rule', which requires foreigners to partner with Algerian firms and means that the majority stakeholder must be Algerian.

FIGURE 3 ALGERIA REAL GDP GROWTH



SOURCE: IMF World Economic Outlook, April 2021 business environment.

FIGURE 4 RANKINGS ACROSS DOING BUSINESS CATEGORIES



SOURCE: World Bank Group, Doing Business 2020, Algeria Economy Profile.

Despite this positive development, the 49/51 rule still applies in a wide range of cases, including: retail activities, mining, oil and gas, power distribution and transportation network activities; military and defence; railways; ports; airports; and some pharmaceutical activities. The government also cancelled its right of first refusal on asset sales by foreign entities in Algeria. In addition, foreign companies investing in Algeria have been permitted to seek loans from foreign banks to finance their investments. The government also approved a new hydrocarbons law, improving fiscal conditions and contract flexibility to attract new international investors.

### 1.5. Political and social context

Algeria has been grappling with its *"Second Revolution"*, triggered in early 2019 by increasingly large demonstrations against a fifth presidential term for Abdelaziz Bouteflika. The ailing President had been absent for years from public life. Protests were initially limited to students and a few activists, but rapidly expanded within civil society in Algiers and in other major cities. The turning point came when the Armed Forces supported the protestors' demands.

Their intervention influenced the transition and in December Abdelmadjid Tebboune was elected and a peaceful transfer of power followed.

Street protests, banned during 2020 as part of anti-COVID19 measures, have, however, restarted and continued in the first months of 2021, albeit with smaller numbers. The power transition is still taking shape with the June legislative elections comprising the latest stage in this process. A new Parliament and Government have taken office..

The establishment is aware of the need to modernise the country, and of the perils of abandoning old but solid pillars of governance all at once. It is proudly determined to go ahead preserving national companies, with no leaps forward. It has little to no trust in any external help that is not based at least on relations among equals. The pandemic and the ensuing crisis have added a sense of urgency, but a large internal consensus has been sought on economic change.

These traits have been translated in practice. A new Constitution has then been approved. It gives greater recognition to basic rights and tries to bridge public demands for more openness in politics.

International relations will be a further area for change. Algeria has traditionally oriented itself towards European partners, and they will remain pivotal in any scenario. However, it also has, excellent relations with China, and balances its relations with Russia, as a traditional ally, and the United States, with their renewed interest in the Maghreb region.



Electricity pylons in the desert, Algeria. © Abderrahmane Ferhi/Shutterstock

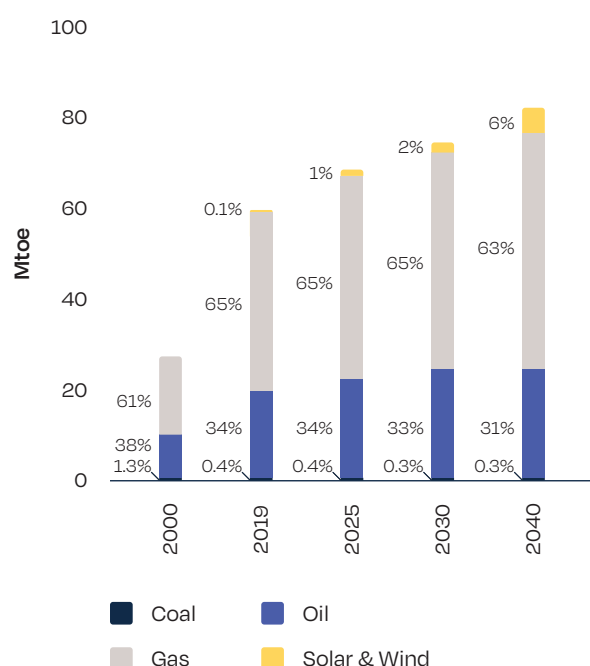
## 2.1. Energy sector overview

Algeria's energy mix consists almost entirely of fossil fuels, with gas accounting for ~65% and oil for ~34% of total primary demand. Between 2000 and 2019, total demand has grown at a Compound Annual Growth Rate (CAGR) of 4% from ~28 Mtoe to ~59 Mtoe. Demand is set to grow to ~82 Mtoe at a CAGR of 2% by 2040 (ETO, 2020). Although renewables – mainly solar – are entering

the scene, their share is expected to remain limited to ~6% of the energy mix by 2040 (ETO, 2020).

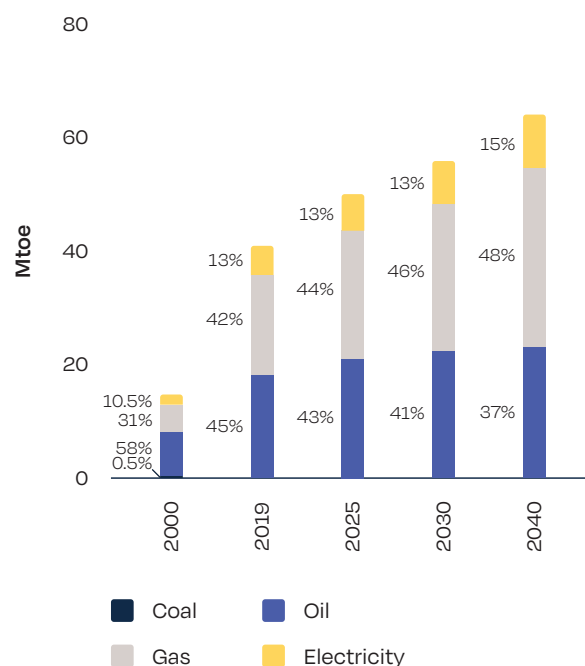
Today total final consumption is dominated by gas (42%) and oil (45%) as well. Electricity's share is 13%. In the future all fuels will grow in absolute terms, but the share of oil will decline from 45% today to 37% in 2040 (ETO, 2020). Electricity, instead, is expected to reach a share of 15%.

FIGURE 5 TOTAL PRIMARY ENERGY DEMAND IN ALGERIA 2000-2040



SOURCE: Wood Mackenzie, Energy Transition Service, 2020.

FIGURE 6 TOTAL FINAL ENERGY CONSUMPTION IN ALGERIA 2000-2040



SOURCE: Wood Mackenzie, Energy Transition Service, 2020.

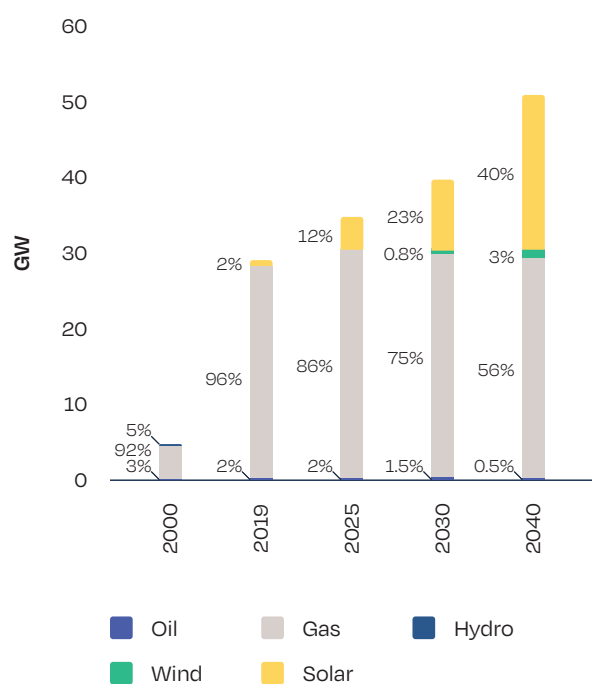
Between 2000 and 2019, total power generation has grown at a CAGR of 6% from ~26 TWh to ~83 TWh. Total power generation is expected to grow at a CAGR of 3% between 2019 and 2040 to ~150 TWh (ETO, 2020).

Today, almost all power is generated by gas. Algeria heavily subsidises oil, gas, and electricity consumption. This has the effect of artificially lowering prices and creating a competitive advantage for oil and gas over other energy sources. While this persists, it will remain difficult for renewables uptake to gain traction in the country.

In the coming years, the power mix will diversify, mainly thanks to solar, which will reach 8% of generation in 2025 and 37% in 2040 (ETO, 2020). In 2020, installed solar capacity amounted to ~0.5 GW (SolarPower Europe, 2021) and is expected to reach ~20 GW in 2040 (ETO, 2020).

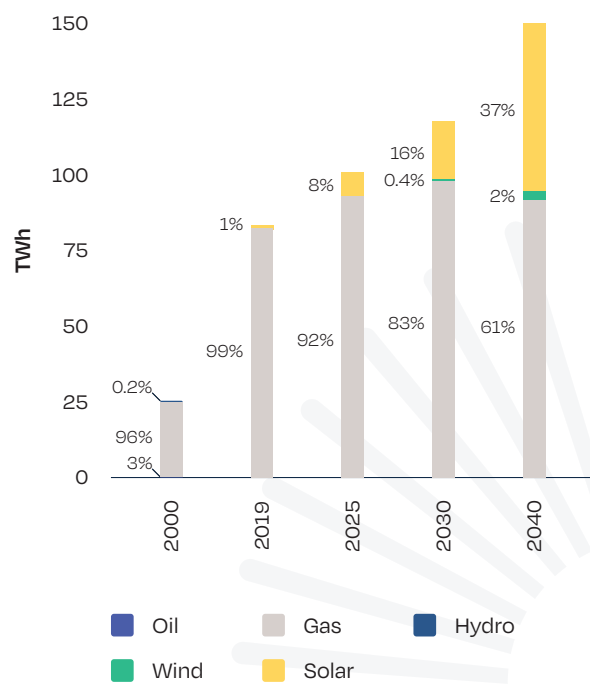
Algeria's Paris agreement pledge (September 2015) mentions a significant potential of geothermal as well. In fact, it has set a modest target of 15 MW capacity of this source by 2030. The pledge envisages a reduction of 7-22% of GHG compared to the business-as-usual scenario in 2030. The 7% reduction will be realised with national means, but any further reduction is conditional upon external support in the form of financing and capacity building as well as development and transfer of technologies. Algeria underlines its vulnerability to climate change given the degradation of soil and desertification that much of its territory is already experiencing. Furthermore, it points at its historically low level of GHG emissions, the dominant role of gas (which is considered a clean fuel in the Paris Agreement pledge) in its energy mix and its dependence on the exportation of hydrocarbons.

**FIGURE 7 POWER CAPACITY (GW) IN ALGERIA 2000-2040**



SOURCE: Wood Mackenzie, Energy Transition Service, 2020.

**FIGURE 8 POWER GENERATION (TWH) IN ALGERIA 2000-2040**



SOURCE: Wood Mackenzie, Energy Transition Service, 2020.



## 2 Algeria electricity market / continued

Algeria is Africa's largest gas producer (~90 bcm in 2019, according to Eni World Oil, Gas and Renewables Review 2020). About half of the gas produced is exported (in 2019 ~42 bcm, according to Eni World Oil, Gas and Renewables Review 2020).

Gas demand has been growing at a CAGR of 4% between 2000 (~20 bcm) and 2019 (~45 bcm) and is expected to grow at a CAGR of 1% between 2019 and 2040 reaching ~60 bcm (ETO, 2020). Growth has been mainly driven by the power sector. The maturity of key gas fields combined with delays due to bureaucracy and lack of upstream investment, increase the risk of short supplies. In the absence of proper management of gas demand and supply, it may become difficult for Algeria to meet its export obligations. Renewables, especially solar PV, could help support power generation, freeing up more gas to be exported (Wood Mackenzie, 2020). This is a key strategy for Algeria's environment and economy, and is emphasised by the number of public bodies, like the Ministry of the Interior and Local Authorities, releasing tenders for renewable energy projects (CEREFÉ, 2020).

Wood Mackenzie's forecast for the Algerian market includes several uncertainties. They have not yet fully modeled the impact of Algeria's latest energy policy regulations that have the goal of increasing solar's share in the energy market. Previous multi-GW solar procurements have stalled or been cancelled and have been burdened by stringent foreign participation and local ownership requirements.

Algeria presented a national programme for renewable energy and energy efficiency in 2011. This set a target of installing 22 GW of renewable power generating capacity by 2030 (12 GW for use within Algeria and 10 GW for export). The government hopes to harness the solar potential in the country, with solar PV making up 37% of the national power supply by 2030 (LSE, 2021). However, current renewable capacity is still limited at 483 MW (SolarPower Europe, 2021). Afrik21 cites the lack of local technical expertise, insufficient funding, and poor coordination between stakeholders as obstacles to advancing the renewable agenda (Afrik21, 2019).



PV panels, Algeria. © Mohamed Laatra/Dreamstime.com

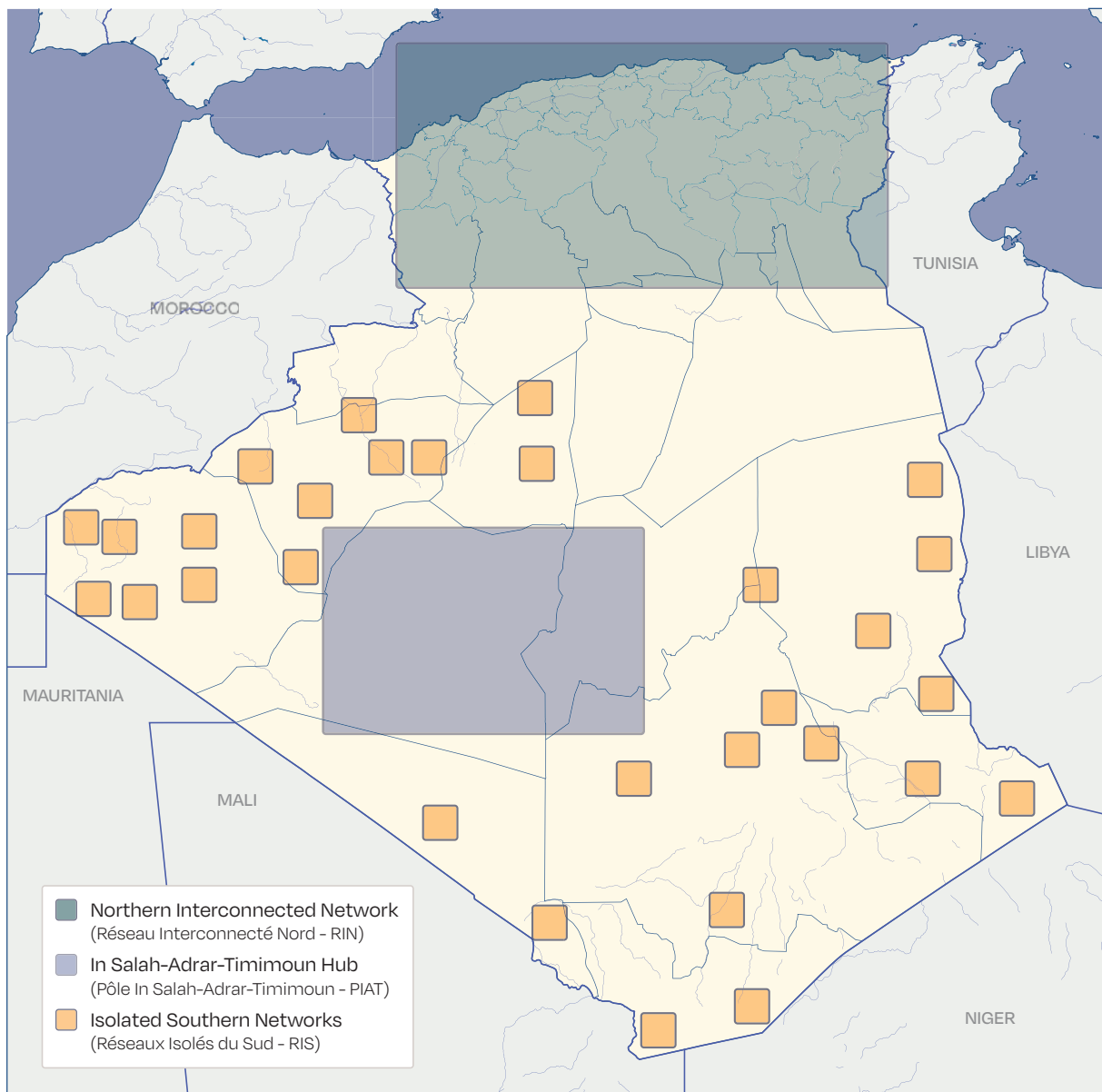


## 2.2. Electricity infrastructure

The transmission system is divided into three main systems (i) Réseau Interconnecté Nord (RIN), (ii) Pôle In Salah-Adrar-Timimoun (PIAT) and (iii) Réseaux Isolés du Sud (RIS). The RIN and PIAT systems are regulated by the Commission de Régulation de l'Electricité et du Gas (CREG).

Since most of the energy demand is concentrated in the north of the country, the RIN is also the most developed grid, as shown in Figure 10 on the following page. The RIS is a far less developed system and electricity is mainly produced by oil-fueled generators. However, solar-oil hybrid systems are emerging, and an initial 50 MW tender was launched in 2019 and a

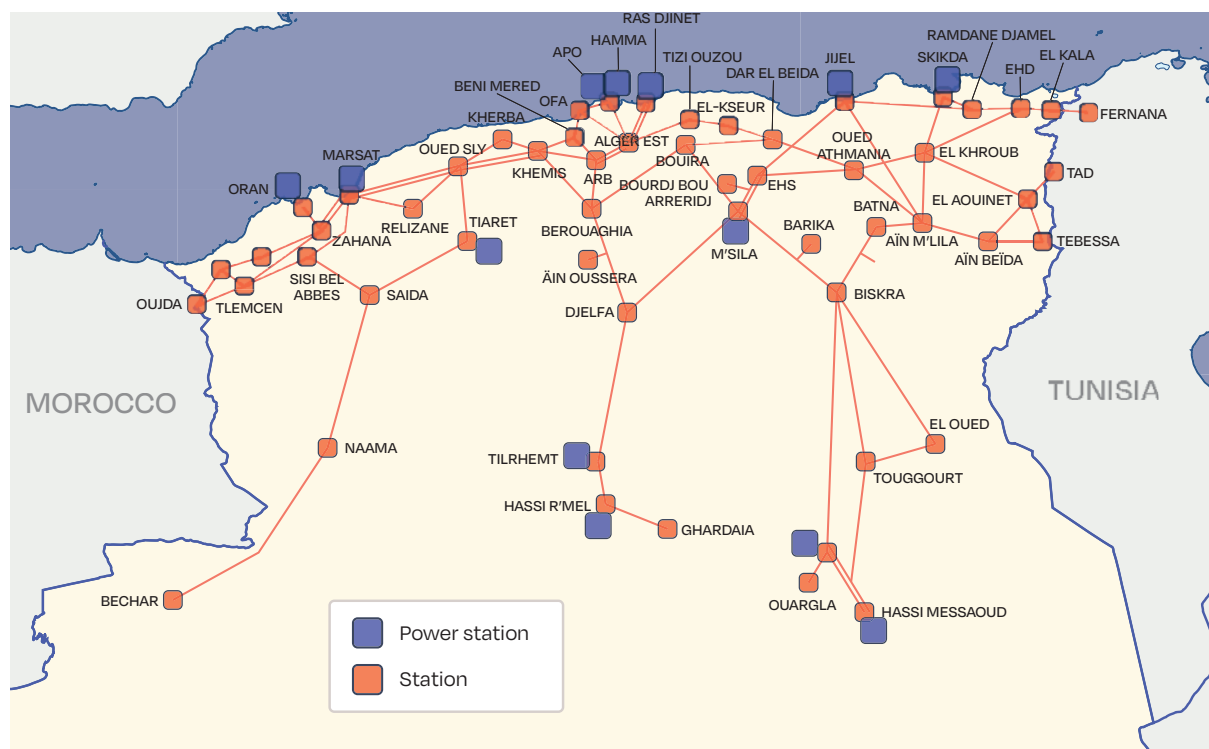
FIGURE 9 MAP OF ALGERIAN ELECTRICITY SYSTEMS



SOURCE: CREG, 2018.

## 2 Algeria electricity market / continued

FIGURE 10 MAP OF ALGERIAN ELECTRICITY GRID



SOURCE: Global Energy Network Institute, 2017.

second one, launched in 2021, is currently in progress. This transition to solar PV-oil hybrid systems also has the advantage of freeing up more oil for export.

The public company Sonelgaz is acting in all the main areas of the electricity sector and manages: (i) the system operation through the Opérateur Système Electrique (OS), (ii) the transmission network through the Société Algérienne du Gestion du Réseau de l'Electricité (GRTE), (iii) the distribution network and sale/retail activities through the Société Algérienne de Distribution de l'Electricité et du Gaz (SADEG).

Moreover, Algeria has strong interconnection systems with Morocco and Tunisia. It is interconnected with Morocco via a single 400 kV line and two 220 kV lines with a tie line capacity of 1,500 MW.

In addition, Algeria is also connected to Tunisia via one 400 kV, one 220 kV, one 150 kV, and two 90 kV AC lines, while an interconnection project with Spain is being explored. Algerian power grid can maintain the power balance by itself.

### 2.3. Actors, tariffs and regulatory framework

Algeria will strongly pursue the path of a necessary transition from a hydrocarbons-centred model – and of revenues' reallocation – to a more modern one, which comprises new energies. This would help the nation rebuild its reputation for regional leadership that has diminished in the last 10 to 15 years.

Over the last few years, the transition to renewable energies has been given new impetus through the creation of dedicated state institutions. In 2019, in cooperation with Germany, Algeria established an energy efficiency network, consisting of companies from both the public and private sector, focused on renewables and energy efficiency in industry. In December 2020, together with the German international cooperation GIZ, Algeria set up a "green municipalities" programme, with the aim of promoting renewable and energy efficiency at municipal level (Afrik21, 9 December 2020). Algeria and Germany have also set up a bilateral Energy Partnership to support

political dialogue, exchange best practices, connect business and politics to support the energy transition. Algeria also has a Strategic Energy Partnership with the EU. The EU funds a technical assistance programme supporting the Algerian authorities in the fields of renewable energy and energy efficiency.

On 11 April 2021 Algérie Presse Service reported that Sonelgaz and Sonatrach had established the company Sharikat Kahraba El Djazaïr (SKE), whose main objective is the production of renewable energy. (Algérie Presse Service, 11 April 2021).

National oil company Sonatrach intends to use solar power as a substitute for gas in powering its upstream operations. By 2030 Sonatrach plans to install 1.3 GW of solar PV capacity for power supply to its upstream facilities, which will free up precious gas for export (Source: Powermag, 1 July 2020).

The national targets set for renewables over the last few years:

- As of end 2019, the target for 2030 included a renewable share of total power generation of 27% (as one of the levers to obtain the emissions reduction aimed for by the conditional INDC as of September 2015), and an installed renewable capacity of 22 GW (of which 13.5 GW solar PV, 2 GW CSP and 5 GW wind) (source: REN21 2020).
- In December 2020, Minister of Energy Transition and Renewables, Chems-Eddine Chitour declared a target of 15 GW solar PV capacity by 2035, with a pace of ~1 GW per year to be assigned through tenders. (Source: Algérie Press Service, 21 December 2020).

In December 2020, Minister Chitour declared that the PV plants would be financed with unused natural gas (source: Algérie Press Service, 21 December 2020).

Since 2020, the “49/51 rule”, limiting foreign investment in Algerian companies to 49%, has only been applicable to sectors defined as “strategic” by the 2020 Finance Law. Whilst the upstream energy sector is considered strategic, there is a lot of ambiguity around whether the 49/51 rule applies to renewable power generation projects. Furthermore, as part of a strategy to boost local job creation and expertise, projects are subject to local content rules, according to which PV modules, cables and mounting structures must be purchased in Algeria. Moreover, the import of raw materials for module

production is not subject to import duties. A new Hydrocarbons Law has been drafted, a cornerstone of energy policy for the country. Announced at the end of 2019, it was enacted in February 2021, on the 50<sup>th</sup> anniversary of the nationalisation of oil. The legislation increases government control over the strategic direction of the energy sector, and this may help the shift to new sources of energy.

The solar module manufacturing industry is growing but, to reach the challenging capacity targets, its development needs to be accelerated significantly. Currently, the landscape is made up by four producers with a total capacity of 190 MW per year (vs. national target of 1 GW installation per year). According to a November 2020 report from the Commissariat aux Energies Renouvelables et à l'Efficacité Énergétique (CEREFE) it will grow to 450 MW in the next years (Algérie Presse Service, 29 November 2020).

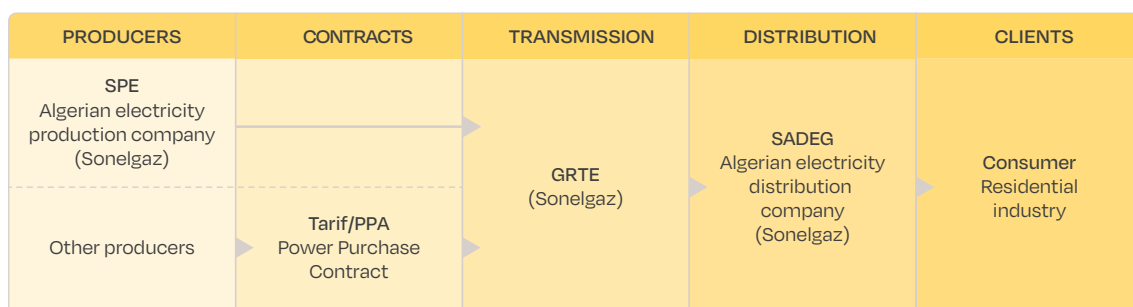
The involvement of the different institutions in Algerian renewable energy sector is as follows:

- **MTEER:** The Ministry of Energy Transition and Renewable Energies, established in June 2020, is responsible for developing policies and strategies aimed at promoting the energy transition and renewable energies, and more precisely:
  - Ensuring the implementation of national policies and strategies in the fields of energy transition and renewable energies and defining the necessary legal, human, financial and material resources.
  - Developing and promoting renewable energies.
  - Designing and implementing strategies and action plans for energy transition in relevant sectors.
  - Developing, in consultation with the sectors concerned, the national energy model.
  - Developing the planning instruments for activities concerning the energy transition.
- **Ministry of Energy:** The Ministry of Energy is responsible for developing, proposing, and ensuring the implementation of policies, legislative measures, strategies, programs, studies, and other necessary measures in this field, for the production, transport, and distribution of electrical energy as well as control of energy consumption.

## 2 Algeria electricity market / continued

- **APRUE:** The National Agency for the Promotion and Rationalization of the Use of Energy (APRUE) is responsible for coordinating and socialising the national energy management policy through the organisation of awareness campaigns for the public, schools, and professionals, disseminating information and establishing projects with relevant actors in the private sector (Industries, Building, Transport). Since March 2021 (Executive Decree N°21-106 of March 17, 2021), APRUE has been supervised by the Ministry of Energy Transition and Renewable Energies.
  - **CREG:** The role of the Regulatory Commission for Electricity and Gas is to ensure the competitive and transparent functioning of the electricity market and the national gas market, in the interests of consumers and operators.
  - **CEREF:** The Renewable Energy and Energy Efficiency Commission contributes to national and sectoral development of renewable energies and energy efficiency. It also conducts periodic evaluations of national policy for the development of renewable energies and energy efficiency.
  - **CDER:** The Renewable Energies Development Centre (CDER) is responsible for developing and implementing research and development programs around renewable energies, including:
    - Establishing renewable energy pilot projects.
    - Certifying and standardising equipment; conducting feasibility studies, and providing expertise and consulting for Energy and Natural Resources (ENR) projects.
    - Organising training in renewable energies.
- Other stakeholders such as SONEGAS (a state-owned enterprise covering production, transmission and distribution of electricity and transmission and distribution of gas) and its subsidiaries play a critical role in the Algerian energy sector:
- **Electricity Production Company (SPE):** SPE develops and operates thermal and hydraulic installations. SPE supplies electricity to the national interconnected network and the In Salah-Adrar-Timimoun hub (Southwest). At the end of 2019, the company managed 15.4 GW, nearly 70% of the national production capacity.
  - **SKTM:** SKTM develops and operates diesel production plants and gas turbines in the Great South and hybrid solar PV installations throughout the country.
- The Electricity System Operator (OS):** The OS is responsible for the operation of the electricity production and transport network. In particular it manages the balance between consumption and production, the security of the system and the reliability and efficiency of the electricity supply. It also focuses on the network's development and the management of international interconnections.
- **The Algerian Company for the Electricity Transmission Network (GRTE):** GRTE is responsible for the development, operation and maintenance of the electricity transmission network at national level and the In Salah-Adrar-Timimoun pole (Southwest) as well as interconnections with neighbouring countries. The network managed by GRTE consists of 29,000 km of lines including more than 2,500 km in 400 kV.
  - **The Algerian Electricity and Gas Distribution Company (SADEG):** SADEG is responsible for the development, operation and maintenance of the electricity distribution network. It is also responsible for the sale of electricity and gas. The company was created in 2017, after the mergers of the regional distribution companies (SDA, SDC, SDO and SDE).
  - **Sonatrach:** Sonatrach is the state-owned oil company of Algeria. It is vertically integrated and conducts operations all along the hydrocarbon value chain. This includes exploring for and producing, transporting and refining hydrocarbons including oil and liquefied natural gas. Along with Sonelgaz, it is the joint owner of the Algerian Renewable Energy Company (SHAEMS).
  - **The Algerian Renewable Energy Company (SHAEMS):** SHAEMS was created by the Ministry of Energy Transition and Renewable Energies in April 2021. The company is due to become operational in late 2021. It will be owned jointly by Sonelgaz and Sonatrach and charged with enacting Algeria's plan for developing renewable energies for the production of electricity (Eco Times, 2021).

FIGURE 11 THE MAIN ACTORS IN THE ALGERIAN ELECTRICITY SECTOR



SOURCE: Own elaboration.

Algerian electricity tariffs are fixed by the CREG and are the lowest in North Africa (AFSIA, 2021). In 2020 the price of electricity in Algeria was 0.039 US\$/kWh, whilst the world average was far higher at 0.136 US\$/kWh. The price of electricity harms the attractiveness of the country to renewable energy investors as they have cannot compete with the electricity prices offered by the state-owned energy producers, like Sonelgaz. The most recent tariff decision (*décision D/22-15/CD*) was issued in

December 2015. The Algerian tariff system includes several different billing options:

- Triple Tariffs: Peak (5PM-9PM) / Full (6AM-5PM & 9PM-10:30PM) / Night (10:30PM-6AM)
- Double Tariffs:
  - Peak (5PM-9PM) / Non-Peak (9PM-5PM)
  - Day (6AM-10:30PM) / Night (10:30PM-6AM)
- Progressive tariffs: same tariffs

TABLE 2 TARIFF PRICES IN ALGERIA

IN cDA/kWh	PEAK	FULL	NIGHT	DAY	NON PEAK	PROGRESSIVE	
Residential	811.47	216.45	120.50	486.98	178.07	<125kWh	177.87
						125-250kWh	417.89
						250-1000kWh	481.29
						>1000kWh	547.96
Non-residential LV	811.47	216.45	120.50	486.98	178.07	<250kWh	417.89
						250-1000kWh	481.29
						>1000kWh	547.96
HV Clients type A	872.02	193.76	102.40	428.30	180.64	375.62	
HV Clients type B	660.85	136.62	59.03	N/A	N/A	136.94	

SOURCE:

## 2 Algeria electricity market / continued

### 2.4. New developments for solar power

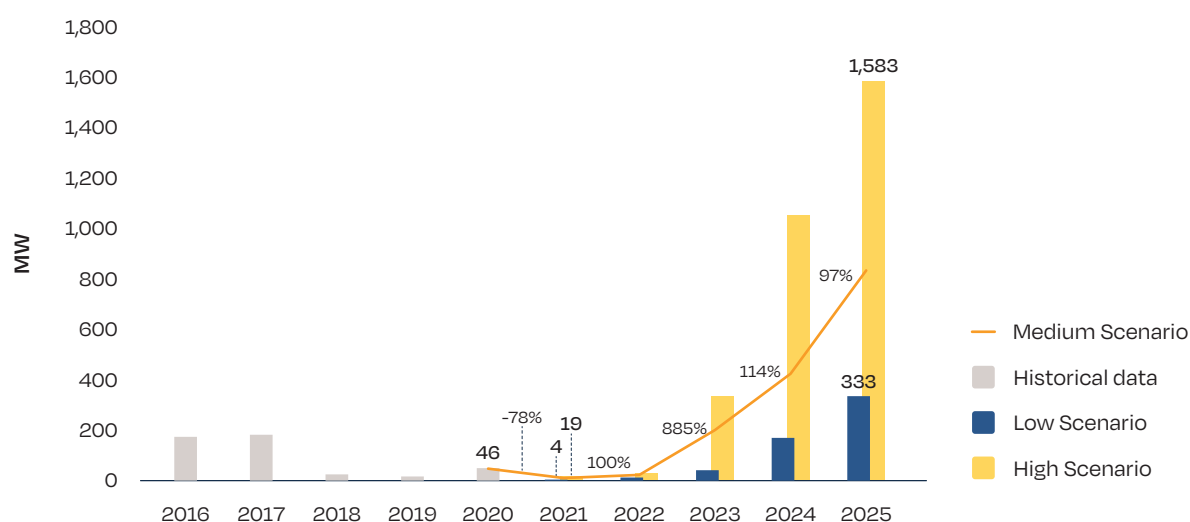
The country witnessed a slow start to the energy transition. In 2004 Algeria adopted the first renewable energy feed in tariff (REFIT) in Africa to speed up the adoption of renewable energy sources. The scheme pertained to plants with power generation capacity exceeding 50 MW. However, it was never implemented.

Despite the REFIT scheme, it wasn't until 2016 that Algeria saw substantial solar PV installations. Growth in the country's annual market continued to rise to 181 MW of new additions in 2017. However, this rise tailed off between 2018 – 2020, with only 83 MW being added in total over this period. Despite this the future looks bright for Solar in Algeria, especially following the announcement of a target of 15 GW of installed solar capacity by 2035 the Minister of Energy Transition and Renewables in December 2020. This is reflected in SolarPower Europe's market data which predicts a year-on-year rise in annual installations between 2021-2025, across all scenarios. The high scenario forecasts that Algeria could become a gigawatt-scale market as early as 2024 (SolarPower Europe, 2021).

Over the past few years, Algeria has launched different mechanisms to promote renewables energy such as:

- Feed in tariff programme, launched in 2014 and abolished in 2016.
- EPC tender, launched by SKTM in 2013, with the award of 23 different projects, totaling 318 MW, to Belelectric (85 MW) and Yingli Solar (233 MW).
- CREG tender, launched in November 2018 and awarded in October 2019, awarded only a third of targeted capacity (50 MW out of 150 MW) to a consortium led by local module manufacturer Condor and Egyptian cable manufacturer, Elsewedy Cable, with a tariff of DZD 8.28/kWh (0.069 US\$/kWh). However, this project is yet to enter the contract process.
- EPC tender for hybrid diesel-solar projects, launched by SKTM in 2019, aimed at adding solar power to existing diesel generators. In total 50 MW, divided into 5 batches of projects, with the following results. (See Figure 13 on the following page.

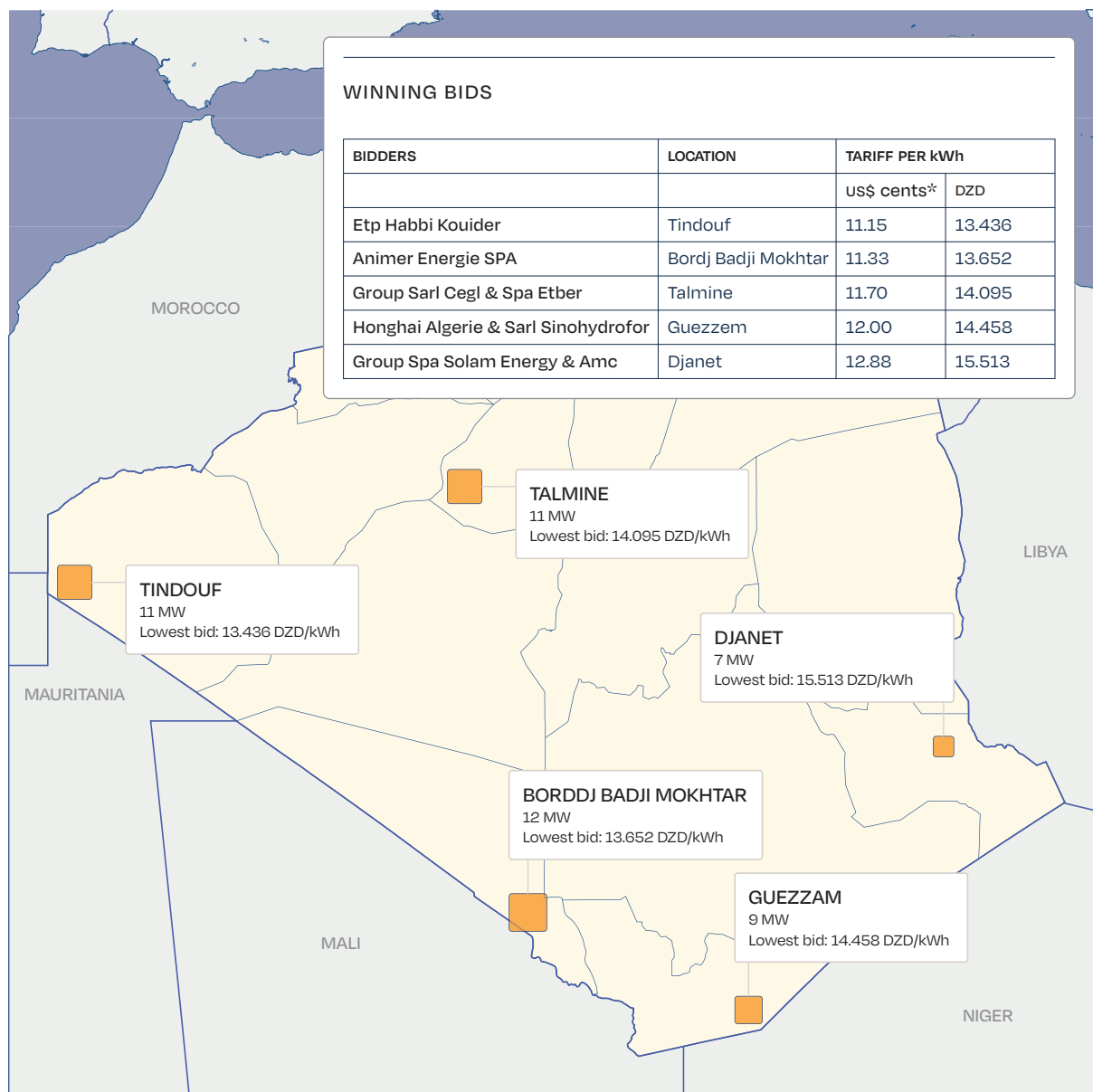
FIGURE 12 ALGERIAN ANNUAL SOLAR PV MARKET - HISTORICAL DATA AND FORECAST FOR THE UPCOMING 5 YEARS



SOURCE: SolarPower Europe, 2021.



FIGURE 13 MAP OF HYBRID DIESEL-SOLAR PROJECTS IN ALGERIA



SOURCE: PV Magazine, 2019. \*1 DZD = 0.0083 US\$.

On January 16<sup>th</sup>, 2019, the *Indicative Programme of Capacity Demands for Electricity Production 2019-2028* (CREG, 2019) was approved by the Ministry of Energy. It identified targets for all three grid connection areas and the basis for the new installations (renewable and conventional).

The plans include aims to double installed capacity by 2028, continuing the rapid growth of new energy generation plants.

The main findings are summarised in Table 3 on the following page.

## 2 Algeria electricity market / continued

TABLE 3 PLANNED NEW CAPACITY TO BE INSTALLED IN ALGERIA, 2019–2028

ELECTRICITY AREA	IN CONSTRUCTION [MW]	PLANNED RES [MW]	PLANNED CONVENTIONAL [MW]	TOTAL [MW]
RIN	10,842	5,150	6,250	22,242
PIAT	272		600	872
RIS	349.3	50	200.7	600
<b>Total</b>	<b>11,463</b>	<b>5,200</b>	<b>7,051</b>	<b>23,714</b>

SOURCE: CREG, 2019.

We highlight the efforts made by the national electricity production company (Sonelgaz) and its subsidiaries to increase global national production capacity.

In August 2019, the Algerian Minister of Energy announced a plan to launch 22 solar projects of 400 MW each.

In May 2020, the Minister of Energy, Arkab Mohamed, announced plans for a huge 4 GW solar project (Tafouk 1), to be tendered in tranches of 800 MW per year between 2020–2024. However, no other announcement has been made since then, and this plan appears to have been shelved for the time being.

In March 2021, the Minister of Energy Transition and Renewables announced that in the summer of 2021 a solar PV tender would be launched for a total of 1 GW, split into 10 lots, ranging from 80–180 MW each, in southern provinces. (Source: Algérie Presse Service, 8 March 2021). This tender is to be the first in a series aimed at adding 1 GW of installed capacity until 2035. The first of these tenders was announced on 30 September and is due to be launched by the end of October 2021, with the awarded PPAs lasting 20–25 years. Initial pricing predictions ranged from 0.036 US\$/kWh to 0.051 US\$/kWh (PV magazine, 2021). The Algerian Renewable Energy Company (SHAEMS), jointly owned by Sonatrach and Sonelgaz will retain an option of a 25% stake in the SPVs that will own the winning projects. In a bid to reassure international investors and attract more established IPPs, the awarded PPAs will be designed according to international standards, making it easier for investors to repatriate dividends in international currency. Furthermore, the requirements around local content usage will not be mandatory for the first tender and the local industry's capacity is will only slightly exceed 1 GW by 2022 (PV Magazine, 2021).

In a session in parliament in March 2021, Minister of Energy Transition and Renewables, Chems-Eddine Chitour, announced a partnership with Germany on renewables and green hydrogen that would make Algeria a pioneer. (Source: Algérie Presse Service, 25 March 2021).

In April 2020 Algeria was to sign an agreement with Dii Desert Energy, regarding Desertec (Afrik21, 2020)– an initiative launched in 2009 by a group of companies – including RWE, Siemens, E.On – that aims to exploit the huge solar energy potential of the deserts in North Africa and the Middle East and export part of the energy produced to Europe (Reuters, 2014). However, the initiative's goals have proved challenging to realise and it is perceived more as an ambition than a concrete project by the energy industry.

In July 2020, Algeria's application for membership of the European Bank for Reconstruction and Development (EBRD) was approved, which could enhance prospects for investors. One of the goals of the EBRD is to “promote sustainable supplies of energy” in the country. (EBRD, 2020).

Almost all solar PV installed capacity is state owned (total was 483 MW in 2020), split in several plants mostly in isolated areas in the southern part of the country and with a capacity between 9 and 60 MW.

Thus far, IPP investments have been very limited and the only large operating solar PV power plants (10 MW) have been done by Condor Electronics JSC and by Eni Spa/Sonatrach. The latter is a brownfield installation aimed to supply power to the Bir Rebaa North field, in the Berkine basin, which is operated by Groupement Sonatrach Eni, a joint venture between Eni and Sonatrach.

# 3

## Recommendations



Tassili N'ajjer reserve, Algeria. © SelimBT/Dreamstime.com

### 3.1. For Algerian policy makers

The previous schemes, though unsuccessful, constitute a useful and rich experience on which to build in order to set up stronger programmes and a sound legal framework in the future. There are several key challenges that policy makers should seek to address to improve renewables growth in Algeria.

The first of these involves issues around the bankability of PPAs in the country. **We recommend including a guarantee on the default risk of the national off taker in future PPAs. Similarly, including indexation to US\$ or Euros in the PPAs.** This would mitigate the risks of foreign currency exchange and help give investors more certainty.

We welcome the news that Algeria's latest tender and awarded PPAs will be designed according to international standards. This will be a big step towards improving investor confidence and attracting more competitive bidders. **We recommend that all future tenders and PPAs be designed in line with international standards.** This will provide positive momentum to renewables development and help the country achieve its targets.

Finally, local banks can play a role in providing project financing. Therefore, **we recommend considering the bankability criteria of local banks** so that they may play a stronger role in future tendering rounds. This will help generate more specialised financing streams and attract more investors.

The second issue linked to PPAs is a lack of communication about calls for tenders. **We**

recommend creating a platform dedicated to publicising tenders which is common to the different public entities involved in their implementation. The platform could bring together all official information as well as government decisions about renewable energies including upcoming tenders, state of progress of the renewable energy program, target audience, modification of the contractual framework, etc.

There is also ongoing uncertainty surrounding the regulatory framework governing renewable energy in Algeria. **We recommend that the Algerian government definitively exclude renewable energy power generation projects from the 49/51 rule** as it limits foreign investment and hampers efforts to achieve national renewable energy targets.

To further enhance the regulatory framework for renewable energy, **we recommend simplifying and clarifying the administrative procedures related to renewable energy projects**, in particular for obtaining the building permit, which turns out to be particularly complex.

Currently, it is very difficult for foreign investors to convert their capital into local currency. To increase the attractiveness of Algeria to international investors, **we recommend making the currency conversion process easier.**

To reassure investors about the security of their investments, **we recommend providing guarantees on the risks associated with changes to the legal framework governing renewable energies.** This will be particularly important as the laws governing the sector continue to evolve.

Currently, retail power prices in Algeria are not cost-reflective due to government subsidisation. However, there is no dedicated incentive scheme for renewable energy. **We recommend implementing an incentive scheme for renewable energy that focuses, in particular, on the C&I segment.**

**We welcome the softening of local content requirements in the upcoming 1 GW tender, making them optional.** This will encourage investor confidence as they can use equipment that has been certified with internationally recognised standards. In the same sense, **we recommend a review and a reduction of the local content requirements for future tenders also,** as they hamper international investment because the local PV market is not well established, local producers do not always meet international standards, and the industry suffers from a lack of production capacity. **Work should also be undertaken with local producers to help them comply with international standards.**

The final hurdle for policy makers to address is related to financing. Currently, uncertainties remain on the terms and conditions for international financing (no international financing has been authorized in the last 15 years). **We recommend removing all restrictions for international financing** and enabling Development Finance Institutions to establish a long-term presence in Algeria. This way they can offer enhanced support to renewable energy projects.

Other financing issues surround local banks. Currently local banks do not have the long-term resources required for them to become viable lenders to renewable energy projects as the maximum loan tenure stands at nine years and they lend almost solely based on their deposits. **We recommend that policy makers collaborate with local banks to draft new debt products that meet the needs of the renewable energy sector.**

Similarly, whilst there is appetite amongst local banks to get involved in the renewable energy sector, they often lack the expertise to provide competitive project financing. **We recommend that policy makers help develop dedicated renewables project financing capacity within local banks** though providing training to financial advisors and building partnerships with international banks and institutions.

### 3.2. For investors

International investors have encountered difficulties gaining entry to the renewable energy market in Algeria. The reasons behind this include the legal uncertainty surrounding the laws on foreign investments, the administrative burden in obtaining project authorisations, the low bankability of tenders, and the lack of available financing.

**We recommend that investors seek dialogue with the institutions identified in this report to develop a mutual understanding of the barriers to investment.** Relevant institutions include local authorities, which are aware of these problems and of the mixed success of the different programs implemented so far, banks and development agencies active in the region.

However, several barriers remain, especially due to the regulatory burden, a lack of clarity in the legal framework and a low access to reliable information. For these reasons, **we strongly recommend to investors to ensure that their contractors (advisors, EPC contractor, lender, etc.) have a track record in Algeria or are knowledgeable about the specificities of this market.**

Finally, Algeria has stringent local content laws in place. This has a potential impact on quality standards, which may differ from international best practices. **We recommend that investors conduct a thorough analysis of the local standards used and the potential impact they may have on system performance and maintenance costs during the design phase of a project.** This will mean that a truer estimate of the project's cost will be reflected in the budget and that any pitfalls can be identified early and mitigated effectively.

### 3.3. For Algerian businesses

Several types of Algerian businesses can be involved in renewable energy projects: EPC and O&M contractors, local banks and suppliers of the PV system and its components.

The challenge for these stakeholders is taking advantage of the large amount of capital required to develop renewable energy plants. Algeria may lack capital to achieve its ambitions in the sector and therefore it would benefit from capital inflow from foreign investors.

For this reason, Algerian businesses are advised to comply with international norms and standards applicable in their sector of activity. Indeed, investors are more likely to invest in a country where they are familiar with the applicable standards (i.e. they comply with international ones), as risk is reduced, making investments more attractive.

Consequently, to increase their competitiveness in the eyes of foreign investors, there are several actions that Algerian businesses can take. Local banks **should seek to develop dedicated project financing instruments for renewable energy projects**. When providing EPC and O&M services, Algerian firms **should follow established best practices** as a way of improving quality assurance and bringing down the costs of maintenance. For more information on industry best practices for EPC and O&M service providers, please refer to SolarPower Europe's EPC and O&M Best Practice Guidelines available at [www.solarpowereurope.org](http://www.solarpowereurope.org). Finally local suppliers should follow international best practice in the production process of PV systems and components. They should also provide a guarantee to this effect.

### 3.4. For development finance institutions

In line with what has been recommended for local decision makers, the DFIs should collaborate with the local authorities to improve the attractiveness of Algeria for international investors. DFIs should **offer their support to the Algerian authorities on the implementation of future tenders**, and leverage their experience from previous successes to ensure their bankability. To ease project financing issues and open up new streams of capital, DFIs should **work with the local authorities to simplify the process for obtaining and granting international financing**. DFIs can also help in assuaging fears surrounding the risks of doing business in Algeria. We recommend that DFIs cover political risk in the country by providing guarantees on restrictions on the transfer of capital, expropriation of assets, breaches of contracts and political violence. To help develop the capacity of local banks, we **recommend that DFIs provide advice and support to local banks on the development and implementation of project finance products** that will meet the needs of investors.



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