



مركز الإحصاء  
STATISTICS CENTRE

# Energy and Water Statistics

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## Introduction

This publication presents statistics of energy and water in the Emirate of Abu Dhabi for the year 2016, comprising statistics of the water and electricity production sector, oil and gas sector, and renewable energy sector. The main sources for these statistics are Abu Dhabi Water and Electricity Authority – ADWEA, Abu Dhabi Water and Electricity Company, Abu Dhabi Distribution Company, Al Ain Distribution Company, Abu Dhabi National Oil Company – ADNOC, TAKREER, and Abu Dhabi Future Energy Company – Masdar.

The Explanatory Notes section at the end of this publication provides an explanation of the key terms and technical concepts used in the compilation of energy and water statistics. Readers are encouraged to refer to that section while reading the statistics and information outlined in the publication.

## Water and electricity statistics

The water and electricity production sector has a great significance among the various economic sectors, given its big role in the provision of basic services that are necessary for Citizens and Non-Citizens' consumption in addition to other economic activities. Therefore, the Emirate of Abu Dhabi pays particular attention to the development of this sector.

The "Water and Electricity" sector saw a remarkable growth after establishing the Abu Dhabi Water and Electricity Authority (ADWEA) in March 1998, a public supervisory body responsible for implementing government policy regarding the water and electricity sector in the Emirate.

ADWEA is serving about 2.9 million inhabitants in the Emirate of Abu Dhabi, living over approximately 67,340 square kilometers, and equivalent to 87 % of the total area of the United Arab Emirates. In 2016, the total electricity production in the Emirate of Abu Dhabi was equivalent to 15,220 MW, while the total capacity of water desalination was approximately 908 million gallons per day.

### Electricity generation

In 2016, the total electricity production by companies was 68,183 GWh, an increase of 168.2% during the whole period since 2005, of which about 6374.7 GWh were transferred to the Northern Emirates, as shown in table (1.1). Electricity consumption in Abu Dhabi Emirate also increased by 162.8 % during the aforesaid period reaching a total consumption of 66,810 GWh in 2016, including internal electrical consumption by power stations and technical losses through the network.

**Table 1.1: Electrical power statistics**  
(MWh)

Item	2005	2011	2012	2013	2014	2015	2016
Total electricity production by companies***	25,423,723	46,314,248	50,378,419	51,936,813	58,342,545	66,626,469	68,183,363
Net electricity transferred from EMAL & TAKREER	139	52,655	2,828	27,982	11,802	-4,378,464	-7,747,290
<b>Total Electricity available</b>	<b>25,423,862</b>	<b>46,366,903</b>	<b>50,381,247</b>	<b>51,964,795</b>	<b>58,354,347</b>	<b>62,248,005</b>	<b>60,436,073</b>
Electricity exports to northern emirates****	-	3,115,984	3,264,421	2,698,226	5,513,310	731065-	-6,374,748
Electricity consumption in the emirate of AD *	25,423,862	43,250,919	47,116,826	49,266,569	52,841,037	62,979,070	66,810,821
Electrical consumption per capita**	18.5	20.01	20.35	19.77	19.89	22.62	22.97
Electricity planned capacity (MW)	7,242	10,875	10,867	10,917	12,571	12,571	15,220

Source: Abu Dhabi Water and Electricity Company

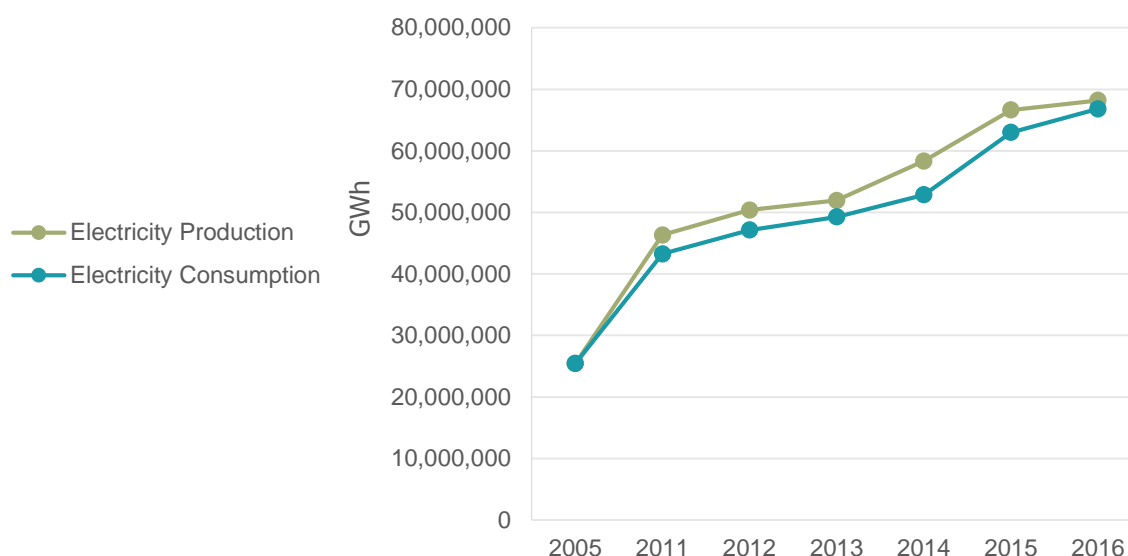
\*Consumption includes internal electrical consumption by power stations & technical losses through the network

\*\* Per capita statistics has been updated as a result of updates on population estimates in the Emirate of Abu Dhabi 2006- 2016.

\*\*\* Solar power data are included since 2015.

\*\*\*\* 2015 and 2016 represents the electrical Energy imported resulting from (Net export= exports – imports).

**Figure (1): Electrical energy production and consumption\***



Source: Abu Dhabi Water and Electricity Company

\*Consumption includes internal electrical consumption by power stations & technical losses through the network

### Fuel consumption of the water and electricity activity

The demand for electricity and water production increases due to population and economic growth, leading to an increased demand for fuel associated with the production of electricity. Power plants use different types of fuel to generate electricity, such as natural gas, crude oil, gas oil (diesel), and fuel oil. Due to economic and environmental considerations, natural gas is the main fuel used in power generation in the Emirate of Abu Dhabi, constituting 99.9 % of the total fuel types used. In 2016, total fuel consumption in power plants decreased by 0.83% compared with 2015, reaching a total of 685,680 Billion BTU, as shown in table 1.2.

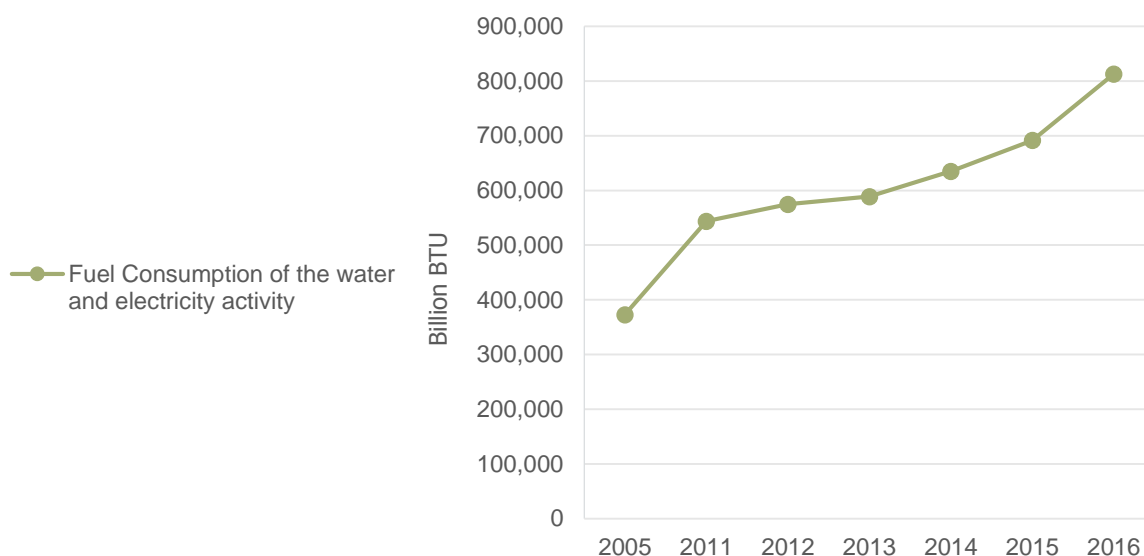
**Table 1.2: Fuel Consumption of the water and electricity activity**

(Billion BTU)

Fuel type	2005	2011	2012	2013	2014	2015	2016
<b>Total</b>	<b>372,818</b>	<b>543,643</b>	<b>574,709</b>	<b>588,794</b>	<b>634,974</b>	<b>691,471</b>	<b>685,680</b>
<b>Natural gas</b>	370,973	528,114	574,499	587,905	633,862	689,368	685,345
<b>Crude oil</b>	1,287	6,062	0	0	0.9	984	110
<b>Gas oil</b>	557	9,467	210	889	1,110	1,119	225
<b>Fuel oil</b>	1	-	-	-	-	-	-

Source: Abu Dhabi Water and Electricity Company

**Figure (2): Fuel Consumption of the water and electricity activity**



Source: Abu Dhabi Water and Electricity Company

### Electricity generated by solar energy

By the end of 2016, electricity production from solar energy reached about 280,085 MWh, representing a growth rate of 6.1% compared with 2015. The distribution network in Abu Dhabi Emirate received 89.2% of solar energy production, while 11% was consumed internally by Masdar city.

**Table 1.3: Electricity Generation and Consumption from Solar Energy**

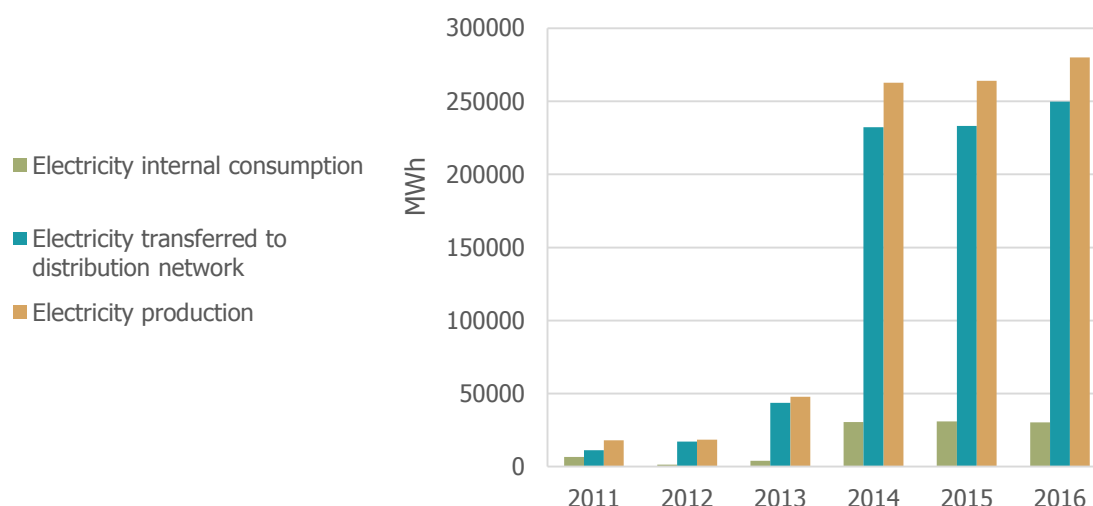
(MWh)

Item	2011	2012	2013	2014	2015	2016
Electricity internal consumption	6,695	1,455	4,069	30,439	30,867	30,360
Electricity transferred to distribution network	11,291	17,131	43,754	232,228	233,147	249,725
<b>Production</b>	<b>17,986</b>	<b>18,586</b>	<b>47,823</b>	<b>262,667</b>	<b>264,014</b>	<b>280,085</b>

Source: Abu Dhabi Future Energy Company – Masdar



**Figure (3): Production and internal consumption of solar energy plants**



Source: Abu Dhabi Water and Electricity Company

### Electricity consumption

The data presented in table (1.4) shows that electricity consumption in Abu Dhabi Emirate reached 66,810 GHW in 2016. Abu Dhabi region consumed the largest share 58.6%, followed by Al Dhafra 23.4% and Al Ain 18.0%.

The Commercial sector consumed 52.1 % of the total, as shown in table (1.5), followed by the Domestic sector with 25.6% and Industry sector with 9.8 %. Some large industrial establishments contribute in providing the network with their excess of electricity, as they have their own power plants e.g. TAKREER, Emal and some other oil production companies.

**Table 1.4: Electricity consumption by region**

(MWh)

Region	2005	2011	2012	2013	2014	2015	2016
<b>Total Consumption *</b>	<b>25,423,862</b>	<b>43,250,919</b>	<b>47,116,826</b>	<b>49,266,569</b>	<b>52,841,037</b>	<b>62,979,070</b>	<b>66,810,821</b>
<b>Abu Dhabi</b>	16,158,411	26,897,768	29,237,489	30,560,312	32,575,456	37,345,510	39,154,003
<b>Al Ain</b>	6,849,131	9,341,749	9,816,642	9,736,976	10,390,745	11,802,149	12,051,168
<b>Al Dhafra</b>	2,416,320	7,011,402	8,062,695	8,969,281	9,874,836	13,831,411	15,605,650

Source: Abu Dhabi Distribution Company and Al Ain Distribution Company

\*Consumption includes internal electrical consumption by power stations and technical losses through the network

**Table 1.5: Percentage of electricity consumption by sector**

(%)

Sector	2007	2012	2013	2014	2015	2016
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100*</b>
Domestic	45.3	30.5	29.9	29.4	26.9	25.6
Commercial	29.2	29.8	30	30.2	48.2	52.1
Government	17.4	23.9	24.1	24.7	9.3	6.6
Agriculture	7.1	6.1	5.6	5.4	5.7	5.7
Industry	0.2	9.3	9.7	10	9.7	9.8
Other Sectors	0.8	0.3	0.7	0.4	0.3	0.1

Source: Abu Dhabi Distribution Company, Al Ain Distribution Company

Note: New meters were installed from 2008 and the cumulative reading of those meter were billed in 2011 for Al Dhafra (Al Marfa)

\*The sum of the individual sectors may not add to 100 due to rounding.

**Table 1.6: Percentage of electricity consumption by region and sector - 2016**

(%)

Sector	Abu Dhabi	Al Ain	Al Dhafra	Total
Domestic	63.2	29.4	7.4	100
Commercial	65.3	9.4	25.3	100
Government	68	24.5	7.5	100
Agriculture	11.7	63.1	25.2	100
Industry	69.7	14.7	15.6	100
Other Sectors	33.9	60.1	6	100

Source: Abu Dhabi Distribution Company, Al Ain Distribution Company

## Production of desalinated water

Table (1.7) shows the production of desalinated water in Abu Dhabi Emirate, which reached 1228.5 MCM in 2016, an increase of 65.4%, compared with 2005, and an increase of 5.0% compared with 2015.

**Table 1.7: Production of desalinated water**

(Million cubic meters)

Item	2005	2011	2012	2013	2014	2015	2016
Total of available desalinated water	742.7	1,000.0	1,085.7	1,113.2	1,152.4	1,170.5	1228.5
Production	637.5	855.3	884.2	901.1	924.7	936.5	886.8
Supply from Al - Fujairah station	105.3	144.7	201.5	212.1	227.6	234.1	341.8

Source: Abu Dhabi Water and Electricity Company

## Consumption of desalinated water

Table (1.8) shows the annual consumption of desalinated water in Abu Dhabi Emirate reaching about 1,116 MCM in 2016, with a daily average consumption of 3.05 MCM and a daily per capita average consumption of 1.10 cubic meters. Abu Dhabi region consumed the most desalinated water in the emirate, about 60.5 % of the total water consumed followed by Al Ain and Al Dafra regions with 26.6% and 12.9% respectively.

**Table 1.8: Consumption of desalinated water**

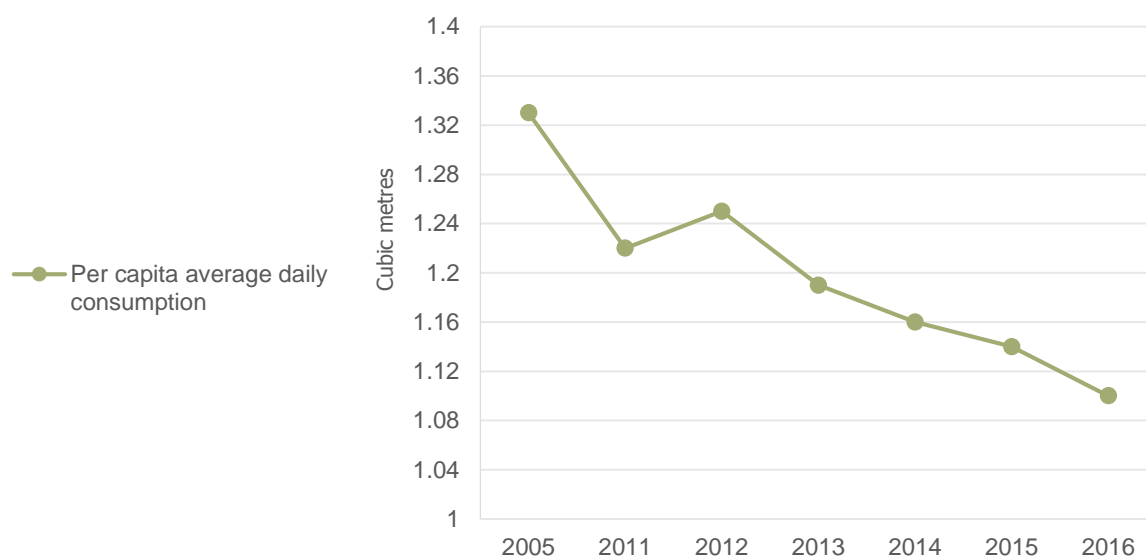
(Million cubic meters)

Year	Annual consumption	Average daily consumption	Average daily consumption per capita*
2005	667.1	1.83	1.33
2011	962.4	2.64	1.22
2012	1,060.1	2.90	1.25
2013	1,083.5	2.97	1.19
2014	1,128.8	3.09	1.16
2015	1,154.6	3.16	1.14
2016	1,116.0	3.05	1.10

Source: Abu Dhabi Water and Electricity Company; Statistics Centre -Abu Dhabi

\*Per capita statistics were updated as a result of updates on population estimates in the Emirate of Abu Dhabi 2006- 2016

**Figure (4): Per capita average daily consumption of desalinated water**



Source: Statistics Center – Abu Dhabi

\* Per capita statistics were updated as a result of updates on population estimates in the Emirate of Abu Dhabi 2006- 2016

**Table 1.9: Percentage of desalinated water consumption by region and sector – 2016**  
(%)

Sector	Abu Dhabi	Al Ain	Al Dhafra
Domestic	71.2	27.6	1.2
Commercial	82.3	16.5	1.2
Government	72.0	25.8	2.1
Agriculture	51.0	48.6	0.4
Industry	75.3	24.6	0.1
Other Sectors	0.0	100.0	0.0

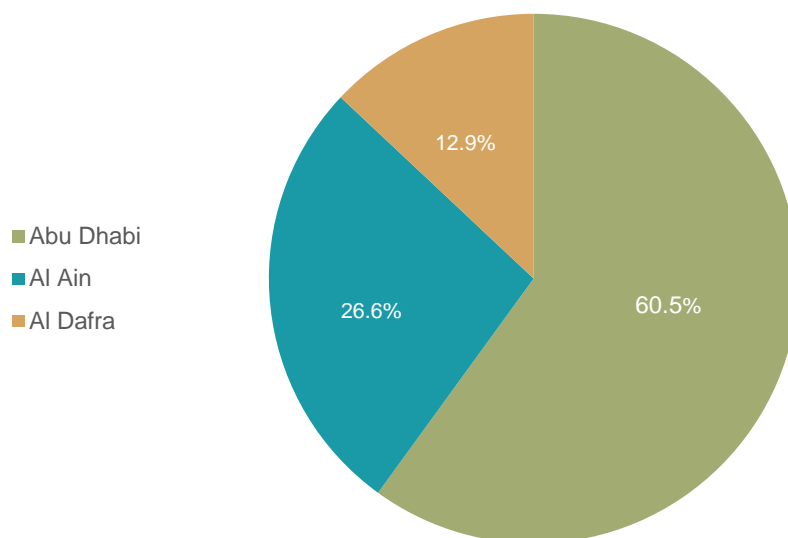
Source: Abu Dhabi Distribution Company, Al Ain Distribution Company

**Table 1.10: Consumption of desalinated water by region**  
(Million cubic meters)

Region	2005	2011	2012	2013	2014	2015	2016
Total consumption	667.6	962.4	1060.1	1083.5	1128.8	1154.6	1116.0
Abu Dhabi	414.3	593.1	653.6	657.5	683.9	695.1	675.6
Al Ain	161.3	259.3	286.6	293.4	294.4	316.7	296.7
Al Dhafra	92.0	110.0	119.9	132.6	150.5	142.8	143.7

Source: Abu Dhabi Water and Electricity Company

**Figure (5): Consumption of desalinated water by region – 2016**



Source: Statistics Center – Abu Dhabi

**Table 1.11: Percentage of desalinated water consumption by sector (%)**

Sector	2008	2011	2012	2013	2014	2015	2016
Domestic	68.4	54.3	51.8	51.9	49.6	47.8	42.3
Commercial	9.6	15.7	13.7	14.0	14.7	18.9	23.4
Government	16.9	22.2	26.5	26.2	28.0	13.7	10.9
Agriculture	3.4	3.2	5.4	5.2	4.9	17.0	20.6
Industry	0.7	1.9	1.7	1.8	2.0	2.3	2.7
Other Sectors	1.1	2.7	1.0	0.9	0.7	0.3	0.2

Source: Abu Dhabi Distribution Company, Al Ain Distribution Company

Note: the sum of the individual sectors may not add to 100 due to rounding.

## Oil and Gas statistics

The Oil and gas sector is deemed to be an important pillar in the economy of Abu Dhabi as it represents a huge share of its GDP. In 2016, Abu Dhabi produced 1,104,827 thousand barrels of crude oil, of which 885,474 thousand barrels were exported. The average prices of crude oil decreased by 15.2 % in 2016 compared with 2015 reaching an average of 42.74 \$/Barrel.

### Crude oil production and exports

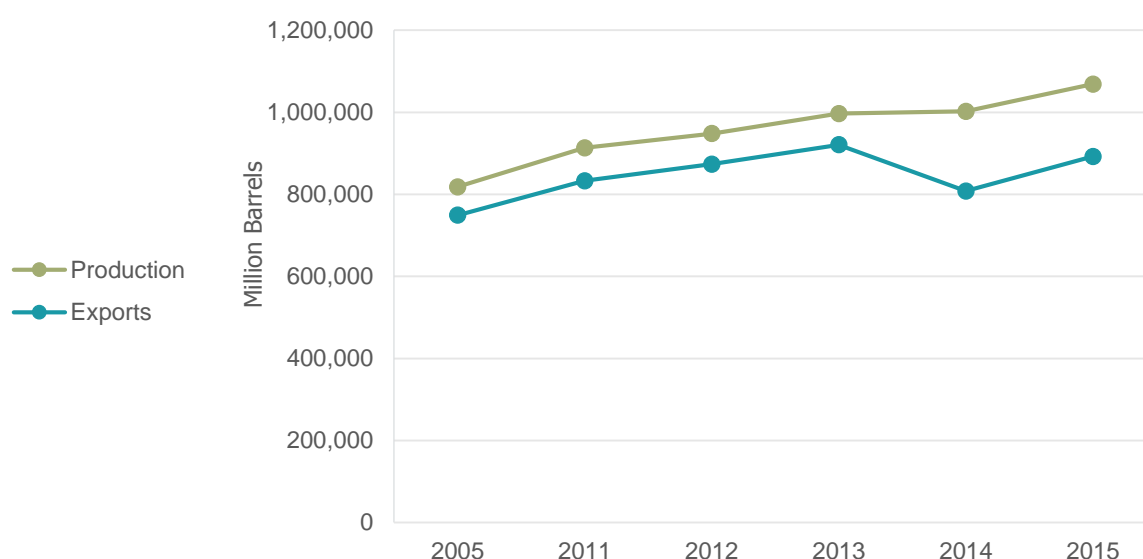
Exports of crude oil represented about 80.1% of 2016 total production as shown in table (2.1). In 2016, the total production increased by 36,252 thousand barrels, an increase of 3.4 % compared with 2015.

**Table 2.1: Crude oil production and exports**  
(Thousand barrels)

Year	Production		Exports	
	Daily average	Annual production	Daily average	Annual exports
<b>2005</b>	2,242	818,330	2,052	749,080
<b>2011</b>	2,502	913,191	2,282	833,070
<b>2012</b>	2,591	948,200	2,387	873,515
<b>2013</b>	2,731	996,928	2,522	920,687
<b>2014</b>	2,746	1,002,179	2,214	808,131
<b>2015</b>	2,928	1,068,575	2,444	892,230
<b>2016</b>	3,019	1,104,827	2,419	885,474

Source: Abu Dhabi National Oil Company - ADNOC

**Figure (6): Production and exports of crude oil**



Source: Abu Dhabi National Oil Company - ADNOC

## Crude oil prices

Figure (7) shows the average crude oil prices decreasing from 50.4 US \$ in 2015 to 42.74 US \$ in 2016.

Table (2.2) shows that the prices of all types of crude oil decreased. The crude oil produced from Murban recorded the highest price at US \$ 44.41 per Barrel.

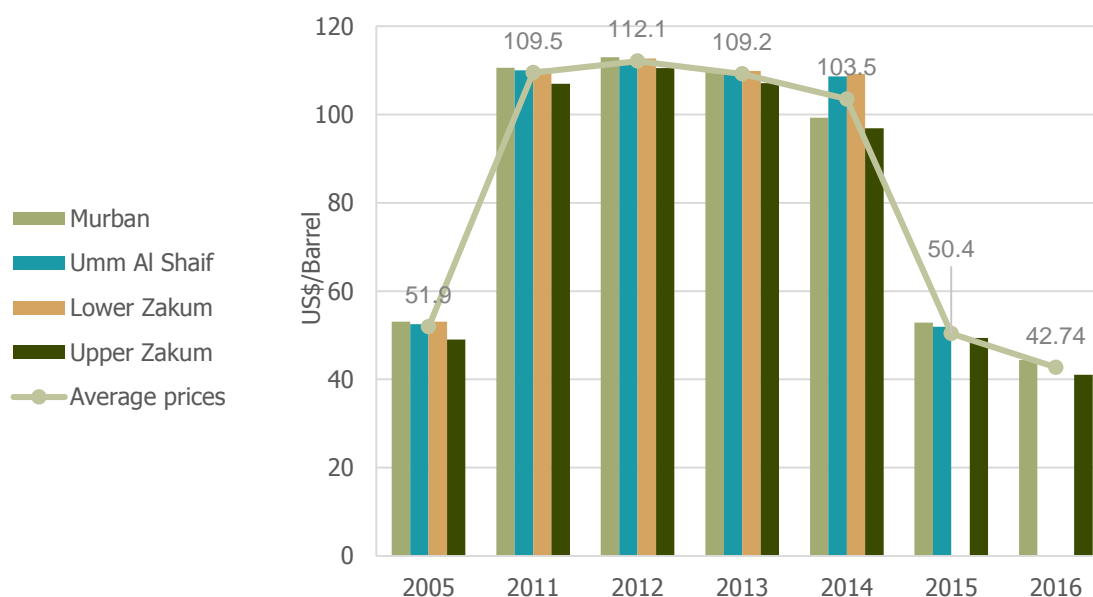
**Table 2.2: Crude oil prices by type**

(US \$/Barrel)

Type of crude	2005	2011	2012	2013	2014	2015	2016
Murban	53.1	110.6	113	110.1	99.3	52.9	44.41
Umm Al Shaif	52.5	110	112.3	109.5	108.6	51.9	-
Lower Zakum	53.1	110.4	112.7	109.9	109.2	-	-
Upper Zakum	49	107	110.5	107.1	96.9	49.44	41.08

Source: Abu Dhabi National Oil Company - ADNOC

**Figure (7): Average prices of crude oil**



Source: Abu Dhabi National Oil Company – ADNOC, Statistics Center – Abu Dhabi

## Petroleum products

Abu Dhabi's production of petroleum products increased by 24.5 % in 2016 compared with 2015. Table (2.3) shows the production of refined petroleum products.

Exports of refined petroleum products in 2016 represented 53.98% of the total production, whereas domestic sales accounted for about 40.69 % of the total production as shown in table (2.5).

**Table 2.3: Production of refined petroleum products**

(Thousand Metric Tons)

Product Type	2005	2011	2012	2013	2014	2015	2016
<b>Total*</b>	<b>17,986</b>	<b>20,702</b>	<b>20,658</b>	<b>21,516</b>	<b>21,657</b>	<b>32,522</b>	<b>40,722</b>
LPG	488	540	453	591	618	785	785
Unleaded gasoline	1,429	2,537	2,800	3,056	2,371	3,589	4,678
Naphtha	4,669	5,071	5,137	4,912	5,048	8,619.50	9,609
Jet Fuel / Kerosene	5,494	6,422	6,921	6,866	6,162	9,810	11,044
Gas Oil /diesel	4,217	5,024	4,442	4,477	4,482	7,711	9,517
Heavy fuel Oil / S.R.Residue	1,689	1,067	860	1,564	2,927	1,917	4,732
Sulfur	-	41	46	50	49	91	124
Lubricants	-	-	-	-	-	-	233

Source: Abu Dhabi National Oil Company – ADNOC, TAKREER

**Table 2.4: Domestic sales of refined petroleum products**

( Thousand Metric Tons)

Product type	Abu Dhabi Emirate				Other Emirates			
	2013	2014	2015	2016	2013	2014	2015	2016
<b>Total</b>	<b>8,589</b>	<b>8,661</b>	<b>9,312</b>	<b>9,764</b>	<b>2,396</b>	<b>1,991</b>	<b>4,063</b>	<b>6,807</b>
LPG	168	187	214	215	-	-	-	-
Unleaded gasoline	3,027	2,681	3,652	4,258	-	-	-	138
Jet fuel / Kerosene	2,139	2,572	3,003	3,149	847	675	1,233	1,822
Gas oil / diesel	3,242	3,220	2,430	2,142	404	344	1,119	2,884
Heavy fuel Oil / S.R.Residue	13	0	13	-	1,145	973	1,711	1,957
Marine Bunker	-	-	-	-	-	-	-	-
Lubricants	-	-	-	-	-	-	-	6

Source: Abu Dhabi National Oil Company – ADNOC, TAKREER



**Table 2.5: Production and domestic sales of refined petroleum products**

(Thousand Metric Tons)

Item	2005	2011	2012	2013	2014	2015	2016
<b>Production</b>							
Quantity	17,986	20,702	20,658	21,516	21,657	32,522	40,722
Daily average	49.3	56.7	56.4	58.9	59.3	89.1	111.26
<b>Domestic sales</b>							
Quantity	3,473	10,252	10,410	10,985	10,653	13,376	16,571
Daily average	9.5	28.1	28.4	30.1	29.2	36.6	45.28
<b>Exports</b>							
Quantity	11,035	10,002	10,006	10,003	8,658	19,039	21,983
Daily average	30.2	27.4	27.3	27.4	23.7	52.2	60.06
<b>Refining capacity</b> (Thousand barrels/daily)	<b>480</b>	<b>505</b>	<b>505</b>	<b>505</b>	<b>505</b>	<b>920</b>	<b>920</b>

Source: Abu Dhabi National Oil Company – ADNOC

**Table 2.6: Export of refined petroleum products**

(Thousand metric tons)

Type of Product	2005	2011	2012	2013	2014	2015	2016
<b>Total</b>	<b>11,035</b>	<b>10,002</b>	<b>10,006</b>	<b>10,003</b>	<b>8,658</b>	<b>19,039</b>	<b>21,983</b>
Naphtha	4,628	5,209	5,137	4,833	4,850	7,864	9,631
Unleaded gasoline	-	-	-	-	-	6	12
Jet Fuel / Kerosene	3,968	3,806	4,207	3,789	2,523	5,421	6,148
Gas oil / Diesel	1,783	987	572	964	713	3,704	4,529
Heavy fuel Oil / S.R.Residue	656	-	89*	417	572	2,044	1,502
Lubricants	-	-	-	-	-	-	161

Source: Abu Dhabi National Oil Company – ADNOC

\* Export price of S.R.Residue only

## Natural Gas

GASCO and ADGAS, two subsidiary companies of ADNOC, are engaged in the extraction of natural gas which has several uses in the Emirate. From natural gas, liquefied fuels and products such as propane, butane and pentane are produced, with most of it being exported. Part of fuels produced as electricity to be used in the steel, aluminum and cement industries. Some of the natural gas is injected back into oil wells in order to increase their production and maintain pressure in the oil reservoir.

**Table 2.7: Natural gas production**

(Million cubic feet)

Year	2005	2011	2012	2013	2014	2015	2016
<b>Production</b>							
Annual	2,069,550	2,305,798	2,791,815	2,756,207	2,799,202	2,733,804	2,727,711
Daily	5,670	6,317	7,628	7,551	7,669	7,490	7,453

Source: Abu Dhabi National Oil Company – ADNOC

**Table 2.8: Production and exports of liquefied natural gas products by product type**

(Thousand metric tons)

Product type	2005		2012		2013		2014		2015		2016	
	Production	Exports	Production	Exports	Production	Exports	Production	Exports	Production	Exports	Production	Exports
<b>Total</b>	<b>14,566</b>	<b>14,404</b>	<b>19,656</b>	<b>19,274</b>	<b>20,003</b>	<b>16,818</b>	<b>21,754</b>	<b>19,821</b>	<b>24,981</b>	<b>22,984</b>	<b>26,835</b>	<b>26,733</b>
LNG	5,647	5,434	5,760	5,601	5,531	5,441	6,050	5,856	5,929	5,728	5,996	5,929
Propane	3,422	3,444	4,734	4,643	4,885	3,672	5,146	4,509	5,621	4,880	5,947	5,769
Butane	3,450	3,455	4,317	4,239	4,447	3,375	4,627	4,089	5,025	4,426	5,076	4,828
Pentane (plus)	2,047	2,071	2,888	2,835	3,024	2,143	3,352	2,876	3,808	3,332	3,860	4,106
Others (Sulfur)	-	-	1,958	1,956	2,117	2,187	2,579	2,490	4,597	4,617	5,957	6,101

Source: Abu Dhabi National Oil Company -ADNOC

## Explanatory Notes

### Data sources

Data are obtained from Abu Dhabi National Oil Company – ADNOC, Abu Dhabi Water and Electricity Authority – ADWEA, Abu Dhabi Future Energy Company – Masdar, Abu Dhabi Water and Electricity Company, Abu Dhabi Distribution Company, Al Ain Distribution Company and TAKREER. The data are processed and passed to Statistic Centre – Abu Dhabi for further editing and compilation.

### Abbreviations used

\$	United States Dollars
BTU	British Thermal Unit
EMAL	Emirates Aluminium
GWh	Gigawatt per Hour
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MWh	Megawatt per Hour
TAKREER	Abu Dhabi Oil Refining Company

### Notes on tables

Value of (percent) in all tables is based on unrounded numbers.

Due to rounding, totals may not equal the sum of component parts.

Unless otherwise indicated, all tables in this publication relate to the Emirate of Abu Dhabi. However, when mentioned in table titles or within table cells "Abu Dhabi" refers only to the Region of Abu Dhabi and not the whole Emirate.

### More information and next release

For more information about energy and environment and other official statistics, please visit the statistics link on the SCAD website at <http://www.scad.ae>

The next annual release is expected in November 2018 for 2017 data.