Tracking SDG 7:

Energy Progress Report 2019

Arab Region

Overview

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Tracking SDG 7: Energy Progress Report 2019

Arab Region

Overview

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Data Sources

This report relies on the data provided by the custodian agencies of Sustainable Development Goal 7: World Health Organization (WHO), World Bank, United Nations Statistics Division (UNSD), International Renewable Energy Agency (IRENA), International Energy Agency (IEA) and a combination of data sources for its analysis.

The report draws on two metadatabases of global household surveys – the Global Electrification Database managed by the World Bank (Elisa Portale and Juliette Besnard) and the Global Household Energy Database managed by WHO (Heather Adair-Rohani and Giulia Ruggeri). Energy balance statistics and indicators for renewable energy and energy efficiency were prepared by IEA (Roberta Quadrelli, Sharon Burghgraeve and Francesco Mattion) and UNSD (Leonardo Souza and Agnieszka Koscielniak) complemented by data on electricity generation from solar and wind energy and off-grid access, provided by IRENA (Adrian Whiteman and Samah Elsayed). Data on gross domestic product and value added were drawn from the World Development Indicators of the World Bank.

Data on individual countries was also provided during a consultative seminar on "Monitoring the Implementation of Energy-related SDG Indicators in the Arab Region" held in April 2019 where ESCWA member countries provided valuable input on their respective countries.

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Executive Summary

1. Progress in sustainable energy lies at the heart of socioeconomic growth and sustainable development across the Arab region. Ensuring access to affordable, reliable, sustainable and modern energy for all (Sustainable Development Goal 7 (SDG 7)) is a key condition for reducing inequalities, poverty eradication, advances in health and education, sustainable economic growth, and the principle of "leaving no one behind", in addition to climate action. Mainstreaming sustainable energy also presents significant opportunities for achieving a greater gender balance in the Arab region, including through improved energy access for women, access to medical services and education, and job opportunities.

2. Long-term progress in the Arab region as a whole has been particularly positive for Sustainable Development Goal sub-target 7.1 ("universal access to affordable, reliable and modern energy services"), with the exception of Arab least developed countries (LDCs). The Arab region's population without access to electricity fell from some 40 million in 2010 to some 30 million in 2017. Thanks to dedicated policy efforts in a number of Arab countries with remaining access deficits during the 2000s, electricity access was virtually universal by 2017 in all but three Arab countries. The Arab region's remaining electricity access deficit is concentrated in the LDCs Mauritania, the Sudan and Yemen, where, in turn, it is a significant obstacle to wider socioeconomic development.

3. Progress in other SDG 7 targets is not on track. The share of renewable energy in total final energy consumption (SDG 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix) has been in slow decline in the Arab region, a historical long-term trend that reflects the increased displacement of traditional solid biofuel in favour of modern liquid fuels and electricity, with a limited role played by other, modern renewable energy. Overall, the share of renewable energy has been plateauing at around 10.2 percent of the Arab region's total final energy consumption (TFEC) since 2010, with Arab LDCs accounting for a large proportion of renewable energy use through traditional biomass, which declined by another 11 percent between 2014 and 2016. Individual country progress in accelerated deployment of solar energy in particular over the tracking period has not been enough to counter this trend, with renewable energy contributing negligibly to total primary energy supply (TPES) in most non-LDCs. The Arab region's energy intensity (EI) (SDG 7.3: By 2030, double the global rate of improvement in energy efficiency (EE)) has continued to decline at a rate of 2.2 percent between 2014 and 2016 against a long-term trend of higher energy intensity during the 2000s than in 1990, but is not enough to bring the region in line with its need to decouple economic growth and energy consumption.

4. Progress in the Arab LDCs across SDG 7 targets lags far behind the rest of the region: reinforced action is urgently needed to achieve SDG 7 by 2030. The Sudan alone accounts for some 17.7 million people without access to electricity, and some 22.7 million people without clean fuels and technologies (CFTs) for around two-thirds of the Arab region's total access deficit for electricity and CFTs, making it one of the world's 20 largest deficit countries in 2017. Vast gaps in access between urban and rural areas across Arab LDCs result in highly precarious living conditions for millions of people. The share of renewable energy in the Arab LDCs' energy mix tends to be higher than elsewhere in the region, owing to greater reliance on solid

biofuel—much of which is traditional biomass—implying this share is expected to decline further, rather than to increase, together with improving living standards. Energy intensity is comparably low, but reflects both lacking industrialization and access to energy, with future improvements in energy access expected to raise this rate in the absence of the widespread adoption of energy efficient technology.

5. Conflict and instability have added further long-term challenges to progress in SDG 7 in a number of Arab countries in recent years. The destruction of infrastructure, the erosion of state institutions and political uncertainty have not only contributed to the erosion of past progress—for instance in the case of secure access to electricity and CFTs—but is also a major liability in these countries' attitude to investing in energy-related policies with a long-term perspective. Neighbouring countries, too, have been affected, through the rapid influx of refugee populations who add further pressure on energy systems with many pre-existing bottlenecks. Ensuring these countries are able to rebuild strong, resilient energy systems will require active assistance, ranging from technical and planning ability to effective institution building and access to finance.

6. Progress in SDG 7 and SDG 13 (Climate action) go hand in hand. The Arab region is highly vulnerable to future effects of climate change. These threaten the livelihood of millions by impacting the availability of arable land, drinking water, through increased heat, and the more frequent occurrence of natural disasters. The World Health Organization (WHO) outdoor air-quality data show that the Arab region is one of the most polluted regions in terms of outdoor air quality worldwide. The burning of fossil fuels to supply the world's growing populations and economies with energy has been a key cause of the release of carbon dioxide and other greenhouse gases (GHGs) into the atmosphere that is linked to climate change. Decoupling economic growth and prosperity from energy use by increasing the share of sustainable, clean energy sources and by increasing the efficiency and productivity of energy use as envisioned under SDG 7 is hence a key step to climate action under SDG 13. Progress in SDG 7 is also essential in this regard.

7. Arab countries need to step up their efforts to achieve both the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change. The Arab region is neither on track to meet its SDG 7 target nor its targets under SDG 12. Extending the pace of regional progress in sustainable energy requires much more policy action than has been the case in the past. Local markets need to be equipped with effective policy frameworks that move beyond lip service. This includes setting the right incentives through the availability of finance, investments in sustainable and clean energy, education infrastructure and services, as well as the removal of many existing market barriers. At the state level, inclusive, transparent and competent institutions are critical to achieving truly sustainable energy policies that move beyond window-dressing. Updated Nationally Determined Contributions (NDCs), due in 2020, should fully reflect concrete goals for renewable energy and energy efficiency. In turn, Arab countries can expect significant opportunities from the pursuit of energy and climate action, including the promotion of new, knowledge-based industries and the creation of jobs.

8. Strengthening regional cooperation among Arab countries could be a fruitful avenue to support the common goal of more sustainable energy systems. A successful energy transition that fosters more inclusive and more sustainable societies in the Arab region will hold benefits for all and will contribute to greater regional peace and security. The reverse is also true: failure to take action and build energy- and climate-resilient economies will affect Arab countries' positioning within the emerging geopolitical landscape that will undoubtedly change over the coming decades as global energy transition progresses. Policy choices made today will affect this position, and whether or not Arab countries will stand to lose or benefit from the global energy transition.

9. Arab LDCs will require special support to accelerate progress in SDG 7 and SDG 13. Closing the energy access gap in Arab LDCs will be more challenging than elsewhere, owing to the considerable size of the challenge, coupled with institutional and financial constraints. Despite progress in recent years in the area of access to electricity and CFTs, strong policy commitment must be accompanied by effective long-term energy planning, the provision of adequate financing and regulatory and fiscal incentives. Lack of sustainable energy access is a fundamental development challenge in LDCs, holding back progress across other development goals such as poverty eradiation and access to education and health, where urgent progress is required. The more effective use of development aid to support scalable, replicable projects with demonstrable benefits for local communities is one concrete way in which external parties such as development banks and third countries can support Arab LDCs in this task.

Acronyms and Abbreviations

CAGR	compound average growth rate
CFTs	clean fuels and technologies for cooking
CHP	combined heat and power
CO_2	carbon dioxide
CSP	concentrated solar power
DSM	demand-side management
EE	energy efficiency
EI	energy intensity
ESCWA	United Nations Economic and Social Commission of Western Asia
ESMAP	Economic Sector Management Assistance Programme
GCC	Gulf Cooperation Council
GDP	gross domestic product
GHG	greenhouse gas
GTF	Global Tracking Framework
GW	gigawatt
GWh	gigawatt-hour
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
IRES	International Recommendations for Energy Statistics
ISIC	International Standard Industrial Classification
KAPSARC	King Abdullah Petroleum Studies and Research Centre
km	kilometre
km/h	kilometres per hour
km^2	square kilometre
kt	kiloton
kW	kilowatt
KWh	kilowatt-hour
l	litre(s)
LDC	least developed countries
LPG	liquefied petroleum gas
m	metre
m^2	square metre
MEPS	minimum energy performance standards
MJ	megajoule
MJ/USD 2011 PPP	megajoules per 2011 US dollars at purchasing power parity
Mn	million
MRV	monitoring, reporting and verification
mt	million tons
NDCs	nationally determined contributions
pkm	passenger-kilometre
PEI	primary energy intensity

PJ	petajoule
PPP	purchasing power parity
PV	photovoltaic
RE	renewable energy
SDG	sustainable development goals
SDG 7	Sustainable Development Goal 7
tkm	tons-kilometre
T&D	transmission and distribution
t/yr	tons per year
TFEC	total final energy consumption
TPES	total primary energy supply
TWh	terawatt-hour
UN	United Nations
ESCWA	United Nations Economic and Social Commission for Western Asia
UNSD	United Nations Statistics Division
USD	United States dollar
WB	World Bank
WHO	World Health Organization
^{0}C	degree Celsius
mg/m^3	micrograms per cubic metre

About this report

The 2030 Agenda for Sustainable Development was adopted by all United Nations Member States in September 2015. Core to all development action are the 2030 Agenda's 17 Sustainable Development Goals (SDGs) that set out a common vision for how to build a peaceful and prosperous future for all, through growth that supports this and coming generations. In December 2015, world leaders signed the Paris Agreement, which sets out additional goals for global climate action.

This report is part of a long-standing effort to track global progress in sustainable energy. The Sustainable Energy for All (SEforAll) Global Tracking Framework (GTF) has had three global editions since its launch in 2013, with biannual updates, led by the World Bank (WB)/Economic Sector Management Assistance Programme (ESMAP) and the International Energy Agency (IEA), with inputs from more than 20 organizations worldwide. The GTF was put in place as the platform that tracks progress towards sustainable energy globally through the collection and analysis of quantifiable, internationally comparable energy-related indicators to provide the international community with a more detailed insight report into progress on the three pillars of sustainable energy: energy access, energy efficiency, and renewable energy.

Since 2019, the GTF has become the Tracking SDG 7: Energy Progress Report, which will continue to be led by SDG 7 custodian agencies (WB, WHO, IEA, the International Renewable Energy Agency (IRENA) and the United Nations Statistics Division (UNSD), all appointed by the United Nations as global custodian agencies responsible for collecting and reporting data related to the energy targets of SDG 7.

Tracking SDG 7 progress in the Arab region

The Executive Secretaries of the United Nations Regional Commissions have called for Member States to accelerate the transition to a new, sustainable and fair energy system, tailored to both national and global needs in the 2030 Development Agenda context. However, to address the gap between current actions taken by governments and the commitments they have made, it is necessary to understand the gaps in their various dimensions.

The year 2017 was the first year of individual reports by the UN regional commissions, including the Economic and Social Commission for Western Asia (ESCWA) on sustainable energy in the Arab region. The first regional edition of the GTF Arab Regional report provided an overview of the progress made by the Arab region in recent years in areas of sustainable energy management and universal energy access with a focus on the 2030 Agenda.

This present report is the latest, thoroughly updated regional edition of the SDG 7 Regional Tracking Report. Compiled by ESCWA, it aims

to help build capacity in the Arab region through access to information with the aims of strengthening proactive policy to improve energy security and enhance resilience to climate change and mainstream sustainable development goals into regional and national policy processes.

This report tracks progress in SDG 7 on affordable and clean energy in the Arab region. Progress towards SDG 7 is tracked along three main indicators:

1. Access to modern energy
2. Energy efficiency
3. Renewable energy

Spanning 19 countries and a population of 398 million, the Arab region is characterized by vastly different development experiences, natural resource endowments, energy access and income levels. Yet, its countries also share a vulnerability to unsustainable growth patterns including in energy and to climate change. Equipping their economies with sustainable energy solutions that enable socioeconomic growth, while protecting the climate and ensuring a healthy planet for future generations, will be one of the most fundamental challenges across all Arab countries in the coming decades.

1.

Energy Access

1. Energy Access

Energy access is measured as the proportion of a country's population with access to (a) electricity and (b) clean fuels and technology for cooking (CFTs). SDG 7.1 tracks aggregate change in these two variables towards the effective goal of ensuring, by 2030, universal access to affordable, reliable and modern energy services. This chapter presents the main findings for the tracking period up to 2017.

Access to electricity

Main messages

- **Regional trend.** Access to electricity is, to a large degree, a bright spot in the Arab region's sustainable development agenda. The Arab region's electrification rate rose from 88.4 percent in 2010 to 92.5 percent in 2017, at an average annual electrification rate of 0.7 percentage points, making it the most electrified regional group of countries in the developing world. By 2017, electrification access was virtually universal in all but three Arab countries. Encouragingly, the decline of the region's access deficit has been accelerating in recent years. The region's population without access to electricity fell from some 40 million in 2010 to some 30 million in 2017.
- **Reaching the 2030 target.** Overall, the Arab region is on track with its target of achieving universal access to electricity by 2030. Region-wide growth in access over the period 2014–2017 averaged 1 percent, requiring further average annual growth of 0.5 percent until 2030 to reach universal electricity access. Among the Arab LDCs—which incur virtually all the Arab region's electricity access deficit—both the Sudan and Yemen are on track, with average annual growth in access between 2014 and 2017, exceeding their required growth rates for the period 2018–2030. Only Mauritania required a significant acceleration in its efforts to make access to electricity universal.
- **Key deficit countries.** In 2017, some 7.5 percent of the Arab region's population, or around 30 million people, were left behind with no formal access to any kind of electricity. Over 90 percent of the Arab region's entire access deficit in 2017 remained concentrated in the three Arab LDCs: the Sudan (17.7 million), Yemen (5.88 million) and Mauritania (2.5 million). The rest of the region's access deficit is found in Libya and the Syrian Arab Republic, both conflict-torn countries, with Libya never recovering its 100 percent access rate since 2000. Libya, the Syrian Arab Republic and Mauritania are the only three countries in which more people lacked access to electricity in 2017 than in 2010.
- **Urban–rural distribution.** The Arab region's remaining electricity access deficit is

- **predominantly a rural problem.** Some 88 percent of Arab LDCs' urban population, but only around 50 percent of its rural population, had access to electricity in 2017. In Yemen, 98 percent of the urban population had access to electricity, versus 69 percent in rural areas. In the Sudan and Mauritania, these numbers are 82 percent for urban access, versus 43 percent rural access in the Sudan and no access at all for rural populations in Mauritania.
- **Conflict, instability and access to electricity.** Conflict and instability have had a highly detrimental impact on a range of socioeconomic factors in the Arab region throughout the tracking period, including electricity access. Conflicts and instability in Iraq, Libya, the Syrian Arab Republic and Yemen generated more than 6 million refugees by 2017, as well as some 11 million internally displaced persons, whose living conditions and energy access remain for the most part provisional and largely unreflected in current data. Conflict-affected countries Libya and the Syrian Arab Republic saw declining rates of electricity access over the tracking period, reflecting large-scale destruction of infrastructure that will likely challenge these countries' efforts in providing universal access to electricity to all citizens for many more years to come.
- **Affordability and reliability of electricity.** While the Arab region boasts overall high rates of electricity access, the quality of service varies significantly. During the tracking period, planned and unplanned service disruptions due to insufficient generation capacity and transmission infrastructure have been of particular concern in conflict-affected Iraq, Libya, the State of Palestine, the Syrian Arab Republic and Yemen, but also in neighbouring Jordan and, in particular, Lebanon. Similarly, electricity is not equally affordable everywhere. Jordanians, Moroccans, Palestinians and Tunisians pay on average more than 20 times the average bill in the Arab region's lowest-cost country. This affects affordability of electricity services in these countries, particularly among low- and lower-middle income groups. Many off-grid solutions such as mini-grids that offer access to remote settlements similarly remain disproportionally expensive, affecting access rates.

Access to clean fuels and technologies for cooking

Main messages

- **Regional trend.** Access to CFTs is encouragingly high in the Arab region. In 2017, 14 out of 19 countries had access rates above 95 percent, as in the case of electricity with a long history of high access rates. Region-wide access to CFTs virtually stagnated, with very modest growth from 89 percent in 2010 and 89.4 percent in 2015 to 90.3 percent in 2017. The overall access deficit in 2017 of 37.5 million people is considerably larger than the access deficit for electricity. This indicates that CFT access still lags behind electrification in the effectiveness of available policies to make access universal.
- **Reaching the 2030 target.** After the tracking period, the challenge of closing the Arab region's CFT access deficit has become larger rather than smaller. With high population growth and slow progress in increasing the share of access over the tracking period, the annualized growth rate in CFT access in the Arab region between 2015 and 2017 will need to speed up more than six-fold over the period until 2030 to close this gap.
- **Key deficit countries.** Some 38 million people lacked access in the Arab region in 2017, most of them in the Arab LDCs Mauritania, the Sudan and Yemen. The Sudan alone accounts for almost 23 million people without CFT access for almost two-thirds of the Arab region's overall access deficit in 2017 and is therefore also one of the world's key deficit countries. Yemen's and Mauritania's access deficit broadened by contrast, with more than 2 million in Mauritania and 10 million in Yemen lacking access.

- **Urban-rural distribution.** As in the case of electricity, the access deficit for CFTs is far more pronounced in rural areas than in cities. In key deficit countries Mauritania, the Sudan and Yemen, rural access lags behind urban access by one-third; in Mauritania, some 46 percent of urban but only 21 percent of rural households had access to CFTs in 2017. There was also an additional access deficit in a number of conflict-affected and neighbouring countries that is not currently captured by our data.
- **Conflict and access to CFTs.** As in the case of electricity, conflict and instability have had a detrimental effect on access to CFTs. Reduced access to electricity has increased the demand for liquid fuels in Iraq, Libya, the Syrian Arab Republic and Yemen, leading to shortages and surging prices that have placed even liquid fuels out of many household budgets, even where they are still available. The result has been an increasing use of other available alternatives, including fuelwood, kerosene and plastic waste, with significant implications for public health, socioeconomic living conditions and the local environment. This reinforces concern about the highly detrimental effects of conflict and instability on the region's progress across all SDGs.

Policy implications

Despite positive progress in regional electrification and access to CFTs, the Arab region faces many challenges in achieving SDG 7. The tracking period has seen important progress in several Arab countries' endeavours to make access to modern energy universal, closing remaining gaps. Not everywhere has this been equally successful, leaving behind a smaller yet significant share of the populations of countries with incomplete access, in particular in rural areas. Arab LDCs continue to face perhaps the greatest challenge in the region, given the continued disconnect of large portions of their rural populations from even basic electricity, with far-reaching effects on sustainable development across different indicators. In addition to electricity access, service reliability in a number of countries remains poor and has been worsening significantly in the face of conflict in an increasing number of Arab countries.

The unparallelled escalation of conflict and instability in Iraq, Libya, the Syrian Arab Republic and Yemen since 2014 has had devastating effects on energy access in the Arab region. The systematic destruction of infrastructure and institutions in these countries, coupled with the loss in human life, talent and opportunities for a whole generation to come, was a step backwards, rather than forwards. Lack of secure, clean and affordable energy here holds many debilitating consequences for millions of people, including access lost to basic health services, education, sanitation and, ultimately, economic opportunities. The close link between energy and economic opportunities many of those protesting in Arab streets in 2010/2011 were hoping for highlights the high degree of vulnerability current conflict inflicts on the Arab region as a whole. Current data inadequately capture the implications of this.

The increasing number of refugees and displaced people in the Arab region poses a challenge to secure access to electricity for all. This crisis affects the entire Arab region, suggesting urgent, comprehensive and dedicated action by all to help in the reconstruction and rehabilitation of those countries that have been suffering from conflict and to assist those countries affected by the spillover effects of conflict, including hosting millions of refugees from neighbouring countries. Progress in CFT access lags significantly behind that in electrification, with conflict having reversed progress made a decade earlier in a number of conflict-affected Arab countries and their neighbours. The parallel breakdown in electricity services in a number of countries—much of which remains probably underrepresented by our data—has led to a further deterioration of CFT access, leading to severe health consequences and environmental destruction as part of the region moves backwards on the energy ladder.

Beyond acute conflict situations, many Arab countries' utility sectors face considerable long-term challenges that require sustainable long-term solutions. These challenges include considerable inefficiencies due to decade-long practices of state-centred utility provision, inefficient subsidies, underfunded national utilities in the absence of any meaningful competition on utility markets. The result is that current operating models in many Arab countries fail to address issues of affordability, as well as long-term financial and environmental sustainability. These problems highlight the need for reform in a number of Arab countries' utility sectors to make electricity provision in the region fit for its essential role in powering sustainable development.

Access to CFTs lags behind progress made in the area of electrification, implying considerably more dedicated efforts to target CFTs are required than has been the case in the past. In countries with remaining access deficits, focused policy action, monitoring and enforcement are necessary to ensure progress. Generally, electrification receives more public attention than access to CFTs: policies need to recognize the importance of CFTs, even more so as CFT access rates lag significantly behind electrification. In conflict-affected countries and countries hosting large refugee populations, such as Lebanon and Jordan, many more people are affected by prohibitively high energy costs, leading to a reversion of past progress in accessing lower-quality fuels. Again, current data unlikely to capture these developments adequately. Failure to address CFT access leads to severe health and environmental implications which none of the countries with incomplete access to CFTs can afford. There is also significant scope to integrate electrification and CFT access with wider climate goals and policies.

Access to finance remains a critical enabler of universal access to CFTs and increasing access to electricity in deficit countries. Cooking stoves, fuel and the majority of stand-alone electricity generators including solar systems and solar water heaters, are bought on a cash basis. For many low-income households, the substantial initial investment in new technology remains a financial challenge, rendering access to CFTs and electricity solutions in the absence of available microfinance unaffordable. Market mechanisms that increase the amount of microfinance available to these users would provide an important tool to help step up access by those households which are currently unable to afford better technologies. This includes finance for the initial stand-alone electricity system (e.g. solar panels and their installation); the initial cost of connecting to a local mini-grid; or the initial cost of a cleaner stove.

Studying energy access also highlights the desperate need for much better-quality data. While a global challenge, access to data is a particular challenge in the Arab region. Lack of actual data is a major constraining factor, which highlights the need for far more frequent, standardized household consumption surveys that generate regionally comparable data. Important current data gaps include standard consumption patterns and affordability, but also electricity service quality and gender-disaggregated access data. Survey data quality is often poor, with data being old, forcing conclusions to be made on results collected from a small number of households many years ago. This increases the challenge of informed decision-making and the design of solutions to people's needs tremendously. This is a call for far more policy engagement, including internal capacity-building, by governments across the Arab region to help and improve their own capabilities in addressing these challenges.

Improved access to information is also a fundamental importance to citizens and businesses, both parts of driving national solutions. The role of governments is critical in making available information, through upgraded technology quality controls and regulation, and the dissemination of dedicated information. Since lack of energy often translates into lack of access to the outside world, the role of governments in making information available is even more critical in deficit countries, in particular in the Arab LDCs. This includes information about technology solutions suitable to different user groups, from improved cooking stoves and better fuels to financing opportunities available to final users.

2. Energy Efficiency

2. Energy Efficiency

SDG 7.3 tracks progress in the rate of improvement in energy efficiency. It is measured through energy intensity as an imperfect but workable proxy indicator, which is calculated as the amount of energy used per unit of GDP. SDG 7.3 targets a doubling of the world's rate of improvement in energy intensity by 2030, implying energy intensity should fall continuously. This chapter examines progress in reductions in energy intensity in the Arab region.

Main messages

- **Regional trend:** Arab region average energy intensity rates remain all but unchanged at 4.7 MJ/USD 2011 PPP continuing a long-term flat trend of autonomous and largely structural energy efficiency improvement since 1990. The Arab region has the second lowest energy intensity of the world's regions, largely a result of its fuel mix based on widespread efficient use of gas. The recent energy intensity trend for the region is a drop of –2 per cent compound average growth rate (CAGR) from 2014 to 2016. This is a necessary improvement over the medium-term 2010–2016 improvement rate of –0.6 per cent and an important reversal over the long term, an increase in regional energy intensity from 1990 to 2010.
- **2030 target:** At –2.0 per cent during the latest two-year period, and –0.6 per cent from 2010 to 2016, improvement in energy intensity across the region is still behind the world average energy intensity improvement rate of –2.3 per cent from 2010 to 2016. The region has yet to implement energy efficiency at sufficient scale and speed to meet SDG 7.3 target. Most countries in the Arab region still need to transpose energy efficiency ambitions and plans into largely implemented measures and measurable energy efficiency progress. Regional energy intensity progress needs to accelerate from a passive trend to a more active policy-driven investment in energy efficiency. Some substantive new policies have emerged, offering evidence that well-designed, implemented policies achieve results. There are country experiences in the region that are regional exemplars, offering a learning process that can be copied in how energy efficiency is a strategic investment in a country's economic development. The rewards occur across all SDGs as SDG 7.3 creates multiple benefits in improved well-being and productivity, as well as reduced global and local emissions.
- **Subregional trends.** The Maghreb without Libya, the Mashreq, and Arab LDCs have seen a long-term trend in falling energy intensity since the 1990s and lay around the 4 MJ/USD 2011 PPP range by 2016. Conflict and instability have significantly affected concerned countries' energy intensity rates over the tracking period and before, in particular Iraq, Libya, the State of Palestine and the Syrian Arab Republic. The GCC exhibits different dynamics than the rest;

- **Overall energy intensity in the GCC has been rising since the 1990s, albeit with a gradual decline in more recent years, to around 6 MJ/USD 2011 PPP in 2016.** Bahrain and Qatar's energy intensity is far above the rest of the GCC, though with a downward trend.
- **Conflict and energy intensity.** Conflict-affected countries' energy intensity levels are substantially higher than those of neighbouring countries and fluctuate considerably over time. Iraq, Libya, the State of Palestine and the Syrian Arab Republic experienced significant disturbances to their economic activities during the period under study, due to the ongoing geopolitical conflict in the region. Conflict-induced effects on energy intensity include damage to key energy infrastructure, including power plants, transmission and distribution (T&D) infrastructure, dams and conflict-driven constraints to operation and maintenance. This also impacts the region, with neighbouring Lebanon and Jordan each hosting high numbers of refugees.
- **Sectoral trends.** Agriculture and services have seen the deepest fall in energy intensity in the Arab region since 2010. Regional averages of the sectoral energy intensities based on sectoral final energy consumption improved by –8.2 per cent CAGR and –3.9 per cent CAGR between 2010 and 2016 for the agricultural and service sectors respectively. The industrial sector's energy intensity increased slightly (+0.2 per cent CAGR) and the residential sector intensity also increased (+1.7 per cent). These trends have been observed across all Arab countries, except for Egypt, Iraq, Morocco and Jordan, which also had their industrial sector energy intensity improve. The same trend is confirmed over the tracking period. The change in sectoral energy intensity and total primary energy intensity (PEI) over the two bienniums seems to indicate that most of the improvement in energy intensity is probably due to changes in the economy structure, moving towards more energy productive activities.

Policy implications

Energy efficiency requires substantial progress through policy action in the Arab region. In many countries, energy efficiency policies have not yet matured into institutional capacity, implementation progress and evaluation. Creating substantial improvement in energy efficiency requires synergies across policies, prices, regulations, market influencers, compliance management and enforcement to work together. Those countries that have made the best progress in the past two years are aligning and integrating policies to achieve the necessary changes. Integrating energy efficiency action plans into development strategies, requires clear SDG targets for each country, identifying required capacity building needs, human and financial resources, making the necessary policy and regulatory reforms and developing the required implementation mechanisms.

Transport energy intensity is highest of the world's regions, but vehicle ownership is low by global standards, implying a pent-up demand for increased mobility. Public transportation has only been developed in parts of the region, but a range of sustainable public transport projects are being implemented and will improve mobility and sustainability of travel in many countries in the region. Much greater efforts are needed to overcome the general lack of data and improve the understanding of transport energy efficiency issues in the region. Policies to improve transport vehicle and system-energy efficiency, reduce high levels of local pollutants, and global emissions, are only available in a few countries in the region and should be reinforced and generalized to include the remaining countries. The oldest and worst polluting vehicles, especially those with the highest mileage (taxis and couriers), should be displaced by integrating regulations and technical and financial solutions. Experience in Egypt in vehicle scrapping can be used as a model for such programmes.

Special policy attention needs to be given to energy intensive industries (representing more than 70 per cent of industry's energy consumption in many countries in the region). Specific

measures need to be developed to increase their energy productivities, such as cogeneration and other appropriate actions. Industrialized countries in the region, with exporting industries, should capitalize on the region's competitive advantage in low energy costs, and enhance their global competitiveness by improving their energy efficiency. Industrial energy efficiency policies need to gain in maturity in many countries, and largely voluntary energy performance requirements should become mandatory, particularly by enforcing relevant equipment MEPS. Examples of advanced energy efficiency programmes exist in some industries, but most countries need capacity building and investment programmes to achieve international benchmarks of energy productivity, using appropriate technologies and industrial processes. Substantial efforts need to be made to understand the dynamics that make these industries operate with such low energy performance. It is imperative that the industrial operators in the Arab region have access to global information, technology and financing opportunities, including properly designed incentives, to reach global advances in energy efficient technologies.

The building sector requires separate attention. Most countries have building codes and appliance standards for air-conditioners, and refrigerators. Developing compliance with these standards and establishing realistic and evolving MEPS is a priority to achieve improved well-being in buildings and avoid unnecessary investment in peak demand capacity in power sectors. Energy demand reductions from energy efficiency are unlikely in LDCs as any efficiency gains would be used to meet increased levels of essential services and improved well-being and would not be visible as energy cost savings. Arab LDCs have a pent-up demand for improved well-being and economic services and a particular need for cooling and water supply as climate impacts develop. Advancing energy efficient cooling systems and water efficiency measures enables better critical services and lowers the costs of extending constrained energy supplies.

Demand-side management (DSM) offers both consumers and energy suppliers cost efficiencies by minimizing peak power demand. DSM techniques include: storing energy; shifting demand peaks to lower demand periods; cutting demand peaks with energy efficiency or distributed generators; and reducing the baseload below demand peaks with energy efficiency. These are typically motivated by consumers receiving cost-reflective time of use price tariff signals that reflect the demand peaks faced by power suppliers. The upstream benefits to suppliers are significant, but critically rely on effective consumer motivation to act. In countries with energy subsidies, consumers, even those with a low preference for electricity, have little motivation as subsidized averaged rate tariffs offer little return or motivation for energy efficiency or DSM actions. There are, as a result, few price-motivated DSM programmes; regulatory actions are required to compensate for the lack of price motivation.

Sustainable DSM programmes in the Arab region therefore need to also look at actions that motivate change with fixed or low energy tariffs. Summer peak or capacity charges for commercial buildings make sense as they motivate reductions in both baseload and peak capacity and can be complemented by direct investment by power suppliers in electricity efficiency measures. These end-use energy efficiency measures are important, every kW of demand reduction can also create a further 0.2–0.3 kW of air-conditioning demand reduction. Power suppliers should therefore assess the economics of investing directly in demand-reducing energy efficiency programmes options such as energy and electricity peak demand audits, free LED lamps, insulation upgrades, air-conditioner performance audits and upgrades, and distributed PV, in areas with supply constraints.

Arab countries need to build institutional capacity to deliver energy efficiency. This includes the development of integrated energy efficiency and renewable energy policies and institutions; and the review and re-development of country targets for energy efficiency and renewable energy to match country societal and economic development ambition, SDG goals, and

local environmental challenges, and mobilize the necessary human and financial means to achieve the retained targets. Requiring utility suppliers to invest in end-use efficiency and distributed renewables will help this goal, while power sector regulations and practices should enable consumers to invest in their own energy efficiency and renewable energy solutions. Arab countries also need regulatory policies and attractive implementation schemes to ensure a sufficient impact that can overcome the lack of economic incentive for consumers where necessary.

Effective policy design requires data transparency, availability of information and monitoring to ensure compliance with existing codes. Progress in energy efficiency requires significant improvement in country and sectoral energy and activity data collection and analysis; clear, transparent monitoring, reporting and verification (MRV) schemes that allow qualification and quantification of actual progress, identifying synergies in energy efficiency and renewable energy progress. Given an established base of appliances and buildings' energy performance policies in the region, priorities must focus on ensuring a high level of compliance with the policies; understanding the efficacy of the policies—are they really achieving their potentials?; maintaining effective review and revisions; collaborating to harmonize country standards around global standards and best regulatory practices as technologies advance; and ensuring industry is supported with accredited test facilities.

Programme evaluation needs to be improved. The potentials and risks, capital investment performance, the prospects of further declining costs for energy efficiency in the Arab region have different drivers than in other regions. The multiple benefits from energy efficiency investments that are delivered in developing and emerging economies may be much greater than in developed economies as they free up constraints in resources to open up new development opportunities. The impacts of improving energy efficiency across other SDG goals have yet to be developed in the region, highlighting that programme evaluation needs improvement.

3. Renewable Energy

3. Renewable Energy

SDG 7.3 tracks progress in the share of renewable energy in total final energy consumption (TFEC) towards the ultimate goal to substantially increase, by 2030, the share of renewable energy in the global energy mix. This chapter presents main findings for the Arab region, looking both at the share of renewable energy and actual consumption dynamics in modern renewable energy use.

Main messages

- **Regional trend.** The share of renewable energy in TFEC has been in slow decline in the Arab region. This historical long-term trend, which runs contrary to global use patterns, as well as the SDG target for renewable energy, reflects the high share of solid biofuel in total regional renewable energy consumption, whose use has been steadily declining. Consisting mostly of traditional biomass, solid biofuels have seen shifting consumption patterns as more households access electricity and liquid fuels. The share of renewable energy has been plateauing at around 10.2 percent of the Arab region's TFEC since 2010, declining by another 11 percent between 2014 and 2016. The share of modern renewable energy technologies—solar, wind and hydropower—lay at 19 percent of the region's total renewable energy consumption in 2016, and has been increasing, albeit at very slow pace.
- **2030 target.** With declining shares of renewable energy in TFEC, the Arab region seems far off SDG target 7.2. ("By 2030, increase substantially the share of renewable energy in the global energy mix"). This overall trend reflects to a large extent a declining use of traditional biomass in favour of more modern, higher-quality liquid fuels and electricity, indicating a welfare gain to Arab societies from the current trend. On the other hand, the use of modern renewable energy technologies, in particular solar and wind energy, has been accelerating in a number of Arab countries over the tracking period. This is an encouraging result that is dented, however, by the very low share of renewables in the region's energy mix. Gains remain small in absolute terms, implying outside countries with high rates of biomass use (predominantly Arab LDCs), renewables continue to contribute a negligible share of the region's energy needs and increases in modern renewable energy use are insufficient to bring the Arab region close to its 2030 target. This means current progress must be accompanied by much accelerated policy action in the coming years in order to ensure Arab countries can take advantage of their largely untapped modern renewable energy resources and to implement climate action.
- **Key deficit countries.** Very few Arab countries rely on renewable energy for a substantial share of their final energy consumption. Only in Mauritania, Morocco, the State of Palestine,

the Sudan and Tunisia does renewable energy contribute a substantial share—above 10 percent —to the national energy mix, and only with solid biofuel—in many cases providing inferior access to energy compared with modern liquid and renewable energy sources and electricity—retaining an overwhelming share in all of these countries' renewable energy consumption. Nine Arab countries, including all GCC countries, consumed no or negligible amounts of renewables, basing their energy mix virtually entirely on fossil fuels.

- **Consumption by final sector.** The residential sector remains the most dominant end user of renewable energy. In 2016, it accounted for over 80 percent of total renewable energy consumption, owing to the large proportion of solid biofuel used for cooking. Only 18 percent of the Arab region's renewable energy consumption is accounted for by electricity generation, with virtually no use of renewable energy in the transport sector.
- **Off-grid electrification.** Distributed electricity generation using renewable energy technologies have grown quickly in the Arab region owing to their large contribution to off-grid electrification. With much of the Arab region's remaining access deficit being concentrated in rural areas, off-grid options such as mini grids and self-generation have become a lifeline for many rural communities that are too scattered or remote to be economically connected to the national grid. The fast growth in solar-powered stand-alone systems, both for electricity generation and water-heating, in Lebanon, the State of Palestine and Yemen further illustrates the vast potential for technology to help restore secure energy access in conflict-affected settings and countries with pre-existing shortcomings in their utility sectors.

Policy implications

Renewable energy continues to be used far below its potential in the Arab region. Modern renewable energy technologies, in particular solar energy, hold vast potential to address a whole range of energy needs in the Arab region. Negative growth in renewable energy use as a share of TFEC over the tracking period reflects decreased use of solid biofuel, much of which is traditional and non-sustainable, but also the continuing small share of modern renewable energy technologies that so far fail to compensate for the fall in biomass consumption. Progress here needs to speed up substantially across countries through the opening up of market opportunities and the removal of barriers to the entry of renewables to the national energy mix.

Rapidly falling costs for solar and wind technologies, both at utility scale and in the off-grid sector, increase the argument in favour of increasing the uptake of more renewable energy. The increasing cost-competitiveness of modern renewables for electricity and heat generation is an important message emerging from past years in the Arab region. Arab countries have set subsequent world record low-bid prices for utility-size solar PV and solar CSP projects in 2016 and 2017, respectively, indicating the vast potential of these technologies to compete on the basis of economics alone. This is also increasingly true in the case of off-grid applications that compete with diesel generators.

In addition to utility-scale deployment, the off-grid segment offers significant opportunities for market growth of solar power in countries with incomplete electricity access. Solar off-grid systems reduce reliance on more expensive diesel, providing secure electricity access to those who so far been left behind. Examples include rural electrification initiatives in countries such as Mauritania, Morocco and Yemen. Promoting the use of solar power for rural electrification is a task for policymakers that includes the preparation of markets through the provision of microfinance solutions and product quality controls in addition to more systematic information management.

The highly encouraging developments of 2014–2017 in the use of solar stand-alone systems suggest far greater policy focus should be turned to distributed generation in its own right. Countries such as Jordan and Lebanon demonstrated over the tracking period the enormous potential for distributed generation and consumption of solar power, even where

grid access is available. The decentralized solar PV market in Lebanon grew by a factor of eight from 2014 to 2017. Currently, self-generation remains most attractive where grid-based access is irregular and where solar rooftop panels therefore offer a cost-competitive option to expensive backup generators. In the future, much more market share could be taken up by distributed generation across different Arab countries, if consumers are provided with the right financial incentives. Legislation such as in Egypt, Jordan and Morocco demonstrates what some of the respective national legislative frameworks could look like.

Stand-alone solar power systems also hold significant potential to help restore electricity access in conflict-affected countries. The State of Palestine and Yemen demonstrate the enormous market potential for solar self-generation, stand-alone systems that have proved to be cost-effective and practical in situations where central states are defunct and/or central grids are working with limited capacity. This is a most encouraging recent development, with substantial potential to help build more resilient societies and economies in conflict-torn countries in dire need to re-establish minimal public services and living conditions, and to reinvigorate basic business activity. Supporting the adoption of stand-alone solar power systems in public buildings such as schools and medical facilities, in SMEs and households, should hence take priority in developing project financing and policy design aimed at restoring peace and stability in a number of Arab countries.

Effective legislation and a business-friendly environment have been an important driving force behind recent success in utility-scale deployment of solar and wind projects in the Arab region. At the heart of these success stories were often well-designed regulatory frameworks aimed to attract private investment through competitive bidding mechanisms under Independent Power Producers (IPPs). Closely tied to these frameworks is an overall national legislation that reduces risks and advances the financial viability of investment in the sector and improves the business climate for private sector investment. This highlights the importance of policy in setting the right conditions for renewable energy.

Affordability of solar off-grid systems remains an issue for poor households, making effective policies to encourage access to credit facilities essential to increasing the uptake of distributed solutions. This means that, despite important progress in the use of off-grid systems in countries including Jordan, the State of Palestine and Yemen, markets still fail in making these technologies mass products accessible to low- and lower-middle income households. Effective policy design to help markets deploy off-grid solar systems in greater numbers will need to include suitable financing mechanisms including at the micro-level and facilities that target households with no formal access to banking. National governments, as well as international lending bodies and development aid donors, can all engage in the provision of suitable financing tools, most critically in microfinance.

Albeit counting toward the region's renewable energy consumption, the continued use of traditional solid biofuel, in particular in the Arab LDCs is not sustainable. The effects of inefficient biomass on households, women and children, and local environments is highly problematic and requires much greater policy action. Continued traditional biofuel use in the LDCs underlines the need for sustainable energy solutions for households that can include greater electrification through the expansion of grid-based and off-grid systems, the switch to more modern forms of solid—and gaseous—biofuel or, in some cases, the switch to non-renewable LPG for cooking. Arab LDCs need to be supported in this endeavour by the full range of national and international actors.

Harvesting the significant benefits of modern renewable energy requires far more dedicated policy design—and investment—than is currently the case. Arab countries' scores under ESMAP's RISE suggests substantial room for improvement at the regulatory and policy level. While a number of Arab countries have adopted ambitious renewable energy targets, practical policy measures to achieve those targets are often still missing. At the same time, barriers to systematic deployment in the utility sector in many cases remain high, reflecting a sector that has yet to move on from a decade-long modus operandi that has focused on state-led, oil- and gas-based business. Arab LDCs are among those countries that could benefit most immediately

from the rapidly improving economies of renewable energy technologies, both in the on- and off-grid market segment; so could many of the Arab middle-income countries, whose increasing energy needs require sustainable solutions beyond their current energy mix and utility business models. Renewable energy also offers the Arab region a tremendous opportunity to help reduce environmental pollution and to address climate change, the implications of which are expected to be severe (Chapter 4). This is a call for policymakers to engage much more proactively in energy policy design that takes up the enormous opportunities offered by renewable energy—today —not sometime in the future.

4. Sustainable Energy and Climate Change

4. Sustainable Energy and Climate Change

SDG 13 asks governments to "take urgent action to combat climate change and its impacts", including by strengthening resilience and adaptive capacity to climate-related hazards and natural disasters in all countries; by integrating climate-change measures into national policies, strategies and planning; by improving education, awareness-raising and human and institutional capacity on climate-change mitigation and adaptation; and by implementing developed-country parties' commitment to the United Nations Framework Convention on Climate Change to mobilize substantial funds to support climate action across the globe, leaving no one behind. This chapter explores the links between SDG 13 with progress in SDG 7, highlighting the close relationship between these two sustainable development goals and the need to better integrate them in future energy policy.

Main messages

- **Climate action and SDG 7.** Progress in sustainable energy and climate action is closely interlinked. The Arab region is highly vulnerable to future effects of climate change, whose effects threaten the livelihood of millions by impacting the availability of arable land, drinking water, through increased heat, and the more frequent occurrence of natural disasters. Decoupling economic growth and prosperity from energy use, by increasing the share of sustainable, clean energy sources and by increasing the efficiency and productivity of energy use as envisioned under SDG 7 is hence a key step to climate action under SDG 13. Combined, the two development goals also go hand in hand in facilitating progress across a range of other development goals, including the promotion of human health, gender equality and the creation of safe, resilient living spaces, in addition to the protection of natural resources on land and at sea.
- **Air pollution and the carbon footprint.** Climate action is urgently needed to respond to the Arab region's rapidly rising carbon footprint. While the region does not account for the largest part of global GHG emissions, it is the fastest growing emitter of GHG emissions worldwide. Arab countries also suffer from highly concerning levels of ambient air pollution. Annual mean exposure to fine particulate air pollution exceeds WHO guideline values in all Arab countries. WHO outdoor air-quality data also show the Arab region is one of the most particularly polluted regions in the world. These results are highly concerning from a climate perspective and from a public health point of view, highlighting the need for Arab countries to step up their efforts in climate action along with progress in SDG 7 as a matter of urgency in both the global and domestic interest.

- **Climate action in the water and electricity sector.** The intrinsic link between energy and water necessitates comprehensive action that addresses the two elements together. Several regional initiatives have confirmed this necessity and called for systemic change. While all these initiatives demonstrate the interest of regional governments in the energy–water nexus, a challenge remains to translate targets and intent into concrete and effective policy action. This includes a much more systematic integration of water and electricity policy, as well as the expansion of the use of available financing and technology options.
- **Aligning SDG 7, SDG 13 and NDCs.** National energy plans and NDCs need to be better aligned with SDG 7 and SDG 13. NDCs are at the heart of the Paris Agreement and the achievement of these long-term climate goals. Yet, less than half the Arab countries have undertaken a Voluntary National Review, highlighting the fact that, despite progress in energy access, few Arab region countries have tangibly advanced measurement of renewable energy and energy efficiency. Better alignment requires positive policy action in institution- and capacity-building, and coordination mechanisms: progress in SDG 7 and SDG 13 cannot happen in isolation from parallel political processes.

Policy implications

Climate action needs to become an integral part of national policymaking. All Arab countries are signatories to the United Nations Framework Convention on Climate Change that requires all parties to work towards reducing GHG emissions and enhancing GHG sinks. Despite widely common declarations of intent, climate-related policies remain scattered in most Arab countries and have to yet become part of formal government plans through concrete measures, policies and public discourse. Political inertia, weak governance and unclear policy mandates have all been obstacles to mainstreaming climate-change policies into planning, policymaking and public discourse. In many cases, integrating climate action into policymaking will also need to involve a revision of politicians' past ambivalence to the topic as one of primary relevance to other nations, principally those which are responsible for the largest share of historical emissions.

National energy planning needs to integrate the dual objectives of sustainable energy (SDG 7) with climate objectives (SDG 13). National energy-sector planning and regulation is one of the foremost sectors where climate action fits in well with existing objectives of making energy production and consumption in Arab countries sustainable. Transport, industry policy, and the building sector/urban planning are other areas where more dedicated focus on climate action would strongly overlap with existing SDG 7 objectives, through the promotion of modern energy access, renewable energy and energy efficiency. For Arab LDCs, it is important that sustainable development goals become part of the countries' own socioeconomic development plans and are sound investments in social and economic development, not just additional cost burdens to government budgets. SDG 7 and SDG 13 carbon mitigation objectives can be integrated into energy-infrastructure development plans, public transport development plans, urbanization and national housing projects, national building retrofits programmes, etc. Making greater use of available climate finance to help pursue sustainable energy targets promises to be a win-win for all involved, including Arab LDCs.

Finance for conventional energy systems needs to be re-directed to mobilize sustainable energy technologies. Both energy efficiency and renewable energy work best when implemented on the demand side along with electricity and water-conservation efforts. This enables reduced transmission and distribution costs, as well as power- and water-production costs but requires a shift from a supply side paradigm to one which seeks increasing system value for public and

private investments in energy efficiency and renewable energy. This is also important for those countries that need to re-build utility systems after conflicts, where utility policies need to enable new lower cost and more resilient power systems with distributed energy efficiency and renewable energy. Targeted development aid, loans and other forms of financial support by international financing bodies and bilateral sources can significantly help countries build sustainable infrastructure rather than focusing them on short-term solutions. Enabling private finance through effective market regulation and the use of tools such as Super-ESCOs can be critical in helping countries mobilize resources but require institution-building and a credible regulatory and financial framework. Mobilizing these resources highlights that progress in SDG 7 and SDG 13 cannot happen in isolation from parallel institution-building efforts.

Education, research and development form an integral part of Arab countries' needed response in order to mitigate and adapt to climate change. The milestone UNFCCC agreement adopted in December 2015 by the Conference of Parties (COP21) in Paris "recognizes the need to strengthen knowledge, technologies, practices and efforts of local communities and indigenous peoples related to addressing and responding to climate change." ESCWA has separately argued that

> "The importance of climate change education lies in its ability to shape and change the way people think and act. It raises awareness and builds human/institutional capacity for mitigation, adaptation, impact reduction and early warning."

Mainstreaming the ideas of climate change and the sustainable management of energy and natural resources for the benefit of future generations needs to become a central element in public discourse, as well as school curricula, and for dissemination by the media. Investment in research and development will equip Arab countries not only with the tools to innovate and develop their own, tailor-made technology solutions for their individual local context, but will, in parallel, help spur economic value generation through new industries, creating valuable jobs.

The lack of current policy focus—and public awareness – of ambient air pollution in the Arab region is additionally concerning. In view of the high potential impact of fine particulate matter and other outdoor air pollution on public health, it is imperative that national governments make data and information available to the public; invest in internal institution building, including through capacity-building and the professionalization of relevant institutions within government; and step up regulative tools, oversight and enforcement. As shown in this chapter, many relevant policy options interlink considerably with other development goals and entail many substantial socioeconomic benefits such as the creation of jobs, new business sectors, effective transport networks that help fuel-growing, thriving economies, and the management of scarce resources, competition over which will only intensify in the coming decades.

Effective climate action by Arab countries benefits from continued engagement at regional and international level. Regional governance and cooperation in the sphere of climate change and sustainable energy is particularly beneficial in areas such as policy coordination and agenda-setting; research and sharing of knowledge and information; technical assistance and capacity-building; and leveraging of finance. Substantial work has been undertaken to integrate climate-related issues into national and regional development policies and programmes (see Box 21). Bilateral development aid is a separate route through which funds that are already underway could be channelled into specific projects that support the provision of sustainable, climate-friendly energy to local communities. It is the role of governments today to understand and communicate to their populations that the effective management of air, land and water resources is not a luxury problem of others, but a precondition to sustained economic growth and the creation of lasting wealth for this and future generations.

About the data used in this report

Country group definitions

In this report, the Arab region has been divided into four subregions, to help facilitate subregional analysis along the very different types of economies within the Arab region.

Table 10. Subregional groups and countries in the Arab region, 2017

Country	Population (million)	Population density (people per km² of land area)	Population in largest city (million)	GDP per capita, PPP (current international USD)
Maghreb				
Algeria	41.3	17.3	2.7	15,260
Libya	6.4	3.6	1.1	19,631
Morocco	35.7	80.1	3.7	8,217
Tunisia	11.5	74.2	2.3	11,911
Mashreq				
Egypt	97.6	98.0	19.6	11,584
Iraq	38.3	88.2	6.7	16,899
Jordan	9.7	109.3	2.0	9,153
Lebanon	6.1	594.6	2.3	14,482
Syrian Arab Republic	18.3	99.5	2.3	..
State of Palestine*	4.7	778.2	0.7	4,885
GCC				
Bahrain	1.5	1918.5	0.5	47,527
Kuwait	4.1	232.1	2.8	71,943
Oman	4.6	15.0	1.4	41,675
Qatar	2.6	227.3	0.7	128,374
Saudi Arabia	32.9	15.3	6.7	53,779
United Arab Emirates	9.4	132.4	2.7	73,878
Arab LDCs				
Mauritania	4.4	4.3	1.2	3,950
The Sudan	40.5	23.3	5.4	4,904
Yemen	28.3	53.5	2.7	2,601

Source: World Bank, 2019b

Access to energy

a. Measuring access to electricity

This report relies on a combination of data sources for its analysis. The World Bank's Global Electrification Database compiles nationally representative household survey data and, occasionally, census data on electricity access, from sources going back to 1990. The database also incorporates data from the Socio-Economic Database for Latin America and the Caribbean, the Middle East and North Africa Poverty Database, and the Europe and Central Asia Poverty Database, which are based on similar surveys.

The typical frequency of surveys is every two to three years but, in many countries, in and outside the Arab region, surveys are irregular in timing and much less frequent. To estimate missing values, a multilevel nonparametric modelling approach—developed by the World Health Organization for estimating clean fuel use—was adapted to electricity access and used to fill in the missing data points for 1990–2017. Where data are available, access estimates are weighted by population. Multilevel non-parametric modelling takes into account the hierarchical structure of data (country and regional levels).

In order to use as much real data as possible, results based on real survey data are reported in their original form for all years available. The statistical model is used to fill in data only for years where they are missing and to conduct global and regional analyses. The Arab region has large deficits in data availability, which implies the need for more modelling based on fewer data points. Many of the region's data points are hence the best approximation based on data provided by countries themselves.

Modelling data points for missing years at times of conflict is particularly challenging, not only because of a frequent lack of information to verify results, but also because conflict damage to infrastructure is intrinsically difficult to take into consideration in modelling exercises.

Furthermore, the devastating effect of political instability on electricity service quality can leave electricity access data seem at odds with the reality on the ground. This problem has been encountered in several Arab countries, for instance in Yemen, where several cities have been left effectively without electricity since 2014 until the time of writing, while our data suggest a 98 percent electrification rate for urban areas.

Electricity access is defined under most underlying surveys as a household connection to electricity supply. The presence of such a connection says nothing about service quality, reliability or affordability, an important caveat when interpreting electricity access data. Households are hence considered to have access to electricity, even if electricity supply is only available for a few hours per day, including off-grid solutions. In Yemen, access to electricity in some cities relies for decentralized solutions (i.e. self-generation through either solar-based systems or diesel generators) for virtually all their electricity supply. At the same time, we have no information about the proportion of decentralized electricity systems in key deficit countries Mauritania and the Sudan, making the statistical comparison between these countries problematic. Mauritania's rural electrification rate fell to 0 percent for 2017, down from 4 percent in 2014 in the 2017 tracking report, which is the result of modelling. Insufficient survey data means current work has to use the available data, despite its imperfections. Countries considered "developed" by the United Nations and classified as high income, on the other hand, are assumed to have an electrification rate of 100 percent from the first year the country entered the category.

b. Measuring access to CFTs

For the proportion of the population without clean cooking access, the main source in this report is WHO's Household Energy Database. The database is a regularly updated collection of nationally representative household survey data from various sources, which form the input basis for WHO's modelling approach. The database

uses a multilevel non-parametric modelling approach developed by WHO, which takes into account the hierarchical structure of the data.

To enable direct comparability with previous estimates, the same model used for the 2016 results was used to calculate the proportion of people relying on clean fuels for 2017. An updated version of the previous model was used to estimate the proportion of people relying on individual fuels for cooking in each country. In this case, the model estimates trends in the use of eight individual fuels (charcoal, coal, crop waste, dung, electricity, gas, kerosene and wood). It also includes corrections to overcome the sampling bias in the proportion of urban and rural survey respondents and missing total number of survey respondents.

As in the case of electricity, the model is applied for all countries with at least one data point. In the Arab region, no data points were available for Lebanon and Libya, nor for the State of Palestine. State of Palestine values were separately supplied for the purposes of this report directly by the Palestinian Central Bureau of Statistics, while progress in access to CFTs could not be tracked for Lebanon and Libya, given current data deficits.

No data for CFT access are available for 2014 because of data constraints. This means that the tracking period for CFTs for this report has had to be 2015–2017 rather than 2014–2017. Moreover, CFT data were available only for specific year points, in this report for 2000, 2005, 2010, 2015, 2016, 2017. This makes time series analysis more difficult. Several countries also questioned the validity of modelled data, suggesting the results presented in this report are overestimating actual access rates. These concerns were raised by Iraq, the Sudan and Yemen.

Energy efficiency

Energy intensity. The main global indicator for SDG 7.3 (energy efficiency at global, regional and country levels) is primary energy intensity (PEI). This is the ratio of total primary energy supply (TPES) to GDP and is measured in MJ/USD 2011 PPP.

$$PEI = \frac{TPES}{GDP}$$

Energy intensity indicates how much energy is used to produce a unit of economic output. A lower ratio indicates that less energy is used to produce a unit of economic output. Energy intensity is an imperfect indicator of energy efficiency as changes are impacted by other factors, particularly changes in the structure of economic activity.

The key indicator of change in energy intensity is the average annual rate of improvement in PEI (percent). This is calculated as compound annual growth rate (CAGR), where:

$$CAGR = \left(\left(\frac{PEI_{t2}}{PEI_{t1}}\right)e^{\frac{1}{(t_2-t_1)}}\right) - 1$$

PEI_{t2} is primary energy intensity in year t2

PEI_{t1} is primary energy intensity in year t1

Negative values represent decreases (or improvements) in energy intensity (less energy is used to produce one unit of economic output or per unit of activity), while positive numbers indicate increases in energy intensity (more energy is used to produce one unit of economic output or per unit of activity).

Total primary energy supply is measured in megajoules (MJ). Defined by the International Recommendations for Energy Statistics (IRES), it is made up of production plus net imports minus international marine and aviation bunkers plus-stock changes. Data sources: total energy supply is typically calculated in the making of national energy balances. Energy balances are compiled based on data collected for around 150 economies from the IEA and for all countries in the world from the UNSD.

Gross domestic product (GDP) is measured in USD 2011 purchasing power parity (PPP). This is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. This is calculated without

making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. GDP is measured in USD 2011 PPP. Purchasing power parities are the rates of currency conversion that equalize the purchasing power of different currencies by eliminating the differences in price levels between countries. In their simplest form, PPPs are simply relative prices which show the ratio of the prices in national currencies of the same goods or services in different countries. Data source: World Bank's World Development Indicators.

Energy intensity within country sectors. Primary energy resources are distributed within countries as final (or commercial) energy product after they have been transformed from primary resources into consumer products: generated electricity, refined diesel, petrol, processed gas and LPG.

Total final energy consumption (TFEC) is the sum of consumption of the final energy products in MJ across different end-use sectors, excluding non-energy uses of fuels. TFEC is broken down into energy demand in the following sectors: industry, transport, residential, services, agriculture and others. It excludes international marine and aviation bunkers, except at the world level where international bunkers are included in the transport sector. Data sources: Energy balances from the IEA, supplemented by the UNSD for countries not covered by IEA.

Value added (USD 2011 PPP). Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for the depreciation of fabricated assets or depletion and degradation of natural resources. The industrial origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Data source: World Bank's World Development Indicators.

Sectoral indicators

Industry energy intensity (in MJ/USD 2011 PPP): the ratio between industry TFEC and industry value added measured in MJ per USD 2011 PPP.

Industry energy intensity = Industrial TFEC/ industrial value added

Industry corresponds to ISIC divisions 10–45 and includes manufacturing (ISIC divisions 15–37), non-fuel mining and construction. Data sources: Energy balances from the IEA and the UNSD and value added from the WDI

Services energy intensity (in MJ/USD 2011 PPP): ratio between services TFEC and services value added measured in MJ per USD 2011 PPP

Services energy intensity = Services TFEC/ Services value added

Services correspond to ISIC divisions 50–99. They include wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Data sources: energy balances from IEA and UNSD and value added from WDI

Agriculture energy intensity (in MJ/USD 2011 PPP): ratio between agriculture TFEC and agriculture value added measured in MJ per USD 2011 PPP

Agriculture energy intensity = agriculture TFEC/ agriculture value added

Agriculture corresponds to ISIC divisions 1–5 and includes forestry, hunting and fishing, as well as cultivation of crops and livestock production. Data sources: energy balances from IEA and UNSD and value added from WDI

Passenger transport energy intensity (in MJ/ passenger-kilometre (pkm)): ratio between passenger transport TFEC and passenger transport activity measured in MJ/pkm

Passenger transport energy intensity = passenger transport TFEC/pkm

Data source: IEA mobility model

Freight transport energy intensity (in MJ/tkm): ratio between freight transport TFEC and activity measured in MJ per ton-kilometre.

Freight transport energy intensity = freight transport TFEC/ton-kilometre

Data source: IEA mobility model

Residential energy intensity (in MJ/unit of floor area): ratio between residential TFEC and square metres of residential building floor area measured in MJ/m^2

Residential energy intensity = residential TFEC/ residential floor area

Data source: IEA buildings model

Energy efficiency in energy transformation (electricity generation), transmission and distribution

Fossil fuel electricity generation efficiency (percent): ratio of the electricity output from fossil fuel power generation (coal, oil and gas) and the fossil fuel input to power generation

Generation efficiency = electricity output/fuel input

Data source: IEA energy balances

Power transmission and distribution (T&D) losses (percent)

Power T&D losses = electricity transmission and distribution losses/(electricity output main + electricity output combined heat and power (CHP) + electricity imports) (percent), where: electricity output main is electricity output from main activity producer electricity plants and electricity output CHP is electricity output from combined heat and power plants. Data source: IEA energy balances.

Energy efficiency data challenges in the Arab region

Aggregate activity and energy data are available for most countries. Data collation by the global data compilers (IEA, World Bank and UN Statistics) checks country data quality and continuity and identifies and addresses data gaps and discontinuities in many countries. These data validation processes are undertaken within globally agreed data definitions and quality management processes to ensure reported data meet these standards to the best ability of countries and data compilers.

At a level below country aggregates, the diversity of statistical resources, capabilities and mandates can increasingly constrain sectoral data quality. Industrial, commercial and agricultural energy intensity metrics are based on economic value-added data and analysis of sector energy consumption and depend on the quality of country economic surveys and energy balance allocations. These are tested for consistency with data standards.

Passenger- and freight-sector energy intensity is based on physical activity and allocations of transport fuels. The activity metrics require surveys of passenger journeys and mass of freight carried. In many countries, these data are not collected and SDG 7 tracking at global level relies on survey data, estimates and modelling. In the Arab region, some countries are improving their basic transport data surveys, but a consistent representative data set is not available and SDG 7 tracking for energy intensity analysis currently has to rely on the IEA mobility model.

Residential activity in the SDG 7 energy intensity indicator is based on the residential floor area. Typically derived from building consent data, the quality of these data varies with local control mandates and data systems.

Methodological issues

SDG 7.3 targets a doubling of the rate of energy efficiency improvement at global and country level. It may, however, not represent a reduction in energy use or an implied improvement in energy efficiency as energy intensity aggregates a multiplicity of continuous changes in an economy or sector:

- Activity changes in population, economic value added and GDP output, including changes in currency valuation for exported products. This factor has been important in the region as oil prices have fluctuated significantly recently.
- Income changes, as wealth grows, consumer aspirations and consumption expand.

- Structural changes in the economic mix in a country; sectoral mix changes (growth in services and decline in energy intensive industry); changes in household structure (dwelling size, household occupancy); modal changes in transport (from cars to public transport or active modes); changes within vehicles (vehicle weight, engine capacity).
- Changes in fuel mix and transformation technologies (power generation and desalination technologies) and their management.
- Efficiency changes in: energy technologies (LED lamps, heat pumps, appliances, process plants…), behaviour and management (energy management, DSM, conservation practices) in every home, institution, transport journey and business in an economy.

These factors make tracking actual energy efficiency difficult. Most SDGs are tracked in absolute changes in key variables or directly measurable participation or access rates. SDG 7.3 (and SDG 9) indicators can become quite abstract, given the complexity of changes that contribute to the metrics they purport to track. These SDGs are however some of the most important for the crucial SDG 13 climate objective and for enabling other SDGs via the multiple benefits of energy efficiency.

Beyond energy intensity to policies and SDG outcomes. For national governments, it is far more important to understand how policies are actually working than to track intensity indices. This requires analysis beyond the energy–activity relationships to social well-being, employment and local environmental outcome impacts of policies.

Renewable energy

The indicator used in this report to track SDG 7.2 is the share of renewable energy in total final energy consumption. Data from IEA and UNSD energy balances are used to calculate the indicator according to the formula:

$$\%TFEC_{RES} = \frac{TFEC_{RES} + \left(TFEC_{ELE} \times \frac{ELE_{RES}}{ELE_{TOTAL}}\right) + \left(TFEC_{HEAT} \times \frac{HEAT_{RES}}{HEAT_{TOTAL}}\right)}{TFEC_{TOTAL}}$$

where the variables are derived from the energy balance flows (TFEC = total final energy consumption, ELE = gross electricity production, HEAT = gross heat production) and their subscripts correspond to the product categories.

The denominator is the TFEC of all energy products, while the numerator, the renewable energy consumption, is defined as the direct consumption of renewable energy sources plus the final consumption of gross electricity and heat that is estimated to have come from renewable sources. This estimation allocates the amount of electricity and heat consumption to renewable sources based on the share of renewables in gross production in order to perform the calculation at the final energy level.

The amount of renewable energy consumption can be divided into three end uses, referring to the energy service for which the energy is consumed: electricity, heat and transport. These are calculated from the energy balance and are defined as follows:

- **Electricity** refers to the amount of electricity consumed in all sectors except transport. Electricity used for heat raising purposes is included because official data on the final energy service are unavailable.
- **Heat raising** refers to the amount of energy consumed for heating purposes in all sectors except transport. It is not equivalent to the final energy end-use service. It is also important to note that in the context of an "end use", heat raising refers to the purpose and does not refer to the energy product "heat" used in the formula above.
- **Transport** refers to the amounts of energy consumed in the transport sector, including electricity. Electricity used in the transport sector is mostly in the rail and road sectors (and in some cases, pipeline transport). The amount of renewable electricity consumed in the transport sector is estimated based on the share of renewable electricity in gross production.

In terms of data analysis, data available to this report ended in 2016, implying the actual tracking period was 2014–2016, rather than 2014–2017. This lack of data illustrates the difficulty of complete data access for data reaching as far back as two years at the time of writing.

The Arab region's data on renewable energy available at the time of writing this report did not include disaggregation between traditional and modern renewable energy, an important distinction at the level of solid biofuel. Since solid biofuel—presumably much of which is traditional in nature—accounts for a large share of energy use in key deficit countries, in particular the Sudan. The Arab region's overall renewable energy trend is disproportionally reflective of renewable energy-consumption trends in traditional solid biofuel. Better data that distinguish between modern and traditional energy and that allow us to better understand the different uses of various types of renewable energy will help improve this analysis in the future.

Total electricity access rate

Country	Total electricity access rate (percent)					Urban electricity access rate (percent)	Rural electricity access rate (percent)
	1990	2000	2010	2015	2017	2017	2017
Algeria			99	100	100	100	100
Bahrain			100	100	100	100	100
Egypt		98	100	100	100	100	100
Iraq			98	100	100	100	100
Jordan	97	99	99	100	100	100	100
Kuwait	100	100	100	100	100	100	100
Lebanon			100	100	100	100	100
Libya		100	81	73	70	70	70
Mauritania			34	40	43	83	0
Morocco		70	91	100	100	100	100
Oman			100	100	100	100	100
Qatar	100	100	100	100	100	100	100
Saudi Arabia		-	100	100	100	100	100
State of Palestine		100	100	100	100	100	100
The Sudan	33	23	36	49	56	83	43
Syrian Arab Republic			93	90	90	100	78
Tunisia		95	100	100	100	100	100
United Arab Emirates	100	100	100	100	100	100	100
Yemen		50	66	74	79	98	69

Total access to clean cooking fuels and technologies

Country	Total CFT access rate (percent)						Urban CFT access rate (percent)			Rural CFT access rate (percent)		
	2000	2010	2015	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Algeria	88	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Bahrain	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Egypt	85	>95	>95	>95	>95	>95	>95	>95	>95	86	>95	>95
Iraq	72	>95	>95	94	>95	>95	>95	>95	>95	84	>95	>95
Jordan	>95	>95	>95	>95	>95	>95	94	>95	>95	91	>95	>95
Kuwait	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Lebanon												
Libya												
Mauritania	30	39	44	30	46	58	39	71	85	8	21	29
Morocco	91	>95	>95	93	>95	>95	>95	>95	>95	74	94	>95
Oman	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Qatar	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Saudi Arabia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
State of Palestine*			93.4	>95				>95			>95	
The Sudan	13	29	41	30	44	57	56	70	83	7	30	58
Syrian Arab Republic	>95	>95	>95	>95	>95	>95	>95	>95	>95	84	>95	>95
Tunisia	93	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
United Arab Emirates	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Yemen	55	60	63	52	63	75	90	>95	>95	26	48	71

Notes: * Data submitted directly by the Palestinian Electricity Authority

Renewable energy

Country	Share in total final energy consumption (percent)													Final consumption of renewable energy (PJ) (4)			Total final energy consumption (PJ)
	Renewable energy				Solid biofuels	Liquid biofuels	Biogases	Hydro	Wind	Solar	Geothermal	Tide	Municipal waste (renew)	Electricity consumption (2)	Heat raising (3)	Transport (4)	
	1990	2010	2015	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016
Algeria	0.2%	0.3%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9	0.3	0.0	1415.6
Bahrain	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	192.7
Egypt	8.5%	5.7%	5.8%	5.7%	3.5%	0.0%	0.0%	1.9%	0.3%	0.0%	0.0%	0.0%	0.0%	47.0	76.6	0.2	2173.9
Iraq	1.6%	1.7%	0.8%	0.9%	0.2%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	5.9	1.2	0.0	761.8
Jordan	2.8%	3.0%	3.2%	4.6%	0.7%	0.0%	0.0%	0.1%	0.5%	3.3%	0.0%	0.0%	0.0%	2.8	8.7	0.0	251.8
Kuwait	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	682.4
Lebanon	11.3%	5.2%	3.6%	3.4%	2.3%	0.0%	0.0%	0.6%	0.0%	0.5%	0.0%	0.0%	0.0%	1.2	5.8	0.0	206.6
Libya	3.1%	1.6%	2.0%	1.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	6.4	0.0	393.4
Mauritania	47.0%	34.0%	32.8%	34.6%	33.5%	0.0%	0.0%	0.0%	0.9%	0.2%	0.0%	0.0%	0.0%	0.4	13.6	0.0	40.7
Morocco	19.5%	13.9%	11.2%	11.0%	8.4%	0.0%	0.0%	0.7%	1.7%	0.2%	0.0%	0.0%	0.0%	16.2	52.2	0.2	622.6
Oman	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	749.6
Qatar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	556.2
Saudi Arabia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0	0.3	0.0	4641.4
State of Palestine*	22.1%	14.1%	10.5%	10.1%	6.0%	0.0%	0.0%	0.0%	0.0%	4.1%	0.0%	0.0%	0.0%	0.0	6.8	0.0	67.6
The Sudan	73.3%	61.6%	64.5%	61.6%	56.7%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.1	287.6	0.0	507.3
Syrian Arab Republic	2.4%	1.4%	0.5%	1.1%	0.1%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4	0.2	0.0	243.0
Tunisia	14.5%	12.7%	12.6%	12.5%	11.3%	0.0%	0.0%	0.0%	0.4%	0.7%	0.0%	0.0%	0.0%	1.6	38.5	0.0	322.4
United Arab Emirates	0.0%	0.1%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	1.1	1.9	0.0	2053.9
Yemen	2.2%	1.0%	3.1%	4.5%	2.5%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	0.0%	0.0%	2.1	2.5	0.0	101.6

Energy efficiency

Country	Energy intensity (MJ/USD 2011 PPP)					Compound annual growth rate of Energy intensity (percent)			
	1990	2000	2010	2015	2016	1990–2000	2000–2010	2010–2015	2015–2016
Algeria	3.50	3.55	3.61	4.15	3.98	0.1%	0.2%	2.8%	-4.1%
Bahrain	12.60	11.17	10.56	9.95	9.59	-1.2%	-0.6%	-1.2%	-3.6%
Egypt	4.00	3.25	3.69	3.51	3.65	-2.1%	1.3%	-1.0%	4.0%
Iraq	4.20	3.79	4.01	3.68	3.85	-1.0%	0.6%	-1.7%	4.6%
Jordan	6.10	5.52	4.37	4.64	4.74	-1.0%	-2.3%	1.2%	2.2%
Kuwait	1.90	5.47	5.96	5.23	5.38	11.2%	0.9%	-2.6%	2.9%
Lebanon	3.90	5.07	3.74	4.10	4.09	2.7%	-3.0%	1.9%	-0.2%
Libya	4.70	5.64	4.69	6.58	7.01	1.8%	-1.8%	7.0%	6.5%
Mauritania	4.00	3.85	3.73	3.61	3.41	-0.4%	-0.3%	-0.7%	-5.5%
Morocco	3.20	3.53	3.37	3.17	3.13	1.0%	-0.5%	-1.2%	-1.3%
Oman	2.80	3.18	5.68	6.29	5.72	1.3%	6.0%	2.1%	-9.1%
Qatar	8.10	7.13	5.20	6.18	5.83	-1.3%	-3.1%	3.5%	-5.7%
Saudi Arabia	3.50	4.58	6.23	5.80	5.41	2.7%	3.1%	-1.4%	-6.7%
State of Palestine*	4.70	3.06	3.37	3.48	3.56	-4.2%	1.0%	0.6%	2.3%
The Sudan	9.90	7.18	4.69	4.65	4.46	-3.2%	-4.2%	-0.2%	-4.1%
Syrian Arab Republic	7.90	7.29	6.59	11.29	11.81	-0.8%	-1.0%	11.4%	4.6%
Tunisia	4.50	4.16	3.88	3.75	3.75	-0.8%	-0.7%	-0.7%	0.0%
United Arab Emirates	4.20	4.08	5.40	5.29	4.96	-0.3%	2.8%	-0.4%	-6.2%
Yemen	2.60	2.86	3.09	2.48	3.02	1.0%	0.8%	-4.3%	21.8%

This publication is the latest and most thoroughly updated regional edition of the Sustainable Development Goal 7 (SDG 7) Regional Tracking Report which addresses access to sustainable and modern energy for all. Developed by ESCWA, it aims to help build capacity in the Arab region, through access to information, with the aim of strengthening proactive policy to improve energy security, enhance resilience in the face of climate change and mainstream sustainable development goals into regional and national policy processes.

This report tracks progress in SDG 7 at Arab regional and country levels through the three main indicators of energy access, energy efficiency and renewable energy. It also traces the interlinkages between progress in SDG 7 and SDG 13 on climate action.

Achieving SDG 7 in the Arab region constitute one of the most fundamental challenges across all Arab countries in the coming decades: it requires a significantly scale-up of progress in renewable energy and in decoupling regional growth from energy consumption. This must be done through improved energy efficiency and increasing productivity of energy use while, at the same time, protecting the climate and ensuring a healthy planet for future generations.

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