MEDSTAT IV

FACILITY FOR EUROMED
DIALOGUE AND EXCHANGE
OF BEST PRACTICES

ENERGY STATISTICS IN ENP-SOUTH COUNTRIES

Insights from the energy balances of Algeria, Egypt, Israel, Jordan, Morocco, Palestine and Tunisia

VOLUME 1 : KEY RESULTS
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PROJECT DURATION: 2016-2019

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BRIEF DESCRIPTION

The MEDSTAT IV project provides expertise and technical support to promote the harmonisation of statistics in line with EU and international standards in six domains: business register and business, trade and balance of payments, energy, labour market, migration and transport). It follows on the previous phase implemented over the period 2010-2013.

COUNTRIES COVERED

Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria and Tunisia (cooperation with Syria is suspended).

OBJECTIVES

The overall objective of the project is to promote evidence-based decision-making and to foster democratic development by improving the availability, visibility and accessibility of robust, reliable and timely statistical data in the ENP-South countries.

ACTIONS IN BRIEF

This will be achieved through four complementary actions:

- Contribution to the production of better quality data in the priority thematic sectors.
- Support to working groups through relevant and timely expertise and activities.
- Harmonisation of statistical data in line with European and international standards.
- Raising awareness on statistics for a number of stakeholders, including a more user-friendly dissemination of statistics

More information at:

ec.europa.eu/eurostat/statistics-explained/index.php/MEDSTAT_programme
www.euneighbours.eu/en/south/eu-in-action/projects/medstat-iv-euro-mediterranean-statistical-cooperation

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Content

Introduction

This publication is the result of a collective work from the MEDSTAT IV working group on Energy statistics under the guidance of the Lead coordinators co-lead countries (Morocco for the issues related to Final energy Consumption, Tunisia for the issues related to Energy Efficiency Indicators and Egypt for the Energy Balances), the Key expert from the project, Mr. Thierry Coulet, and Mr. Nicolas Brizard, Lead Expert on Energy statistics. The content of the publication is based on the contributions from the representatives of the national statistical institutes and from the energy ministries of the ENP-S countries. Other contributors include experts from international organisations such as Eurostat and the IEA. All contributions are gratefully acknowledged.

One of the key objectives of the MEDSTAT IV project was to improve the quality and coverage of statistics through the harmonisation of energy statistics in the ENP-S countries with EU and international standards. Energy balances are at the centre of any relevant statistical system for the energy sector and, as such, their construction has been a priority of the project from the beginning.

MEDSTAT IV promoted the sharing of national experiences in the production of energy balances and their regular peer-to-peer review. The activities implemented by MEDSTAT IV allowed the ENP-S countries to present their methodologies in the production of Energy balances and to further improve their knowledge of both the Eurostat and IEA formats of Energy balances and the practical requirements attached to their implementation. A particular focus was put on the detailed rules to be applied in the treatment of transformation processes in Energy Balances: production of refineries, coal-fired and oil-fired power stations, specific energy products such as biomass and other renewable energy products, specific uses of petroleum products, etc. It should also be noted that activities carried out by MEDSTAT IV on final energy consumption surveys in the transport, industry and household sectors contributed directly to the improvement of energy balance statistics by allowing more detailed and better quality statistics on energy use.

A regional workshop, which took place in Brussels on 26-28 June 2018, established the objectives and approach for the production of this regional publication. The preparation of a regional statistical publication is always a good opportunity to improve data quality and comparability and to further align methodologies and presentation standards. A publication also increases the visibility of the concrete achievements made possible through the support provided by MEDSTAT and makes the access to harmonised regional statistics easier for data users. Finally, it is an important step towards the achievement of a key objective of MEDSTAT IV project which was to produce harmonised energy balances across the region.

The results of the work of the ENP-S countries on Energy balances are presented in two complementary volumes:

- Volume 1: “Key results” presents the latest available year (2017) for the countries’ comparable energy balances, a quick review of the main evolutions of the energy balances indicators between 2013 and 2017 and a trend analysis for the main comparable indicators extracted from the Energy balances,
- Volume 2: “Detailed results” provides all the basic data that were gathered and consolidated on the Energy balances for the years 2013 to 2017. The publication also includes a description of the methods and practices followed by each country in compiling the energy balances.

Energy balances are available for the following seven partner countries: Algeria, Egypt, Israel, Jordan, Morocco, Palestine and Tunisia. Lebanon, because of limited resources, and Libya, because of the conflict situation, were not able to submit energy balances for this publication.

2017 Energy balances

The energy balance presents all statistically significant energy products of a country and their production, trade, transformation and consumption by different types of end-users in the various sectors or the economy: industry, transport, households, services and agriculture. It is basically a matrix, where columns are energy products (or "fuels") and rows are energy flows (production – transformation – final consumption). An energy balance is an accounting framework for the compilation and reconciliation of data on all flows of energy products entering, exiting and used within the national territory of a given country during a reference period. It offers a complete view on the domestic energy sector in a compact format and as such, is the natural starting point to study the energy market and monitor the impact of energy policies[1].

All MESDSTAT partner countries participating in this publication report their balance in a format which is compatible with an international standard:

- Eurostat (Algeria, Egypt, Morocco and Tunisia),
- IEA (Jordan, Israel),
- UNSD-IRES (Palestine).

[1] This section is based on Eurostat's draft of the "Energy Balance Guide". https://ec.europa.eu/eurostat/documents/38154/4956218/ENERGY-BALANCE-GUIDE-DRAFT-31JANUARY2019.pdf/cf121393-919f-4b84-9059-cdf0f69ec045

Algeria

ALGERIA 2017 (Ktoe)	Total energy products	Solid fuels	Oil	Total Petroleum Products	Gas	Total renewable energy	Wastes (non renewable)	Derived heat	Electricity
Primary production	**165 321**	-	73 972	-	91 286	63	-	-	-
Recovered products	**-**	-	-	-	-	-	-	-	-
Imports	**4 086**	203	244	3 592	-	-	-	-	46
Stock changes	**(288)**	21	(412)	172	(70)	-	-	-	-
Exports	**107 187**	-	39 944	16 133	51 034	-	-	-	76
Bunkers	**231**	-	-	231	-	-	-	-	-
Gross inland consumption	**62 276**	**182**	**34 684**	**(12 945)**	**40 322**	**63**	**-**	**-**	**(29)**
Transformation input	**62 069**	**185**	**31 920**	**235**	**33 730**	**-**	**-**	**-**	**-**
Thermal power stations (main activity)	**16 914**	-	-	233	16 681	-	-	-	-
Thermal power stations (autoproducer)	**829**	-	-	2	827	-	-	-	-
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**4**	4	-	-	-	-	-	-	-
Blast-furnaces	**181**	181	-	-	-	-	-	-	-
Gas works	**16 222**	-	-	-	16 222	-	-	-	-
Refineries	**31 920**	-	31 920	-	-	-	-	-	-
Charcoal production plants		-	-	-	-	-	-	-	
Non elsewhere specified		-	-	-	-	-	-	-	
Transformation output	**52 354**	**-**	**-**	**30 001**	**15 871**	**-**	**-**	**-**	**6 483**
Thermal power stations (main activity)	**6 043**	-	-	-	-	-	-	-	6 043
Thermal power stations (autoproducer)	**440**	-	-	-	-	-	-	-	440
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**-**	-	-	-	-	-	-	-	-
Blast-furnaces	**9**	-	-	-	9	-	-	-	-
Gas works	**16 494**	-	-	632	15 862	-	-	-	-
Refineries	**29 369**	-	-	29 369	-	-	-	-	-
Charcoal production plants		-	-	-	-	-	-	-	
Non elsewhere specified		-	-	-	-	-	-	-	
Exchanges and transfers, returns	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Interproduct transfers	**-**	-	-	-	-	-	-	-	-
Products transferred	**-**	-	-	-	-	-	-	-	-
Returns from petrochemichal industry	**-**	-	-	-	-	-	-	-	-
Consumption of the energy branch	**5 796**	**-**	**497**	**16**	**4 559**	**-**	**-**	**-**	**725**
Distribution losses	**2 718**	**-**	**608**	**76**	**1 098**	**-**	**-**	**-**	**935**
Available for final consumption	**39 752**	**39**	**835**	**17 074**	**16 665**	**63**	**-**	**-**	**4 794**
Final non-energy consumption	**3 443**	**-**	**-**	**436**	**3 007**	**-**	**-**	**-**	**-**
Chemical industry	**-**	-	-	-	-	-	-	-	-
Other sectors	**-**	-	-	-	-	-	-	-	-
Final energy consumption	**36 174**	**41**	**-**	**17 624**	**13 655**	**6**	**-**	**-**	**4 848**
Industry	**6 892**	**41**	**-**	**732**	**4 378**	**6**	**-**	**-**	**1 736**
Iron and steel	***469***	*41*	-	-	*258*	-	-	-	*171*
Non-ferrous metals	**-**	-	-	-	-	-	-	-	-
Chemical and petrochemical	***168***	-	-	*25*	*48*	-	-	-	*95*
Non-metallic minerals	**-**	-	-	-	-	-	-	-	-
Mining and quarrying	**-**	-	-	-	-	-	-	-	-
Food, beverages and tobacco	***720***	-	-	-	*552*	-	-	-	*167*
Textile and leather	***67***	-	-	-	*35*	-	-	-	*32*
Paper, pulp and printing	**-**	-	-	-	-	-	-	-	-
Machinery	**-**	-	-	-	-	-	-	-	-
Construction	**4 106**	-	-	359	3 350	-	-	-	397
Non-specified (Industry)	***1 362***	-	-	*347*	*135*	*6*	-	-	*873*
Transport	**14 728**	**-**	**-**	**14 627**	**9**	**-**	**-**	**-**	**92**
Rail	***92***	-	-	-	-	-	-	-	*92*
Road	***14 124***	-	-	*14 124*	-	-	-	-	-
International aviation	***504***	-	-	*504*	-	-	-	-	-
Domestic aviation	**-**	-	-	-	-	-	-	-	-
Domestic Navigation	**-**	-	-	-	-	-	-	-	-
Pipeline transport		-	-	-	-	-	-	-	
Non-specified (Transport)	**9**	-	-	-	9	-	-	-	-
Other sectors	**14 554**	**-**	**-**	**2 265**	**9 268**	**-**	**-**	**-**	**3 021**
Services	***2 543***	-	-	*514*	*1 012*	-	-	-	*1 017*
Residential	***11 747***	-	-	*1 668*	*8 206*	-	-	-	*1 873*
Agriculture, forestry and fishing	***213***	-	-	*32*	*50*	-	-	-	*131*
Non-specified (Other)	**51**	-	-	51	-	-	-	-	-
Statistical differences	**134**	**(1)**	**835**	**(986)**	**4**	**56**	**-**	**-**	**(55)**

In 2017, natural gas dominated the structure of Algeria's primary energy production, reaching 53%. Commercial production of primary energy decreased softly in 2017 compared to 2016, being around 165 MToe. The reduction of liquid products was balanced only partially by the production of natural gas. The high increase of primary electricity production, which includes water energy and solar PV energy sectors, following the start of production of several PV plants built with the national programme of renewable energies. The balance of energy exchanges presents a net exporter balance of 103,3 MToe. This corresponds to a decrease of 2,3% compared to 2016.

The structure of derived energy was dominated by oil products, representing 55% of total energy production. The derived energy production reached 52,4 MToe in 2017, 1,1% more than in 2016, further to the production increase of liquefied natural gas (+6,0%), thermal electricity (+6,7%) and LPG (+5,3%). This increase was more than balanced by the reduction of oil products production (-2,7%).

Quantities of transformed primary energy for 2017 increased softly (+1,6%) compared to the previous year, reaching 66,1 MToe. Transformation activity was affected by three main elements:

- Electricity production: an increase of 6,9% of natural gas debits in 2017 for electricity plants' needs (Sonelgaz and auto-producers), reaching 17,5 MToe;
- Liquefaction: an increase (+6,2%) of natural gas volume treated in liquefaction units, due to the increase of collection of Sonatrach's customers;
- Refining: a decrease (-2,9%) of transformed quantities in refineries (crude oil and condensate), reaching 31,4 MToe.

The national energy consumption (including losses) reached 48,1 MToe in 2017, increasing by 1,5% compared to 2016. This rise was mainly due to the increase of the final consumption (+3,9%). Conversely, the non-energy consumption and the one of energy industries respectively decreased by 19,6% and 7,3%.

The final consumption increased from 34,8 MToe in 2016 to 36,2 MTeo in 2017, a growth of 3,9%, due to the higher increase of consumption of natural gas, electricity and LPG than the decrease of oil products. Compared to 2016, this structure shows a growth of the shares of electricity and natural gas to the detriment of the share of oil products, which lowered by around 2 points in 2017. However, oil products dominate the structure of the final consumption (42%).

By economy sector, the final consumption evolved as follow:

- A decrease in the consumption of “transport” sector by 0,9% compared to the previous year, further to the price rise on the domestic market;
- An increase of the consumption of the sector of “industries and building and public works” by 8,3%, in particular further to the growth of the consumption of the sub-sector of building material (+6,2%);
- An increase of the consumption of the sector “households and others” by 7,1%, mainly due to the “services sub-sector” and “residential sub-sector”, in particular because of the needs for gas and electricity resulting from the increase in the number consumers of low pressure and low-voltage.

The structure of the final consumption remained dominated by the demand of the “transport” sector (41%), the “households and others” sector (40%) and “industries and building and public works” (19%). Nevertheless, the share of the transport sector decreased by almost 2 points compared to 2016, further to the decrease of the fuel consumption to the benefit of the two other sectors.

Egypt

EGYPT 2016-17 (Ktoe)	Total energy products	Solid fuels	Oil	Total Petroleum Products	Gas	Total renewable energy	Wastes (non renewable)	Derived heat	Electricity
Primary production	**73 069**	153	32 964	-	38 644	1 308	-	-	-
Recovered products	**-**	-	-	-	-	-	-	-	-
Imports	**31 689**	259	6 094	16 654	8 676	-	-	-	6
Stock changes	**18**	18	-	-	-	-	-	-	-
Exports	**14 739**	-	11 574	1 885	1 251	-	-	-	29
Bunkers	**517**	-	-	517	-	-	-	-	-
Gross inland consumption	**89 519**	**430**	**27 484**	**14 252**	**46 069**	**1 308**	**-**	**-**	**(23)**
Transformation input	**96 907**	**34 800**	**25 354**	**7 860**	**28 889**	**-**	**-**	**-**	**3**
Thermal power stations (main activity)	**35 940**	-	-	7 667	28 270	-	-	-	3
Thermal power stations (autoproducer)	**-**	-	-	-	-	-	-	-	-
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**412**	412	-	-	-	-	-	-	-
Blast-furnaces	**-**	-	-	-	-	-	-	-	-
Gas works	**-**	-	-	-	-	-	-	-	-
Refineries	**26 167**	-	25 354	193	619	-	-	-	-
Charcoal production plants	**-**	-	-	-	-	-	-	-	-
Non elsewhere specified	**-**	-	-	-	-	-	-	-	-
Transformation output	**38 571**	**118**	**-**	**24 746**	**-**	**(1 308)**	**-**	**-**	**15 015**
Thermal power stations (main activity)	**13 704**	-	-	-	-	(1 308)	-	-	15 012
Thermal power stations (autoproducer)	**3**	-	-	-	-	-	-	-	3
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**118**	118	-	-	-	-	-	-	-
Blast-furnaces	**-**	-	-	-	-	-	-	-	-
Gas works	**28**	-	-	28	-	-	-	-	-
Refineries	**24 705**	-	-	24 705	-	-	-	-	-
Charcoal production plants	**-**	-	-	-	-	-	-	-	-
Non elsewhere specified	**-**	-	-	-	-	-	-	-	-
Exchanges and transfers, returns	**875**	**(412)**	**(1 476)**	**1 476**	**-**	**-**	**-**	**-**	**1 287**
Interproduct transfers	**875**	(412)	(1 476)	1 476	-	-	-	-	1 287
Products transferred	**-**	-	-	-	-	-	-	-	-
Returns from petrochemichal industry	**-**	-	-	-	-	-	-	-	-
Consumption of the energy branch	**532**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**532**
Distribution losses	**2 731**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2 731**
Available for final consumption	**63 838**	**(276)**	**-**	**32 614**	**17 180**	**1 308**	**-**	**-**	**13 012**
Final non-energy consumption	**1 982**	**-**	**-**	**1 982**	**-**	**-**	**-**	**-**	**-**
Chemical industry	**-**	-	-	-	-	-	-	-	-
Other sectors	**1 982**	-	-	1 982	-	-	-	-	-
Final energy consumption	**61 841**	**136**	**-**	**30 138**	**17 221**	**1 308**	**-**	**-**	**13 038**
Industry	**19 915**	**136**	**-**	**5 598**	**10 615**	**-**	**-**	**-**	**3 567**
Iron and steel	***1 449***	*136*	-	-	*1 313*	-	-	-	-
Non-ferrous metals	**-**	-	-	-	-	-	-	-	-
Chemical and petrochemical	**-**	-	-	-	-	-	-	-	-
Non-metallic minerals	**-**	-	-	-	-	-	-	-	-
Mining and quarrying	**-**	-	-	-	-	-	-	-	-
Food, beverages and tobacco	**-**	-	-	-	-	-	-	-	-
Textile and leather	**-**	-	-	-	-	-	-	-	-
Paper, pulp and printing	**-**	-	-	-	-	-	-	-	-
Machinery	**-**	-	-	-	-	-	-	-	-
Construction	**-**	-	-	-	-	-	-	-	-
Non-specified (Industry)	***18 466***	-	-	*5 598*	*9 301*	-	-	-	*3 567*
Transport	**13 251**	**-**	**-**	**12 888**	**314**	**-**	**-**	**-**	**49**
Rail	***49***	-	-	-	-	-	-	-	*49*
Road	***12 360***	-	-	*12 046*	*314*	-	-	-	-
International aviation	**-**	-	-	-	-	-	-	-	-
Domestic aviation	**595**	-	-	595	-	-	-	-	-
Domestic Navigation	**247**	-	-	247	-	-	-	-	-
Pipeline transport	**-**	-	-	-	-	-	-	-	-
Non-specified (Transport)	**-**	-	-	-	-	-	-	-	-
Other sectors	**27 367**	**-**	**-**	**11 653**	**6 292**	**-**	**-**	**-**	**9 422**
Services	**-**	-	-	-	-	-	-	-	-
Residential	***12 192***	-	-	*4 776*	*1 902*	-	-	-	*5 515*
Agriculture, forestry and fishing	***1 471***	-	-	*891*	-	-	-	-	*580*
Non-specified (Other)	**13 703**	-	-	5 986	4 390	-	-	-	3 328
Statistical differences	**15**	**(412)**	**-**	**494**	**(41)**	**-**	**-**	**-**	**(26)**

Between 2013 and 2017, the Egyptian energy market has witnessed a slight decline in the primary energy production (-3,8%). Crude oil production decreased by 5,9% over the same period and natural gas production by 27,1 %. On the other hand, the production of renewable energy increased by 5.3%. Concerning energy trade, a significant increase in energy imports (+140,9%) and a decrease in energy exports (-17,2%) were observed. This led to a sharp increase in the dependency ratio from -6% in 2013 to +19% in 2017.

Gross inland consumption increased during the period 2013-2017 by 12,5%. However, gross inland consumption per capita and per unit of constant GDP decreased by respectively 3,4% and 3,9%.

Between 2013 and 2017, the total final energy consumption increased slightly (+1,2%). However, this trend hides diverging developments at the subsector level. The residential and transport sectors showed significant increases (respectively +9,3% and +10,9%) while the industry reduced its energy consumption by 1% and the agriculture sector by 46,6%.

Electricity consumption increased significantly in all sectors of the Egyptian economy: residential (+7,3%), industry (+10.8%), commercial and other (+8,9%). Only public lightening has reduced its electricity consumption (-17,6%). To ensure a sustainable supply of electricity for all regions of Egypt and to meet summer loads, a fast-track plan has been implemented in 2015 to add and increase the total generation capacity and to reduce network losses. Also, Egypt adopted new policies which aim to improve energy trading at regional and international levels through the use of electrical interconnection with its neighbours.

Regarding the SDG 7, Egypt has the following policies and objectives:

- The new renewable energy strategy aims to increase the share of generated energy from renewable energy to 20% out of the total generated energy in Egypt by 2022, out of which 6% from hydro power, 12% from wind energy and 2% from other renewable energy sources (especially solar energy). The strategy also includes the construction of wind projects with the participation of the private sector to bring the total installed capacity to 7 200 MW by 2022.
- Secure the energy supply of the entire population[2].

[2] In Egypt, the proportion of population with access to electricity is 99,7% (census 2017)

Israel

ISRAEL 2017 (ktoe)	Total all energy sources	Solid Fuels	Oil	Total petroleum products	Natural gas	Total renewable energy	Wastes (non renewable)	Derived heat	Electricity
Production	**8 990**	43	78	-	8 284	585	-	-	-
Imports	**22 310**	5 067	14 688	2 117	438	-	-	-	-
Exports	**(6 364)**	-	-	(5 817)	(62)	-	-	-	(486)
International bunkers (4)	**(1 326)**	-	-	(1 326)	-	-	-	-	-
Stock changes	**(708)**	(141)	(474)	(92)	..	-	-	-	-
Total primary energy supply (TPES)	**22 903**	**4 968**	**14 291**	**(5 117)**	**8 661**	**585**	**-**	**-**	**(486)**
Transformation input							-	-	
Refineries	**(13 838)**	-	(13 669)	..	(169)	-	-	-	..
Electricity production	**(12 694)**	(4 985)	-	(189)	(7 362)	(158)	-	-	-
Transformation output									
Refineries	**14 111**	-	-	13 464	-	-	-	-	-
Electricity production	**5 820**	-	-	-	-	-	-	-	5 820
Other transformation output	**-**	-	-	-	-	-	-	-	-
Energy industry own use and losses	**(1 060)**	-	-		..	(8)	-	-	(404)
Total final consumption	**15 393**	**19**	**-**	**8 910**	**1 130**	**419**	**-**	**-**	**4 915**
Energy use		19	-	8 194			-	-	
Industry	**..**	19	-	1 636	..	58	-	-	1 187
Transport	**..**	-	-	5 977	..	-	-	-	..
Commercial and public services	**..**	-	-	157	..	..	-	-	1 538
Residential	**..**	-	-	140	-	361	-	-	1 597
Other	**..**	-	-	283	..	-	-	-	593
Non-energy use	**..**	0	-	716	..		-	-	
Statistical differences	**..**	**(35)**	**622**	**(753)**	**..**	**..**	**-**	**-**	**15**

.. = unknown or not for publication

In the past, Israel's energy economy was mainly based on imports of energy sources for the production of petroleum products and electricity. However, in recent years, the share of domestic natural gas in the energy supply has been growing rapidly. Production of energy from renewable sources and the entry of new producers into the electricity industry in recent years have also changed the energy market.

During the five-year period reviewed in this publication, the Israeli economy grew rapidly at a rate of 3,5% per year on average[3]. In addition, during these years, a number of significant major shifts occurred in the energy sector:

Natural gas

Production from to the "Tamar" reservoir with estimated reserves of 256 bcm, was the beginning of a process that changed the mix of energy sources in Israel. The supply of natural gas increased by 49,1% between 2013 and 2017. The transition to natural gas reduced dependency on imports of energy products. The dependency rate dwindled from almost 100% two decades ago to 66% in 2017.

[3] Compound Annual Growth Rate of the GDP in constant 2010 US dollars (source: World Bank)

Electricity

The total electricity production in 2017 was 67,7 TWh. Israel's electricity production is domestic and only a small share of it is exported (8,3% in 2017). As a result of the privatisation of the electricity sector, the share of private electricity producers has increased from 7% in 2013 to 28% in 2017.

Because of the transition to the use of natural gas, the share of natural gas in the fuel mix for power generation increased from 43% to 64% over the reviewed period. As a consequence, the use of coal was reduced and the consumption of oil products for electricity production is marginal (less than 2% in 2017). The increased use of natural gas to generate electricity improved the efficiency of conversion from 42,6% to 45,8%.

Renewable energy

Electricity production from renewable sources stands at 2,5%, mostly from solar energy. The use of solar water heaters in Israel is very common. It is estimated that 85% of all households use a solar water heater. The energy output of solar water heaters in 2017 was 361 Ktoe, which accounts for about 17% of the total energy consumption by households.

Petroleum products

The proportion of oil products in the total mix of resources remains relatively constant. However, the internal mix has changed significantly. While the consumption of gasoline and diesel increased by 16,5% and 10,2% respectively over the period, the consumption of fuel oil declined significantly (-46%). In the years 2015-2016, a decline in oil prices occurred, which affected the prices of distillates. In addition, there was a huge increase in the number of vehicles driven by low interest rates that encouraged the purchase of durable goods. This trend was partially offset by improved vehicle efficiency. It should be noted that in 2017, transportation constituted 73% of the total final consumption of petroleum products.

The decrease in the volume of fuel oil and heating oil consumption is due to the gradual connection of electricity producers and heavy industrial consumers to the natural gas grid. Stricter environmental regulations also encouraged or forced these consumers to switch to cleaner fuels.

Energy Intensity

In the reviewed years, a trend in the reduction of energy intensity can be identified. From a ratio of 86 kgoe per unit of GDP[4] in 2013, it declined to 77 kgoe in 2017. Therefore, the Israeli economy uses less and less energy to generate one unit of GDP. The connection of large consumers and in particular electricity producers to the natural gas network increased the overall efficiency of the Israeli economy which contributed to a decrease in energy intensity values.

[4] 1 000 US Dollars of 2010

Jordan

JORDAN 2017 (Ktoe)	Total all energy sources	Solid Fuels	Oil	Total petroleum products	Gas	Total renewable energy	Wastes (non renewable)	Derived heat	Electricity
Production	**582,1**	-	0,3	-	82,7	212,1	-	-	287,0
Imports	**10 207,2**	312,9	2 850,4	2 670,9	4 342,5	17,6	-	-	12,9
Exports	**929,8**	-	-	-	915,4	-	-	-	14,4
International bunkers	**133,3**	-	-	133,3	-	-	-	-	-
Stock changes	**(196,3)**	-	(16,5)	(179,8)	-	-	-	-	-
Total primary energy supply (TPES)	**10 008,7**	**312,9**	**2 867,2**	**2 803,6**	**3 509,8**	**229,7**	**-**	**-**	**285,5**
Refineries	**(198,4)**	-	(2 867,2)	2 668,8	-	-	-	-	-
Electricity production	**(2 110,4)**	-	-	325,2	(3 509,8)	-	-	-	1 724,6
Losses	**224,8**	-	-	-	-	-	-	-	224,8
Energy industry own use	**256,5**	-	-	213,5	-	-	-	-	43,0
Final Energy Consumption	**6 987,1**	**312,9**	**-**	**4 933,8**	**-**	**229,1**	**-**	**-**	**1 511,3**
Industry	**938,2**	312,9	-	299,8	-	-	-	-	325,5
Transport	**3 431,3**	-	-	3 431,3	-	-	-	-	-
Residential	**1 548,7**	-	-	687,5	-	166,7	-	-	694,5
Commercial and public services	**459,7**	-	-	169,0	-	62,4	-	-	228,3
Other	**490,7**	-	-	227,7	-	-	-	-	263,0
Non-energy use	**176,8**	-	-	176,8	-	-	-	-	-
Statistical Differences	**(58,1)**	0,0	-	(58,1)	-	-	-	-	-

Primary production

The local production of energy (crude oil, natural gas and renewable energy) amounted to 582,1 Ktoe in 2017 which represents 6% of Jordan's total energy requirements. Due to a lack of energy sources, Jordan depends heavily on imports to fulfil its domestic energy needs.

Imported quantities of crude oil and oil products reached 5 669 Mtoe in 2017 and LNG imports 127 bcf. Total fossil fuel imports reached 2,4 billion JD in 2017; a 26% increase compared with 2016.

Jordan has significant renewable energy sources, in particular solar and wind energy. Jordan is located in the so-called "sunbelt" area where the intensity of direct solar radiation is 5-7 kWh/m². Its wind potential is also significant with wind speed in specific areas ranging from 7 to 9 m/s. Jordan's strategy for the energy sector aims to diversify energy sources and reduce the reliance on energy imports with RES representing 20% of total energy mix by 2025.

Jordan's domestic oil and natural gas resources remain limited despite efforts by the Government of Jordan to further explore and develop them. In particular, Jordan has large reserves of oil shale which may be used directly to generate electricity or to produce gas and oil using the ICP[5] technology.

[5] ICP: In-situ Conversion Process

Primary and final energy demand

The total demand for primary energy increased by 4,1% in 2017 to 10,1 Mtoe while the total final energy demand increased by 5,1% to reach 6,9 Mtoe.

Demand for electricity increased by 5% in 2017. The highest growth rates were recorded in sub-sectors such as street lighting (+15%) and the household and commercial sectors (+8% each). The total amount of electricity imported *via* interconnections with Egypt and Syria amounted to 51,3 GWh, an 84% decrease compared to 2016.

Electricity Generation and Consumption

The amount of electricity generated in 2017 reached 20,7 TWh, a 7% increase compared with 2016 and electricity consumption reached 17,6 TWh (+5%). The peak load increased by 2% to 3 320 MW in 2017. Over the 2013-2017 period, Jordan increased significantly the share of natural gas in its primary energy mix. Natural gas is only used for power generation. The efficiency of thermal generation increased from 40,4% to 45% over the same period due to the increased use of natural gas which followed a period marked by the interruption of supplies from Egypt.

Energy policies

The Ministry of Energy and Mineral Resources endeavours to secure a sustainable supply of energy and the optimal utilisation of natural resources. Key objectives are to diversify sources of imported energy, boost domestic energy sources and scale up renewable energy sources and energy efficiency in various sectors. The Ministry of Energy and Mineral Resources, in cooperation with energy stakeholders, implemented policies and measures approved by the Action Plan which stemmed from the mutual vision of the Executive Development Program and the Comprehensive Energy Strategy for the year 2017. Jordan's main strategic objectives in the field of energy are:

- To achieve security of energy supply;
- To diversify energy sources;
- To develop and utilise conventional and renewable domestic energy sources such as oil shale and uranium;
- To transfer, localise, develop, sustain and improve the uses of nuclear energy;
- To improve the overall energy efficiency;
- To maximise the value added in the mining industry.

Morocco

MOROCCO 2017 (Ktoe)	Total energy products	Solid fuels	Oil	Total Petroleum Products	Gas	Total renewable energy	Wastes (non renewable)	Derived heat	Electricity
Primary production	**2 210**	-	5	-	62	1 736	72	336	-
Recovered products	**-**	-	-	-	-	-	-	-	-
Imports	**19 492**	4 494	-	13 514	964	-	-	-	521
Stock changes	**(20)**	(41)	-	21	-	-	-	-	-
Exports	**14**	-	-	-	-	-	-	-	14
Bunkers	**134**	-	-	134	-	-	-	-	-
Gross inland consumption	**21 535**	**4 452**	**5**	**13 402**	**1 025**	**1 736**	**72**	**336**	**507**
Transformation input	**6 720**	**4 434**	**-**	**835**	**960**	**155**	**-**	**336**	**-**
Thermal power stations (main activity)	**6 337**	4 434	-	835	960	108	-	-	-
Thermal power stations (autoproducer)	**-**	-	-	-	-	-	-	-	-
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**-**	-	-	-	-	-	-	-	-
Blast-furnaces	**-**	-	-	-	-	-	-	-	-
Gas works	**-**	-	-	-	-	-	-	-	-
Refineries	**-**	-	-	-	-	-	-	-	-
Charcoal production plants	**-**	-	-	-	-	-	-	-	-
Non elsewhere specified	**383**	-	-	-	-	47	-	336	-
Transformation output	**2 473**	**-**	**-**	**-**	**-**	**14**	**-**	**-**	**2 459**
Thermal power stations (main activity)	**2 347**	-	-	-	-	-	-	-	2 347
Thermal power stations (autoproducer)	**-**	-	-	-	-	-	-	-	-
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**-**	-	-	-	-	-	-	-	-
Blast-furnaces	**-**	-	-	-	-	-	-	-	-
Gas works	**-**	-	-	-	-	-	-	-	-
Refineries	**-**	-	-	-	-	-	-	-	-
Charcoal production plants	**-**	-	-	-	-	-	-	-	-
Non elsewhere specified	**126**	-	-	-	-	14	-	-	112
Exchanges and transfers, returns	**-**	**-**	**-**	**-**	**-**	**(363)**	**-**	**-**	**363**
Interproduct transfers	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Products transferred	**-**	**-**	**-**	**-**	**-**	**(363)**	**-**	**-**	**363**
Returns from petrochemichal industry	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Consumption of the energy branch	**21**	**-**	**5**	**-**	**-**	**-**	**-**	**-**	**16**
Distribution losses	**522**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**522**
Available for final consumption	**16 745**	**18**	**-**	**12 567**	**65**	**1 232**	**72**	**-**	**2 791**
Final non-energy consumption	**490**	**-**	**-**	**490**	**-**	**-**	**-**	**-**	**-**
Chemical industry	**-**	-	-	-	-	-	-	-	-
Other sectors	**490**	-	-	490	-	-	-	-	-
Final energy consumption	**16 283**	**18**	**-**	**12 108**	**62**	**1 232**	**72**	**-**	**2 791**
Industry	**3 260**	**18**	**-**	**2 060**	**62**	**32**	**72**	**-**	**1 017**
Iron and steel	**-**	-	-	-	-	-	-	-	-
Non-ferrous metals	***7***	*2*	-	*4*	-	-	-	-	*0*
Chemical and petrochemical	***171***	-	-	*70*	-	-	*9*	-	*93*
Non-metallic minerals	***1 415***	-	-	*1 099*	*30*	*26*	*63*	-	*197*
Mining and quarrying	***676***	-	-	*415*	*19*	-	-	-	*242*
Food, beverages and tobacco	***400***	*16*	-	*230*	-	*4*	-	-	*150*
Textile and leather	***128***	-	-	*59*	-	*1*	-	-	*68*
Paper, pulp and printing	***72***	-	-	*28*	*17*	-	-	-	*26*
Machinery	***189***	-	-	*69*	-	*0*	-	-	*120*
Construction	**84**	-	-	58	-	1	-	-	26
Non-specified (Industry)	***122***	-	-	*28*	-	*0*	-	-	*93*
Transport	**6 502**	**-**	**-**	**6 471**	**-**	**-**	**-**	**-**	**32**
Rail	***41***	-	-	*9*	-	-	-	-	*32*
Road	***5 713***	-	-	*5 713*	-	-	-	-	-
International aviation	***722***	-	-	*722*	-	-	-	-	-
Domestic aviation	**27**	-	-	27	-	-	-	-	-
Domestic Navigation		-	-	-	-	-	-	-	-
Pipeline transport		-	-	-	-	-	-	-	-
Non-specified (Transport)		-	-	-	-	-	-	-	-
Other sectors	**6 520**	**-**	**-**	**3 577**	**-**	**1 200**	**-**	**-**	**1 742**
Services	***1 287***	-	-	*149*	-	*658*	-	-	*480*
Residential	***4 009***	-	-	*2 524*	-	*542*	-	-	*943*
Agriculture, forestry and fishing	***1 223***	-	-	*904*	-	-	-	-	*320*
Non-specified (Other)		-	-	-	-	-	-	-	-
Statistical differences	**(28)**	**0**	**-**	**(32)**	**4**	**-**	**-**	**-**	**-**

Energy profile of Morocco

Morocco is provided with significant renewable energy sources, in particular with a sunshine of 6,5 kWh/m²/d. Morocco currently has an installed capacity of 161 MW in the solar energy and of 25 000 MW in wind energy on-shore.

However, Morocco doesn't have any fossil energy resources and almost totally depends on foreign supply for energy products. The energy dependency rate of Morocco almost reached 90% in 2017, decreasing by 4 points compared to 2013 when it was at 94%. A peak was reached in 2008 with a dependency rate of 97,5%. The rise in importance of renewable energies in the electricity production mainly explains the decrease of the energy dependency rate of Morocco.

Net importer of energy products, the net energy invoice of Morocco decreased from 93,2 billions of dirhams in 2013 to 67,2 billions of dirhams in 2017. This drop is a consequence of the decrease of oil prices on the international market.

Production of energy

The primary energy production of Morocco did not roughly changed between 2013 and 2017. The slight change of +0,6% was the joint result of a decrease in the production of all fossil energy products (and mainly the oil with -13%) and an increase of the production of all types of renewable energies (solar, wind and water energy) by 1%. Nevertheless, the water energy production decreased during this period, from 724 KToe in 2013 to 308 KToe in 2017.

Measured by Kilogramme in oil equivalent/thousand of USD of 2010, the primary energy intensity per unit of GDP decreased by 0,7% during the same period. This could indicate that the growth of the Moroccan economy generally requires less energy.

Efficiency of energy transformation

Considering energy production, the efficiency of the Moroccan thermal plants dropped by 0,8% between 2013 and 2017, reaching only 37%. The efficiency may have been impacted by the age of some plants in activity, as well as by the different technologies used. As for oil refining, the activity stopped after the closing of the SAMIR refinery for economic viability reasons.

Energy consumption

The energy consumption in Morocco remained low but sustainably progressed these last few years. It increased from 19,6 MToe in 2013 to 21,5 MToe in 2017, with an annual average rate of change of 2,4%.

The final energy consumption progressed by 2,7% between 2013 and 2017, almost at the same pace than the gross domestic consumption (+2,4%). Depending on products, the evolution was different: the final demand for solid fuel increased by around 8% while the demand for natural gas decreased by -3,1%. Therefore, the expected and wished energetic transition still remains far away.

Data on final energy consumption per sector in 2017 showed that three sectors monopolised 84,5% of the final energy consumption. In decreasing order, the transport sector used 40% of the final energy consumption, and then residential and industries sectors respectively used a quarter and a fifth of the total final energy consumption. All the other sectors used only 15,5% of total final energy consumption.

Total energy consumption per capita also strongly increased in the last few years, from 0,36 Toe in 2012 to 0,6 Toe in 2017. The explanation of this increase was a dynamic economic growth in this period, growth supported by an ambitious investment programme in big basic infrastructures.

Development of renewable energies: a strategic decision of Morocco

In order to reduce its energy dependency and to limit greenhouse gas emissions, Morocco drawn up a new energetic strategy whose main goals were: to guarantee a safe supply, the availability and the general access to energy, the control of the demand and environmental conservation. These strategic orientations call for a diversified energy mix, the development of the renewable energies and of energy efficiency, and for the strengthening of regional integration. Two ambitious goals have been set:

1. The decrease of energy consumption by 5% in 2020 and 20% in 2030,
2. The reinforcement of the part of the renewable energies in the energy mix, to reach 42% of the installed capacity in 2020 and 52% in 2030.

Development of the share of renewable energies in the installed capacity and in the electricity production between 2010 and 2017

Year	2010	2011	2012	2013	2014	2015	2016	2017
Part of Renewable Energies (%) in the installed capacity[6]	31,4	31,7	30,2	30,8	32,1	33,4	33,9	33,4
Part of Renewable Energies (%) in the electricity production[7]	18,9	11,7	9,7	16,2	14,2	16,1	16,5	15,9

[6] The targeted strategic goal is of 42% by 2020 and of 52% by 2030

[7] The level of part of Renewable Energies depends, on the one hand, on climate fluctuations, and on the other hand, on the start of production of additional thermal power plants

Palestine

PALESTINE 2017 (Ktoe)	Total all energy sources	Solid Fuels	Crude Oil	Total petroleum products	Natural gas	Total renewable energy	Wastes (non renewable)	Derived heat	Electricity
Primary production	**233,5**	-	-	-	-	233,5	-	-	
Imports	**1 624,6**	-	-	1 143,7	-	1,3	-	-	479,5
Exports	**(0,3)**	-	-	(0,1)	-	(0,2)	-	-	-
Stock changes	**-**	-	-	-	-	-	-	-	-
Total energy supply	**1 857,8**	-	-	1 143,7	-	234,6	-	-	479,5
Electricity plants	**(75,2)**	-	-	(118,3)	-	-	-	-	43,1
Losses	**134,1**	-	-	3,6	-	67,3	-	-	63,2
Final consumption	**1 648,6**	-	-	1 021,7	-	167,4	-	-	459,4
Final energy consumption	**1 624,5**	-	-	997,7	-	167,4	-	-	459,4
Industry	**87,1**	-	-	25,3	-	7,0	-	-	54,8
Transport	**756,5**	-	-	756,5	-	-	-	-	-
Road	**756,5**	-	-	756,5	-	-	-	-	-
Households and other sectors	**780,9**	-	-	215,9	-	160,4	-	-	404,6
Residential	**623,6**	-	-	181,8	-	157,8	-	-	284,0
Agriculture	**13,7**	-	-	10,9	-	-	-	-	2,8
Commercial and public services	**143,6**	-	-	23,2	-	2,6	-	-	117,8
Non-energy use	**24,1**	-	-	24,1	-	-	-	-	-
Statistical differences	**-**	-	-	-	-	-	-	-	-

Notes:

1. For charcoal and wood, a unified calorific value of 15.79 gigajoules/ton was used
2. The efficiency of the solar water heater was considered to be 45% and the consumed energy is half of the produces quantity.
3. The technical losses in electricity in Palestine are considered to be 12% based on the Palestinian Energy and Natural Resources Authority.

Sources:

Palestinian Energy and Natural Resources Authority, 2018. Ramallah -Palestine. Unpublished Data

Palestinian Central Bureau of Statistics, 2018. Foreign Trade Data 2017. Ramallah - Palestine. Unpublished Data

Palestinian Central Bureau of Statistics, 2018. Economic Series Surveys 2017. Ramallah - Palestine. Unpublished Data

Palestine imports most of its energy and is completely dependent on Israel for the supply of energy due to the absence of control over its own borders, Israeli administrative and security control on most of the West Bank and the fragmentation of the country into two distinct geographical zones: the West Bank and the Gaza Strip. Palestine has an urgent need to develop its own energy sector.

Energy Production

In terms of primary production, Palestine only has renewable energy sources: Wood and charcoal, solar thermal, olive cake and solar photovoltaic (PV). Primary production from these sources reached 234,6 Ktoe in 2017 which represents 12,6% of the total energy supply for Palestine.

Palestine has proven reserves of natural gas in Gaza Strip in two locations. Reserves are estimated to be around 1,1 trillion cubic feet but the gas which was discovered in 2000 is still not utilised due to the political situation. Palestine also has oil and gas reserves in the West Bank but these are utilised by Israel.

Energy Imports

Palestine imported 87% of its energy needs in 2017. Its dependency ratio increased by 3,6 percentage points from 2013 to 2017. In 2017, Palestine imported 99% of its energy imports from Israel only.

Electricity

In 2017, Palestine imported around 91% of its available electricity. 98% of electricity imports originated from Israel, 1% from Egypt and 1% from Jordan. There is only one electricity plant in Palestine located in the Gaza Strip. This plant has an installed capacity of 140 MW and runs on diesel. However, it runs at less than half its capacity (60 MW) due to the shortage of fuel that is imported from Israel. In 2017, 45 GWh were produced from solar PV systems. The total electricity production in Palestine reached 9% of the total electricity needs.

Renewable Energy

Referring to the energy balance of Palestine for 2017, the use of renewable energy for final consumption reached 167,4 Ktoe, of which wood represented 50%, solar water heaters 40%, olive cake 8% and solar PV 2%.

The share of renewable energy sources in Gross Inland Energy Consumption reached 12,6% in 2017; down 3,8 percentage points compared to 2013 (16,4%). The decrease is due to the increase in the total energy consumption of non-renewable energy and the decrease in the consumption of renewable energy, mainly fuelwood. Palestine could increase the share of renewable energy sources through a better utilisation of its large solar energy potential and the installation of solar water heaters and solar PV systems.

Energy Consumption

Total final energy consumption increased from 1 251 Ktoe in 2013 to 1 624 Ktoe or 6,8% annually[8]. In 2017, transport amounted to 47% of Palestine's total final energy consumption, the household sector 38%, commercial and public services 9%, industry 5% and agriculture/forestry/fishing 1%.

Energy Efficiency

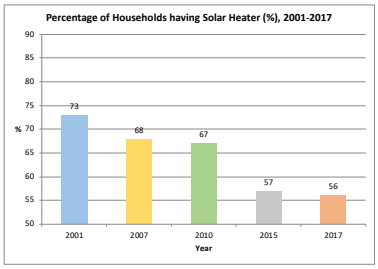
The Government of Palestine, through the Palestinian Energy Authority, started an energy auditing program in 2012. The auditing was focused on 230 industrial, commercial and services sectors facilities. Total energy savings reached 25 GWh which amounts to 0,5% of the total electricity consumption in Palestine. Significantly larger savings could be achieved by promoting energy efficiency in the transport and household sectors which represent 85% of the total final energy consumption compared with 12% for industry and services. Energy efficiency policies should therefore focus more on the transport and residential sectors.

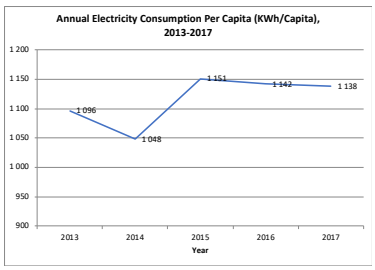
[8] Compound annual growth rate between 2013 and 2017

Solar Water heaters

Around 56% of Palestinian households had solar water heaters in 2017 down from 72,1% in 2001. This decrease is the result of the conflicts and blockade in Gaza. In the West Bank, it is the result of the spread of vertical constructions without solar water panels and the non-payment of electricity bills which makes water heating with electricity affordable for some households.

Following the request by the Office of the Palestinian President to PCBS to make proposals on priority projects to develop, PCBS submitted a proposal to establish a legal framework that regulates the installation of solar water heaters in the residential and non-residential sectors. The regulation would ensure that solar water heaters are installed in all new buildings as a requirement for obtaining a building permit, as is the case in countries such as Israel or Cyprus.





Source: PCBS

Electricity Consumption Per Capita

It reached 1 138 kWh in 2017 compared to 1 096 in 2013. Looking at the last three years of the period, per capita consumption is decreasing. This is mainly due to the severe shortage of electricity in the Gaza Strip.

According to the 2017 census, 99,7% of Palestinian households are connected to the electricity network. However, this figure doesn't give the full picture of the real situation, especially in the Gaza Strip which suffers from frequent disruption in the supply of electricity. 97,3% of Gaza Strip households experience power cuts lasting several hours whereas in the West Bank, long disruptions affect less than 0,5% of households.

In this context, PCBS also submitted a proposal to the Office of the Palestinian President to invest in the construction of a solar PV panel factory. This will encourage the installation of PV systems in Palestine which, in turn, will lead to a better handling of electricity shortages and the reduction of the costs associated with imported electricity.

Tunisia

TUNISIA 2017 (Ktoe)	Total energy products	Solid fuels	Oil	Total Petroleum Products	Gas	Total renewable energy	Wastes (non renewable)	Derived heat	Electricity
Primary production	**5 533**	-	2 125	-	2 139	1 190	-	80	-
Recovered products	**-**	-	-	-	-	-	-	-	-
Imports	**8 115**	-	649	4 131	3 296	-	-	-	39
Stock changes	**109**	-	81	28	-	-	-	-	-
Exports	**2 175**	-	1 705	429	-	-	-	-	42
Bunkers	**267**	-	-	267	-	-	-	-	-
Gross inland consumption	**11 315**	**-**	**1 150**	**3 462**	**5 436**	**1 190**	**-**	**80**	**(3)**
Transformation input	**5 138**	**-**	**934**	**18**	**3 727**	**379**		**80**	**-**
Thermal power stations (main activity)	**3 554**	-	-	1	3 554	-	-	-	-
Thermal power stations (autoproducer)	**271**	-	-	18	173	-	-	80	-
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**-**	-	-	-	-	-	-	-	-
Blast-furnaces	**-**	-	-	-	-	-	-	-	-
Gas works	**-**	-	-	-	-	-	-	-	-
Refineries	**934**	-	934	-	-	-	-	-	-
Charcoal production plants	**379**	-	-	-	-	379	-	-	-
Non elsewhere specified	**-**	-	-	-	-	-	-	-	-
Transformation output	**2 797**	**-**	**-**	**922**	**-**	**156**	**-**	**-**	**1 719**
Thermal power stations (main activity)	**1 628**	-	-	-	-	-	-	-	1 628
Thermal power stations (autoproducer)	**91**	-	-	-	-	-	-	-	91
Patent fuel and briquetting plants	**-**	-	-	-	-	-	-	-	-
Coke-ovens	**-**	-	-	-	-	-	-	-	-
Blast-furnaces	**-**	-	-	-	-	-	-	-	-
Gas works	**-**	-	-	-	-	-	-	-	-
Refineries	**922**	-	-	922	-	-	-	-	-
Charcoal production plants	**156**	-	-	-	-	156	-	-	-
Non elsewhere specified	**-**	-	-	-	-	-	-	-	-
Exchanges and transfers, returns	**12**	**-**	**(137)**	**148**	**-**	**(52)**	**-**	**-**	**52**
Interproduct transfers	**-**	-	(137)	137	-	(52)	-	-	52
Products transferred	**12**	-	-	12	-	-	-	-	-
Returns from petrochemichal industry	**-**	-	-	-	-	-	-	-	-
Consumption of the energy branch	**262**	**-**	**5**	**35**	**148**	**-**	**-**	**-**	**74**
Distribution losses	**365**	**-**	**8**	**-**	**56**	**-**	**-**	**-**	**302**
Available for final consumption	**8 359**	**-**	**67**	**4 479**	**1 505**	**915**	**-**	**-**	**1 392**
Final non-energy consumption	**317**	**-**	**-**	**317**	**-**	**-**	**-**	**-**	**-**
Chemical industry	**-**	-	-	-	-	-	-	-	-
Other sectors	**317**	-	-	317	-	-	-	-	-
Final energy consumption	**8 054**	**-**	**-**	**4 253**	**1 500**	**915**	**-**	**-**	**1 386**
Industry	**2 163**	**-**	**-**	**842**	**857**	**-**	**-**	**-**	**463**
Iron and steel	***-***	-	-	-	-	-	-	-	-
Non-ferrous metals	***33***	-	-	-	*10*	-	-	-	*23*
Chemical and petrochemical	***172***	-	-	-	*112*	-	-	-	*60*
Non-metallic minerals	***1 172***	-	-	*547*	*489*	-	-	-	*136*
Mining and quarrying	***34***	-	-	-	*7*	-	-	-	*28*
Food, beverages and tobacco	***147***	-	-	-	*80*	-	-	-	*67*
Textile and leather	***101***	-	-	-	*62*	-	-	-	*39*
Paper, pulp and printing	***71***	-	-	-	*53*	-	-	-	*17*
Machinery	***-***	-	-	-	-	-	-	-	-
Construction	***-***	-	-	-	-	-	-	-	-
Non-specified (Industry)	***434***	-	-	*295*	*45*	-	-	-	*94*
Transport	**2 560**	**-**	**-**	**2 328**	**224**	**-**	**-**	**-**	**8**
Rail	***24***	-	-	*18*	-	-	-	-	*6*
Road	***2 306***	-	-	*2 306*	-	-	-	-	-
International aviation	***4***	-	-	*4*	-	-	-	-	-
Domestic aviation	***-***	-	-	-	-	-	-	-	-
Domestic Navigation	***-***	-	-	-	-	-	-	-	-
Pipeline transport	***226***	-	-	-	*224*	-	-	-	*2*
Non-specified (Transport)	***-***	-	-	-	-	-	-	-	-
Other sectors	**3 332**	**-**	**-**	**1 084**	**419**	**915**	**-**	**-**	**914**
Services	***674***	-	-	*102*	*170*	*14*	-	-	*388*
Residential	***2 139***	-	-	*586*	*226*	*901*	-	-	*427*
Agriculture, forestry and fishing	***519***	-	-	*396*	*23*	*0*	-	-	*100*
Non-specified (Other)	***-***	-	-	-	-	-	-	-	-
Statistical differences	**(13)**	-	67	(92)	5	(0)	-	-	7

Last years, the Tunisian energy landscape was marked by an important decrease in the production of primary energy and by an undisrupted increase in the demand for energy. As a consequence, there was an energy structural deficit which can be translated by a rate of dependency of 51 % in 2017, whereas it was only 32 % four years ago.

The primary energy production clearly stepped back (less 7%) between 2013 and 2017, for more than 1,5 million tonnes of oil equivalent (Mtoe). The crude petroleum production registered a decrease of 10 % on that same period. The decrease was translated by a fall in energy exports (less 33%) between 2013 and 2017 and an increase in energy imports of 21%.

The crude domestic consumption increased by 2% all over the period. In the same time, the energy supply of the country was highly dominated by fossil energies that represented about 89% of the crude domestic consumption. More particularly, the electric sector depends on almost totally of the natural gas. It was imported for 60% in 2017 whereas for 46% in 2013. This important increase in imported natural gas is principally due to the depletion of the national gas resource.

Although the part of the sustainable energies (excluding biomass) increased by 36% over the period 2013-2017, the crude domestic consumption of sustainable energy progressed only slowly (+0,8%). This is due to the fact that energy biomass represents 91% of the total crude domestic consumption of sustainable energy in 2017.

Regarding the final energy consumption, it progressed with an average of 3% on the period 2013-2017, from 7,1 Mtoe to 8,1 Mtoe. The final energy consumption of Tunisia is marked by the dominance of petroleum products which did not stop to strengthen; from 49% in 2013 to 53% in 2017.

During the period 2013-2017, the organisation of the final energy balance went through important mutations: after having been the first consumer sector in 2013 (29%), right before transport (28,6%) and housing (27,6%), the industry sector got down at the second place in 2015 (28,8%), followed by housing (27,1%) and after transport (29,5%). The sector confirmed its gains in 2016 and 2017. This permutation was generated by the magnitude of the fall of energy demand in the transport sector between 2011 and 2014. This could be explained by:

1. The upsurge during these years of smuggled fuel sales attributable to uncontrolled flows from neighbouring countries;
2. The decrease of the quantity of transported gas by trans-Mediterranean pipeline and the consumption of the compressor stations.

From 2015, the consolidation of the monitoring at the border and the gradual recovery of gas transport reversed the trend.

Concerning energy performance, Tunisia was the leader in the rational use of energy in the region. In the beginning of the 1980s, it established a deliberate policy. The efforts to control the energy demand resulted in decoupling energy consumption from economic growth. A decrease of primary energy intensity of 2% per year took place during the last decade (2000-2010). However, since 2010, the primary energy intensity followed a near stability despite the existence of an important potential of energy efficiency remaining to be exploited.

Regarding the power sector, the activity of thermal power stations (public and self-producers) progressed on the period 2013-2017, with the increase of power produced by 2,7% per year. The fuel consumption, which corresponds to the power production, also increased, but slowly: 0,7% per year. Those unequal evolutions are due to an improvement of power generation efficiency which evolved from 41,6% in 2013 to 44,9% in 2017. This result was achieved thanks to a better optimisation and utilisation of the electrical generation and the commissioning phase of new combined cycle gas.

The situation described above implies for Tunisia important challenges on strategic and socio-economic issues. In order to supply oil products, electricity and gas in all areas of the country sustainably and fairly, while improving the quality of the citizens' life and contributing to the development of the national economy, the national goals for energy are:

- to secure the energy supply of the whole population and all users,
- to diversify the energy mix, in particular thanks to renewable energies, with the target of raising the part of renewable energy in the electricity production up to 30 % in 2030, and to promote other uses of renewable energy,
- to increase the energy efficiency and reduce the primary energy demand by 30% from now until 2030,
- to ensure the development of electricity interconnections, gas interconnections and facilities for liquefied natural gas,
- to take care of the energy sustainability considering the energy equity, economic competitiveness and targeted subsidies,
- to respect the environment with the objective to reduce carbon intensity by 46% from now until 2030.

Regional Energy Balance Indicators

The indicators

Energy Balances can be difficult to interpret and analyse without the use of indicators and time series. We calculated eleven key energy balance indicators for all reporting partner countries over a period of five years: 2013-2017. They cover four main topics:

- the energy mix: Ssupply, transformation and consumption of solid fuels, oil, gas, electricity, heat and renewable energies,
- energy dependency,
- energy use and energy efficiency,
- renewable energies.

Number	Indicator	Definition / formula
1	**Gross Inland Consumption by energy product (in ktoe and %)**	▪ **Formula:** Gross inland consumption for all categories of energy products (Solid fuels, Oil, Petroleum Products, Gas, Renewable energy, Wastes (non-renewable), Derived heat, Electricity) ▪ **Observation:** Gross inland consumption is defined as Primary production + Recovered products + Imports + Stock changes – Exports – Bunkers
2	**Primary production by energy product (in ktoe and %)**	▪ **Formula:** Primary production for all categories of energy products (Solid fuels, Oil, Gas, Renewable Energy, Non-renewable Waste, Derived Heat)
3	**Total Final Energy Consumption by energy product (in ktoe and %)**	▪ **Formula:** Gross inland consumption in ktoe for all categories of energy products (Solid fuels, Petroleum Products, Gas, Renewable energy, Wastes (non-renewable), Electricity) ▪ **Observation:** TFEC does not include final non-energy consumption i.e. the consumption of energy products as feedstock
4	**Energy dependency rate (in %)**	▪ **Formula:** Net imports (imports minus exports) divided by gross consumption, expressed as a percentage ▪ **Observation:** Gross consumption is equal to gross inland consumption plus the fuel (oil) supplied to international marine bunkers. A negative dependency rate indicates a net exporter of energy. A value greater than 100% occurs when net imports exceed gross consumption. In this case, energy products are placed in stocks and not used in the year of import. (source: EUROSTAT)
5	**Total Final Energy Consumption (TFEC) by sector (in ktoe and %)**	▪ **Formula:** TFEC by sector (Industry, Transport, Services, Residential, Agriculture, forestry & fishing and Non-specified/Other) ▪ **Observation:** It does not include non-energy consumption
6	**Primary energy intensity per capita (in toe/capita)**	▪ **Formula:** Gross inland consumption of energy divided by total population expressed in toe per capita ▪ **Observation:** Population data are provided by the World Bank for all countries (some updates have been made by a few countries for the latest years)

Number	Indicator	Definition / formula
7	**Primary energy intensity per unit of GDP (in kgoe / 1,000 constant 2010 US$ and in kgoe per constant 2011 international $ PPP)**	▪ **Formula:** Gross inland consumption of energy divided by gross domestic product (GDP) expressed in kgoe per unit of GDP ▪ **Observation:** GDP data are provided by the World Bank for all countries and expressed in thousand 2010 US dollars[9] or in constant 2011 international $ PPP[10]
8	**Efficiency of thermal power generation (in %)**	▪ **Formula:** Transformation Output for thermal power divided by Transformation Input for thermal power, expressed as a percentage
9	**Final Energy Consumption per capita (in toe/capita)**	▪ **Formula:** Final energy consumption of energy divided by total population expressed in toe per capita ▪ **Observation:** Population data are provided by the World Bank for all countries (some updates have been made by a few countries for the latest years)
10	**Final energy consumption in the residential sector by energy product (in ktoe and %)**	▪ **Formula:** Final energy consumption in the residential sector by energy product (Petroleum Products, Gas, Renewable energy and Electricity) ▪ **Observation:** It does not include non-energy consumption
11	**Share of renewable energy sources in Gross Inland Energy Consumption (in %)**	▪ **Formula:** Gross inland consumption of energy from renewable sources divided by the total (primary) Gross Inland Energy Consumption, expressed as a percentage ▪ **Observation:** This indicator is different from the "share of renewable energy in the gross final consumption of energy" calculated by EU member states according to the RES directive articles and using the SHARES tool

The indicators are presented along the four categories noted above in introduction of this section: Energy mix (indicators 1, 2 and 3), Energy dependency (indicators 4, 9 and 10), Energy use and efficiency (indicators 5, 6, 7 and 8) and Renewable energies (indicator 11).

[9] GDP at purchaser's prices 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. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 2010 official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used. Source: World Bank

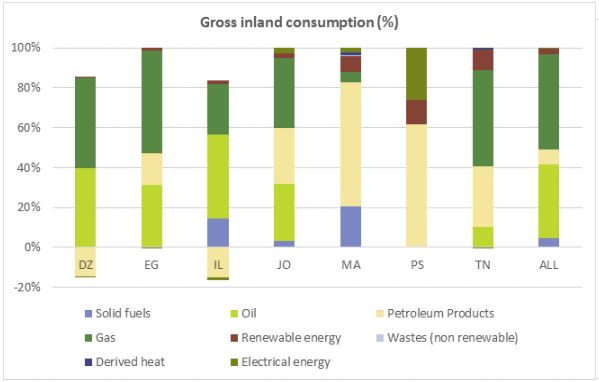
[10] PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2011 international dollars. Source: World Bank

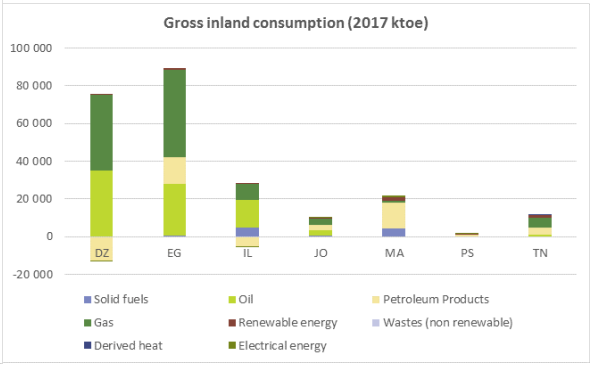
Regional 2017 data

ENERGY MIX

Indicator 1: Gross Inland Consumption by energy product (2017, ktoe)

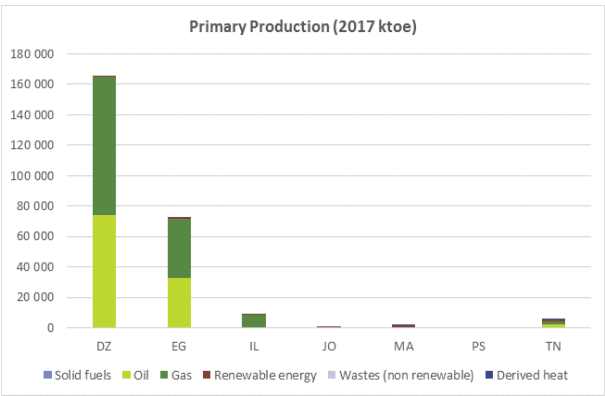
Energy Products	DZ	EG	IL	JO	MA	PS	TN	ALL
Solid fuels	182	430	4 968	313	4 452			**10 345**
Oil	34 684	27 484	14 291	2 867	5		1 150	**80 481**
Petroleum Products	-12 945	14 252	-5 117	2 804	13 402	1 144	3 462	**17 001**
Gas	40 322	46 069	8 661	3 510	1 025		5 436	**105 022**
Renewable energy	63	1 308	585	230	1 736	231	1 190	**5 342**
Wastes (non renewable)					72			**72**
Derived heat					336		80	**416**
Electrical energy	-29	-23	-486	286	507	483	-3	**735**
Total all products	**62 276**	**89 519**	**22 903**	**10 009**	**21 535**	**1 858**	**11 315**	**219 414**

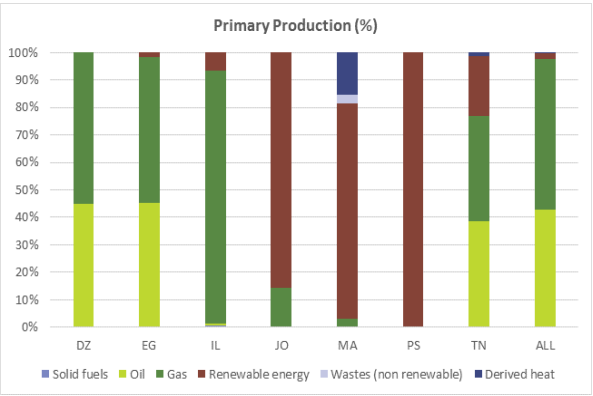




Indicator 2: Primary production by energy product (2017, ktoe)

Energy Products	DZ	EG	IL	JO	MA	PS	TN	ALL
Solid fuels		153	43					**195**
Oil	73 972	32 964	78	0,3	5		2 125	**109 144**
Gas	91 286	38 644	8 284	83	62		2 139	**140 498**
Renewable energy	63	1 308	585	499	1 736	234	1 190	**5 614**
Wastes (non renewable)					72			**72**
Derived heat					336		80	**416**
Total all products	**165 321**	**73 069**	**8 990**	**582**	**2 210**	**234**	**5 533**	**255 939**





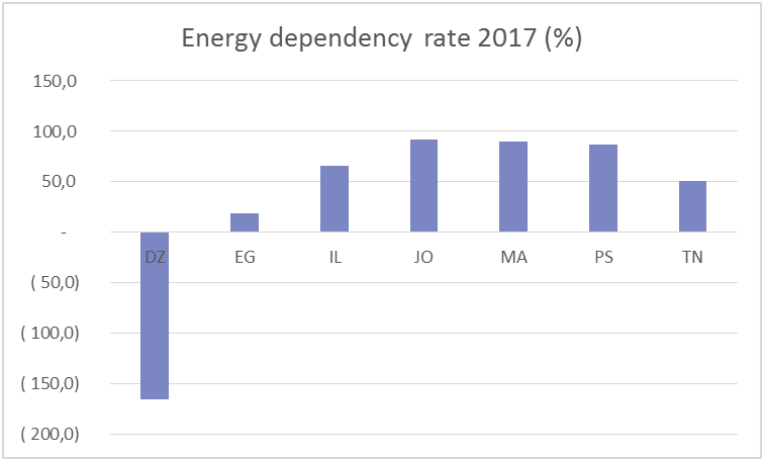
Indicator 3: Total Final Energy Consumption by energy product (2017, ktoe)

Energy Products	DZ	EG	IL	JO	MA	PS	TN	ALL
Solid fuels	41	136	19	313	18			**526**
Petroleum Products	17 624	30 138	8 194	4 757	12 108	998	4 253	**79 021**
Gas	13 655	17 221	1 130		62		1 500	**33 567**
Renewable energy	6	1 308	419	229	1 232	163	915	**4 273**
Wastes (non renewable)					72			**72**
Electrical energy	4 848	13 038	4 915	1 511	2 791	463	1 386	**28 952**
Total all products	**36 174**	**61 841**	**15 393**	**6 810**	**16 283**	**1 624**	**8 054**	**146 412**

ENERGY DEPENDENCY

Indicator 4: Energy dependency rate (2017, in %)

Partner Country	2013	2014	2015	2016	2017
DZ	(174,8)	(157,0)	(160,4)	(175,6)	(164,9)
EG	(5,8)	0,6	8,8	12,9	18,8
IL	76,3	69,7	69,6	61,7	65,8
JO	93,6	98,2	97,8	92,4	91,5
MA	94,4	97,1	90,7	89,6	89,9
PS	83,8	80,2	84,7	84,7	87,4
TN	32,3	38,1	44,1	46,6	51,3



Indicator 9: Final Energy Consumption per capita

Formula: Total final energy consumption divided by total population expressed in toe per capita.

Total final energy consumption per capita (2017 toe/person)

	DZ	EG	IL	JO	MA	PS	TN	ALL
Total final energy consumption (ktoe)	36 174	61 841	15 393	6 810	16 283	1 624	8 054	146 180
Population (1,000)*	41 318	97 553	8 712	10 053	35 740	4 733	11 532	209 642
Total all products (toe/person)	**0,88**	**0,63**	**1,77**	**0,68**	**0,46**	**0,34**	**0,70**	**0,70**

** Source: World Bank - UN*

Indicator 10: Final energy consumption in the residential sector by energy product

Total Final Energy Consumption (TFEC) in the residential sector by energy product (2017; ktoe)

Energy Products	DZ	EG	IL	JO	MA	PS	TN	ALL
Petroleum Products	1 668	4 776	140	688	2 524	182	586	**10 563**
Gas	8 206	1 902					226	**10 334**
Renewable energy			361	167	542	156	901	**2 127**
Electrical energy	1 873	5 515	1 597	695	943	286	427	**11 334**
Total all products	**11 747**	**12 192**	**2 098**	**1 549**	**4 009**	**624**	**2 139**	**34 358**

Indicator 5: Total Final Energy Consumption (TFEC) by sector

NB: does not include non-enegy use

Total Final Energy Consumption (TFEC) by sector - All enery products (2017; ktoe)

Sectors	DZ	EG*	IL**	JO	MA	PS	TN
Industry	6 892	19 915	:	938	3 260	87	2 163
Transport	14 728	13 251	:	3 431	6 502	756	2 560
Services	2 543	:	:	460	1 287	144	674
Residential	11 747	12 192	:	1 549	4 009	624	2 139
Agriculture, forestry & fishing	213	1 471	:		1 223	14	519
Non-specified (Other)	51	15 011	:	491			
Total Final Energy Consumption	**36 174**	**61 841**	**15 393**	**6 810**	**16 283**	**1 624**	**8 054**

** Egypt's enery balance doesn't provide a value for the services sector*

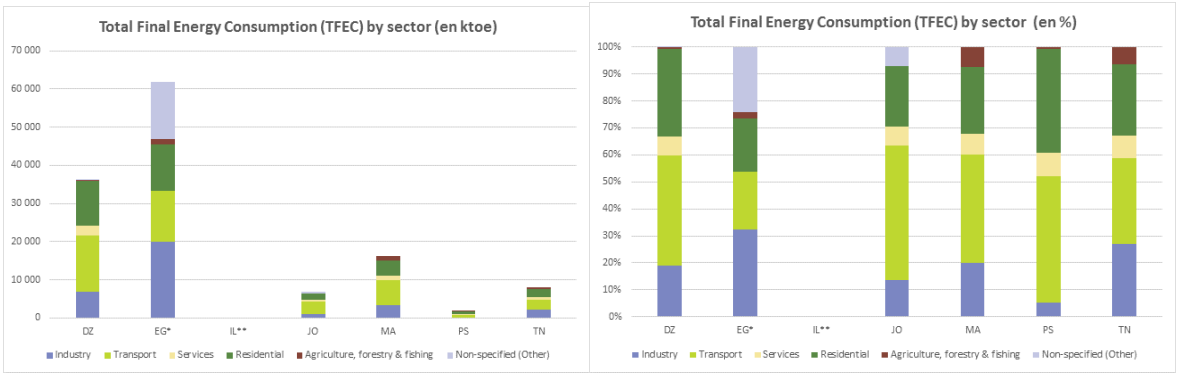
*** Values are not available for natural gas and petroleum products*

Total Final Energy Consumption (TFEC) by sector - All enery products (2017; %)

Sectors	DZ	EG*	IL**	JO	MA	PS	TN
Industry	19,1	32,2	:	13,8	20,0	5,4	26,9
Transport	40,7	21,4	:	50,4	39,9	46,6	31,8
Services	7,0	:	:	6,8	7,9	8,8	8,4
Residential	32,5	19,7	:	22,7	24,6	38,4	26,6
Agriculture, forestry & fishing	0,6	2,4	:	0,0	7,5	0,8	6,4
Non-specified (Other)	0,1	24,3	:	7,2	0,0	0,0	0,0
Total Final Energy Consumption	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

** Egypt's enery balance doesn't provide a value for the services sector*

*** Values are not available for natural gas and petroleum products*



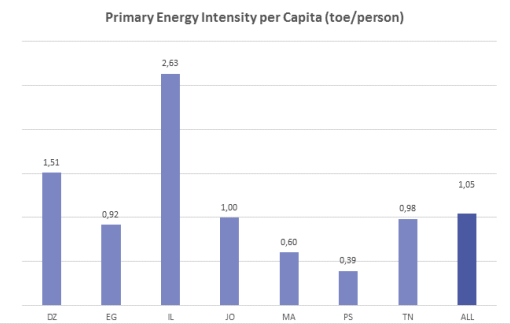
Indicator 6: Primary energy consumption per capita

Formula: gross inland consumption of energy divided by total population expressed in toe per capita.

Gross inland consumption per capita (2017 toe/person)

	DZ	EG	IL	JO	MA	PS	TN	ALL
Gross inland consumption (ktoe)	62 276	89 519	22 909	10 009	21 535	1 858	11 315	219 421
Population (1,000)*	41 318	97 553	8 712	10 053	35 740	4 733	11 532	209 642
Gross inland consumption per capita (toe/person) (toe/person)	**1,51**	**0,92**	**2,63**	**1,00**	**0,60**	**0,39**	**0,98**	**1,05**

** Source: World Bank - UN*



Indicator 7: Primary Energy intensity

Formula: gross inland consumption of energy divided by gross domestic product (GDP) expressed in kgoe per unit of GDP.

Gross inland consumption per unit of GDP (2017, kgoe per thousand constant 2010 US$)

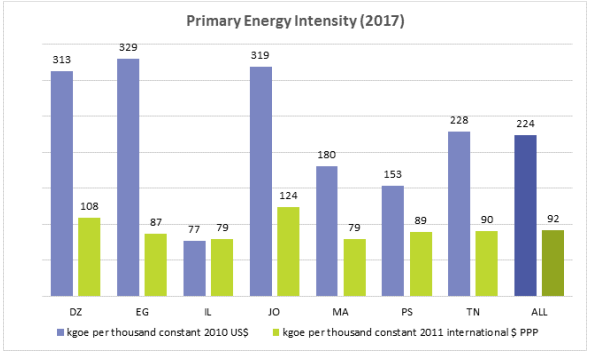
	DZ	EG	IL	JO	MA	PS	TN	ALL
Gross inland consumption (ktoe)	62 276	89 519	22 909	10 009	21 535	1 858	11 315	219 421
GDP (million constant 2010 US$)*	199 171	271 710	297 396	31 419	119 347	12 137	49 634	980 813
kgoe per thousand constant 2010 US$	**313**	**329**	**77**	**319**	**180**	**153**	**228**	**224**

** Source: World Bank*

Gross inland consumption per unit of GDP (2017, kgoe per constant 2011 international $ PPP)

	DZ	EG	IL	JO	MA	PS	TN	ALL
Gross inland consumption (ktoe)	62 276	89 519	22 909	10 009	21 535	1 858	11 315	219 421
GDP (million, constant 2011	574 329	1 029 313	288 662	80 893	271 322	20 847	125 115	2 390 481
kgoe per thousand constant 2011 international $ PPP	**108**	**87**	**79**	**124**	**79**	**89**	**90**	**92**

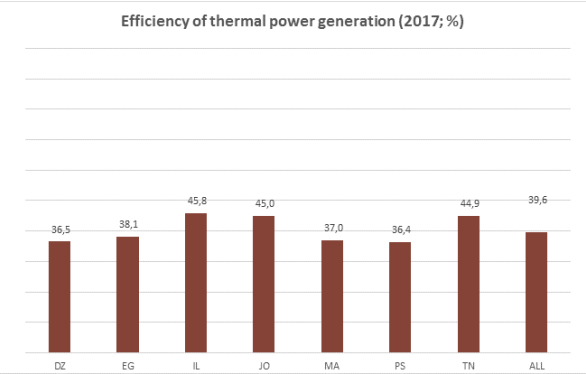
** Source: World Bank*



Indicator 8: Efficiency of thermal power generation in %

Formula: Transformation Output for thermal power divided by Transformation Input for thermal power, expressed as a percentage

	DZ	EG	IL	JO	MA	PS	TN	ALL
Transformation Input for thermal power (ktoe)	17 743	35 940	12 694	3 835	6 337	118	3 825	**80 492**
Transformation Output for thermal power (ktoe)	6 483	13 707	5 820	1 725	2 347	43	1 719	**31 844**
Efficiency of thermal power generation in %	**36,5**	**38,1**	**45,8**	**45,0**	**37,0**	**36,4**	**44,9**	**39,6**



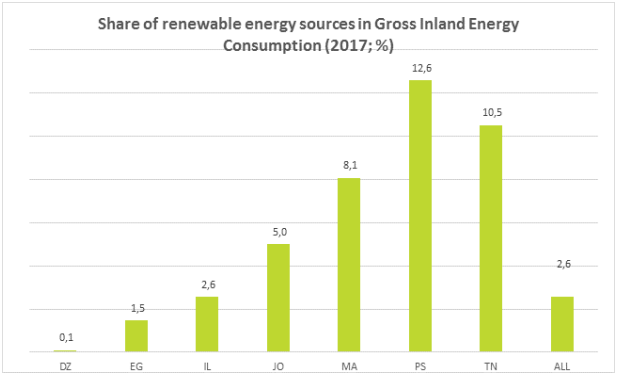
RENEWABLE ENERGY

Indicator 11: Share of renewable energy sources in Gross Inland Energy Consumption (%)

Formula: gross inland consumption of energy from renewable sources divided by the total (primary) Gross Inland Energy Consumption, expressed

Share of renewable energy sources in Gross Inland Energy Consumption (2017; %)

	DZ	EG	IL	JO	MA	PS	TN	ALL
Gross inland consumption from renewable energy (ktoe)	63	1 308	585	499	1 736	234	1 190	**5 614**
Total gross inland consumption (ktoe)	62 276	89 519	22 909	10 009	21 535	1 858	11 315	**219 421**
Share of renewable energy sources (%)	**0,1**	**1,5**	**2,6**	**5,0**	**8,1**	**12,6**	**10,5**	**2,6**



Trend analysis

The seven MEDSTAT Partner Countries for which energy balances are available offer a great variety of situations in terms of supply, transformation and consumption of energy. One important difference between countries is the availability of fossil fuel resources such as crude oil and natural gas. Looking at indicator 2, Algeria and Egypt stand out as large producers of oil and natural gas. Israel and Tunisia produce natural gas, and in the case of Tunisia, oil as well; but in much smaller quantities than Algeria and Egypt. In contrast, Palestine, Morocco and Jordan produce little or no fossil fuels. The region doesn't have a notable production of solid fossil fuels (e.g. coal or lignite).

Indicator 2: Total Primary Production (2013-2017; ktoe)

	2013	2014	2015	2016	2017	CAGR (%)
DZ	149 717	154 834	154 387	165 683	165 321	**2,5**
EG	85 493	80 176	76 297	71 732	73 069	**-3,8**
IL	5 882	6 930	7 591	8 563	8 990	**11,2**
JO	273	266	305	510	582	**20,8**
MA	2 154	2 083	2 156	2 224	2 210	**0,6**
PS	244	280	274	294	237	**-0,7**
TN	7 303	6 751	6 400	6 048	5 533	**-6,7**
ALL	**251 066**	**251 321**	**247 408**	**255 055**	**255 943**	**0,5**

The Gross Inland Consumption[11] block of the energy balance shows how countries ensure that their total energy supply is met through domestic primary production or imports. This primary energy demand takes place before any transformation is carried out in refineries, power plants or other energy transformation installations. With the exception of Israel (+0,6% per year), Total Gross Inland Consumption (indicator 1) rose steadily over the 2013-2017 period with Palestine and Jordan experiencing annual growth rates above 5%.

Indicator 1: Total Gross Inland Consumption (2013-2017, ktoe)

	2013	2014	2015	2016	2017	CAGR (%)
DZ	54 163	60 311	58 474	59 869	62 276	**3,6**
EG	79 591	79 775	82 751	81 872	89 519	**3,0**
IL	22 390	21 501	22 717	23 065	22 903	**0,6**
JO	8 157	8 461	8 944	9 615	10 009	**5,2**
MA	19 583	19 897	20 530	20 565	21 535	**2,4**
PS	1 507	1 697	1 788	1 899	1 858	**5,4**
TN	10 418	10 594	10 932	11 011	11 315	**2,1**
ALL	**195 809**	**202 236**	**206 137**	**207 895**	**219 414**	**2,9**

[11] Or "Total Primary Energy Supply" in other classifications of energy flows such as IEA's

The diversity of situations is reflected in the dependency rate for each country (indicator 4). This indicator shows the extent to which an economy relies upon imports of primary (e.g. crude oil) or secondary energy products (e.g. petroleum products) in order to meet its energy needs. Algeria displays a negative dependency rate (-165% in 2017) because it is a net exporter of energy. Egypt moved from being a net exporter of energy in 2013 to a net importer over the period 2014-2017 as a result of rising energy demand and lower production levels. It is expected that Egypt's dependency rate will see its recent trend reversed with the production coming from Zohr, a new large offshore natural gas field. The production of oil and/or gas in Israel and Tunisia contributed to mid-range dependency rate, respectively 65,8% and 51,3%. However, the two countries register opposite trends due to rising natural gas production in Israel and dwindling oil and gas production in Tunisia. Palestine, Jordan and Morocco exhibit high dependency rates due to the lack of domestic primary fossil energy resources. However, in the case of Morocco and Jordan, the dependency rate is decreasing because of the development of renewable energy sources. In Palestine, the deteriorating dependency rate is caused by a decreasing use of solar water heaters in a context of rising demand.

Indicator 4: Energy dependency rate (2013-2017; %)

	2013	2014	2015	2016	2017	Variation (% points)
DZ	(174,8)	(157,0)	(160,4)	(175,6)	(164,9)	**9,9**
EG	(5,8)	0,6	8,8	12,9	18,8	**24,6**
IL	76,3	69,7	69,6	61,7	65,8	**(10,4)**
JO	93,6	98,2	97,8	92,4	91,5	**(2,1)**
MA	94,4	97,1	90,7	89,6	89,9	**(4,5)**
PS	83,8	80,2	84,7	84,7	87,4	**3,6**
TN	32,3	38,1	44,1	46,6	51,3	**19,0**

The transformation block of energy balances provides useful information on the transformation of primary energy sources (e.g. crude oil or natural gas) into secondary energy products (e.g. diesel, gasoline, electricity or heat); that is in energy forms suitable for final energy consumption. Most of the transformation activity takes place in refineries or power plants. Indicator 8 informs about the average efficiency of thermal power plants. Tunisia, Jordan and Israel have the most efficient fleets of thermal power plants with an average 45% efficiency. Morocco, Egypt, Algeria and Palestine have lower efficiencies, between 36,4% and 38,1%. Differences can be explained by the average structure and age of the fleet of thermal plants. Recent technologies have better nameplate efficiency levels and gas-fired technologies, in particular CCGTs[12], have higher efficiencies than oil and coal fired power plants. The data for Palestine are highly dependent on the operational situation of the thermal power plant located in Gaza.

[12] Combined Cycle Gas Turbine

Indicator 8: Efficiency of thermal power generation (2013-2017; %)

	2013	2014	2015	2016	2017	Variation (% points)
DZ	39,4	38,8	34,3	35,9	36,5	**(2,8)**
EG	37,2	41,9	41,2	37,6	38,1	**0,9**
IL	42,6	44,2	45,1	46,0	45,8	**3,3**
JO	40,4	42,2	41,0	43,5	45,0	**4,6**
MA	37,9	36,9	36,3	37,0	37,0	**(0,8)**
PS	40,0	68,6	41,5	39,6	36,4	**(3,6)**
TN	41,6	40,5	42,0	44,3	44,9	**3,4**

Total Final Energy Consumption (FEC) by country and by energy product is shown in indicator 3[13]. The FEC structure is dominated by fossil fuels in all countries whose share ranges between 60,7% in Israel and 80,6% in Algeria. The share of electricity, itself produced mostly from fossil fuels, and the penetration of renewable energy sources in end-uses, explain these differences.

Indicator 3: Total Final Energy Consumption (2013-2017; ktoe)

	2013	2014	2015	2016	2017	CAGR (%)
DZ	30 937	32 229	34 766	34 816	36 174	**4,0**
EG	58 867	58 391	56 712	58 892	61 841	**1,2**
IL	14 035	14 078	14 860	15 116	15 393	**2,3**
JO	5 354	5 485	5 800	6 467	6 810	**6,2**
MA	14 660	14 705	15 220	15 489	16 283	**2,7**
PS	1 251	1 593	1 586	1 674	1 624	**6,8**
TN	7 132,6	7 416,2	7 593,2	7 704,9	8 054	**3,1**
ALL	**132 236**	**133 896**	**136 536**	**140 159**	**146 180**	**2,5**

Israel and Algeria have the highest energy consumption (primary and final) per capita while Morocco and Palestine have the lowest (see indicators 6 and 9). In general terms, the higher the GDP per Capita, the higher the consumption of primary or final energy per capita. However economic structures also play an important role in explaining energy consumption levels per capita. Economies with large energy intensive industries (e.g. Algeria, Egypt) will tend to consume, all else being equal, more energy than economies in which the services sector is more important (e.g. Israel, Palestine).

[13] See detailed version of the indicator in Volume 2

Indicator 6: Primary energy consumption per capita (2013-2017; toe/person)

	2013	2014	2015	2016	2017	CAGR (%)
DZ	1,4	1,5	1,5	1,5	1,5	**1,6**
EG	0,9	0,9	0,9	0,9	0,9	**0,9**
IL	2,8	2,6	2,7	2,7	2,6	**-1,4**
JO	1,0	1,0	1,0	1,0	1,0	**0,7**
MA	0,6	0,6	0,6	0,6	0,6	**1,0**
PS	0,3	0,4	0,4	0,4	0,4	**3,0**
TN	0,9	1,0	1,0	1,0	1,0	**0,9**

Another way to look at energy intensity is to consider the ratio between primary energy use and GDP expressed in constant monetary terms in order to eliminate price effects (indicator 7). With respectively 77, 153 and 180 kgoe per thousand constant 2010 US dollar of GDP, Israel, Palestine and Morocco are the least energy intensive economies of the MEDSTAT region. In comparison, with primary energy demand at respectively 313, 319 and 329 kgoe per thousand constant 2010 US dollar of GDP, the economies of Algeria, Jordan and Egypt are the most energy intensive. Adjusted for differences in price levels across countries, GDP can be expressed in power purchasing parities (ppp). Differences are much less important with GDP expressed in ppp but the ranking of MEDSTAT's economies according to energy intensity remains more or less the same with Algeria and Jordan being the most energy intensive economies.

Indicator 7: Primary Energy intensity (2013-2017; kgoe per thousand constant 2010 US$)

	2013	2014	2015	2016	2017	CAGR (%)
DZ	307	330	308	305	313	**0,4**
EG	342	333	331	314	329	**-0,9**
IL	86	80	82	80	77	**-2,8**
JO	285	287	296	312	319	**2,8**
MA	185	183	181	179	180	**-0,7**
PS	138	156	159	161	153	**2,5**
TN	225	223	227	226	228	**0,3**

Another important difference across MEDSTAT countries is the penetration of renewable energy sources (RES) in the overall energy mix. Expressed as the share of RES in the Gross Inland Energy Consumption, RES represents almost 12,6% of primary energy demand in Palestine but very little in Algeria (0,1% only).

Indicator 11: Share of renewable energy sources in Gross Inland Energy Consumption (2013-2017; %)

	2013	2014	2015	2016	2017	Variation (% points)
DZ	0,1	0,1	0,0	0,1	0,1	**0,0**
EG	1,6	1,6	1,6	1,6	1,5	**(0,1)**
IL	1,8	2,1	2,2	2,5	2,6	**0,8**
JO	2,0	2,0	2,3	4,4	5,2	**3,2**
MA	8,5	8,0	8,2	8,5	8,1	**(0,4)**
PS	16,4	16,7	15,8	15,4	12,6	**(3,8)**
TN	11,1	11,1	10,7	10,8	10,5	**(0,5)**

Trends over the last five years of available data are sobering with only Jordan, and to a lesser extent Israel, showing progress in the uptake of RES. Countries showing negative variations face a situation in which the increase in RES is not strong enough to keep up with the increase of primary energy demand.

List of Acronyms and Abbreviations

BSC	Bureau of Statistics and Census (Libya)
CAGR	Compound annual growth rate
CAPI	Computer Assisted Personal Interview
CAPMAS	Central Agency for Public Mobilisation and Statistics (Egypt)
CAS	Central Administration for Statistics (Lebanon)
CATI	Computer Assisted Telephone Interview
CBS	Central Bureau of Statistics
CCGT	Combined Cycle Gas Turbine
CIRCABC	Communication and Information Resource Centre for Administrations, Businesses and Citizens (EC portal)
CSO	Central Statistical Office
DoS	Department of Statistics (Jordan)
EB	Energy Balance
EC	European Commission (EU)
EMWG	Euro-Mediterranean Working Group
EMWG-ES	Euro-Mediterranean Working Group on Energy Statistics
ENP-South	European Neighbourhood Policy for the South Region
ESCM	Energy Statistics Compilers Manual
EU	European Union
Eurostat	Statistical Office of the European Commission
FEC	Final Energy Consumption
GDP	Gross Domestic Product
GWh	Gigawatt Hour
HCP	Haut Commissariat au Plan (High Commission for Planning, Morocco)
ICBS	Israeli Central Bureau of Statistics
IEA	International Energy Agency
INS	Institut National de la Statistique, Tunisie (National Statistical Institute, Tunisia)
IRES	International Recommendations for Energy Statistics
ISIC	International Standard Industrial Classification of all economic activities
Kgoe	Kilogram of oil equivalent
Ktoe	Kiloton of oil equivalent
kWh	Kilowatt Hour
MEDSTAT	Euro-Mediterranean Statistical Cooperation (EC cooperation programme)
NACE Rev. 2	Statistical classification of economic activities
Mtoe	Million ton of oil equivalent
MW	Megawatt
NSI	National Statistical Institute
ONS	Office National des Statistiques, Algérie (National Office of Statistics, Algeria)
PCBS	Palestinian Central Bureau of Statistics
PPP	Power Purchasing Parities

RES	Renewable Energy Sources
Toe	Ton of oil equivalent
TWh	Terawatt hour
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UN-ESCWA	United Nations Economic and Social Commission for Western Asia
UNSD	United Nations Statistics Division

ENP SOUTH COUNTRY CODES

DZ	Algeria
EG	Egypt
IL	Israel
JO	Jordan
LB	Lebanon
LY	Libya
MA	Morocco
PS	Palestine
SY	Syria
TN	Tunisia

MORE INFORMATION ON MEDSTAT IV

Official MEDSTAT IV pages on the Eurostat web site:
https://ec.europa.eu/eurostat/statistics-explained/index.php/MEDSTAT_programme

MEDSTAT IV on EU Neighbours South:
https://www.euneighbours.eu/en/south/stay-informed/projects/medstat-iv-euro-mediterranean-statistical-cooperation

MORE INFORMATION ON STATISTICS IN THE ENP-S COUNTRIES

Algeria: http://www.ons.dz/
Egypt: https://www.capmas.gov.eg/
Israel: http://www.cbs.gov.il/reader/cw_usr_view_Folder?ID=141
Jordan: http://dosweb.dos.gov.jo/
Lebanon: http://www.cas.gov.lb/
Libya: http://www.bsc.ly
Morocco: https://www.hcp.ma/
Palestine: http://www.pcbs.gov.ps/site/lang__en/1/default.aspx
Tunisia: http://www.ins.nat.tn/

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MEDSTAT IV

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