



مركز الإحصاء  
STATISTICS CENTRE



# Environmental Statistics 2012

Issued in October 2013

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## Foreword

This report presents various environmental statistics of the Emirate of Abu Dhabi in 2012, including climate statistics, air statistics, air quality and pollutant emissions. It also contains statistics covering energy, water, food safety and occupational health as well as waste statistics. The key sources of data used in this report are the National Centre of Meteorology and Seismology, Environment Agency - Abu Dhabi, Abu Dhabi National Oil Company (ADNOC), Abu Dhabi Water and Electricity Company – ADWEC, Abu Dhabi Distribution Company, Al Ain Distribution Company, Abu Dhabi Water & Electricity Authority - ADWEA, Abu Dhabi Sewerage Services Company (ADSSC), Health Authority - Abu Dhabi (HAAD), in addition to the Centre of Waste Management - Abu Dhabi.

The "Explanatory Notes" section at the end of this report provides an explanation of the key terms and technical concepts used in this publication. Readers are encouraged to refer to that section in conjunction with reading the statistics and information outlined in the publication.

## Key Points

### 1. Climate

The National Centre of Meteorology and Seismology provides the Statistics Centre - Abu Dhabi (SCAD) with climate data from stations throughout the Emirate of Abu Dhabi. The Statistics Centre – Abu Dhabi then process it and produce climate data classified into four main areas: Abu Dhabi, Al Ain, Al Gharbia and the Islands. The Emirate of Abu Dhabi has a desert climate with high temperatures, especially in summer. Abu Dhabi is located in the dry tropical zone, where Tropic of Cancer passes in the southern part of the Emirate. Moreover, high temperature in summer causes high relative humidity, especially in coastal areas. The winter of Abu Dhabi is generally warm as temperatures drop to low levels. The Emirate suffers from scarcity of rain throughout the year. The Emirate contains different geographic provinces including coastal areas, inner desert areas in addition to highlands, where each part enjoys different temperatures. Seasonal northerly winds blow across the UAE helping to ameliorate the weather when they are not loaded with dust, in addition to the brief moisture-laden south-easterly winds. The wind often blows from south, southeast and southwest or north, northwest and northeast. Another characteristic of the Emirate's weather is the high rate of water evaporation due to several factors, including wind speed, blowing force, high temperatures and low rainfall.

#### Temperatures

Abu Dhabi climate shows variation in temperatures in each season of the year. Table (1.1) displays the change in average temperatures, where the lowest degree was 17.4 degrees Celsius and it was recorded in January in Al Ain and Al Gharbia, while the highest temperature was 37.9 degrees Celsius and it was recorded in same two regions in July. Figure (1) illustrates the average maximum and minimum temperature values in Abu Dhabi, where it shows that the average maximum temperature is 43 degrees Celsius while the minimum average temperature was less than 13 degrees Celsius in the winter. Statistical tables number (1 - 4) in the Annex display the change of temperature values and average maximum and minimum in addition to the absolute maximum and minimum for each region by month.

Chart number (1) showed the average maximum and minimum air temperature by region and month of 2012

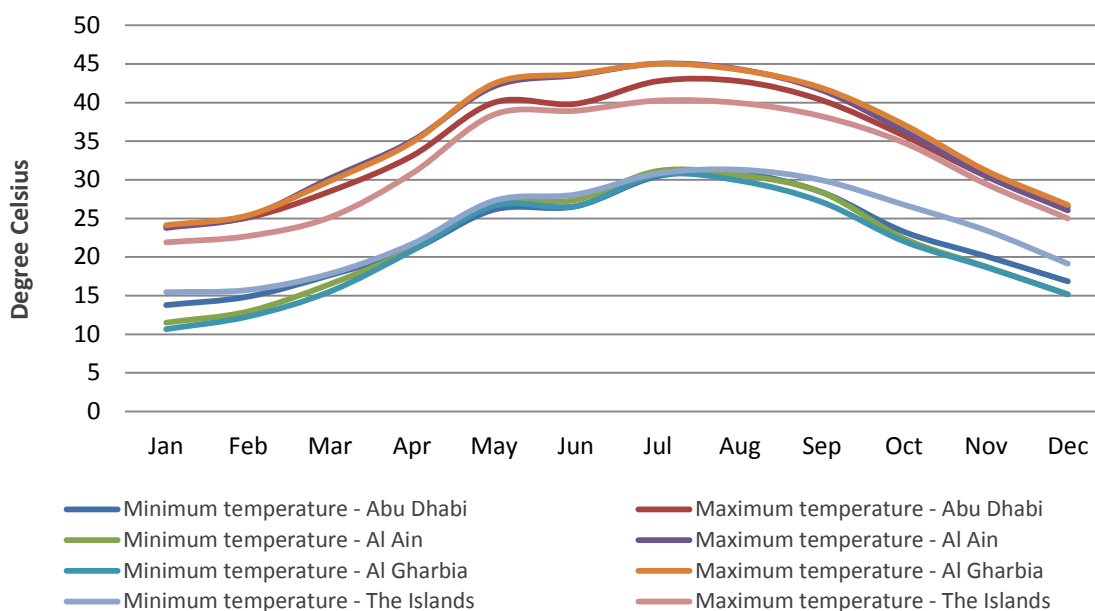
**Table (1.1): Average air temperature by region and month - 2012**

(Degree Celsius)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	18.7	17.4	17.4	18.6
February	19.9	19.0	19.0	19.1
March	22.5	23.2	22.6	21.0
April	26.5	28.1	27.9	25.8
May	32.7	34.5	34.8	32.1
June	33.0	35.6	35.5	33.0
July	36.1	37.9	37.9	35.1
August	36.0	37.2	37.1	35.2
September	34.3	34.7	34.4	33.8
October	29.4	29.3	29.8	30.6
November	25.3	24.4	25.0	26.4
December	21.7	20.3	21.0	22.2

Source: Statistics Centre- Abu Dhabi

**Chart (1): Average maximum and minimum air temperature by region and month - 2012**

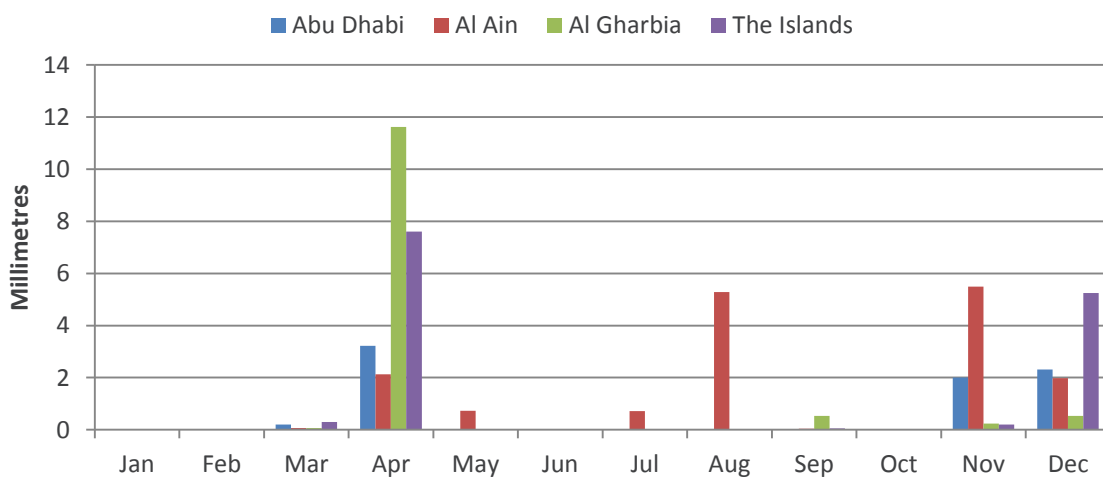


Source: Statistics Centre- Abu Dhabi

**Rainfall**

Abu Dhabi is characterized by scanty and abrupt rainfall, which occurs few times during winter time in different parts of the Emirate; it also rains during spring and summer seasons on the mountains, which are located mostly in Al Ain region. The average annual rainfall in the Emirate of Abu Dhabi declined from 21.5 mm in 2011 to 12.6 mm in 2012. Statistical tables (5) and (6) show data in details on the total monthly rainfall and heaviest rainfall in one day by month and region.

**Chart (2): Average rainfall by region and month - 2012**



Source: Statistics Centre- Abu Dhabi

## Relative humidity

Coastal areas and islands of the Emirate of Abu Dhabi have high humidity compared with inland areas. Table (1.2) displays values of relative humidity, showing the impact of geographic location and season change. The highest average relative humidity was recorded during January in the islands of the Emirate, while the lowest value was recorded in May and June in Al Ain ranging between 23.4% and 27.1%. Statistical tables (7 - 10) show absolute maximum and minimum relative humidity and its averages by month and region.

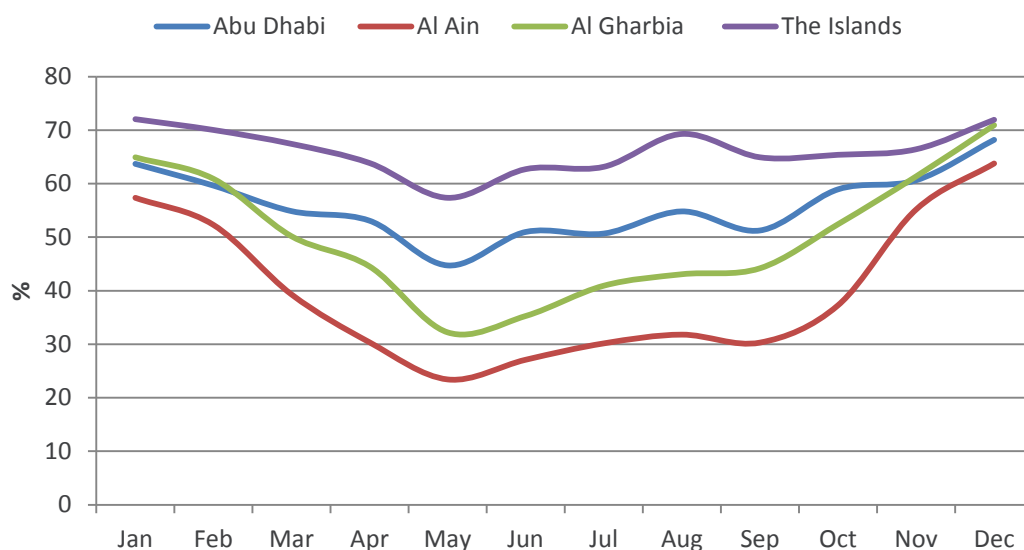
**Table (1.2): Average relative humidity by region and month - 2012**

(%)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	63.7	57.3	64.9	72.0
February	59.6	52.3	60.9	70.0
March	54.9	39.3	50.2	67.4
April	53.1	30.3	44.5	63.9
May	44.7	23.4	32.2	57.4
June	51.0	27.1	35.3	62.7
July	50.7	30.2	40.9	63.1
August	54.8	31.8	43.1	69.3
September	51.2	30.3	44.2	64.9
October	58.9	37.3	52.4	65.4
November	60.6	55.2	61.3	66.4
December	68.2	63.8	70.9	71.9

Source: Statistics Centre- Abu Dhabi

**Chart (3): Average relative humidity by region and month – 2012**



Source: Statistics Centre- Abu Dhabi

## Atmospheric Pressure

Table (1.3) reflects that the average atmospheric pressure in the Emirate of Abu Dhabi during summer season is low; the lowest value was recorded in July 2012 at 995.3 Hectopascal in Abu Dhabi region. Atmospheric pressure usually rises in winter, with the highest value recorded in January at 1018 Hectopascal in the Islands.

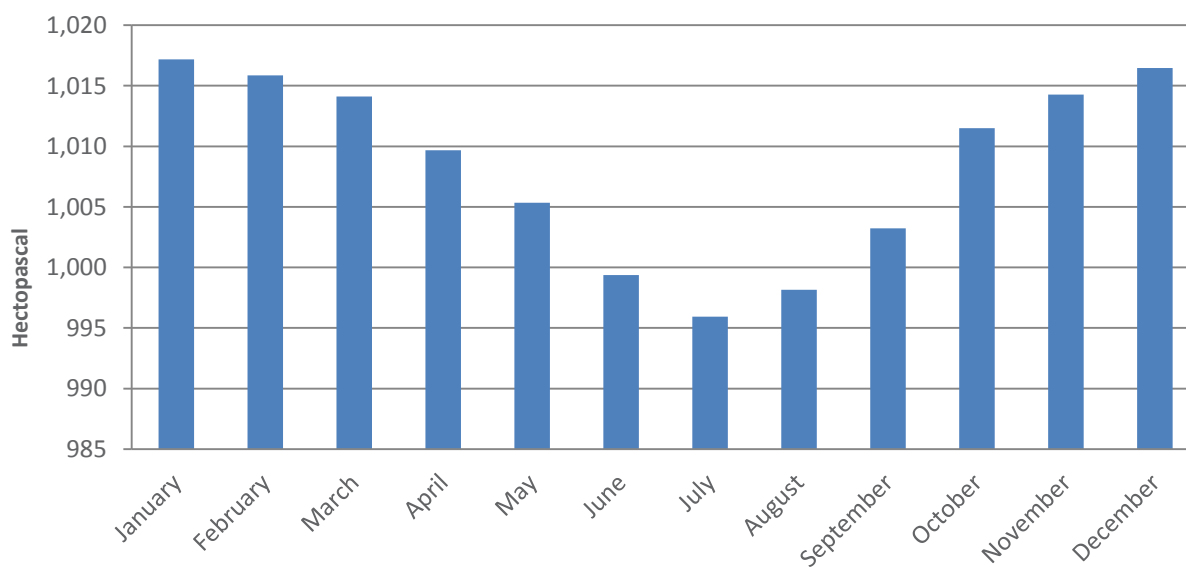
**Table (1.3): Average atmospheric pressure by region and month - 2012**

(Hectopascal)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	1,016.5	1,016.8	1,017.4	1,018.0
February	1,015.3	1,015.4	1,016.0	1,016.7
March	1,013.7	1,013.3	1,014.4	1,015.1
April	1,009.4	1,009.2	1,009.7	1,010.4
May	1,005.0	1,005.1	1,005.4	1,005.9
June	998.8	999.0	999.4	1,000.3
July	995.3	995.8	995.6	997.0
August	997.6	998.1	997.8	999.1
September	1,002.3	1,003.5	1,002.7	1,004.4
October	1,011.0	1,011.4	1,011.3	1,012.3
November	1,013.5	1,014.1	1,014.3	1,015.2
December	1,016.5	1,015.7	1,016.2	1,017.5

Source: Statistics Centre- Abu Dhabi

**Chart (4): Average atmospheric pressure by month - 2012**



Source: Statistics Centre- Abu Dhabi



## Wind Speed

The highest wind speed average in 2012 was seen in the Islands of the Emirate in March at 10.5 knots, while the lowest average was recorded in Al Ain in November at 4.8 knots, as shown in Table (1.4). Generally, there are two types of wind blowing over Abu Dhabi; the northern wind, which is dry and is mostly loaded with dust but it soothes air temperature and the eastern wind, which is short and very hot as it blows from the Empty Quarter, KSA. Non- seasonal southerly, south easterly, westerly and north westerly winds blow occasionally across the Emirate. Average wind speed is obviously higher in Abu Dhabi Islands and the open areas of Al Gharbia region than in the city of Abu Dhabi where high rise buildings and trees act as winds breaks. Statistical tables (11 - 14) show the maximum values and averages of wind speed by month and region.

**Table (1.4): Average wind speed by region and month - 2012**

(Knot\*)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	6.2	5.3	6.6	7.9
February	8.0	7.4	8.4	9.7
March	8.2	7.3	9.1	10.5
April	5.7	6.1	6.6	6.7
May	6.3	6.4	6.8	7.0
June	6.6	6.6	7.3	6.9
July	6.7	6.2	6.7	7.9
August	7.1	6.4	6.3	7.3
September	6.8	5.8	6.2	8.0
October	5.8	5.1	5.4	6.4
November	6.0	4.8	5.7	7.7
December	6.1	5.3	6.0	8.0

Source: Statistics Centre- Abu Dhabi

\*Knot = 1.15 mph

## Solar Radiation

The sky of Abu Dhabi Emirate is cloudless almost all year around, which prolongs the hours of sunshine and increases the amount of solar radiation, which is currently used to generate electrical energy from solar plants. During the 2012 summer, as shown in Table (1.5), the highest day length was 11.1 hours in Abu Dhabi region and 11.5 hours in Al Ain region. During the winter of the same year, the day length in Abu Dhabi and Al Ain regions declined to 7.6 hours and 8.5 hours, respectively. Table (1.6) illustrates the daily average of solar radiation, where the highest value was about 6,997 W / m<sup>2</sup>/ h and it was recorded in Al Ain region. Statistical tables (15 - 18) show the maximum and minimum values of daily solar radiation intensity by month and region.

**Table (1.5): Average daily sunshine in Abu Dhabi and Al Ain by month - 2012**

(Hours)

Month	Abu Dhabi	Al Ain
January	8.3	8.8
February	9.0	9.5
March	9.3	10.1
April	8.8	10.6
May	10.9	11.2
June	11.1	11.5
July	10.5	11.1
August	10.4	10.9
September	9.8	10.3
October	9.6	9.9
November	8.2	9.1
December	7.6	8.5

Source: Statistics Centre- Abu Dhabi

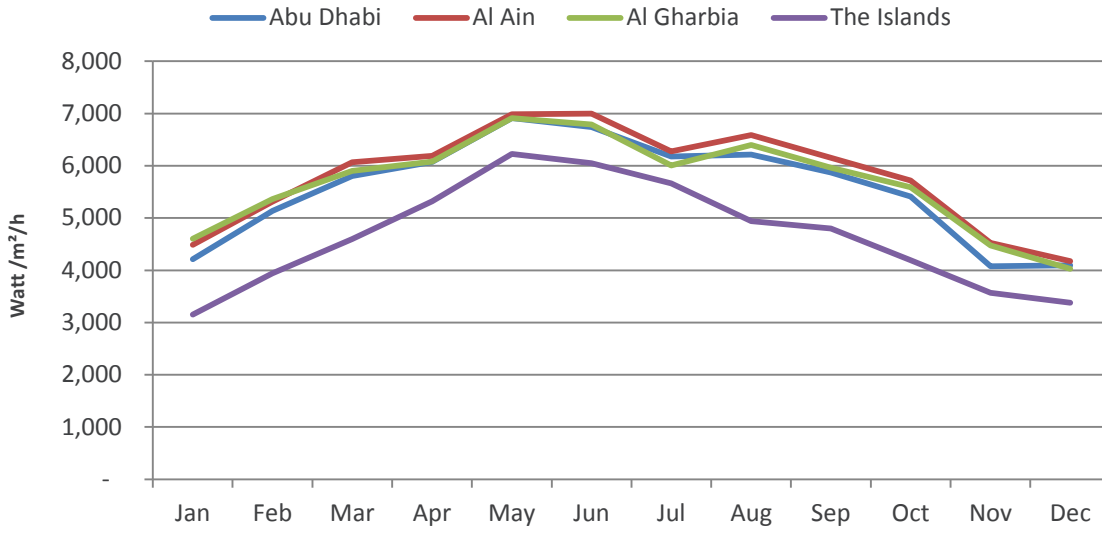
**Table (1.6): Average daily total solar radiation by region and month - 2012**

(Watt/ m<sup>2</sup>/h)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	4,211	4,488	4,605	3,153
February	5,137	5,313	5,363	3,941
March	5,804	6,065	5,899	4,597
April	6,075	6,191	6,080	5,318
May	6,909	6,988	6,912	6,227
June	6,740	6,997	6,788	6,049
July	6,176	6,276	6,003	5,661
August	6,214	6,588	6,396	4,938
September	5,868	6,155	5,961	4,802
October	5,411	5,715	5,588	4,191
November	4,077	4,526	4,478	3,567
December	4,098	4,177	4,030	3,379

Source: Statistics Centre- Abu Dhabi

Chart (5): Average daily total solar radiation by region and month - 2012



Source: Statistics Centre- Abu Dhabi

## 2. Air Statistics

The Abu Dhabi government pays tireless efforts to improve air quality and to control harmful emissions; entities and organizations were established to protect environment from the dangers of pollutants, such as reducing fuel combustion by generating electrical energy from renewable sources like sun and wind. The Government of Abu Dhabi Emirate has issued strict laws and legislations to help reduce air pollution and emissions and mitigate their impacts in order to maintain the health of those who live in the Emirate. In this regard, the Council of Ministers issued Decree No. 12 of 2006 on Regulation Concerning Protection of Air from Pollution which binding on both entities and individuals with pollutant types and maximum limits permitted.

Air pollution figures in the Emirate of Abu Dhabi are generally within the accepted range. However, the readings vary with different locations and activities. Stations were built on the roads to record and monitor rates of pollution caused by emissions from vehicle exhausts. Likewise, readings are taken from oil and industrial activities, such as Mussafah industrial area, where pollution rates are higher than other regions of the Emirate.

### Air quality in urban areas

Indicators to measure air quality in urban areas are deemed to be the most important indicators of sustainable development all over the world; the indicator aims at measuring the availability of healthy and safe environment for residents on the territory of the Emirate of Abu Dhabi. Table (2.1) shows that the average concentration of sulphur dioxide did not exceed the permitted limits as the maximum concentration in urban areas was eight micrograms/cubic meters in 2012. The annual maximum allowed concentration is 60 micrograms/ cubic meter. This applies to other pollutants except lingering dust as readings were higher than the normal rates as a result of changing weather and dust-laden winds during the year. Statistical tables (19 - 22) show air quality indicators by type, region and the location of the station.

**Table (2.1): Annual average of air pollution indicators in urban areas by region and station, 2012**  
(Microgram/m<sup>3</sup>)

Indicator (annual maximum allowable limit)	Abu Dhabi		Al Ain	Al Gharbia
	Khalifa school	Baniyas School	Al Ain School	Bida Zayed
Sulphur dioxide (60 mcg/m <sup>3</sup> )	6	3	5	8
Nitrogen dioxide	33	29	27	22
Ground level ozone	55	48	44	49
Particulate matter – PM10	175	174	156	168

Source: Statistics Centre- Abu Dhabi

Table (2.2) proves that carbon monoxide concentration in 2012 relatively changed compared with 2011. The annual average concentration was 0.7 mg/cubic meter, a 22% decline compared with 2011 in a roadside station in Abu Dhabi. The concentration in a roadside station near Al Ain was 0.9 mg/cubic meter, a decrease of 10% compared with 2011.

**Table (2.2): Annual average of carbon monoxide concentration in ambient air by region**

(Milligram/m<sup>3</sup>)

Station Location	2008	2009	2010	2011	2012
<b>Abu Dhabi</b>					
Road Side - Hamdan Street	1.40	1.10	1.00	0.90	0.7
<b>Al Ain</b>					
Road Side - Al Ain Street	2.20	1.40	0.90	1.00	0.9

Source: Environment Agency - Abu Dhabi

Table (2.3) shows the annual average noise levels in 2012, where some regions in the Emirate recorded the same levels of noise such as urban regions. Abu Dhabi region recorded 56.8 Decibels, while both Al Ain and Al Gharbia regions recorded 51.2 Decibels.

**Table (2.3): Annual average of noise Level by region**

(Decibels)

Station Location	2008	2009	2010	2011	2012
<b>Abu Dhabi</b>					
City Centre - Khadija School	57.8	57.6	57.4	59.6	60.1
Urban/ Residential - Khalifa School	50.9	52.3	53.0	54.2	46.0
Road Side - Hamdan Street	68.9	65.5	66.6	66.6	59.8
Urban/ Residential - Baniyas School	49.7	51.0	53.7	55.5	56.8
Industrial - Mussafah	54.9	49.6	48.3	46.0	44.6
<b>Al Ain</b>					
Urban/ Residential - Al Ain School	49.7	49.7	48.9	50.7	51.2
Road Side - Al Ain Street	62.2	62.1	61.6	62.4	62.6
<b>Al Gharbia</b>					
Urban/ Residential - Bida Zayed	53.2	54.3	na	51.3	51.2
City Centre - Gayathi School	49.6	50.7	50.6	53.0	na
Regional Background - Liwa Oasis	54.4	53.7	50.6	46.1	47.4

Source: Environment Agency - Abu Dhabi

## Air pollutant emissions - oil and gas sector

Total air pollutant emissions sum up together the emissions of sulphur dioxide, nitrogen oxides and volatile organic compounds. Table (2.4) and Chart (6) show that the total emissions from oil and gas sector in 2012 increased by 50% compared with 2011. Total emissions were 541,303 tons. As a result, the emissions per capita in 2012 increased by 36.5% than last year, as shown in table (2.5). This increment was due to a rise in volatile organic compounds emissions amount in 2012, which resulted from increasing the efficiency ratio of calculated emissions from the fuel distribution stations in 2012. Statistical tables (23 - 25) show the amount of emissions by type of pollutant and by sectors in Abu Dhabi National Oil Company.

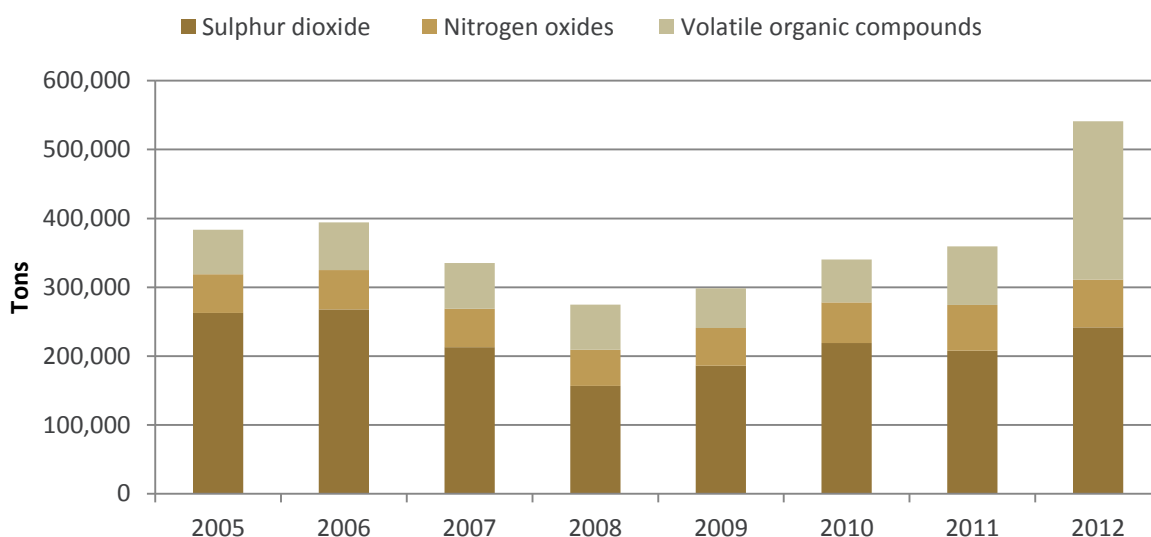
**Table (2.4): Air pollutant total emissions – oil and gas**

(Tons)

Pollutant	2005	2009	2010	2011	2012
<b>Total</b>	<b>383,679</b>	<b>298,651</b>	<b>340,093</b>	<b>359,550</b>	<b>541,303</b>
Sulphur dioxide (SO <sub>2</sub> )	262,539	185,870	219,022	208,025	241,799
Nitrogen oxides (NO <sub>x</sub> )	56,225	54,782	58,901	66,105	69,283
Volatile organic compounds (VOC)	64,915	57,999	62,170	85,420	230,221

Source: Abu Dhabi National Oil Company - ADNOC

**Chart (6): Air pollutant total emissions - oil and gas sector**



Source: Abu Dhabi National Oil Company – ADNOC, Statistics Centre- Abu Dhabi.

**Table (2.5): Per capita air pollutant total emissions - oil and gas sector**

(Tons)

Pollutant	2005	2009	2010	2011	2012
<b>Total</b>	<b>0.279</b>	<b>0.164</b>	<b>0.173</b>	<b>0.170</b>	<b>0.232</b>
Sulphur Dioxide (SO <sub>2</sub> )	0.191	0.102	0.111	0.098	0.104
Nitrogen Oxides (NO <sub>x</sub> )	0.041	0.030	0.030	0.031	0.030
Volatile Organic Compounds (VOC)	0.047	0.032	0.032	0.040	0.099

Source: Statistics Centre- Abu Dhabi

**Carbon Dioxide Emissions – Oil and Gas Sector**

Table (2.6) illustrates the change in carbon dioxide emissions during the period from 2006 to 2012 of oil and gas sector. Gas emissions in 2012 totalled 26.4 million tons, while the emission per capita from oil and gas sector was 11.3 million tons in the same year. Statistical tables (26 - 27) display carbon dioxide emissions and per capita carbon dioxide emissions by sectors in Abu Dhabi National Oil Company.

**Table (2.6): Carbon dioxide emissions - oil and gas sector**

Item	2006	2009	2010	2011	2012
Carbon dioxide emissions (Million Tons)	23.0	21.0	23.0	27.9	26.4
Per capita carbon dioxide emissions	15.7	11.5	11.7	13.2	11.3

Source: Abu Dhabi National Oil Company – ADNOC, Statistics Centre- Abu Dhabi

### 3. Energy statistics

Energy statistics enjoy a great significance locally and internationally. As an essential factor in achieving people's needs, efforts had been made to monitor the energy situation and to identify the amount of the demand. In 2012, electricity consumption totalled 47,116 GWH, an increase of 9% than 2011. The annual and summer power transmission system availability in the Emirate of Abu Dhabi was 99.25 percent and 99.65 percent respectively during the same year.

#### Electricity Consumption

According to 2012 estimates, electricity consumption the Emirate totalled 47,116 GWH, where Abu Dhabi region accounted for 62% of total consumption, while Al Ain and Al Gharbia consumed 21% and 17% respectively. By sector, the domestic sector accounted for the largest share at 30.5% of total electricity consumption, followed by the commercial sector at 29.8%. The agriculture sector came last with only 6% of the total electricity consumption in the Emirate.

**Table (3.1): Electricity consumption by region**

(MWH)

Region	2005	2009	2010	2011	2012
<b>Total consumption*</b>	<b>25,423,862</b>	<b>34,716,166</b>	<b>39,173,140</b>	<b>43,250,919</b>	<b>47,116,826</b>
Abu Dhabi	16,158,411	22,062,262	24,850,010	26,897,768	29,237,489
Al Ain	6,849,131	8,474,342	9,081,380	7,011,402	9,816,642
Al Gharbia	2,416,320	4,179,562	5,241,750	9,341,749	8,062,695

Source: Abu Dhabi Water and Electricity Company

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

**Table (3.2): Electricity consumption by economic sector**

(MWH)

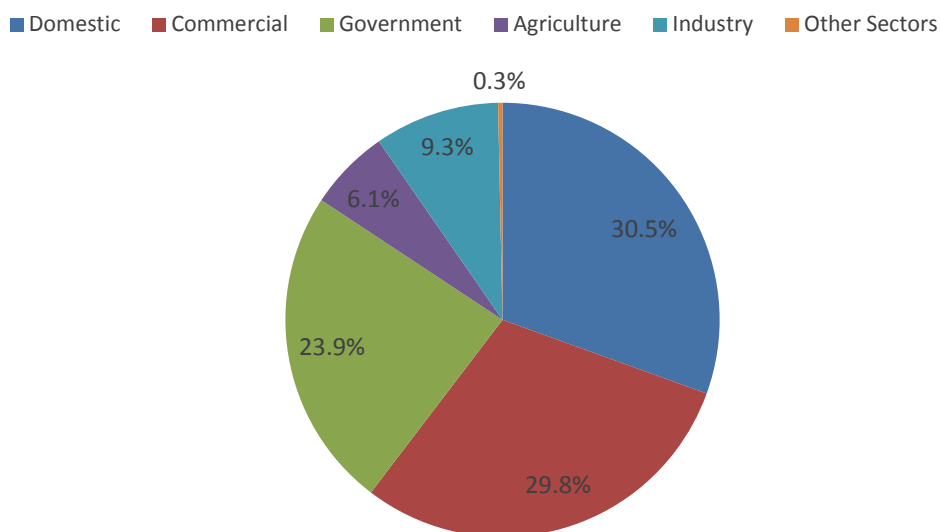
Sector	2005	2009	2010	2011	2012
<b>Total*</b>	<b>25,423,862</b>	<b>34,716,166</b>	<b>39,173,140</b>	<b>43,250,919</b>	<b>47,116,826</b>
Domestic	9,919,427	13,544,932	14,045,202	13,278,032	14,377,690.6
Commercial	7,917,862	10,811,804	12,573,879	12,456,264	14,063,836.8
Government	4,326,170	5,907,364	6,290,204	10,855,981	11,274,332.7
Agriculture	2,292,501	3,130,400	3,223,131	3,027,564	2,857,831.2
Industry	752,456	1,027,475	2,811,665	3,460,074	4,388,848.9
Other Sectors	215,447	294,191	229,059	173,004	154,285.8

Source: Statistics Centre- Abu Dhabi

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



**Chart (7): Percentage distribution of electricity consumption by sector - 2012**



Source: Statistics Centre- Abu Dhabi

### Interruptions in Electricity Supply Network

The number of electricity interruptions increases normally during the summer period due to the high network loads. In July 2012, the number of interruptions totalled 3,434. The highest number of customers experienced electricity interruptions was 74,663 customers in March 2012. Statistical tables (28 - 30) illustrate the number and duration of interruptions by month and region.

**Table (3.4): Number and duration of interruptions in electricity supply - 2012**

Month	Number of interruptions	Interruption duration (thousand minutes)	with Number of customers interruption in electricity supply
January	1,495	217,554	45,084
February	1,594	207,545	52,306
March	1,780	230,093	74,663
April	1,822	232,862	72,252
May	2,126	223,332	60,177
June	2,001	227,459	53,044
July	3,434	321,341	72,783
August	2,616	249,126	64,728
September	1,747	191,826	57,983
October	1,640	208,931	57,522
November	1,531	206,391	73,921
December	1,749	252,096	71,519
<b>Total</b>	<b>23,535</b>	<b>2,768,556</b>	<b>755,982</b>

Source: Abu Dhabi Water and Electricity Authority.

## Performance indicators of power system reliability

Establishments involved in generating and distributing electricity usually measure their performance through performance indicators, known as Key Performance Indicators (KPIs). KPIs measure the achievements level. Performance in this type of establishments is measured via two key indices:

### 1- System Average Interruption Frequency Index (SAIFI)

The system average interruption frequency Index is a factor that measures the average number of interruptions experienced by each customer in the electricity supply service. In 2012, Abu Dhabi Distribution Company's SAIFI increased by 2.7%, while Al Ain Distribution Company's SAIFI decreased by 7% than 2011.

**Chart (8): SAIFI by electricity Distribution Company**

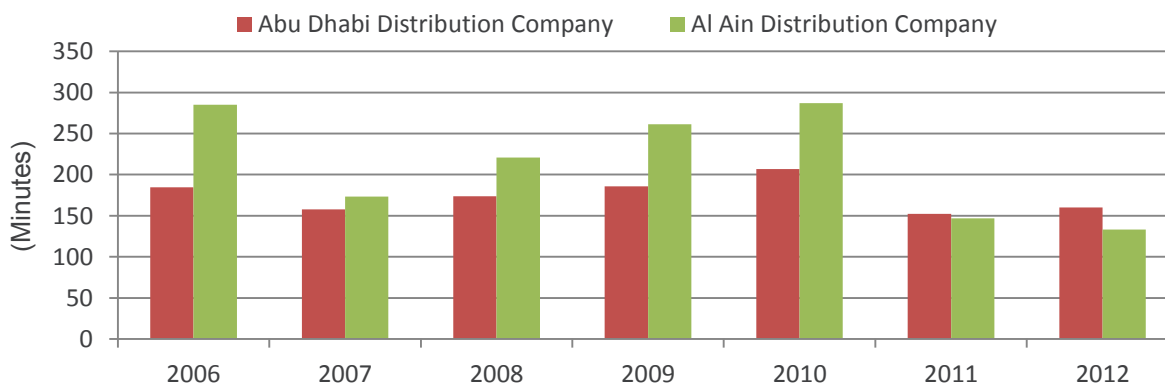


Source: Abu Dhabi Distribution Company, Al Ain Distribution Company.

### 2- System Average Interruption Duration Index (SAIDI)

The SAIDI index measures the annual average interruption durations in minutes per customer in the electricity supply service. In 2012, Abu Dhabi Distribution Company's SAIDI increased by 5%, while Al Ain Distribution Company's SAIDI decreased by 9.2% than 2011.

**Chart (9): SAIDI by Electricity Distribution Company**



Source: Abu Dhabi Distribution Company, Al Ain Distribution Company

## Power Transmission System Availability

Transmission system availability is the summation of the availabilities of individual circuits of the main interconnected transmission system expressed as a percentage of the total number of circuits. A circuit is defined as an overhead line, cable, transformer, or any combination of these plant items controlled by one or more circuit breakers.

Table (3.5) displays the annual and summer power transmission system availability in Abu Dhabi Emirate. Electrical consumption reaches its maximum in summer. In order to meet the increasing demand for electricity, distribution companies increase the transmission system availability during summer period. Power availability during summer 2012 was 99.65%, while annual power availability was 99.25%, an increase of 0.28% than 2011. Statistical table (31) shows power transmission availability in Abu Dhabi by month.

**Table (3.5): Annual and summer power transmission system availability**

(%)

Item	2005	2009	2010	2011	2012
Summer Availability	99.92	99.63	99.02	99.39	99.65
Annual Availability	98.56	98.10	98.64	98.97	99.25

Source: Abu Dhabi Water and Electricity Authority.

#### 4. Water statistics

Water statistics are considered one of the most important branches of environmental statistics. Water statistics include water resources and types as well the amount consumed and sanitation statistics. Abu Dhabi government seeks to optimum utilization of water resources, conservation of natural resources and to meet the growing need for water in various areas.

Desalinated water in the Emirate of Abu Dhabi in 2012 totalled 1,084.72 MCM, of which 1,059.2 MCM were consumed. While, wastewater amounted to 275.5 MCM, of which 96.3% were treated and 138.8 MCM were re-used to irrigate green plantings in the Emirate.

#### Water production and consumption

In 2012, desalinated water in Emirate of Abu Dhabi increased to 1,084.72 MCM, an increase of 8.6% compared with 2011. Annual consumption of desalinated water amounted to 1,059.2 MCM, making an increase of 10.2% to meet the population growth in the Emirate. Table (4.1) shows the stability of per capita daily consumption of equals 1.2 cubic meter/day.

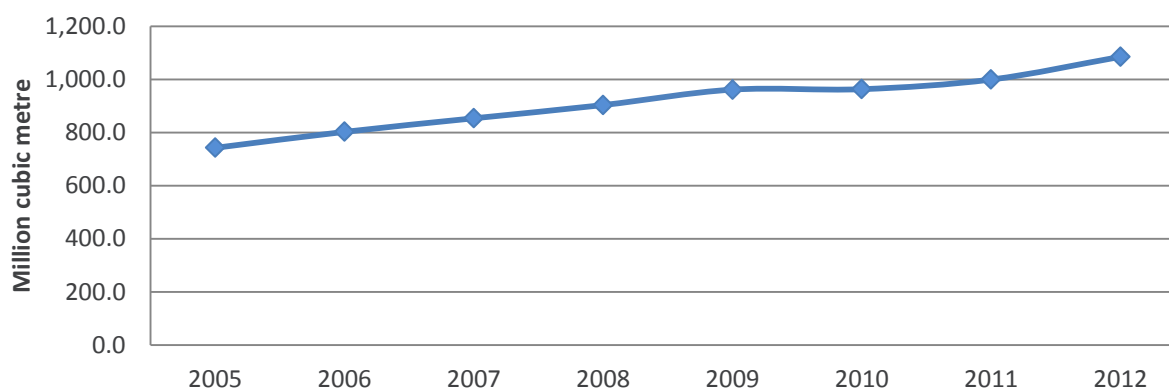
**Table (4.1): Production and consumption of desalinated water**

(Million cubic metre)

Item	2005	2009	2010	2011	2012
<b>Total of available desalinated water</b>	<b>742.1</b>	<b>961.3</b>	<b>962.8</b>	<b>999.2</b>	<b>1084.72</b>
<b>Production</b>	636.9	845.4	834.5	854.6	883.4
Supply from Al - Fujairah Station	105.2	115.9	128.3	144.6	201.3
<b>Consumption</b>	667.0	790.0	873.0	961.5	1059.2
Daily consumption	1.8	2.2	2.4	2.6	2.9
Daily average per capita ( cubic meters)	1.3	1.2	1.2	1.2	1.2

Source: Abu Dhabi Water and Electricity Company (ADWEC), Statistics centre –Abu Dhabi.

**Chart (10): Total of available desalinated water**



Source: Abu Dhabi Water and Electricity Company.

## Consumption of desalinated water by sector

Table (4.2) shows that consumption of desalinated water by region increased in 2012 by 10.2% compared with 2011. Abu Dhabi region consumed 62% of the total consumption. The Table (4.3) also displays consumption by sector, where domestic sector comes in the first rank with 51.8% of the total consumption in all sectors in 2012, followed by the government sector with 26.5%, the commercial sector with 13.7%, and the agriculture sector with 5.4%, whereas the least consumption was recorded for the industrial sector with 1.7% of the total consumption.

**Table (4.2): Consumption of desalinated water by region**

(Million cubic metre)

Region	2005	2009	2010	2011	2012
<b>Total consumption</b>	<b>667.0</b>	<b>790.0</b>	<b>873.0</b>	<b>961.5</b>	<b>1059.2</b>
Abu Dhabi	413.9	490.2	529.0	592.6	653.1
Al Ain	161.2	190.9	232.2	259.1	286.4
Al Gharbia	92.0	108.9	111.7	109.9	119.8

Source: Abu Dhabi Water and Electricity Company.

**Table (4.3): Consumption of desalinated water by sector**

(Million cubic metre)

Sector	2005	2009	2010	2011	2012
<b>Total</b>	<b>667.0</b>	<b>790.0</b>	<b>873.0</b>	<b>961.5</b>	<b>1059.2</b>
Domestic sector	456.0	540.1	596.2	522.2	548.6
Commercial	63.7	75.5	82.3	150.5	144.6
Government	112.3	133.0	146.3	213.8	280.6
Agriculture	22.8	27.0	32.4	30.7	56.9
Industry	4.5	5.3	5.7	17.9	18.3
Other Sectors	7.7	9.1	10.1	26.4	10.3

Source: Abu Dhabi Distribution Company, Al Ain Distribution Company

## Water transmission system availability

Water transmission system availability is calculated in percentage in terms of the summation of the availabilities of transmission system components, such as water transmission lines, storage tanks and pumps. Table (4.4) presents the annual and summer water transmission system availability in the Emirate of Abu Dhabi in 2012. The table also shows that the summer transmission system availability decreased by 0.4%, while annual transmission system availability increased by only 0.02%. Statistical table (32) displays the monthly transmission system availability.

**Table (4.4): Annual and summer water transmission system availability**

(%)

Item	2005	2009	2010	2011	2012
Summer Availability	95.57	96.74	99.02	98.37	97.97
Annual Availability	95.72	96.02	98.64	97.85	97.87

Source: Abu Dhabi Water and Electricity Authority

## Non-conventional water resources

The amount of non-conventional water resources including the total amount of consumed desalinated water and the reused sewage water in 2012 totaled 1,198.1 MCM, an increase of 9.4% compared with 2011.

**Table (4.5): Total non-conventional water resources by type**

(Million cubic meter)

Type	2005	2009	2010	2011	2012
<b>Total</b>	<b>770.0</b>	<b>909.6</b>	<b>999.3</b>	<b>1,095.0</b>	<b>1,198.1</b>
Desalinated water consumption	667.0	790.0	873.0	961.5	1,059.2
Quantity of treated wastewater reuse	103.0	119.6	126.3	133.5	138.8

Source: Statistics Centre - Abu Dhabi

## Wastewater

Wastewater treatment is one way of utilizing water and diversifying its sources, especially when water resources are scarce. In 2012 the quantity of wastewater inflow totalled 275.5MCM, an increase of 6.1% than 2011. 96.3% of the quantity was treated, while the quantity of the reused treated wastewater accounted to 50.4%. Water treatment plants capacity in 2012 totalled 405.219 MCM.

With the increasing demand on wastewater treatment and reuse in the Emirate of Abu Dhabi, the environmental monitoring level and health standards of wastewater treatment, reuse or disposal also increased. There are several parameters that are examined in the process of wastewater treatment, such as the daily amount of dry sludge, the concentrations of biochemical oxygen demand and suspended solids.

In 2012, the daily production of dry sludge increased by 10% compared with 2011 as shown in table (4.8).

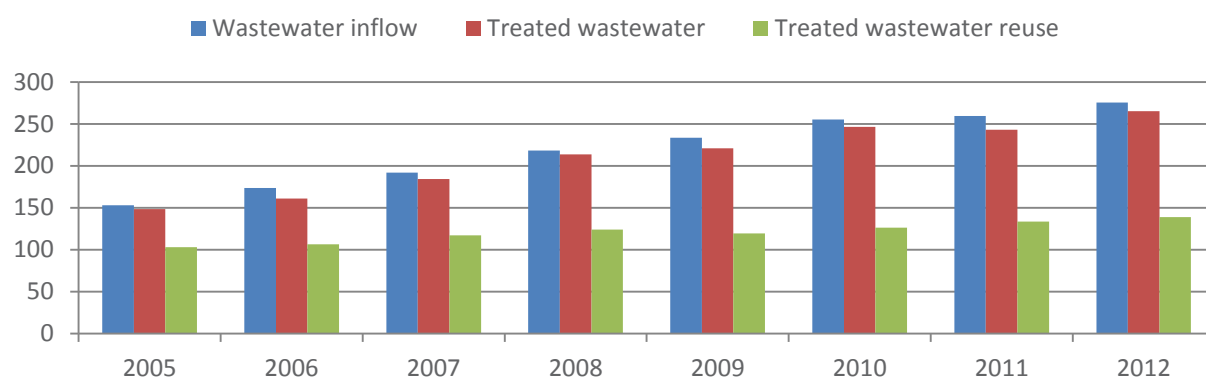
**Table (4.6): Wastewater statistics**

(Million cubic meter)

Item	2005	2009	2010	2011	2012
Wastewater inflow	153.1	233.8	255.5	259.7	275.5
Treated wastewater	148.3	220.9	246.6	243.1	265.4
Treated wastewater reuse	103.0	119.6	126.3	133.5	138.8

Source: Abu Dhabi Sewerage Services Company.

**Chart (11): Quantity of wastewater**



Source: Abu Dhabi Sewerage Services Company.

**Table (4.7): Total wastewater treatment plants capacity**

(Million cubic metre)

Item	2005	2009	2010	2011	2012
Total wastewater treatment plants capacity	135.8	183.2	442.5	431.4	405.2
Total conventional wastewater treatment plants capacity	134.4	171.6	419.9	414.4	404.6
Total non-conventional wastewater treatment plants capacity	1.4	11.6	22.6	17.0	0.6

Source: Abu Dhabi Sewerage Services Company

**Table (4.8): Wastewater quality**

Region	2006	2009	2010	2011	2012
Average daily amount of dry sludge (ton/day)	97.73	164.83	135.63	149.63	164.67
Average daily concentration of BOD (kg/day)	82,071.12	115,726.45	119,011.71	107,694.00	170,230.95
Average daily concentration of suspended solids (ton/day)	69.47	89.94	97.38	103.11	148.4

Source: Abu Dhabi Sewerage Services Company

## Marine waters quality

The table below presents readings of Abu Dhabi city marine waters quality in terms of temperature, salinity, dissolved oxygen, in addition to nutrients, such as phosphate, nitrates, and others. The readings have been taken at monitoring stations at certain depths in ten regions.

The waters of the Emirate of Abu Dhabi are fairly nutrient-rich. Nutrient inputs into the sea from dust to sand storms, sewage discharges and land runoff near-shore areas. Examples of important nutrients in the sea water essential for the life and growth of plants and phytoplankton include nitrites, nitrates, phosphates, and silicates. Generally, nutrients level rises in closed areas where it is difficult for water renewal to occur or in industrial zones which have intensive human activities.

The salinity in the Arabian Gulf is relatively high because of combined influence of restricted exchange of Gulf waters with the open ocean, the high evaporation rates caused by high temperatures, and the desalination industry. The salinity in marine waters in the city of Abu Dhabi in 2012 ranges between 35.05 – 46.55 Practical Salinity Unit (psu).

Regarding dissolved oxygen, most of the readings taken are between 4.58 – 6.01 mg/litre and these are ideal levels for supporting the life of marine living organisms.

Table (4.9) contains the physical and chemical measurements along with nutrients concentration of the marine waters of Abu Dhabi city.

**Table (4.9): Marine waters quality in the city Abu Dhabi - 2012**

Sample number	Max. Depth (m)	Secchi Depth (m)	Acidity (pH)	Salinity (psu)	Temperature (°C)	Dissolved Oxygen (mg/L)	Biochemical Oxygen Demand (BOD) (mg/L)
1	10.00	1.26	8.26	46.55	27.50	6.01	4.75
2	6.00	0.76	8.14	35.05	28.51	4.66	5.58
3	9.00	1.50	8.18	46.09	27.61	5.00	5.33
4	4.50	1.37	7.90	45.13	28.06	4.58	4.50
5	3.50	1.55	8.02	44.28	27.77	4.74	4.54
6	8.00	2.92	7.99	43.04	27.79	5.07	4.23
7	4.50	2.06	8.00	42.66	28.00	4.97	4.78
8	5.00	2.41	7.94	42.44	27.62	4.93	5.24
9	4.50	1.88	7.96	42.55	28.14	4.71	3.86
10	10.00	2.96	8.05	45.98	29.15	5.03	5.17

Source: Environment Agency – Abu Dhabi



**Table (4.10): Concentration of natural nutrients in marine waters - 2012**

(Microgram/liter)

Sample number	Chlorophyll	Phosphate PO <sub>4</sub>	Silicate SiO <sub>3</sub>	Nitrate NO <sub>3</sub>	Nitrite NO <sub>2</sub>
1	6.84	360.00	1124.17	838.33	39.17
2	14.67	3440.83	5525.83	17039.17	458.33
3	5.66	579.17	834.17	292.50	27.50
4	2.13	344.17	1412.50	738.33	21.67
5	2.50	140.83	715.00	241.67	10.83
6	1.03	418.33	770.83	120.00	19.17
7	1.09	222.50	750.83	126.67	10.83
8	1.51	172.50	2255.00	298.33	27.50
9	1.97	314.17	1415.83	138.33	15.83
10	1.00	224.17	708.33	210.00	13.33

Source: Environment Agency – Abu Dhabi

## 5. Health and safety statistics

Maintaining public health is the core base in improving living standards in developed countries, therefore governments establish regulatory bodies and institutions that work to ensure the safety of food, and in return they sought to improve medical and therapeutic services to ensure the preservation of public health. Food safety deals with food preparation and storage. It aims at preventing food poisoning and foodborne illnesses and the preparation of plans and working methods to solve problems facing various business sectors in the Emirate. It also aims at providing secure working environments through identifying and controlling risks and minimizing the possibility of accidents occurrence. In 2011, there were 71 cases of fatal occupational incidents and 12 fatal occupational road accidents in the Emirate of Abu Dhabi. Moreover, there were 2,107 cases of foodborne illnesses and food poisoning caused by consuming foods or drinks contaminated with bacteria and viruses. Typhoid accounted for the largest share of poisoning cases, claiming 394 victims or 26.6 percent of the total cases of poisoning during the year 2011.

### Food Poisoning and foodborne illnesses

Food poisoning is defined as an illness caused by consuming foods or drinks contaminated with bacteria, viruses, or poisons, with different severity levels that may sometimes cause death. Symptoms of food poisoning usually include nausea, vomiting, and abdominal cramps, diarrhea, fever, shivering, and others. Such symptoms may affect one person or a group of people who have had the same contaminated foods or drinks. As a result of the increasing number of problems related to food safety and consumer worries, governments exert huge efforts to improve food safety and human health.

In 2011 there were 1,356 cases of food poisoning and foodborne illnesses. Typhoid accounted for the largest share of poisoning cases, claiming 394 cases or 29 percent of the total cases of poisoning.

**Table (5.1): Number of food poisoning and foodborne illnesses by type**

Type	2007	2009	2010	2011
<b>Total</b>	<b>1,051</b>	<b>1,114</b>	<b>1,259</b>	<b>1,356</b>
Salmonella	128	205	90	na
Other food poisoning	215	309	471	667
Typhoid fever	77	133	335	394
Viral hepatitis A	211	181	193	138
Giardia lamblia	170	36	55	82
Bacillary dysentery	71	52	51	na
Bacterial dysentery	na	123	na	na
Paratyphoid fever	5	30	12	na
Brucellosis	69	45	52	75
Other	105	na	na	na

Source: Health Authority - Abu Dhabi

## Occupational health and safety

Occupational health and safety aims at promoting and enhancing secure working environments and preserving the health of employees who are involved in the various economic activities. This will result in increasing the productivity of the individual and the optimum utilization of human resources; it will also identify risks faced by employees, while measuring the intensity and periodicity of these risks.

### Road and occupational injuries

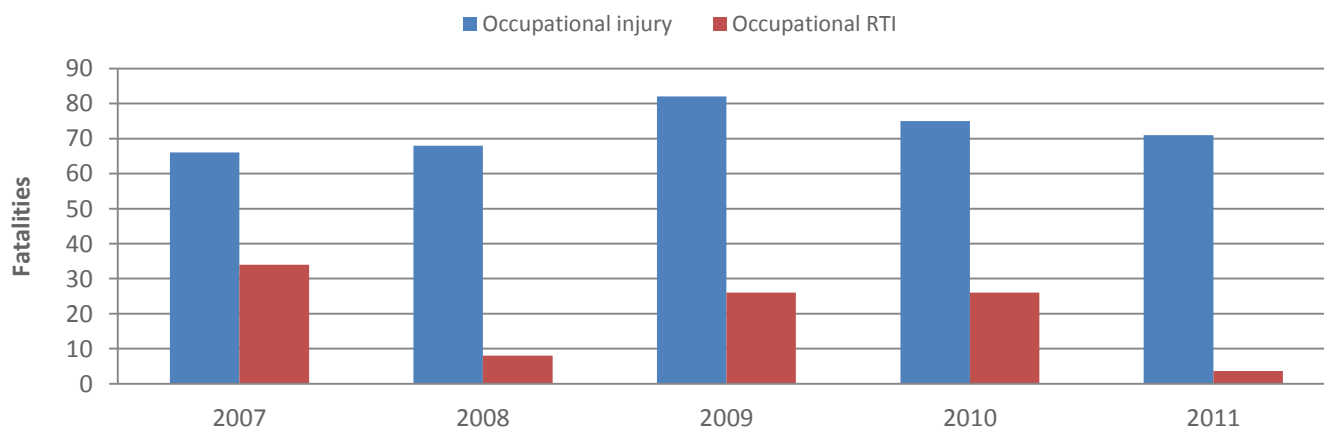
Table (5.2) shows that the number of death toll caused by occupational injuries in Abu Dhabi in 2011 decreased significantly by 17.8% compared with 2010, whereas the number of deaths caused by occupational road traffic accounted for 3.6% of total road traffic injury deaths.

**Table (5.2): Occupational Injury Deaths**

Injury Category	2007	2008	2009	2010	2011
<b>Total</b>	<b>100</b>	<b>76</b>	<b>108</b>	<b>101</b>	<b>83</b>
Occupational injury	66	68	82	75	71
Road traffic injury (RTI)	34	8	26	26	12
% occupational RTI from total RTI	8.0	1.9	6.0	7.4	3.6

Source: Health Authority - Abu Dhabi, Statistics Centre - Abu Dhabi

**Chart (12): Occupational Injury Deaths**



Source: Health Authority - Abu Dhabi

## Occupational health and safety statistics – Water and electricity production sector

Table (5.3) shows that lost time injury incidents totaled 23 incidents per million man-hours worked in the water and electricity production sector, an increase of 91.7% than 2011. The registered near miss cases were 2,229 cases. While, the lost time injury frequency rate was 0.33%. The lost time injury severity rate (LTISR) was 7.51 as shown in Table (5.4)

**Table (5.3): Number of occupational health and safety incidents - water and electricity production sector**

Item	2005	2009	2010	2011	2012
Fatality incidents	1	3	6	0	4
Fatality non recordable	0	0	0	0	0
Disability incident	0	0	1	0	1
Lost time injury incidents	9	19	22	12	23
Medical treatment case	5	531	472	8	12
Restricted workday case	0	4	1	0	4
Journey incident	0	3	0	10	1
Reporting dangerous occurrence	0	9	4	0	7
Road traffic incidents	44	8	3	1	1
Near miss	47	1,1495	596	1,355	2,229

Source: Abu Dhabi Water and Electricity Authority - ADWEA

**Table (5.4): Rate of injuries and incidents registered per million man-hours worked - water and electricity production sector**

Item	2005	2009	2010	2011	2012
Number of Working Hours ( <i>Million Hours</i> )	9.8	50.6	42.1	36.0	62.0
Lost Time Injury Frequency Rate (LTIFR)	0.9	0.4	0.5	0.3	0.4
Lost Time Injury Severity Rate (LTISR)	2.1	4.7	17.1	7.5	9.4
Total Reportable Case Frequency (TRCF)*	0.1	10.6	11.3	0.5	0.6

Source: Abu Dhabi Water and Electricity Authority - ADWEA

\*Includes Fatal Accident Rate (FAR)

## Occupational health and safety statistics – Oil and gas sector

Table (5.5) shows a decrease in the lost time injury incidents to reach 89 incidents in 2012, a decrement of 19% than 2011, while road traffic incidents increased by 28.5% compared with 2011. It is worth mentioning that fatal accident rate decreased by 54% than 2011 with an amount of 1.4 in 2012, whereas lost time injury frequency rate and total reportable case frequency slightly increased in 2012 comparing with 2011 as shown in table (5.6)

**Table (5.5): Number of occupational health and safety incidents - oil and gas sector**

Item	2005	2009	2010	2011	2012
Fatality incidents	6	7	4	18	12
Fatality non recordable	na	7	11	19	23
Disability incident	0	1	0	17	3
Lost time injury incidents	53	75	66	110	89
Medical treatment case	123	93	144	279	388
Restricted workday case	41	44	58	1	68
Journey incident	na	na	na	na	-
Occurrence of occupational disease	na	na	na	na	397
Road traffic incidents	171	135	177	284	365
Near miss	na	24,419	30,186	50,624	*58,788

Source: Abu Dhabi National Oil Company - ADNOC

\* Includes serious near miss incidents.

**Table (5.6): Rate of injuries and incidents registered per million man-hours worked - oil and gas sector**

Item	2005	2009	2010	2011	2012
Number of working hours ( <i>million hours</i> )	171	313	355	588.54	865.0
Lost time injury frequency rate (LTIFR)	0.31	0.24	0.19	0.19	0.10
Lost time injury severity rate (LTISR)	na	na	na	na	na
Total reportable case frequency (TRCF)	1.27	0.68	0.76	0.58	0.6
Fatal accident rate (FAR)	3.50	2.23	1.13	3.06	1.4

Source: Abu Dhabi National Oil Company - ADNOC

## Occupational health and safety statistics – Sewerage services

Table (5.7) shows a significant decrement in the number of occupational health and safety incidents according to Abu Dhabi Sewerage Services Company. Lost time injury incidents decreased to one incident in 2012, while no restricted workday cases recorded in 2012 comparing to six cases in 2011.

The lost time injury frequency rate (LTIFR) was 0.91, with a lost time injury severity rate (LTISR) at 89.7, while the total reportable case frequency (TRCF) decreased to 0.48 as shown in Table (5.8).

**Table (5.7): Number of occupational health and safety incidents - sewerage services**

Item	2007	2009	2010	2011	2012
Fatality Incidents	1	1	2	1	1
Fatality Non Recordable	0	0	0	0	1
Disability Incident	0	0	0	0	1
Lost Time Injury Incidents	2	6	0	6	1
Medical Treatment Case	0	0	0	0	0
Restricted Workday Case	0	0	0	6	0
Serious Near Miss	0	182	244	0	0
Journey Incident	0	0	0	0	1
Reporting Dangerous Occurrence	0	1	2	0	1
Occurrence of Occupational Disease	0	0	0	0	0
Road Traffic Incidents	0	0	1	1	0
Other (Near miss incidents)	0	0	0	165	17

Source: Abu Dhabi Sewerage Services Company

**Table (5.8): Rate of injuries and incidents registered per million man-hours worked - sewerage services**

Item	2007	2009	2010	2011	2012
Number of Working Hours ( <i>Million Hours</i> )	2.44	12.34	15.77	9.572	33.44
Lost Time Injury Frequency Rate (LTIFR)	0.16	0.729	0.00	0.56	0.91
Lost Time Injury Severity Rate (LTISR)	0.41	7.30	0.00	8.89	89.7
Total Reportable Case Frequency (TRCF)	0.00	0.92	0.118	0.63	0.48
Fatal Accident Rate (FAR)	0.08	0.46	0.051	0.10	0.09

Source: Abu Dhabi Sewerage Services Company

## 6. Waste statistics

Abu Dhabi government ensures applying the proper and sustainable use of natural resources and encourages decreasing the production of waste from its sources, in addition to monitoring all activities related to waste management in order to overcome the environmental and economic damages resulted from improper disposal of waste. Improper disposal of waste may result in polluting ground and sea water and harming both coastal and urban areas. Even if waste is disposed through the proper means of imbedding, it requires large areas of land which may not be available for many countries.

Consequently, an increasing need for safe and effective waste management system emerges along with waste recycling that conserves the environment and contributes economic benefits to society and its economic sectors. The total amount of waste in 2012 was about 12.8 million tons.

### Solid Waste

The total amount of the waste generated daily in 2012 was about 34.97 thousand tons. The demolition and construction activity accounts for 75.4% of total waste generated, whereas the amount of solid municipal waste reached about 1,272 thousand tons of which 70.2% was in the Abu Dhabi region.

**Table (6.1): Non-hazardous solid waste generation by region and source activity - 2012\***

(Tons)

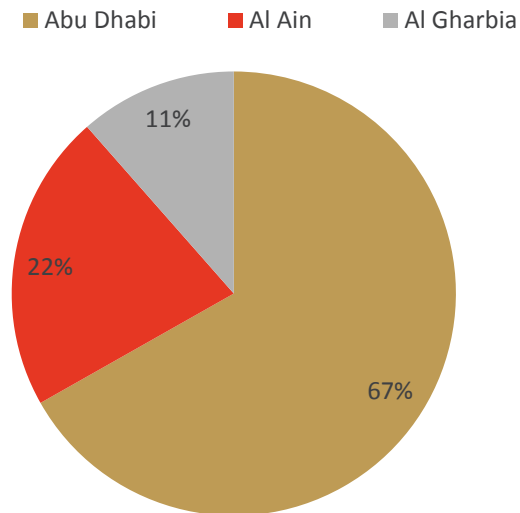
Source	Total	Abu Dhabi	Al Ain	Al Gharbia
<b>Grand total</b>	<b>12,765,163</b>	<b>8,527,782</b>	<b>2,771,098</b>	<b>1,466,283</b>
<b>Daily average</b>	<b>34,973</b>	23,364	7,592	4,017
Construction and demolition	<b>9,628,309</b>	6,694,919	1,881,040	1,052,350
Commercial and industrial Waste	<b>804,173</b>	450,210	201,523	152,440
Agricultural Waste	<b>898,258</b>	345,305	383,236	169,717
Municipal Solid Waste	<b>1,272,668</b>	892,895	293,042	86,731
Other **	<b>161,755</b>	144,453	12,257	5,045

Source: The Centre of Waste Management - Abu Dhabi

\* Does not include waste of oil and gas sector

\*\* Include solid waste from sewage treatment and tires waste

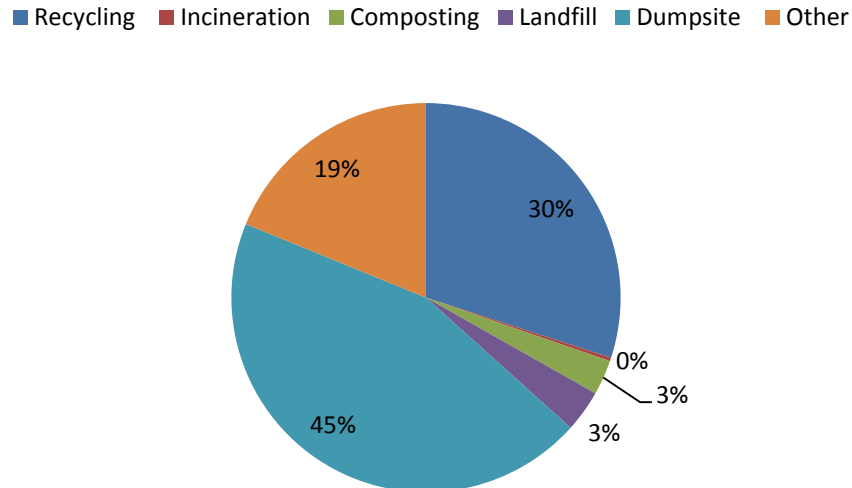
**Chart (13): Percentage distribution of non-hazardous solid waste generation by region - 2012**



Source: Statistics Centre - Abu Dhabi

Due to the development witnessed by the Emirate of Abu Dhabi in terms of waste treatment, recycled waste reached 37% in 2011, while waste transferred to dumpsite reached 57% of the total waste generated in Abu Dhabi emirate. As shown in the chart 14.

**Chart (14): Percentage distribution of non-hazardous solid waste by disposal method - 2012**



Source: Statistics Centre - Abu Dhabi



## Statistical Tables

**Table 1 : Air temperature by month - Abu Dhabi - 2012**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	18.7	5.9	13.8	30.9	24.0
February	19.9	7.9	14.9	32.3	25.1
March	22.5	7.7	17.7	40.0	28.5
April	26.5	14.2	20.9	43.9	33.1
May	32.7	20.2	26.1	46.1	40.0
June	33.0	19.5	26.6	47.6	39.8
July	36.1	24.8	30.5	48.9	42.8
August	36.0	25.4	30.8	48.3	42.8
September	34.3	21.1	28.4	46.4	40.3
October	29.4	15.7	23.3	42.4	35.7
November	25.3	12.5	20.1	36.0	30.5
December	21.7	8.1	16.9	32.7	26.5

Source: Statistics Centre - Abu Dhabi

**Table 2 : Air temperature by month – Al Ain - 2012**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	17.4	4.1	11.5	30.2	23.8
February	19.0	5.6	13.0	32.3	25.3
March	23.2	5.5	16.5	38.8	30.2
April	28.1	12.9	21.0	44.2	35.1
May	34.5	21.5	26.8	47.9	42.1
June	35.6	21.8	27.4	49.0	43.6
July	37.9	25.5	31.2	49.9	45.0
August	37.2	19.4	30.6	49.8	44.3
September	34.7	23.0	28.4	47.5	41.6
October	29.3	17.1	22.4	43.4	36.3
November	24.4	11.7	18.8	35.6	30.5
December	20.3	8.7	15.2	33.2	26.0

Source: Statistics Centre - Abu Dhabi

**Table 3 : Air temperature by month – Al Gharbia - 2012**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	17.4	1.9	10.7	32.6	24.1
February	19.0	5.8	12.3	34.5	25.4
March	22.6	4.8	15.5	40.1	29.9
April	27.9	15.1	20.8	44.0	34.9
May	34.8	21.3	26.7	48.1	42.5
June	35.5	20.2	26.6	49.4	43.7
July	37.9	25.3	30.6	50.1	45.0
August	37.1	25.2	29.9	49.6	44.2
September	34.4	21.1	27.1	48.0	41.9
October	29.8	16.7	22.0	42.5	37.2
November	25.0	12.9	18.7	36.2	31.2
December	21.0	6.3	15.2	32.3	26.7

Source: Statistics Centre - Abu Dhabi

**Table 4 : Air temperature by month – The Islands - 2012**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	18.6	7.1	15.4	32.2	21.9
February	19.1	7.6	15.7	33.5	22.7
March	21.0	10.4	17.9	40.7	25.2
April	25.8	17.2	21.7	43.0	30.8
May	32.1	22.9	27.3	47.4	38.5
June	33.0	21.1	28.1	45.6	38.9
July	35.1	25.5	30.8	47.0	40.3
August	35.2	26.6	31.3	47.3	39.9
September	33.8	23.2	29.9	44.5	38.2
October	30.6	19.5	26.8	39.9	34.8
November	26.4	17.1	23.5	36.0	29.5
December	22.2	12.8	19.1	31.9	25.0

Source: Statistics Centre - Abu Dhabi

**Table 5 : Rainfall in Abu Dhabi and Al Ain regions by month - 2012**

(Millimetres )

Month	Abu Dhabi		Al Ain	
	Heaviest fall in one day	Total for month	Heaviest fall in one day	Total for month
January	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	0.0
March	0.6	0.8	0.4	0.6
April	5.2	12.9	6.6	19.1
May	0.0	0.0	6.0	6.6
June	0.0	0.0	0.0	0.0
July	0.0	0.0	6.2	6.4
August	0.0	0.0	33.6	47.6
September	0.0	0.0	0.4	0.4
October	0.0	0.0	0.0	0.0
November	2.8	6.0	33.4	49.4
December	3.6	9.2	6.0	17.8

Source: Statistics Centre - Abu Dhabi

**Table 6: Rainfall in Al Gharbia and The Islands by month - 2012**

(Millimetres )

Month	Al Gharbia		The Islands	
	Heaviest fall in one day	Total for month	Heaviest fall in one day	Total for month
January	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	0.0
March	0.2	0.4	0.8	1.2
April	21.8	69.7	9.2	30.4
May	0.0	0.0	0.0	0.0
June	0.0	0.0	0.0	0.0
July	0.0	0.0	0.0	0.0
August	0.0	0.0	0.0	0.0
September	3.0	3.2	0.2	0.2
October	0.0	0.0	0.0	0.0
November	1.2	1.4	0.6	0.8
December	2.2	3.2	12.4	21.0

Source: Statistics Centre - Abu Dhabi.

**Table 7: Relative humidity by month - Abu Dhabi - 2012**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	63.7	12.0	42.6	100	81.0
February	59.6	9.4	39.1	100	79.2
March	54.9	5.7	32.4	100	75.8
April	53.1	4.9	25.3	100	76.9
May	44.7	3.6	19.7	98.3	69.2
June	51.0	2.0	24.2	100	77.5
July	50.7	4.0	25.1	91	72.4
August	54.8	5.7	25.9	98.2	79.4
September	51.2	4.0	21.7	96.9	78.1
October	58.9	4.0	27.6	100	84.3
November	60.6	15.0	37.1	98.5	80.5
December	68.2	17.5	45.9	100	85.6

Source: Statistics Centre - Abu Dhabi.

**Table 8 : Relative humidity by month - Al Ain - 2012**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	57.3	1.3	31.6	100.4	83.2
February	52.3	2.1	27.2	100.0	82.2
March	39.3	1.1	17.4	100.0	64.9
April	30.3	1.6	13.0	100.0	55.7
May	23.4	2.4	8.8	100.0	46.1
June	27.1	1.2	7.1	100.0	57.0
July	30.2	3.0	12.4	100.0	52.9
August	31.8	2.1	13.3	100.0	57.8
September	30.3	1.0	12.2	100.0	53.9
October	37.3	1.0	14.3	100.0	69.0
November	55.2	12.9	29.2	100.0	82.9
December	63.8	6.1	37.4	100.0	88.9

Source: Statistics Centre - Abu Dhabi.

**Table 9 : Relative humidity by month - Al Gharbia - 2012**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	64.9	12.3	36.4	100.0	91.7
February	60.9	10.9	33.9	100.0	89.3
March	50.2	3.9	25.4	100.0	78.4
April	44.5	1.6	20.4	100.0	72.7
May	32.2	2.0	13.0	100.0	59.4
June	35.3	1.5	12.4	100.0	66.9
July	40.9	2.5	18.5	100.0	72.4
August	43.1	3.3	16.2	100.0	75.8
September	44.2	1.0	17.7	100.0	75.2
October	52.4	5.1	21.6	100.0	85.1
November	61.3	10.3	35.0	100.0	87.8
December	70.9	17.9	44.2	100.0	93.4

Source: Statistics Centre - Abu Dhabi

**Table 10 : Relative humidity by month – The Islands - 2012**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	72.0	13.7	54.2	100.0	86.6
February	70.0	12.5	52.2	100.0	86.1
March	67.4	0.0	47.5	100.0	86.2
April	63.9	5.8	33.8	100.0	87.4
May	57.4	0.6	27.2	100.0	85.2
June	62.7	2.2	30.3	100.0	88.6
July	63.1	5.1	33.7	100.0	88.1
August	69.3	4.3	42.5	100.0	89.5
September	64.9	1.6	38.6	100.0	86.2
October	65.4	11.0	40.8	100.0	84.1
November	66.4	17.3	49.4	100.0	81.5
December	71.9	25.2	55.3	100.0	86.9

Source: Statistics Centre - Abu Dhabi

**Table 11 : Wind speed by month - Abu Dhabi - 2012**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	6.2	23.1	11.3
February	8.0	30.0	14.4
March	8.2	25.8	15.0
April	5.7	31.6	13.1
May	6.3	20.5	13.0
June	6.6	22.0	13.5
July	6.7	24.7	14.6
August	7.1	23.7	14.6
September	6.8	23.3	15.0
October	5.8	33.6	12.9
November	6.0	17.9	12.4
December	6.1	26.0	12.9

Source: Statistics Centre - Abu Dhabi

\*Knot = 1.15 mph

**Table 12 : Wind speed by month - Al Ain - 2012**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	5.3	31.9	11.4
February	7.4	45.2	14.6
March	7.3	37.2	14.8
April	6.1	50.0	14.3
May	6.4	34.8	14.6
June	6.6	29.5	15.0
July	6.2	30.2	14.8
August	6.4	36.1	14.9
September	5.8	27.0	13.7
October	5.1	29.0	11.9
November	4.8	22.7	10.9
December	5.3	26.4	11.5

Source: Statistics Centre - Abu Dhabi

\*Knot = 1.15 mph

**Table 13 : Wind speed by month - Al Gharbia - 2012**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	6.6	33.4	12.7
February	8.4	37.2	15.5
March	9.1	38.9	17.3
April	6.6	49.8	15.2
May	6.8	31.1	15.0
June	7.3	31.5	15.9
July	6.7	35.6	14.6
August	6.3	28.9	14.1
September	6.2	26.4	14.5
October	5.4	37.3	12.3
November	5.7	24.1	11.9
December	6.0	28.8	12.2

Source: Statistics Centre - Abu Dhabi

\*Knot = 1.15 mph

**Table 14 : Wind speed by month - The Islands - 2012**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	7.9	27.0	13.3
February	9.7	32.1	16.0
March	10.5	34.3	17.9
April	6.7	33.3	14.1
May	7.0	26.3	13.3
June	6.9	27.3	13.5
July	7.9	33.7	14.1
August	7.3	24.6	13.7
September	8.0	24.9	14.7
October	6.4	37.6	11.9
November	7.7	24.3	13.3
December	8.0	27.5	14.2

Source: Statistics Centre - Abu Dhabi

\*Knot = 1.15 mph

**Table 15 : Daily total solar radiation by month - Abu Dhabi - 2012**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	4,211	1,710	5,100
February	5,137	3,678	6,221
March	5,804	2,984	6,910
April	6,075	2,799	7,960
May	6,909	5,493	8,080
June	6,740	5,284	8,150
July	6,176	3,523	7,760
August	6,214	4,756	7,350
September	5,868	4,350	6,890
October	5,411	4,255	6,600
November	4,077	1,715	5,290
December	4,098	2,123	5,541

Source: Statistics Centre - Abu Dhabi

**Table 16 : Daily total solar radiation by month – Al Ain - 2012**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	4,488	2,153	5,510
February	5,313	1,770	7,010
March	6,065	3,529	7,345
April	6,191	1,750	8,247
May	6,988	5,381	8,343
June	6,997	4,877	8,778
July	6,276	4,367	8,208
August	6,588	4,045	8,043
September	6,155	3,995	7,715
October	5,715	4,501	7,051
November	4,526	1,752	6,329
December	4,177	2,609	6,334

Source: Statistics Centre - Abu Dhabi



**Table 17 : Daily total solar radiation by month - Al Gharbia - 2012**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	4,605	3,158	5,330
February	5,363	3,897	6,590
March	5,899	1,858	7,334
April	6,080	1,645	7,922
May	6,912	4,821	7,975
June	6,788	5,380	8,051
July	6,003	2,308	7,774
August	6,396	3,784	7,278
September	5,961	2,405	7,122
October	5,588	4,220	6,647
November	4,478	1,195	5,524
December	4,030	1,885	4,799

Source: Statistics Centre - Abu Dhabi

**Table 18 : Daily total solar radiation by month – The Islands - 2012**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	3,153	1,046	5,228
February	3,941	1,995	6,691
March	4,597	1,409	6,830
April	5,318	1,423	7,657
May	6,227	4,008	7,320
June	6,049	4,520	7,349
July	5,661	3,248	6,730
August	4,938	2,957	5,925
September	4,802	2,285	6,285
October	4,191	810	6,464
November	3,567	1,121	5,501
December	3,379	784	4,786

Source: Statistics Centre - Abu Dhabi

**Table 19 : Annual average of sulphur dioxide concentration in ambient air by region\***(Microgram/m<sup>3</sup>)

Station Location	2008	2009	2010	2011	2012
<b>Abu Dhabi</b>					
City Centre - Khadija School	11	9	10	8	6
Urban/ Residential - Khalifa School	11	6	8	7	6
Road Side - Hamdan Street	13	7	10	7	5
Urban/ Residential - Baniyas School	29	7	13	9	3
Industrial - Mussafah	6	19	7	7	5
<b>Al Ain</b>					
Urban/ Residential - Al Ain School	6	3	5	9	5
Road Side - Al Ain Street	7	4	6	7	5
<b>Al Gharbia</b>					
Urban/ Residential - Bida Zayed	8	3	8	7	8
City Centre - Gayathi School	7	7	6	5	4
Regional Background - Liwa Oasis	4	3	5	5	5

Source: Environment Agency - Abu Dhabi

\* The annual maximum allowable limit for sulphur dioxide average concentration is 60 mcg/m<sup>3</sup>**Table 20 : Annual average of nitrogen dioxide concentration in ambient air by region**(Microgram/m<sup>3</sup>)

Station Location	2008	2009	2010	2011	2012
<b>Abu Dhabi</b>					
City Centre - Khadija School	46	36	53	30	33
Urban/ Residential - Khalifa School	42	41	40	29	33
Road Side-Hamdan Street	21	49	59	46	46
Urban/ Residential - Baniyas School	24	27	31	28	29
Industrial-Mussafah	46	53	59	50	43
<b>Al Ain</b>					
Urban/ Residential - Al Ain School	54	na	29	27	27
Road Side - Al Ain Street	26	45	35	39	36
<b>Al Gharbia</b>					
Urban/ Residential - Bida Zayed	na	16	17	17	22
City Centre - Gayathi School	13	17	11	13	13
Regional Background - Liwa Oasis	2	3	4	4	3

Source: Environment Agency - Abu Dhabi

**Table 21 : Annual average of ground level ozone concentration in ambient air by region**(Microgram/m<sup>3</sup>)

Station Location	2008	2009	2010	2011	2012
<b>Abu Dhabi</b>					
City Centre - Khadija School	42	45	59	67	71
Urban/ Residential - Khalifa School	32	34	54	72	55
Urban/ Residential - Baniyas School	35	33	52	59	48
<b>Al Ain</b>					
Urban/ Residential - Al Ain School	33	27	38	61	44
<b>Al Gharbia</b>					
Urban/ Residential - Bida Zayed	45	47	68	73	49
City Centre - Gayathi School	53	54	88	81	62
Regional background - Liwa Oasis	71	44	82	93	93

Source: Environment Agency - Abu Dhabi

**Table 22 : Annual average of particulate matter (PM10) concentration in ambient air by region**(Microgram/m<sup>3</sup>)

Station Location	2008	2009	2010	2011	2012
<b>Abu Dhabi</b>					
City Centre - Khadija School	133	152	133	140	157
Urban/ Residential - Khalifa School	90	98	72	137	175
Road Side - Hamdan Street	124	148	143	128	151
Urban/ Residential - Baniyas School	72	71	189	203	174
Industrial - Mussafah	195	209	227	184	189
<b>Al Ain</b>					
Urban/ Residential - Al Ain School	92	115	72	138	156
Road Side - Al Ain Street	132	147	151	143	155
<b>Al Gharbia</b>					
Urban/ Residential - Bida Zayed	118	149	102	171	168
City Centre - Gayathi School	170	143	128	169	181
Regional Background - Liwa Oasis	159	147	153	168	217

Source: Environment Agency - Abu Dhabi

**Table 23: Sulphur dioxide emissions – oil and gas sector**

(Tons)

Business Sector	2005	2006	2007	2008	2009	2010	2011	2012
<b>Total</b>	<b>262,539</b>	<b>267,739</b>	<b>212,722</b>	<b>156,674</b>	<b>185,870</b>	<b>219,022</b>	<b>208,025</b>	<b>241,799</b>
Exploration and production	103,516	103,415	88,390	45,619	76,641	153,500	147,263	180,511
Independent operators**	*	*	*	*	*	52,790	45,076	44,299
Shared services**	**	**	**	**	**	74	na	188
Marketing and refining	10,040	10,185	10,075	11,506	11,271	12,318	15,183	16,264
Gas processing	148,743	153,900	114,045	99,349	97,780	*	*	*
Petrochemicals	240	239	212	200	178	340	503	537

Source : Abu Dhabi National Oil Company - ADNOC

\* Included with exploration and production

\*\* New business sector

**Table 24 : Nitrogen oxides emissions - oil and gas sector**

(Tons)

Business Sector	2005	2006	2007	2008	2009	2010	2011	2012
<b>Total</b>	<b>56,225</b>	<b>57,332</b>	<b>55,881</b>	<b>52,755</b>	<b>54,782</b>	<b>58,901</b>	<b>66,105</b>	<b>69,283</b>
Exploration and production	16,655	17,359	16,287	15,045	17,670	29,288	33,999	33,480
Independent operators**	*	*	*	*	*	2,336	2,427	2,426
Shared services**	**	**	**	**	**	802	NA	1,442
Marketing and refining	17,795	18,523	19,596	20,253	20,031	23,430	26,079	27,842
Gas processing	20,263	19,956	18,473	16,004	15,696	*	*	*
Petrochemicals	1,512	1,494	1,525	1,453	1,385	3,045	3,600	4,094

Source: Abu Dhabi National Oil Company - ADNOC

\* Included with exploration and production

\*\* New business sector

**Table 25 : Volatile organic compounds emissions - oil and gas sector**

(Tons)

Business Sector	2005	2006	2007	2008	2009	2010	2011	2012
<b>Total</b>	<b>64,915</b>	<b>69,339</b>	<b>66,698</b>	<b>65,475</b>	<b>57,999</b>	<b>62,170</b>	<b>85,420</b>	<b>230,221</b>
Exploration and production	47,490	51,476	50,532	50,404	42,835	51,464	55,003	56,212
Independent operators**	*	*	*	*	*	1,166	1,013	** 1196
Marketing and refining	8,222	8,401	8,430	8,310	8,343	7,808	27,692	170,174
Gas processing	8,503	8,754	7,027	5,978	6,206	*	*	*
Petrochemicals	700	708	709	783	615	1,732	1,712	2,639

Source: Abu Dhabi National Oil Company - ADNOC

\* Included with exploration and production

\*\* New business sector

**Table 26 : Carbon dioxide emissions - oil and gas sector**

(Million Tons)

Business Sector	2006	2007	2008	2009	2010	2011	2012
<b>Total</b>	<b>23.0</b>	<b>22.0</b>	<b>21.0</b>	<b>21.0</b>	<b>23.0</b>	<b>27.9</b>	<b>26.4</b>
Exploration and Production	16.0	15.0	15.0	14.0	15.0	17.1	16.6
Independent Operators*	1.0	1.0	1.0	1.0	1.0	1.0	0.7
Marketing & Refining	5.0	5.0	4.0	5.0	4.0	6.3	5.7
Petrochemicals	1.0	1.0	1.0	1.0	3.0	3.4	3.4

Source: Abu Dhabi National Oil Company - ADNOC

\* Total includes shared services sector

**Table 27 : Per capita carbon dioxide emissions - oil and gas sector**

(Tons)

Business Sector	2006	2007	2008	2009	2010	2011	2012
<b>Total</b>	<b>15.73</b>	<b>13.99</b>	<b>12.39</b>	<b>11.50</b>	<b>11.68</b>	<b>13.20</b>	<b>11.32</b>
Exploration and Production	10.95	9.53	8.85	7.66	7.62	8.10	7.10
Independent Operators*	0.68	0.64	0.59	0.55	0.51	0.48	0.30
Marketing & Refining	3.42	3.18	2.36	2.74	2.03	2.99	2.46
Petrochemicals	0.68	0.64	0.59	0.55	1.52	1.61	1.47

Source: Statistics Centre- Abu Dhabi

\* Total includes shared services sector

**Table 28: Number and duration of interruptions in electricity supply - Abu Dhabi - 2012**

Month	Number of Interruptions	Interruption Duration (Thousand minutes)	Number of Customers with interruption in Electricity Supply
January	741	132,732	23,811
February	841	116,259	25,597
March	863	118,495	35,468
April	851	127,376	38,024
May	836	94,765	34,609
June	733	109,844	31,783
July	1,248	129,221	39,988
August	1,015	109,008	30,416
September	779	79,586	37,243
October	836	112,959	34,400
November	797	107,630	42,923
December	888	151,655	38,823
<b>Total</b>	<b>10,428</b>	<b>1,389,530</b>	<b>413,085</b>

Source: Abu Dhabi Water and Electricity Authority

**Table 29 : Number and duration of interruptions in electricity supply - Al Ain - 2012**

Month	Number of Interruptions	Interruption Duration (Thousand minutes)	Number of Customers with interruption in Electricity Supply
January	581	68,036	13,442
February	571	69,463	14,275
March	715	88,565	25,873
April	723	77,087	18,421
May	958	95,513	14,947
June	998	87,983	10,321
July	1,719	154,174	18,301
August	1,233	105,947	14,020
September	679	73,829	9,831
October	526	56,534	11,055
November	448	54,327	11,397
December	616	71,255	19,013
<b>Total</b>	<b>9,767</b>	<b>1,002,713</b>	<b>180,896</b>

Source: Abu Dhabi Water and Electricity Authority

**Table 30 : Number and duration of interruptions in electricity supply - Al Gharbia - 2012**

Month	Number of Interruptions	Interruption Duration (Thousand minutes)	Number of Customers with interruption in Electricity Supply
January	173	16,786	7,831
February	182	21,823	12,434
March	202	23,033	13,322
April	248	28,399	15,807
May	332	33,054	10,621
June	270	29,632	10,940
July	467	37,946	14,494
August	368	34,171	20,292
September	289	38,411	10,909
October	278	39,438	12,067
November	286	44,434	19,601
December	245	29,186	13,683
<b>Total</b>	<b>3,340</b>	<b>376,313</b>	<b>162,001</b>

Source: Abu Dhabi Water and Electricity Authority

**Table 31: Power transmission system availability by month - Abu Dhabi Emirate**

( %)

Month	2005	2006	2007	2008	2009	2010	2011	2012
January	97.55	97.36	98.71	97.93	96.09	98.13	98.46	98.51
February	96.78	97.36	98.45	98.00	96.05	98.30	98.24	98.87
March	96.64	97.32	98.62	98.42	96.84	98.08	98.10	98.64
April	97.23	98.38	98.50	98.16	97.21	98.35	98.88	98.99
May	98.23	99.14	99.20	98.70	96.67	98.14	99.27	99.24
June	99.37	99.09	98.99	98.33	97.54	98.70	99.40	99.59
July	99.83	99.67	99.11	99.30	98.32	99.06	99.44	99.84
August	99.92	99.63	99.52	99.34	99.63	99.30	99.52	99.77
September	99.86	99.54	99.61	99.18	99.31	99.44	99.31	99.83
October	99.48	99.49	99.09	99.03	99.67	99.24	99.18	99.48
November	98.84	98.97	98.51	97.17	99.57	98.47	99.07	99.09
December	98.09	99.12	98.33	97.91	99.23	98.44	98.77	99.21

Source: Abu Dhabi Water and Electricity Authority.

**Table 32: Water transmission system availability by Month - Abu Dhabi Emirate**

( %)

Month	2005	2006	2007	2008	2009	2010	2011	2012
January	95.80	95.80	95.75	95.84	94.88	97.28	97.21	97.71
February	94.69	95.72	95.54	95.86	94.50	97.43	97.17	97.95
March	95.91	95.62	95.55	95.31	94.52	96.98	97.37	98.07
April	95.51	95.80	95.57	94.69	95.15	99.24	97.08	97.82
May	95.83	95.97	95.69	94.60	96.24	99.58	98.18	97.88
June	96.28	95.60	96.97	94.99	96.17	99.34	98.40	98.25
July	96.02	95.74	96.88	93.32	96.51	97.74	98.45	98.04
August	95.57	95.60	96.90	93.78	96.74	97.33	98.46	97.80
September	95.82	95.69	96.59	93.82	97.01	97.55	98.36	97.88
October	95.76	95.46	96.89	93.76	96.87	96.70	98.32	97.89
November	95.60	95.47	96.49	94.10	96.88	96.86	97.69	97.82
December	95.80	95.72	96.68	94.53	96.75	96.56	97.49	97.29

Source: Abu Dhabi Water and Electricity Authority.

## Explanatory Notes

### Glossary

This report contains certain terms specific to environment and necessary when analyzing the environment statistics of Abu Dhabi Emirate. They include the following terms:

#### **Environment:**

Environment is the whole external conditions which affect the life, growth, and existence of a living organism on earth including climate, air, water, soil, metals, and the living organisms.

#### **Environmental statistics:**

Environmental statistics are statistics that describe the state and trends of the environment covering the natural environment (air/ climate, water, land/soil), living organisms in their ecosystems and human settlements. Environmental statistics are integrative in nature, measuring human activities and natural events that affect the environment, the impact of these activities and events, and the social responses to environmental impacts. Broad definitions include environmental indicators, indices and accounting (2).

### 1. Climate

#### **Atmospheric pressure:**

Atmospheric pressure is the weight of the air column that extends from the surface of the ground until the end of the atmosphere of the Earth. Air pressure is one of the most important weather elements. The difference in atmospheric pressure leads to the emergence of descendant force which is the main cause of air movement from one place to another and that is wind. Thus transferring energy from one place to another and causing fluctuations in weather and climate.

Atmospheric pressure at sea level is equivalent to the mercury column of height 76 cm. and the atmospheric pressure is inversely proportional to the degree of air temperature. When temperature rises, air expands and density decreases, then decreasing the weight and pressure, and vice versa. If temperature decreases, air shrinks and gains weight, the pressure rises. Also air pressure rises or decreases with increasing or decreasing the altitude from sea level.

#### **Average rainfall:**

Average rainfall is the average of the amounts of falling rain in millimeter within one month or year.

#### **Climate:**

Climate is the condition of weather at a particular location or region over a long period of time that can be a month, a year, a season, or several years. It is the long-term result in the atmosphere including elements, such as temperature, solar radiation humidity, rainfall, atmospheric pressure, wind speed and direction, and the variations of these elements.

#### **Heaviest fall:**

Heaviest fall is the highest amount of rainfall in millimeter on a certain location within one month or year (a period of time).



**Relative humidity:**

It is a percentage of water vapor mass per unit volume of air relative to the mass of water vapor necessary to satisfy the same volume unit, at the same temperature and atmospheric pressure.

Relative humidity % = (Actual water vapor pressure / Saturation water vapor pressure) \* 100 OR

Relative humidity % = (Specific humidity / Saturation specific humidity) \* 100

The relative humidity changes during the day depending on temperature because the saturation vapor pressure is controlled by temperature. Relative humidity is low during the day and rises gradually to reach its highest levels in the last hours of the night at the minimum temperatures. Sometimes the saturation may lead to formation of dew, if temperature is higher than zero degree centigrade or frost if the temperature is below zero centigrade.

**Solar radiation**

It is a set of ethereal radiation from the sun such as light and radiant heat, and others.

**Sunshine:**

It is the number of hours of sunshine during the day time. It is measured in the period where sun light is not veiled as a result of clouds, fog or particles stuck (e.g., smog).

**Winds:**

It is the horizontal movement of air, and air either moves up or down causing what is known as updrafts and downdrafts. The sun is the primary source of climatic changes on earth as the sun rays heat and stretch the air and consequently its pressure decreases and winds move from areas with high atmospheric pressure to areas of low atmospheric pressure. Because the earth rotates around itself, the wind does not blow go directly from high pressure areas to low pressure, but deviates to the right direction in the northern hemisphere and to the left direction in the southern hemisphere because of the "Coriolis effect" resulting from the earth's rotation on its axis.

**2. Air Statistics****Air Pollution:**

It is the presence of contaminant or pollutant substances a pollutant in air that do not disperse properly and interfere with human health or welfare, or produce other harmful environmental effects (2).

**Annual mean concentration:**

It is the arithmetic mean over all valid measurements for the respective year (1).

**Carbon Dioxide (CO<sub>2</sub>):**

It is a colorless, odorless and non-poisonous gas that results from fossil fuel combustion and is normally a part of ambient air. It is also produced in the respiration of living organisms (plants and animals), and considered to be the main greenhouse gas, contributing to climate change (2).

**Carbon dioxide emissions (per Capita):**

Carbon dioxide emissions per capita is the total amount of carbon dioxide emitted by a country as a consequence of human (production and consumption) activities, divided by the population of the country. This include emissions of carbon dioxide include emissions from consumption of solid, liquid and gas

fuels; cement production; and gas flaring. National reporting to the United Nations Framework Convention on Climate Change, which follows the Intergovernmental Panel on Climate Change guidelines, is based on national emission inventories and covers all sources of anthropogenic carbon dioxide emissions as well as carbon sinks (such as forests). Carbon dioxide emissions per capita are calculated by dividing carbon dioxide emissions by the number of people in the national population <sup>(1)</sup>.

**Carbon Monoxide (CO):**

Colorless, odorless and poisonous gas produced by incomplete fossil fuel combustion. Carbon monoxide combines with the hemoglobin of human beings, reducing its oxygen carrying capacity, with effects harmful to human beings <sup>(2)</sup>.

**Decibel:**

It is the unit of sound measurement on a logarithmic scale, with sound approximately doubling in loudness for every increase of 10 decibels <sup>(2)</sup>.

**Ground Level Ozone (O3):**

Ozone presents as a secondary pollutant in the lower atmosphere, where its formation can be enhanced by other pollutants. It is highly toxic at levels above 0.1 parts per million (p.p.m) <sup>(2)</sup>.

**Nitrogen dioxide (NO2):**

It is a reddish - brown very toxic gas with a strong irritating smell. When present in high concentrations, it causes serious damage to the lungs. Nitrogen dioxide is an oxidant which reacts in air forming nitric acid causing corrosion in addition to the formation of toxic organic nitrates that contribute to the production of ground-level ozone and smog.

**Nitrogen oxides (NOx):**

Nitrogen oxides are formed quickly from emissions from cars, in addition to contributing to the formation of ground-level ozone.

**Noise:**

Audible sound from traffic, construction and so on that may generate unpleasant and harmful effects (hearing loss). It is measured in decibels <sup>(2)</sup>.

**Ozone (O3):**

It is a pungent, colorless, toxic gas that contains three atoms of oxygen in each molecule. It occurs naturally at a concentration of about 0.01 parts per million (p.p.m) of air. Levels of 0.1 p.p.m. ppm are considered to be toxic. In the stratosphere, ozone provides a protective layer shielding the earth from the harmful effects of ultraviolet radiation on human beings and other biota. In the troposphere, it is a major component of photochemical smog, which seriously affects the human respiratory system <sup>(2)</sup>.

**Suspended Particulate Matter**

Fine liquid or solid particles, such as dust, smoke, mist, fumes or smog found in air or emissions <sup>(2)</sup>.

**Remote regions/ background site:**

It refers to monitoring stations far from any industrial or densely populated area <sup>(1)</sup>.

**Sulphur dioxide (SO<sub>2</sub>):**

It is a heavy, pungent colorless gas formed by the combustion of fossil fuels. It is harmful to human beings and vegetation, and contributes to the acidity in precipitation <sup>(2)</sup>.

**Suspended particulate matter (SPM<sub>10</sub>):**

It refers to finely divided solids or liquids, less than 10 (micrometers) that may be dispersed through the air from combustion processes, industrial activities or natural sources <sup>(1)</sup>.

**Volatile Organic Compounds**

They are organic compounds that evaporate readily and contribute to air pollution mainly through the production of photochemical oxidants <sup>(2)</sup>.

**Volatile organic compounds except for methane (NMVOCs):**

They are emissions produced mainly in fuel combustion and in processes that use solvents or solvent-based products such as painting, metal degreasing etc. Several of these chemicals are harmful to human health if inhaled, ingested, drunk or get in contact with skin. NM-VOCs are significant precursors to ground level ozone formation. NM-VOCs are the sum of all hydrocarbon air pollutants except methane <sup>(1)</sup>.

**3. Energy Statistics****The system average interruption index (SAIFI):**

It is the average number of interruptions experienced by each customer in the electricity supply service.

**The system average duration index (SAIDI):**

It is the average number interruptions duration in minutes experienced by each customer in the electricity supply service.

**Power Transmission System Availability:**

Transmission System Availability is calculated in terms of the summation of the availabilities of individual circuits of the main interconnected transmission system expressed as a percentage of the total number of circuits. A circuit is defined as an overhead line, cable, transformer, or any combination of these plant items controlled by one or more circuit breakers.

**4. Water Statistics****Biochemical oxygen demands (BOD)**

Amount of dissolved oxygen required by organisms for the aerobic decomposition of organic matter present in water. This is measured at 20 degrees Celsius for a period of five days. The parameter yields information on the degree of water pollution with organic matter <sup>(3)</sup>.

**Biological treatment:**

It is a wastewater treatment employing aerobic and anaerobic micro-organisms that results in decanted effluents and separate sludge containing microbial mass together with pollutants. Biological treatment processes are also used in combination or in conjunction with mechanical treatment <sup>(1)</sup>.

**Desalinated Water:**

Total volume of water obtained from desalination of (i.e., removal of salt from) seawater and brackish water <sup>(3)</sup>.

**Mechanical treatment:**

It is the treatment of a physical and mechanical nature that results in decanted effluents and separate sludge. Mechanical processes are also used in combination and/or in conjunction with biological and advanced unit operations. Mechanical treatment includes processes as sedimentation, flotation, etc <sup>(1)</sup>.

**Sea water:**

Sea water is water from a sea or ocean. On average, sea water in the world's oceans has a salinity of ~3.5 per cent. This means that for every 1 litre (1000 ml) of sea water there are 35 grams of salts (mostly, but not entirely, sodium chloride) dissolved in it <sup>(3)</sup>.

**Sewage sludge production (dry matter)**

The accumulated settled solids, either moist or mixed, with a liquid component as a result of natural or artificial processes, that have been separated from various types of waste water during treatment <sup>(3)</sup>.

**Total public water supply:**

Water supplied by economic units engaged in collection, purification and distribution of water (including desalting of sea water to produce water as the principal product of interest, and excluding system operation for agricultural purposes and treatment of waste water solely in order to prevent pollution.) It corresponds to ISIC division 41. Deliveries of water from one public supply undertaking to another are excluded <sup>(1)</sup>.

**Total reuse of freshwater:**

Freshwater that has undergone wastewater treatment and is deliverable to a user as reclaimed wastewater. This means the direct supply of treated effluent to the use. Excluded is wastewater discharged into watercourse and used again downstream <sup>(1)</sup>.

**Total wastewater generated:**

The quantity of water in cubic meters (m<sup>3</sup>) that is discharged due to being of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence <sup>(1)</sup>.

**Total wastewater treatment:**

Process to render waste water fit to meet applicable environmental standards or other quality norms for recycling or reuse <sup>(1)</sup>.

**Treated in other treatment plants:**

Treatment of wastewater in any non-public treatment plants, i.e. industrial wastewater plants. Excluded from 'Other wastewater treatment' is treatment in under independent treatment facilities such as septic tanks <sup>(1)</sup>.

**Treatment in independent treatment facilities:**

Individual private treatment facilities to treat domestic and other wastewater in cases where a public waste water network is not available or not justified either because it would produce no environmental benefits . Examples of such systems are treatment in wastewater tanks <sup>(1)</sup>.

**Wastewater treated in public treatment plants:**

All treatment of wastewater in municipal treatment plants by official authorities, or by private companies for local authorities, whose main purpose is wastewater treatment <sup>(1)</sup>.

**Water transmission system availability:**

Water Transmission System Availability is calculated in percentage in terms of the summation of the availabilities of transmission system components, such as pumps, water transmission lines, storage tanks, and surge vessels.

## 5. Health and safety Statistics

**Food poisoning:**

It refers to any illness caused by infection or poisoning resulting from food or water consumption. Food poisoning may affect individuals or group of people who have consumed the same contaminated food or drinks that contained harmful substance (toxin) or pathogens (bacteria, virus, and parasite) or chemical or allergic substances. Food poisoning has various factors and symptoms.

**Occupational health and safety:**

It is a discipline concerned with protecting the health and safety of people engaged with work by fostering a safe illness and accident-free environment. In other words, it is a set of procedure and rules within legislative framework aiming at protecting man from injures and possessions from being damaged or lost.

**Occupational accident:**

The harm that happens to a worker because of an accident is defined as “injury” as a direct result of an accident to that labor. Occupational accident is defined as work-related injury that occurs to the worker at the workplace or because of it, is also one of the injuries occurring to workers on their way to work or returning from work, provided that the labor used the regular route without interruption or deviation. The occupational diseases are also considered as work injuries.

## 6. Waste Statistics

**Agriculture wastes:**

All waste from agricultural and forestry activities <sup>(1)</sup>.

**Composting:**

A biological process that submits biodegradable waste to anaerobic or aerobic decomposition, and that results in a product that is recovered <sup>(1)</sup>.

**Construction waste:**

All waste from construction activities. This category refers to waste generated in ISIC division 45 <sup>(1)</sup>.

**Hazardous waste:**

It is the wastes that, owing to their toxic, infectious, radioactive or flammable properties pose a substantial actual or potential hazard to the health of humans and other living organisms and the environment <sup>(1)</sup>.

**Incineration:**

It is a controlled burning of waste materials with or without energy restoration <sup>(1)</sup>.

**Incineration plants:**

Facilities for burning waste under controlled conditions, with or without energy recovery <sup>(1)</sup>.

**Industrial waste:**

Include wastes from mine, quarries, manufacturing industries, energy production, and construction <sup>(1)</sup>.

**Landfilled waste:**

This includes all amounts of waste transferred to landfill, either directly, or after sorting and/or treatment, as well as residues from recovery and disposal operations for dispatch to landfill. Landfill is the final placement of waste into or onto the land in a controlled or uncontrolled way. The definition covers both in-house landfills, where a generator of waste is carries out its own waste disposal on site) as well as in external landfills <sup>(1)</sup>.

**Landfills:**

It refers to the sites that manage the final placement of waste in or on the land in a controlled or uncontrolled way <sup>(1)</sup>.

**Liquid waste:**

Liquid products or outputs resulting from the use of water produced by manufacturing processes and leftover industrial materials, such as oils that are disposed of by on-site treatment, sewage network, dumping into the sea or via other disposal routes.

**Municipal waste:**

Municipal waste includes household waste and similar waste. The definition also includes bulky waste (e.g. white goods, old furniture, mattresses) and yard waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if managed as waste. It includes waste originating from: households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes waste from selected municipal services, i.e. waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste. The definition excludes waste from municipal sewage network and treatment, municipal construction and demolition waste <sup>(1)</sup>.

**Municipal waste collected:**

Municipal waste collected by or on behalf of municipalities, as well as municipal waste collected by the private sector. It includes mixed household waste, and fractions collected separately for recovery operations (through door-to-door collection and/or through voluntary deposits) <sup>(1)</sup>.

**Municipal waste generated:**

This amount is the sum of the amount of municipal waste collected plus the estimated amount of municipal waste from areas not served by a municipal waste collection service <sup>(1)</sup>.

Municipal waste managed in a country:

The amount of municipal waste collected in the country –amount exported before treatment or disposal + amount imported for treatment or disposal <sup>(1)</sup>.

**Oil spill:**

Oil, discharged accidentally or intentionally, that floats on the surface of water bodies as a discrete mass and is carried by the wind, currents and tides. Oil spills can be partially controlled by chemical dispersion, combustion, mechanical containment and adsorption. They have destructive effects on coastal ecosystems <sup>(2)</sup>.

**Other (waste treatment/disposal):**

It refers to any other final treatment or disposal different from recycling (composting), incineration and landfill. Permanent storage of waste is included here <sup>(1)</sup>.

Recycling:

It is the reusing of waste materials in production process by restoring them from wastes, except reusing as fuel <sup>(1)</sup>.

**Treatment Plants:**

Facilities for the physical, thermal, chemical, or biological processing of waste that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling, or enhance recycling. Composting plants are included in this type of treatment <sup>(1)</sup>.

**Wastes:**

Materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose, with the exception of wastes recycled or reused in place of production (i.e. establishments) and wastes discharged directly to water or ambient air <sup>(1)</sup>.

## Data sources

Data are obtained from The Centre of Waste Management – Abu Dhabi. The data are processed and passed to Statistic Centre – Abu Dhabi for further editing and compilation

## Abbreviations used

**AADC** Al Ain Distribution Company

**ADDC** Abu Dhabi Distribution Company

**ADWEA** Abu Dhabi Water and Electricity Authority

**BOD** Biochemical Oxygen Demand

**EAD** Environment Agency - Abu Dhabi

**GWH** Gega Watt Hour

**L** Litre

**mcg** Microgram

**mg** Milligram

**mph** Mile per Hour

**MWH** Mega Watt Hour

**Na** Not Available

**SAIDI** System Average Interruption Duration

**SAIFI** System Average Interruption Frequency Index

## Notes on tables

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 environmental statistics and other official statistics, please visit the statistics link on the SCAD website at <http://www.scad.ae>

The next release is expected in October 2014 for 2013 data.

## References

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Tel: +971 2 8100000 - Fax: +971 2 8100800

P.O. Box: 6036, Abu Dhabi, U.A.E.