SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all

The Arab States have made significant progress towards universal access to electricity but the least developed countries lag far behind. Rapid growth in domestic energy consumption and increased energy intensity associated with economic growth are significant challenges. Accelerating progress on SDG 7 requires a decisive policy shift to decouple economic growth and energy consumption, enhance efficiency and productivity, and increase investment in and use of clean and renewable energy. A whole-of-society transition towards sustainable energy is needed. Supporting this transformative shift in turn requires developing free and vibrant voices in the academy, media and civil society.

Key facts

90% of the population

The Arab region has done well as a whole in facilitating universal access to energy, with access to electricity reaching close to 90 per cent of the population.[1]

36 million people lacking access

Overall, access to electricity is close to universal in cities but remains fixed at approximately 80 per cent in rural areas, with 36 million people lacking access in 2016.[2]

Arab LDCs

The least developed countries lag far behind in access to electricity, with levels below 50 per cent, and as low as 30 per cent in Somalia and 38 per cent in the Sudan.[3]

Many countries continue to experience service disruptions and power outages.[4]

The share of people using clean fuels and technologies for cooking, heating and lighting has risen continuously since the 2000s, reaching around 95 per cent in countries in the Mashreq, Maghreb and GCC in 2016; access in the least developed countries, however, lags far behind at 42 per cent.[5]

39% of energy use for transport fuel

Energy consumption has almost tripled since 1990.[6] Transport fuel consumption accounts for 39 per cent of total energy use, at least 18 per cent higher than the global average.[7]

70% residential

In 2017, the residential and service sectors combined accounted for about two-thirds of total annual electricity consumption in the region, of which more than 70 per cent was consumed by the residential sector alone.[8]

3% energy intensity

While global averages have declined significantly since 1990, energy intensity in the Arab region rose during the 1990s. It has started to fall in recent years, but at a slow pace, dropping by about 3 per cent from 2010 to 2016.

GCC

The GCC economies are among the most energy intensive. Some of the most active countries in prioritizing energy efficiency are net importing countries, particularly Jordan, Morocco and Tunisia.[9]

4.1%

Renewable energy provides only 4.1 per cent of total final energy consumption in the region compared to a world average of 18 per cent.[10] Most of this comes from biomass, with modern technologies such as wind and solar producing marginal supplies, except in a few countries such as Morocco and the United Arab Emirates.[11]

Renewable energy

The current long-term historic trend in the region is a falling share of renewables in the overall energy mix. This is due to a shift away from biomass as well as the broader use of fossil fuels to meet rapidly increasing energy demand.[12] Many countries have adopted national renewable energy targets, suggesting that growth in renewables could occur in the coming years.

$17 billion

The region's nominal share of global energy efficiency investment in 2016 was an estimated $17 billion, about 2.7 per cent of regional gross fixed capital formation that year.[13]

Measuring SDG 7 in the Arab region according to the global SDG indicator framework

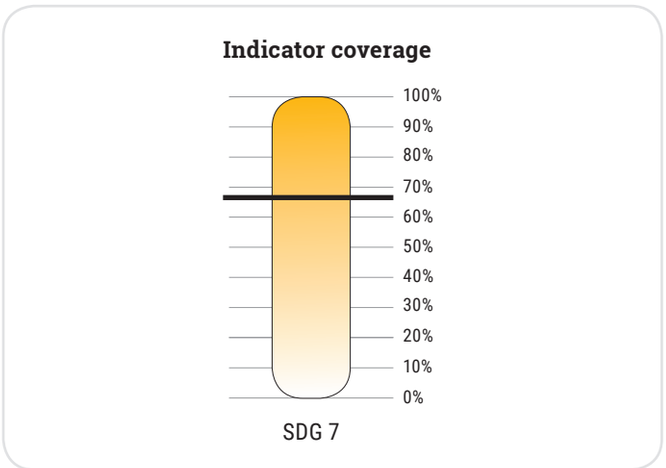
Data are available for 4 out of 6 indicators,[14] covering 3 out of 5 targets under SDG 7.

Several targets and indicators build on historical efforts by international agencies to harmonize and consolidate data under the Sustainable Energy for All (SE4ALL) Global Tracking Framework. This has led to relatively good data availability for three targets.

The remaining two "means of implementation" indicators lack data. They include: indicator 7.a.1, on international financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems,[15] and indicator 7.b.1, on investments in energy efficiency as a proportion of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services. Both indicators are particularly relevant in the Arab region given significantly low levels of research and investment in renewable and clean energy as well as energy efficiency.

The following are relevant factors in measuring SDG 7 in the Arab region using the official set of SDG indicators:

- Indicator 7.1.1 on access to electricity does not capture the reliability of electricity access. Service disruption is a common feature in many countries in the region.
- The affordability of energy, which is included in the language of SDG 7, is not currently captured by the official indicators.



- Potentially complementary indicators would include investment in renewable energy and installed renewable energy capacity, per capita energy consumption and carbon dioxide emissions from fossil fuel combustion.
- Measuring energy productivity, or the return on energy use, would mark the extent to which macroeconomic policy is transforming to achieve sustainable growth.
- Measuring achievement in relation to SDG 7 is also possible across indicators under other goals, including carbon dioxide emissions per unit of value added (under SDG 9, indicator 9.4.1), domestic material consumption (under SDGs 8 and 12, indicators 8.4.2 and 12.2.2), and fossil fuel subsidies (under SDG 12, indicator 12.c.1).

The main barriers to ensuring access to affordable, reliable, sustainable and modern energy for all in the Arab region

Energy is crucial for the achievement of almost all of the SDGs, starting with its role in the eradication of poverty (SDG 1).[16] Interlinkages between energy and other SDGs related to food (SDG 2), water (SDG 6), economic growth and economic planning (SDG 8), industrialization (SDG 9), sustainable consumption and production (SDG 12), and climate change (SDG 13) are particularly important.

In the Arab region, given the critical situation of water scarcity (SDG 6) as well as the need to ensure more productive and sustainable agricultural practices (SDG 2), applying a "water-energy-food nexus" approach is very useful. It can help optimize the complex relationships among these sectors and mitigate tensions or trade-offs. There is also a strong link to health (SDG 3) through outdoor and indoor air pollution in cities with deteriorating air quality and in areas where households lack access to clean cooking fuels. In addition to pollution, inadequate access to energy in some areas impacts the provision and quality of health services, including life-saving surgeries.

The United Arab Emirates, one of the world's top exporters of net oil, is today the owner of the largest operating solar photovoltaic (PV) and concentrating solar power (CSP) plant in the world.

Masdar City is a sustainable city powered by renewable energy. Its Masdar Institute is a graduate level academic institution dedicated to research and development in sustainable energy and water technologies. The institute is also the home of the Research Center for Renewable Energy Mapping and Assessment.

Source: ESCWA, 2017b.

The Tunisian Solar Program (PROSOL), a joint initiative of the Governments of Tunisia and Italy and the United Nations Environment Programme, began in 2005. It set up a dissemination mechanism, including soft loans and cost subsidies provided by the Government of Tunisia, allowing households easy access to solar technology. Consequently, solar water heating installations increased tenfold from 2005 to 2011. Over 50,000 Tunisian families now get their hot water from the sun; 42 technology suppliers have officially registered; and at least 1,000 companies have installed the systems, supporting job creation. The move has also prevented 240,000 tons of carbon dioxide emissions and reduced reliance on imported fuel.

Source: ESCWA, 2017c; United Nations, n.d.

THE FOLLOWING ARE THE KEY BARRIERS TO ACHIEVING SDG 7 IN THE ARAB REGION

Lack of policies to improve energy efficiency and productivity and move away from fossil fuels

The most significant barrier to achieving SDG 7 in the region historically has been the absence of decisive and comprehensive policies to improve energy efficiency and productivity and move away from fossil fuels. The result has been largely unregulated supply and demand at the macro and micro levels. While some countries are making considerable efforts to improve efficiency and productivity, overall, Arab countries lag behind others in the world on a number of fronts linked to policy deficits, as follows:

- Policy and investment have focused on ensuring energy access in the face of rapid population growth, increasing urbanization, economic and industrial expansion and rising living standards. All of these developments have driven considerable demand for energy, which has largely been met by fossil fuels.
- High energy subsidies distort energy consumption and production patterns. Combined with a lack of energy-efficiency regulations, they have contributed to large increases in per capita electricity consumption. A number of Arab countries are taking positive steps to reform subsidy regimes. At the same time, measured and/or gradual approaches to reducing or removing subsidies are necessary given the direct impact on the poor.
- Measures that help increase energy efficiency and therefore energy productivity, particularly on the regulatory side (such as building codes, efficiency standards and labelling), have been piecemeal or poorly enforced in many parts of the region.[17] The scarcity of sustainable, adequate and efficient public transport systems hinders efforts to increase efficiency and productivity, and decrease energy intensity.

- Investment in energy-efficiency improvements has been limited due to the low cost of input fuels and feedstocks from domestic production of oil and natural gas. As a result, a weak market incentive to adopt modern, efficient technologies or alternative fuels, or to reduce energy consumption persists despite the rapidly declining cost of these technologies in recent years.
- Reliance on public companies to provide affordable electricity and water limits consumer choice over their electricity supply and hinders market competition. There is little incentive for public utilities to invest in more energy-efficient technologies, switch fuels or experiment with renewable technologies to drive down costs.
- Knowledge and awareness, both institutional and public, are not harnessed effectively to promote a transformative shift towards more sustainable energy supply and demand practices. Scientific research, critical media and a vibrant civil society should play a role in producing and disseminating information to inform policy and consumer choice. They are also critical in assessing policies and their economic, environmental and social impacts on consumers and the public.[18]

Capacity and resources

Constraints in technical and institutional capacity, insufficient access to information and data, a dearth of skilled human resources, and the lack of mandates and resources to enforce policies and regulations are hampering efforts to integrate large quantities of intermittent renewable energy into existing energy grids, as well as to develop and implement energy-related policies and regulations.

Access to finance

Access to finance for renewable energy projects or energy efficiency improvements remains constrained not only by weak policy support, but also by the lack of financial instruments and suitable credit markets that target such investments. Low capital market development, high capital costs, and a perceived higher risk for investors continue to constrain access to finance in the region.

At risk of being left behind

The region's least developed countries continue to face a considerable gap in terms of access to electricity as well as clean fuels and technology. Around 80 per cent of the region's deficit is in the Sudan and Yemen alone. Access has improved in Mauritania since 2000.[19] In general, the shortfall remains a major obstacle to further socioeconomic development.

Access to electricity is almost universal in Arab cities. Yet only around 80 per cent of **rural and remote communities** have access.[20] This creates a noticeable rural-urban divide. For example, in Mauritania, only 2 per cent of people living in rural areas have access to electricity. The figure is 32 per cent in the Sudan.[21]

Countries affected by conflict and political instability face major obstacles to SDG 7 and may experience reversals in past progress in energy access. The Syrian Arab Republic has suffered severe and lasting damage to its ability to supply its population with energy. The destruction of oil and gas fields caused an estimated $8.4 billion in losses by early 2016. Losses to electricity, water and sewerage installations amounted to $8.2 billion.[22]

In **Yemen**, the replacement of gas with fuelwood has led to increased competition for scarce resources, resulting in further conflict between internally displaced Yemenis and their host communities. Pregnant and lactating women together with their children have been most affected by the lack of fuel, particularly those living as internally displaced people in makeshift huts and tents. Traditionally, men were responsible for collecting fuel but this responsibility has shifted primarily to women and girls. This has increased their risk of exposure to gender-based violence and has had negative health consequences, such as miscarriages from carrying heavy loads.

Source: Oxfam International, 2016.

The province of **Darfur** is one of the most impoverished parts of the Sudan. Most of the population has no access to electricity or clean fuels. The widespread use of diesel generators is highly polluting, with several consequences for human health and the environment. Solar PV provides a promising source of clean energy for remote communities.

Source: ESCWA, 2017a.

What the region can do to accelerate progress on SDG 7

Given the barriers, constraints and distorted market signals outlined above, political will and policy priority need to be given to achieving a sustainable energy transition and addressing climate change in the region. A transformation in economic planning should bridge environmental and social dimensions and intersect with a policy shift towards sustainable energy production and use.

1. Proactively develop integrated policymaking for sustainable energy:

- Strengthen the link between sustainable energy and social and economic development goals, the rational use of the region's fossil fuels and exploitation of the economic potential of renewable energy.
- Strengthen efforts to increase the share of renewable energy and reduce energy consumption, adopting quantitative national renewable energy and energy efficiency targets that help to measure and communicate progress, and engage stakeholders through a participatory approach.
- Enhance policy coherence through the use of complementary policies coordinated across government ministries, and strengthen analytical and institutional capacity to integrate energy policy with policies related to climate change and the water-energy-food nexus.
- Promote the use of public-private partnerships in the energy utility sector to enable private sector investment in domestic energy markets.
- Ensure that new regulatory policies, codes and standards relating to energy efficiency and productivity are enforceable, and increase institutional capacity and resource allocation to enable adequate monitoring and enforcement.

2. Restructure domestic energy and water pricing, and ensure complementary policies to mitigate unintended negative consequences on vulnerable groups:

- Restructure domestic pricing to reflect the full costs of energy production and use, including externalities. Energy price signals should be aligned with sustainable management of energy resources and enable accelerated uptake of energy efficiency, and renewable and clean energy technologies.
- Rationalize the use of energy subsidies by developing efficient and effective ways to protect vulnerable groups, and avoid indiscriminate direct and indirect energy subsidies that damage national budgets, distort energy markets, and severely reduce incentives for investments in sustainable energy solutions.

3. Enhance intraregional cooperation and trade:

- Strengthen grid interconnections between Arab countries, and promote pan-Arab integration projects and initiatives such as a pan-Arab electricity market, focusing on smart grids and green corridors.

4. Establish financial markets and financing solutions to drive clean energy deployment:

- Develop microcredit for small-scale applications and microgrids, or public-private partnerships and national financial instruments to incentivize international investment in large-scale applications.

5. Increase investment in research and development to enhance the science-policy interface:

- Empower public and private institutions to assess policies and impact, and produce the necessary knowledge to change consumption and production patterns.

SDG 7 targets and indicators in the Arab region

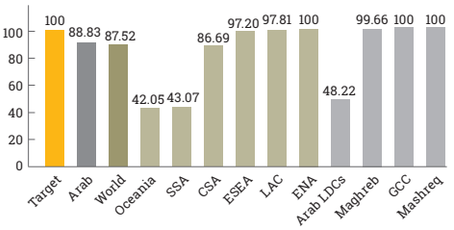
Target

7.1
By 2030, ensure universal access to affordable, reliable and modern energy services

Indicator

7.1.1
Proportion of population with access to electricity

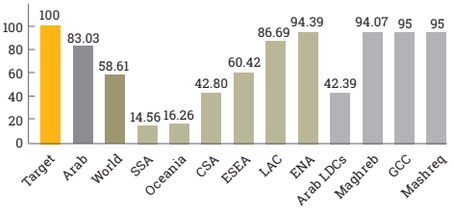
Figure 1 Proportion of population with access to electricity (percentage)



Note: All means are population weighted using the latest (2015) population estimates (United Nations Population Division, 2017; United Nations Statistics Division, 2019b). The calculated Arab regional aggregate includes the data values of all 22 Arab countries in 2016.

7.1.2
Proportion of population with primary reliance on clean fuels and technology

Figure 2 Proportion of population with primary reliance on clean fuels and technology (percentage)

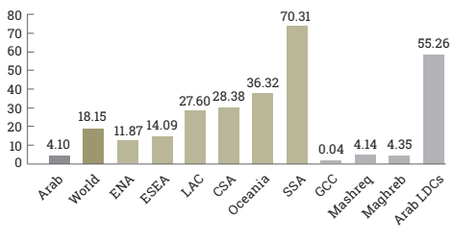


Note: All means are population weighted using the latest (2015) population estimates (United Nations Population Division, 2017; United Nations Statistics Division, 2019b). The calculated Arab regional aggregate includes the data values of the following Arab countries for 2016: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates and Yemen. According to the SDG Indicators Metadata Repository, the proportion of the population with primary reliance on clean fuels and technology is "calculated as the number of people using clean fuels and technologies for cooking, heating, and lighting divided by the total population reporting, expressed as a percentage. 'Clean' is defined by the emission rate targets and specific fuel recommendations (i.e. against unprocessed coal and kerosene) included in the normative guidance WHO guidelines for indoor air quality: household fuel combustion" (United Nations Statistics Division, 2019b).

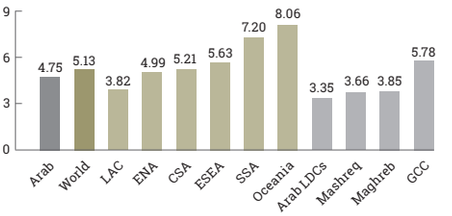
7.2
By 2030, increase substantially the share of renewable energy in the global energy mix

7.2.1
Renewable energy share in the total final energy consumption

Figure 3 Renewable energy share in the total final energy consumption (percentage)



Note: All means are weighted by the total final energy consumption (TJ) (i.e., the denominator) for 2015, taken from the World Development Indicators based on original sources (national statistical offices). The calculated Arab regional aggregate includes the data values of all 22 Arab countries in 2015.

7.3 By 2030, double the global rate of improvement in energy efficiency	**7.3.1** Energy intensity measured in terms of primary energy and GDP	**Figure 4** Energy intensity measured in terms of primary energy and GDP (megajoules per GDP in constant 2011 United States dollars, PPP)  Note: All means are weighted by constant 2011 PPP GDP in United States dollars (i.e., the denominator) for 2015, taken from the World Development Indicators. The calculated Arab regional aggregate includes the data values of the following Arab countries for 2015: Algeria, Bahrain, Comoros, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Tunisia, United Arab Emirates and Yemen. According to the United Nations Statistics Division (2019b), "energy intensity is an indication of how much energy is used to produce one unit of economic output. It is a proxy of the efficiency with which an economy is able to use energy to produce economic output". Thus, the lower the ratio, the higher the efficiency.
7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	**7.a.1** International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems	Adopted criteria to obtain a regional average are not met for this indicator.
7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support	**7.b.1** Investments in energy efficiency as a proportion of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services	Adopted criteria to obtain a regional average are not met for this indicator.

Note: Central and Southern Asia (CSA); Eastern and South-Eastern Asia (ESEA); Europe and Northern America (ENA); Gulf Cooperation Council (GCC); Latin America and the Caribbean (LAC); Arab Least Developed Countries (Arab LDCs); Oceania (excluding Australia and New Zealand); Sub-Saharan Africa (SSA).

All figures are based on the Global SDG Indicators Database (United Nations Statistics Division, 2018).

ENDNOTES

1. Calculated by ESCWA, see figure 1.
2. ESCWA, 2017a.
3. Calculated by ESCWA, see figure 1. For more information on country-level data, refer to the annex complementing this report.
4. ESCWA, 2017a.
5. Calculated by ESCWA, see figure 2.
6. ESCWA, 2017a.
7. The region here is per the definition of UITP MENA, 2019.
8. Based on Arab Union of Electricity, 2017.
9. ESCWA, 2017a.
10. Calculated by ESCWA, see figure 3.
11. ESCWA, 2017a.
12. Ibid.
13. Estimated by ESCWA using data accessed through https://data.worldbank.org/indicator/NE.GDI.FTOT.CD?. For more information, see IEA, 2014.
14. According to the methodology used in this report.
15. Measurement of this indicator is set to start in 2020.
16. United Nations, 2016.
17. ESCWA, 2019, chapter 1, section B.
18. ESCWA, 2019, p. 61.
19. ESCWA, 2017a.
20. Ibid.
21. Ibid.
22. ESCWA, 2016.

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