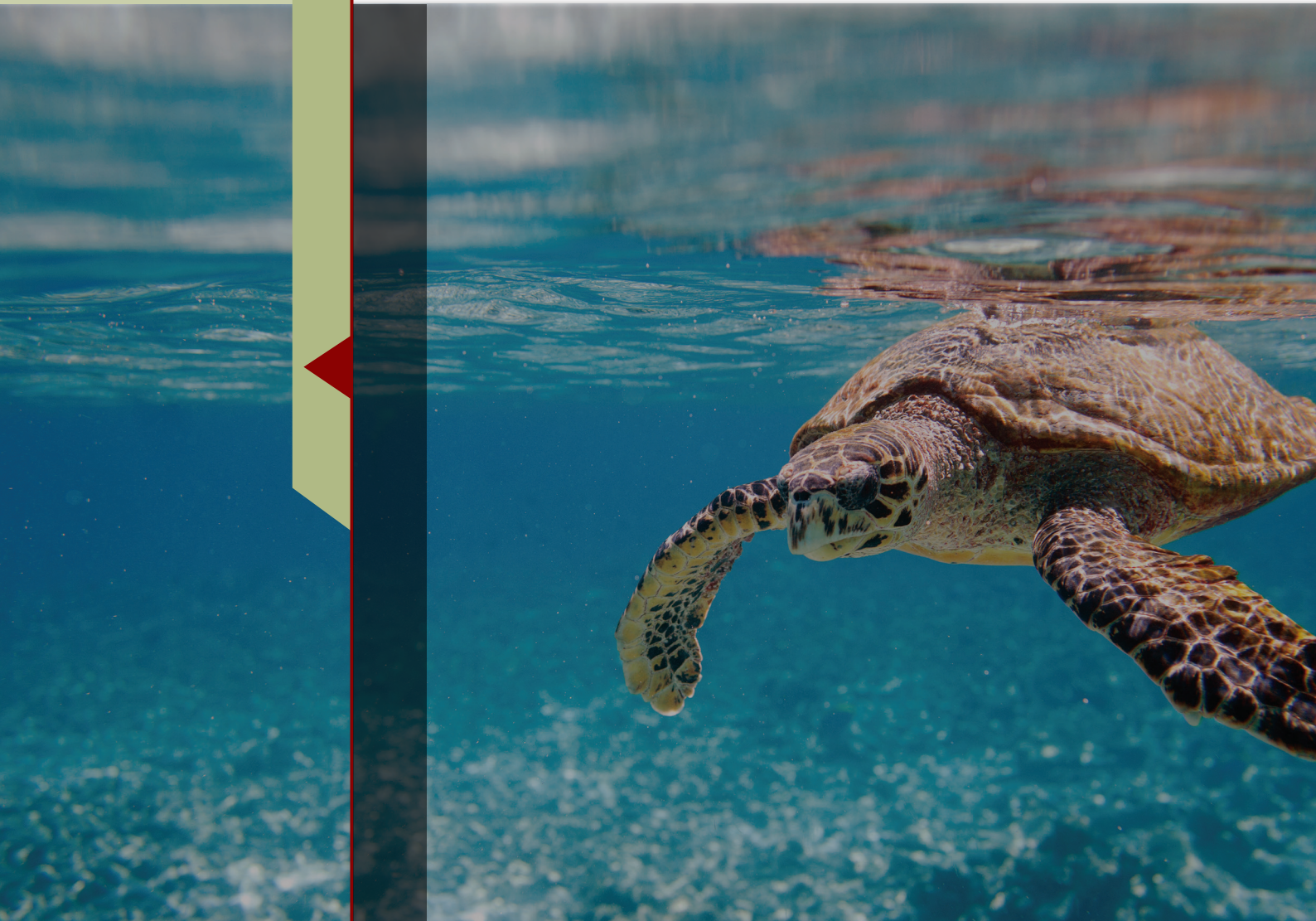




مركز الإحصاء  
STATISTICS CENTRE



## Environment Statistics

# 2014

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## Foreword

This report presents various environmental statistics of the Emirate of Abu Dhabi in 2014, including climate statistics, air statistics, and air quality and pollutant emissions. It also contains statistics covering water, food safety and occupational health, waste statistics as well as biodiversity 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 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

### Climate Statistics

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

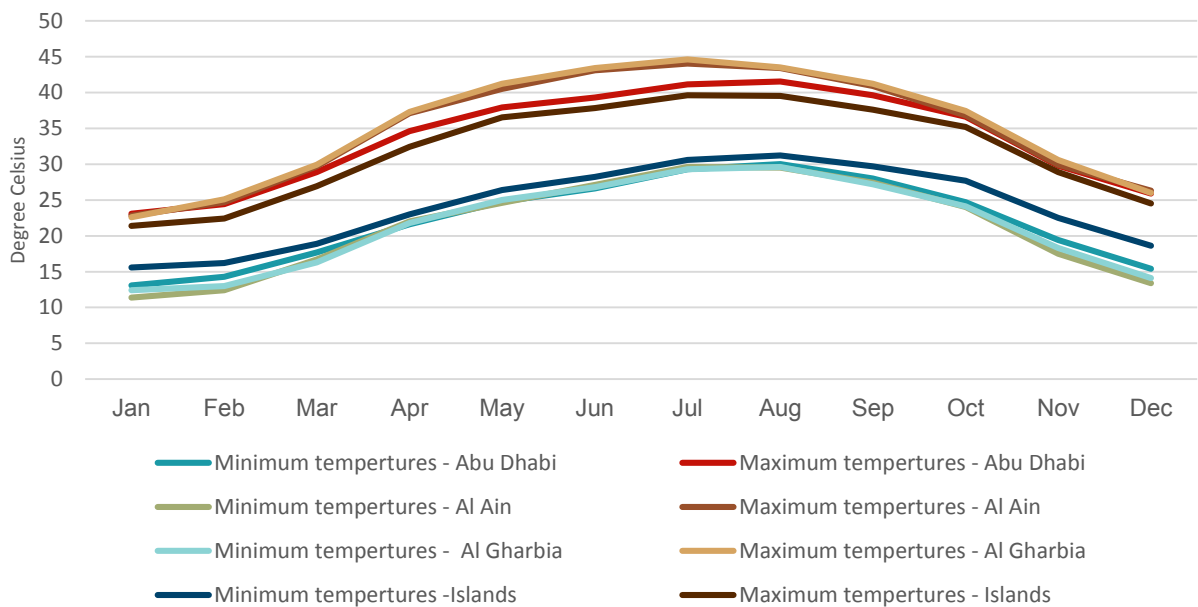
Abu Dhabi climate shows variation in temperatures in each season of the year. Table (1.1) displays the change in average temperatures, where the lowest degree was 17.1 degrees Celsius and it was recorded in January in Al Ain, while the highest temperature was 37.0 degrees Celsius and it was recorded in Al Ghariba 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 45 degrees Celsius while the minimum average temperature was less than 12 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.

**Table 1.1: Average air temperature by region and month 2014**  
(Degree Celsius)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	18.1	17.1	17.5	18.5
February	19.4	18.6	19.1	19.3
March	23.3	23.2	23.1	22.9
April	28.1	29.6	29.6	27.7
May	31.4	32.6	33.1	31.5
June	33.0	35.1	35.1	33.0
July	35.2	36.8	37.0	35.1
August	35.8	36.5	36.6	35.4
September	33.8	34.2	34.2	33.7
October	30.7	30.4	30.8	31.5
November	24.6	23.7	24.5	25.7
December	20.7	19.9	20.1	21.6

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Figure 1: Average maximum and minimum air temperature by region and month 2014**



Source: Statistics Centre- Abu Dhabi

## Rainfall

Abu Dhabi is characterized by scanty and abrupt rainfall, which occurs few times during wintertime 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. Table (1.2) displays average rainfall by region and month, In 2014 average annual rainfall decreased in the Emirates of Abu Dhabi as shown in figure (2), reducing from 77.6 millilitres in 2013 to 38.5 millilitres in 2014. Statistical tables (5) and (6) in the Annex show data in details on the total monthly rainfall and heaviest rainfall in one day by month and region.

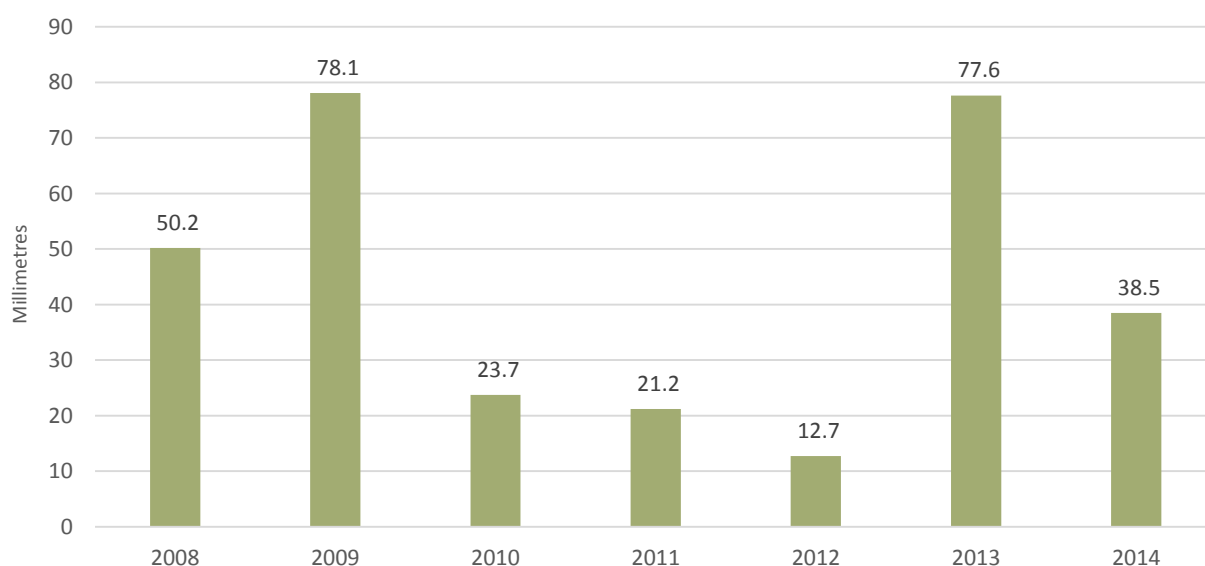
**Table 1.2: Average rainfall by region and month 2014**

(Millimetres)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	7.1	4.3	3.2	4.9
February	3.8	2.5	0.5	1.0
March	22.1	34.3	19.6	5.0
April	4.8	6.8	3.4	2.5
May	0.1	0.3	0.0	0.2
June	0.0	0.2	0.0	0.0
July	0.0	0.0	0.0	0.0
August	0.5	6.9	1.5	0.0
September	0.0	9.9	0.0	0.0
October	0.0	2.4	0.6	1.7
November	0.1	1.3	0.0	0.3
December	0.1	0.0	0.9	1.6

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Figure 2: Annual rainfall average - Abu Dhabi Emirates**



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 (1.3) displays values of relative humidity, showing the impact of geographic location and season change. The highest average relative humidity recorded in winter during January in the islands of the Emirate ranging 83%, while the lowest value recorded in May in Al Ain ranging 28%. Statistical tables (7 - 10) in the Annex show absolute maximum and minimum relative humidity and its averages by month and region.

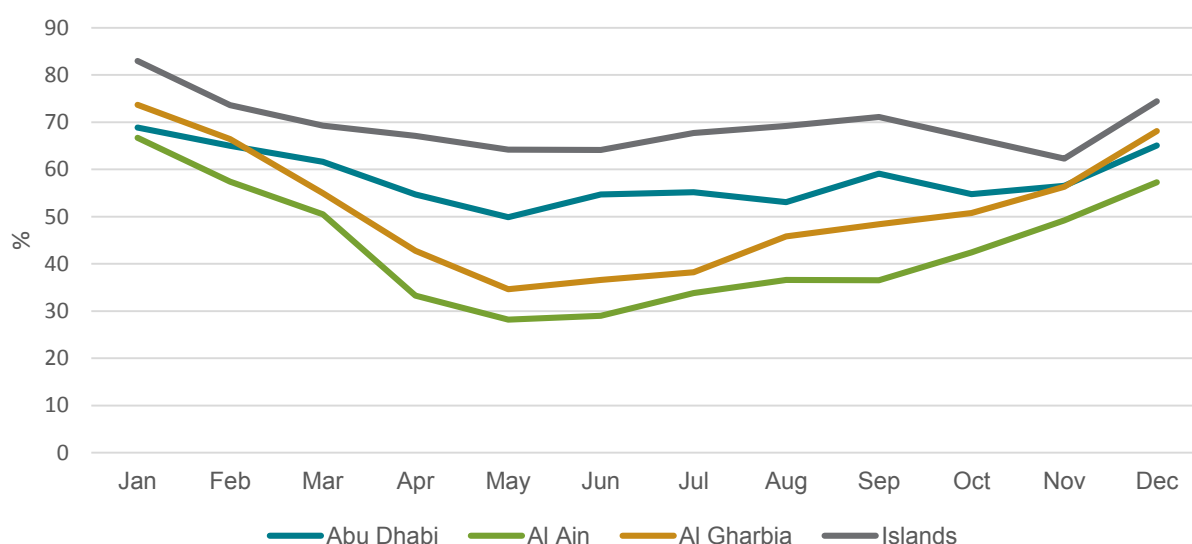
**Table 1.3: Average relative humidity by region and month 2014**

(%)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	68.9	66.7	73.7	83.0
February	65.0	57.4	66.4	73.6
March	61.6	50.5	55.0	69.3
April	54.7	33.3	42.8	67.1
May	49.9	28.2	34.6	64.2
June	54.7	29.0	36.6	64.1
July	55.2	33.8	38.2	67.7
August	53.1	36.6	45.8	69.2
September	59.1	36.5	48.4	71.1
October	54.8	42.4	50.8	66.7
November	56.5	49.2	56.3	62.3
December	65.1	57.3	68.1	74.4

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Figure 3: Average relative humidity by region and month 2014**



Source: Statistics Centre- Abu Dhabi



## Atmospheric Pressure

Table (1.4) reflects that the average atmospheric pressure in the Emirate of Abu Dhabi during summer season is low; the lowest value recorded in July 2014 at 997.9 Hectopascal in Abu Dhabi region. Atmospheric pressure usually rises in winter, with the highest value recorded in December at 1,020.3 Hectopascal in the Islands.

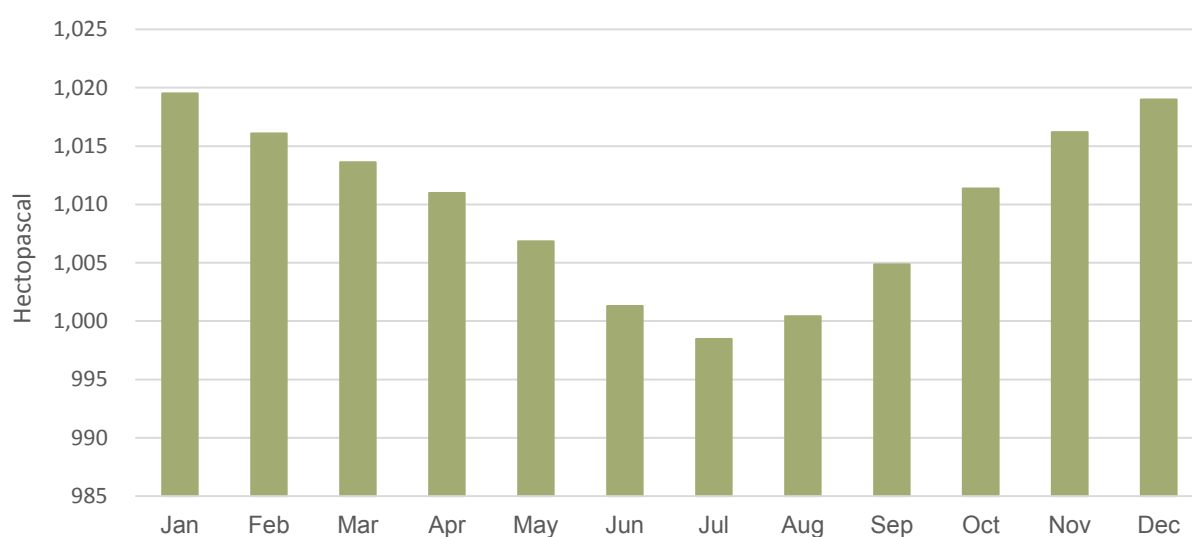
**Table 1.4: Average atmospheric pressure by region and month 2014**

(Hectopascal)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	1,019.5	1,018.5	1,019.7	1,020.3
February	1,015.2	1,015.3	1,016.9	1,017.0
March	1,013.4	1,012.9	1,014.2	1,014.1
April	1,010.8	1,010.1	1,011.6	1,011.4
May	1,006.5	1,006.3	1,007.5	1,007.0
June	1,000.7	1,001.0	1,002.0	1,001.4
July	997.9	998.5	999.0	998.5
August	999.9	1,000.8	1,000.8	1,000.3
September	1,004.4	1,004.9	1,005.2	1,005.0
October	1,011.4	1,011.7	1,010.9	1,011.5
November	1,016.2	1,016.3	1,015.6	1,016.6
December	1,018.9	1,019.0	1,018.4	1,019.7

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Figure 4: Average atmospheric pressure by month 2014**



Source: Statistics Centre- Abu Dhabi



## Wind Speed

The highest wind speed average in 2014 seen in the Islands of the Emirate in December at 16.3 knots, while the lowest average recorded in Al Ain in November at 5.0 knots, as shown in Table (1.5). 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 and Al Ain region where high-rise buildings and mountains and the tall trees act as winds breaks. Statistical tables (11 - 14) in the Annex show the maximum values and averages of wind speed by month and region.

**Table 1.5: Average wind speed by region and month 2014**

(Knot\*)

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	5.7	5.0	5.6	8.1
February	7.0	6.1	7.1	9.5
March	6.9	6.2	7.1	7.4
April	11.9	10.9	12.3	15.1
May	12.6	11.6	12.5	13.8
June	13.5	12.0	13.3	16.3
July	13.0	11.6	13.2	15.0
August	14.1	11.4	13.4	15.0
September	11.9	10.7	10.9	13.0
October	11.8	10.3	10.4	12.2
November	12.0	9.9	11.5	15.4
December	10.4	8.6	11.4	15.9

Source: National Centre of Meteorology and Seismology , 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 currently used to generate electrical energy from solar plants. During the 2014 summer, as shown in Table (1.6), the highest day length was 11.3 hours in both Abu Dhabi and Al Ain regions. During the winter of the same year, the day length in Abu Dhabi and Al Ain regions declined to 8.9 hours and 7.0 hours, respectively. Table (1.7) illustrates the daily average of solar radiation, where the highest value was about 7,184 W / m<sup>2</sup>/ h and it recorded in Abu Dhabi City. Statistical tables (15 - 18) in the Annex show the maximum and minimum values of daily solar radiation intensity by month and region.

**Table 1.6: Average daily sunshine in Abu Dhabi and Al Ain regions by month 2014**  
(Hours)

Month	Abu Dhabi	Al Ain
January	9.0	7.0
February	9.0	9.0
March	9.0	9.0
April	10.5	10.3
May	11.0	10.9
June	11.3	11.3
July	11.1	10.5
August	10.8	10.4
September	10.4	10.1
October	9.8	9.7
November	9.2	8.8
December	8.9	8.3

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

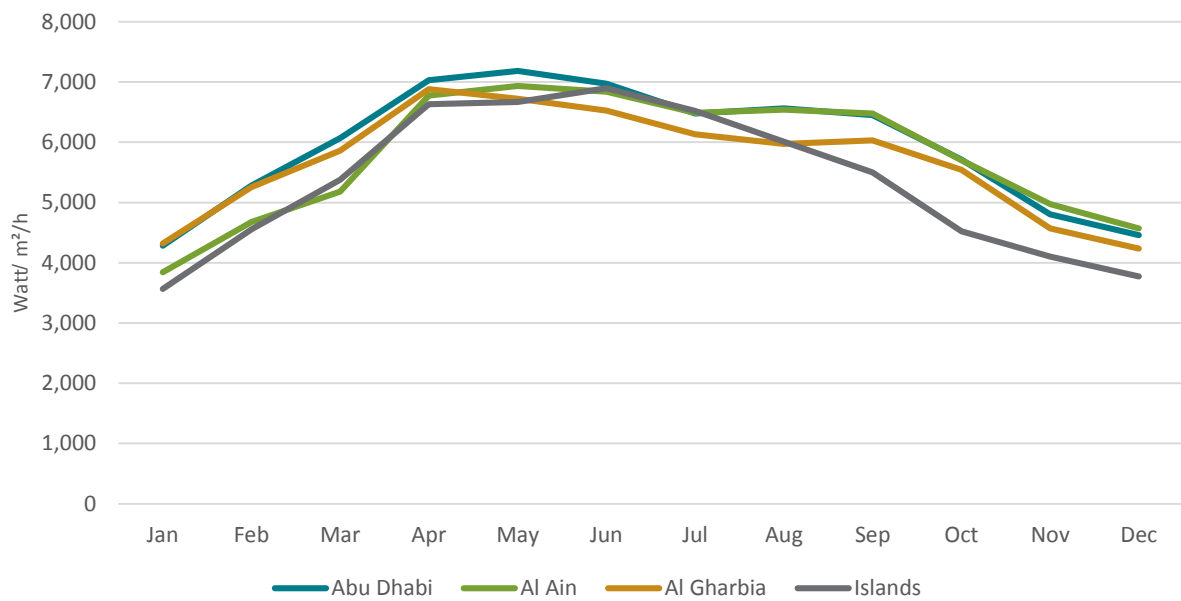
**Table 1.7: Average daily total solar radiation by region and month 2014**

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

Month	Abu Dhabi	Al Ain	Al Gharbia	The Islands
January	4,281	3,843	4,319	3,565
February	5,285	4,679	5,254	4,555
March	6,070	5,179	5,862	5,378
April	7,033	6,773	6,880	6,631
May	7,184	6,933	6,722	6,671
June	6,974	6,840	6,527	6,900
July	6,477	6,491	6,135	6,521
August	6,561	6,541	5,975	6,012
September	6,451	6,478	6,033	5,500
October	5,711	5,702	5,541	4,521
November	4,805	4,974	4,568	4,103
December	4,458	4,568	4,235	3,774

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Figure 5: Average daily total solar radiation by region and month 2014**



Source: Statistics Centre- Abu Dhabi

## Air Statistics

The Abu Dhabi government pays tireless efforts to improve air quality and to control harmful emissions; entities and organizations 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 deemed 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 15.2 micrograms/cubic meters in 2014. The annual maximum allowed concentration is 60 micrograms/ cubic meter. This applies to other pollutants including lingering dust as readings were between 67.8 and 112.6 micrograms/cubic meters in 2014 where the maximum allowed rate is 150 micrograms/cubic meters .Statistical tables (19 - 22) in the Annex shows 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 2014**

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

Region	Sulphur dioxide	Nitrogen dioxide	Ground level ozone	Particulate matter – PM10
<b>Abu Dhabi</b>				
Khalifa School	5.6	27.8	94.3	82.5
Bny Yas School	5.4	32.5	103.9	67.8
Khalifa City	9.2	34.7	102.6	83.5
AlMaqtaa	4.2	42.0	78.5	112.6
<b>Al Ain</b>				
Al Ain School	7.7	36.3	74.6	105.4
Suwaihan	4.1	15.1	101.5	92.8
Zakher	4.3	28.4	-	94.2
Al Tawya	6.4	20.5	102.5	100.6
<b>Al Gharbia</b>				
Bda Zayad	15.2	17.0	99.7	98.7

Source: Statistics Centre- Abu Dhabi

Concentration of carbon monoxide is measured in stations designed and placed in the roadsides to measure the amount of gas released from car exhausts, concentration of carbon monoxide reached in Hamdan Street in Abu Dhabi about 1.1 milligram/m<sup>3</sup>, followed by 0.9 milligram/m<sup>3</sup> in a roadside station in Al Ain Street. Where in Al Gharbia region the annual average of carbon monoxide concentration did not exceed 0.3 milligram/m<sup>3</sup> in both E11 road and Ruwais.

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

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

Station Location	2010	2011	2012	2013	2014
<b>Abu Dhabi</b>					
Road Side - Hamdan Street	1.2	1.0	0.9	0.9	1.1
Urban area- Al Maqtaa	-	-	-	0.5	0.7
<b>Al Ain</b>					
Road Side - Al Ain Street	0.9	0.7	1.2	1.2	0.9
Regional background - Alqoa	-	-	-	0.3	0.3
Urban area- Swihan	-	-	0.1	0.4	0.5
<b>Al Gharbia</b>					
Road side - E11 Road	-	-	-	0.4	0.3
Industrial - Ruwais	-	-	-	0.3	0.3

Source: Environment Agency - Abu Dhabi

Note: all historical data been modified according to the source.

Table (2.3) shows the annual average noise levels in Abu Dhabi Emirates, where some regions in the Emirate recorded the same levels of noise such as urban regions. Annual average of noise level in 2014 in all Abu Dhabi Emirate regions (Abu Dhabi, Al Ain and Al Gharbia) 53.1, 53.2 and 52.5 Decibels respectively.

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

(Decibels)

Station Location	2010	2011	2012	2013	2014
<b>Abu Dhabi</b>					
City Centre - Khadija School	57.4	59.6	60.1	67.5	-
Urban/ Residential - Khalifa School	53.0	54.2	47.6	58.4	42.8
Road Side - Hamdan Street	66.6	66.6	-	68.3	65.7
Urban/ Residential - Baniyas School	53.1	55.6	56.9	52	50.2
Industrial - Mussafah	48.3	46.0	44.7	69	60.7
Industrial – Al Mafrq	-	-	-	60.2	53.0
Urban area- Khalifa city	-	-	-	60.1	49.7
Urban area- Al Maqtaa	-	-	-	53.7	49.3
<b>Al Ain</b>					
Urban/ Residential - Al Ain School	48.9	50.7	51.2	55.8	51.5
Road Side - Al Ain Street	61.6	62.4	62.6	64.1	62.0
Regional Background - Alqoa	-	-	-	54.4	51.5
City Centre- Zakher	-	-	-	54.9	49.1
Urban area- Al Tawya	-	-	-	56.7	51.7
<b>Al Gharbia</b>					
Urban/ Residential - Bida Zayed	-	-	51.3	53.8	45.5
Road side - E11 Road	-	-	-	65.8	61.1
Industrial - Ruwais	-	-	-	55.6	53.2
City Centre - Gayathi School	50.6	53.0	65.3	61.3	54.8
Regional Background - Liwa Oasis	50.6	46.1	47.3	50.8	45.3
Regional Industrial Background– Habshan	-	-	-	59.7	55.1

Source: Environment Agency - Abu Dhabi

Note: all historical data been modified according to the source.

## 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 Figure (6) shows that the total emissions from oil and gas sector in 2014 increases by 25.6% compared with 2013. Total emissions were 448,392 tons. As a result, the emissions per capita in 2014 increased by 12.5% than last year to reach 0.17 tons per capita, as shown in table (2.5). Statistical tables (23 - 25) show the amount of emissions by type of pollutant and by sectors in Abu Dhabi National Oil Company.

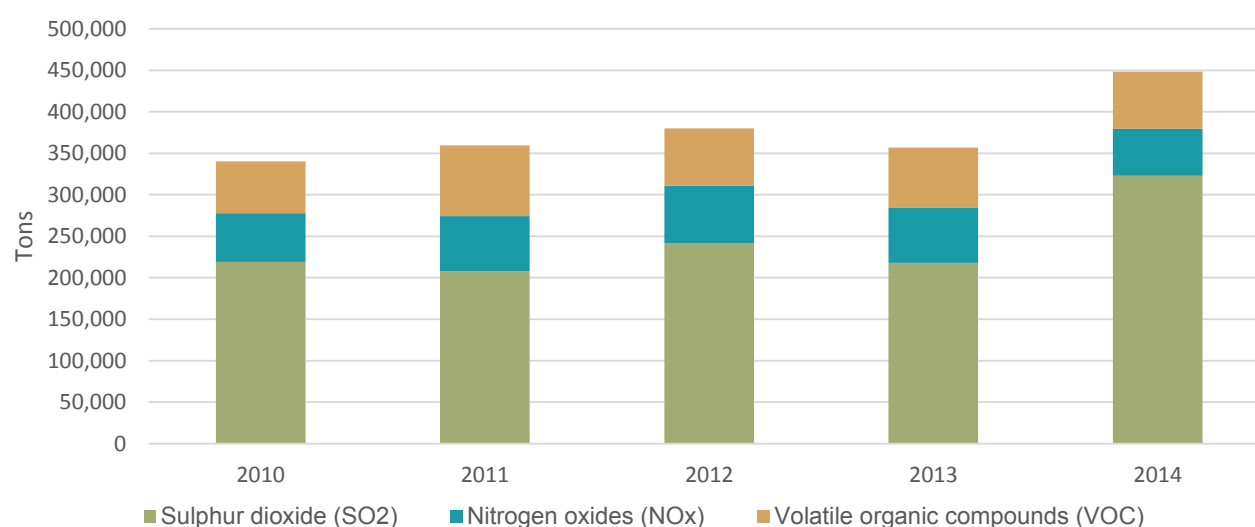
**Table 2.4: Air pollutant total emissions – oil and gas sector**

(Tons)

Pollutant	2005	2010	2011	2012	2013	2014
<b>Total</b>	<b>383,679</b>	<b>340,093</b>	<b>359,550</b>	<b>380,117</b>	<b>356,975</b>	<b>448,392</b>
Sulphur dioxide (SO <sub>2</sub> )	262,539	219,022	208,025	241,799	217,925	322,798
Nitrogen oxides (NO <sub>x</sub> )	56,225	58,901	66,105	69,283	66,597	56,708
Volatile organic compounds (VOC)	64,915	62,170	85,420	69,035	72,453	68,886

Source: Abu Dhabi National Oil Company - ADNOC

**Figure 6: Air pollutant total emissions - oil and gas sector**



Source: Statistics Centre- Abu Dhabi

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

(Tons)

Pollutant	2005	2010	2011	2012	2013	2014
<b>Total</b>	<b>0.28</b>	<b>0.16</b>	<b>0.17</b>	<b>0.16</b>	<b>0.15</b>	<b>0.17</b>
Sulphur Dioxide (SO <sub>2</sub> )	0.19	0.10	0.10	0.10	0.09	0.12
Nitrogen Oxides (NO <sub>x</sub> )	0.04	0.03	0.03	0.03	0.03	0.02
Volatile Organic Compounds (VOC)	0.05	0.03	0.04	0.03	0.03	0.03

Source: Statistics Centre- Abu Dhabi

\* Data per capita has been updated as a result of updates on population estimates in the Emirate of Abu Dhabi 2006- 2014



## Carbon Dioxide Emissions – oil and gas sector

Table (2.6) illustrates the change in carbon dioxide emissions during the period from 2006 to 2014 of oil and gas sector. Gas emissions in 2014 totalled 30 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	2010	2011	2012	2013	2014
Carbon dioxide emissions (Million Tons)	23.0	23.0	27.9	26.4	26.6	30.0
Per capita carbon dioxide emissions (Tons)*	15.4	11.0	12.9	11.4	10.7	11.3

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

\* Data per capita has been updated as a result of updates on population estimates in the Emirate of Abu Dhabi 2006- 2014

## Water statistics

### 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 2014 totaled 1,318 MCM, an increase of 6.6% compared with 2013.

**Table 3.1: Total non-conventional water resources by type**

(Million cubic meter)

Type	2005	2010	2011	2012	2013	2014
<b>Total</b>	<b>770.0</b>	<b>999.3</b>	<b>1,095.0</b>	<b>1,198.0</b>	<b>1,236.3</b>	<b>1,318.0</b>
Desalinated water consumption	667.0	873.0	961.5	1,059.2	1,082.5	1,126.3
Quantity of treated wastewater reuse	103.0	126.3	133.5	138.8	153.8	191.7

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 2014, the quantity of wastewater inflow totalled 322.7 MCM, an increase of 9.4% than 2013. Approximately 97% of the wastewater quantity treated, while the quantity of the reused treated wastewater accounted to 61.3%. Water treatment plants capacity in 2014 totalled 467 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. Several parameters 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 2014 daily production of sludge increased by 12.7% from 2013, also the average daily concentration of BOD increased by 22.2% from 2013 as shown in table (3.4) .

**Table 3.2: Wastewater statistics**

(Million cubic metre)

Item	2005	2010	2011	2012	2013	2014
Wastewater inflow	153.1	255.5	259.7	275.5	295.1	322.7
Treated wastewater	148.3	246.6	243.1	265.4	283.0	312.9
Treated wastewater reuse	103.0	126.3	133.5	138.8	153.8	191.7

Source: Abu Dhabi Sewerage Services Company

**Figure 7: Quantity of wastewater**



Source: Abu Dhabi Sewerage Services Company

**Table 3.3: Total wastewater treatment plants capacity**

(Million cubic metre)

Item	2005	2010	2011	2012	2013	2014
Total wastewater treatment plants capacity	135.8	442.5	431.4	405.2	497.5	466.8
Total conventional wastewater treatment plants capacity	134.4	419.9	414.4	404.6	496.3	461.6
Total non-conventional wastewater treatment plants capacity	1.4	22.6	17.0	0.6	1.2	5.2

Source: Abu Dhabi Sewerage Services Company

**Table 3.4: Wastewater quality**

Region	2006	2010	2011	2012	2013	2014
Average daily amount of dry sludge (ton/day)	97.73	135.63	149.63	164.67	119.22	134.38
Average daily concentration of BOD (kg/day)	82.07	119.01	107.70	170.23	128.56	157.06
Average daily concentration of suspended solids (ton/day)	69.47	97.38	103.11	148.4	564.43	-

Source: Abu Dhabi Sewerage Services Company

## Marine water 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 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 seawater 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 2014 ranges between 18.6 – 47.9 Practical Salinity Unit (psu).

Regarding dissolved oxygen, most of the readings taken are between 4.5 – 6.9 mg/litre and these are ideal levels for supporting the life of marine living organisms.

Table (3.5) and (3.6) contains the physical and chemical measurements along with nutrients concentration of the marine waters of Abu Dhabi city.

**Table 3.5: Marine waters quality in the city Abu Dhabi 2014**

Sample number	Secchi Depth (m)	Acidity (pH)	Salinity (psu)	Temperature (°C)	Dissolved Oxygen (mg/L)	Biochemical Oxygen Demand (BOD) (mg/L)
1	1.0	8.3	47.9	27.9	5.2	3.9
2	0.6	8.4	34.6	28.8	6.9	4.5
3	1.1	8.3	47.2	28.5	5.1	3.5
4	1.2	8.1	46.9	28.7	4.7	4.1
5	1.4	8.2	45.8	28.2	4.9	3.0
6	2.6	8.2	44.4	28.0	5.0	3.2
7	1.8	8.1	44.2	28.2	5.1	3.3
8	1.6	8.1	44.1	28.5	4.7	3.4
9	1.7	8.1	44.4	28.2	4.8	3.3
10	2.1	8.2	47.7	29.5	4.7	3.4
11	-	7.8	18.6	32.6	4.7	4.3
12	-	8.1	33.0	32.7	5.1	3.2
13	4.4	8.1	47.1	30.7	5.4	3.0
14	2.4	8.1	43.6	30.5	5.3	3.0
15	4.0	8.1	47.3	30.1	4.9	4.5
16	3.7	8.1	47.0	30.0	5.1	3.5
17	3.3	8.1	46.7	29.8	5.1	3.0
18	2.4	8.0	44.9	29.4	4.5	4.0
19	2.6	8.1	46.2	30.7	5.2	3.0
20	3.3	8.1	46.7	29.8	5.1	3.0
21	2.4	8.0	44.9	29.4	4.5	4.0
22	2.6	8.1	46.2	30.7	5.2	3.0

Source: Environment Agency – Abu Dhabi

**Table 3.6: Concentration of natural nutrients in marine waters 2014**

(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	5.3	924.2	773.3	169.2	-
2	24.4	2,351.7	3,527.5	9,144.2	11,913.3
3	5.7	470.8	665.0	215.8	-
4	2.1	350.0	1,085.8	448.3	329.2
5	1.8	230.8	790.0	105.0	-
6	0.7	193.3	399.2	120.0	104.2
7	0.6	259.2	636.7	157.5	137.5
8	1.0	282.5	1,026.7	388.3	173.3
9	1.0	270.0	1,354.2	175.0	225.8
10	0.8	224.2	544.2	145.0	235.0
11	1.9	370.0	11,793.3	5,245.0	48.3
12	1.8	236.7	8,133.3	5,395.0	31.7
13	0.3	-	200.0	220.0	15.0
14	0.4	-	370.0	285.0	-
15	0.3	90.0	1,055.0	175.0	-
16	0.5	105.0	475.0	355.0	15.0
17	0.4	-	415.0	175.0	15.0
18	0.4	380.0	465.0	350.0	15.0
19	0.5	90.0	175.0	265.0	-
20	0.4	-	415.0	175.0	15.0
21	0.4	380.0	465.0	350.0	15.0
22	0.5	90.0	175.0	265.0	0.0

Source: Environment Agency – Abu Dhabi

## 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.

### 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, diarrhoea, 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 2013 there were 1,949 cases of food poisoning and foodborne illnesses Caused by eating food or drinks contaminated with bacteria and viruses. Typhoid poisoning claimed 248 cases or 13% of the total cases of poisoning in 2013.

**Table 4.1: Number of food poisoning and foodborne illnesses by type**

Type	2009	2010	2011	2012	2013
<b>Total</b>	<b>1,114</b>	<b>1,259</b>	<b>1,356</b>	<b>2,107</b>	<b>1,949</b>
Salmonella	205	90	-	-	-
Other food poisoning	309	471	667	1,147	1,237
Typhoid fever	133	335	394	443	248
Viral hepatitis A	181	193	138	279	271
Giardia lambia	36	55	82	103	94
Bacillary dysentery	52	51	-	-	-
Bacterial dysentery	123	-	-	-	-
Paratyphoid fever	30	12	-	-	-
Brucellosis	45	52	75	135	99
Other	-	-	-	-	-

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.

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

Table (4.2) shows that lost time injury incidents totaled 30 incidents per million man-hours worked in the water and electricity production sector, an increase of 50% from 2013. The registered near miss cases were 1,587 cases. While, the lost time injury frequency rate was 0.4. The lost time injury severity rate (LTISR) was 12 as shown in Table (4.3).

**Table 4.2: Number of occupational health and safety incidents - water and electricity production sector**

Item	2005	2010	2011	2012	2013	2014
Fatality incidents	1	6	0	4	1	9
Fatality non recordable	0	0	0	0	0	0
Disability incident	0	1	0	1	0	0
Lost time injury incidents	9	22	12	23	20	30
Medical treatment case	5	472	8	12	24	22
Restricted workday case	0	1	0	4	6	2
Journey incident	0	0	10	1	6	0
Reporting dangerous occurrence	0	4	0	7	9	8
Occupational diseases incident	0	0	0	0	0	0
Road traffic incidents	44	3	1	1	7	0
Near miss	47	596	1,355	2,229	1,813	1,587

Source: Abu Dhabi Water and Electricity Authority - ADWEA

**Table 4.3: Rate of injuries and incidents registered per million man-hours worked - water and electricity production sector**

Item	2005	2010	2011	2012	2013	2014
Number of Working Hours ( <i>Million Hours</i> )	9.8	42.1	36.0	62.0	82.9	72.3
Lost Time Injury Frequency Rate (LTIFR)	0.9	0.5	0.3	0.4	0.2	0.4
Lost Time Injury Severity Rate (LTISR)	2.1	17.1	7.5	9.4	4.1	12.0
Total Reportable Case Frequency (TRCF)*	0.1	11.3	0.5	0.6	0.3	0.8

Source: Abu Dhabi Water and Electricity Authority - ADWEA

\*Includes Fatal Accident Rate (FAR)



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

Table (4.4) shows a decrease in the lost time injury incidents to reach 60 incidents in 2014, a decrement of 9% than 2013. It is worth mentioning that fatal accident rate decreased by 6.3% than 2013 with an amount of 1.5 in 2014, whereas lost time injury frequency rate had the same rate as shown in table (4.5).

**Table 4.4: Number of occupational health and safety incidents - oil and gas sector**

Item	2005	2010	2011	2012	2013	2014
Fatality incidents	6	4	18	12	11	8
Fatality non recordable	-	11	19	23	43	32
Disability incident	0	0	17	3	-	-
Lost time injury incidents	53	66	110	89	66	60
Medical treatment case	123	144	279	388	-	-
Restricted workday case	41	58	1	68	-	-
Journey incident	-	-	-	-	-	-
Occurrence of occupational disease	-	-	-	397	497	589
Road traffic incidents	171	177	284	365	-	-
Near miss	-	30,186	50,624	*58,788	-	-

Source: Abu Dhabi National Oil Company - ADNOC

\* Includes serious near miss incidents.

**Table 4.5: Rate of injuries and incidents registered per million man-hours worked - oil and gas sector**

Item	2005	2010	2011	2012	2013	2014
Number of working hours ( <i>million hours</i> )	171.0	355.0	588.5	865.0	710.4	533.9
Lost time injury frequency rate (LTIFR)	0.3	0.2	0.2	0.1	0.1	0.1
Total reportable case frequency (TRCF)	1.3	0.8	0.6	0.6	-	-
Fatal accident rate (FAR) (per 100 million working hours)	3.5	1.1	3.1	1.4	1.6	1.5

Source: Abu Dhabi National Oil Company - ADNOC

## Occupational health and safety statistics – Sewerage services sector

Table (4.6) shows a of occupational health and safety incidents according to Abu Dhabi Sewerage Services Company. In 2014, lost time injury incidents increased to reach to 27 incident compared with 18 incident in 2013, but reportable dangerous occurrence decreased to record 17 ceases compared to 23 cases in 2013.

The lost time injury frequency rate (LTIFR) was 0.4, with a lost time injury severity rate (LTISR) at 7.3, while the total reportable case frequency (TRCF) decreased to 0.9 as shown in Table (4.7).

**Table 4.6: Number of occupational health and safety incidents - sewerage services sector**

Item	2007	2010	2011	2012	2013	2014
Fatality Incidents	1	2	1	1	1	1
Fatality Non Recordable	0	0	0	1	0	1
Disability Incident	0	0	0	1	0	1
Lost Time Injury Incidents	2	0	6	1	18	27
Medical Treatment Case	0	0	0	0	5	8
Restricted Workday Case	0	0	6	0	3	1
Serious Near Miss	0	244	0	0	0	772
Journey Incident	0	0	0	1	0	0
Reporting Dangerous Occurrence	0	2	0	1	23	17
Occurrence of Occupational Disease	0	0	0	0	0	0
Road Traffic Incidents	0	1	1	0	0	0
Other (Near miss incidents)	0	0	165	17	825	0

Source: Abu Dhabi Sewerage Services Company

**Table 4.7: Rate of injuries and incidents registered per million man-hours worked - sewerage services sector**

Item	2007	2010	2011	2012	2013	2014
Number of Working Hours ( <i>Million Hours</i> )	2.4	15.8	9.6	33.4	29.5	29.4
Lost Time Injury Frequency Rate (LTIFR)	0.16	0.00	0.56	0.91	0.95	0.40
Lost Time Injury Severity Rate (LTISR)	0.41	0.00	8.89	89.7	37.56	7.3
Total Reportable Case Frequency (TRCF)	0.00	0.12	0.63	0.48	0.95	0.9
Fatal Accident Rate (FAR)	0.08	0.05	0.01	0.09	0.03	0.03

Source: Abu Dhabi Sewerage Services Company

## 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 2014 was about 9.9 million tons.

### Solid Waste

The total amount of the waste generated daily in 2014 was about 27.2 thousand tons. The demolition and construction activity accounts for 46% of total waste generated, whereas the amount of solid municipal waste reached about 1.3 million tons of which 53.1% was in the Abu Dhabi region.

**Table 5.1: Non-hazardous solid waste generation by region and source activity 2014**

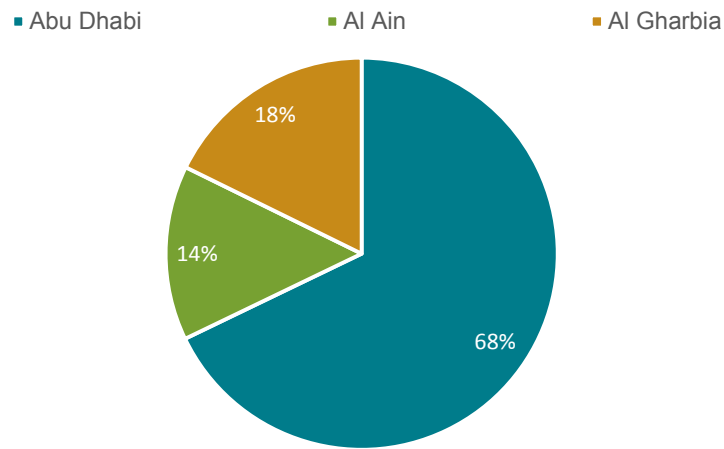
(Tons)

Source	Total	Abu Dhabi	Al Ain	Al Gharbia
<b>Grand total</b>	<b>9,918,591</b>	<b>6,730,060</b>	<b>1,429,901</b>	<b>1,758,630</b>
<b>Daily average</b>	<b>27,174</b>	18,438	3,918	4,818
Construction and demolition	<b>4,587,301</b>	2,436,958	780,623	1,369,720
Commercial and industrial Waste	<b>3,297,147</b>	3,290,399	2,124	4,624
Agricultural Waste	<b>561,991</b>	52,785	295,022	214,184
Municipal Solid Waste	<b>1,298,955</b>	787,279	342,999	168,677
Other *	<b>173,197</b>	162,639	9,133	1,425

Source: The Centre of Waste Management - Abu Dhabi

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

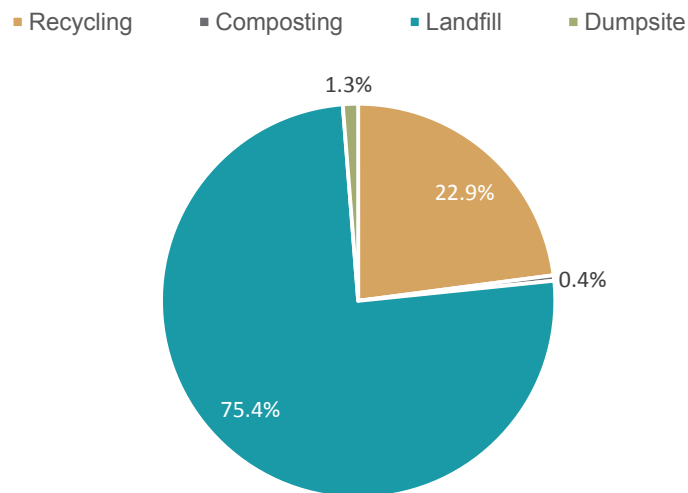
**Figure 8: Percentage distribution of non-hazardous solid waste generation by region 2014**



Source: Statistics Centre - Abu Dhabi

Due to the development witnessed by the Emirate of Abu Dhabi in terms of waste treatment, recycled waste reached 22.9% in 2014, while waste disposed by dumpsite reached 75.4% of the total waste generated in Abu Dhabi emirate. As shown in Figure 9.

**Figure 9: Percentage distribution of non-hazardous solid waste by disposal method 2014**



Source: Statistics Centre - Abu Dhabi

## Biodiversity Statistics

Biodiversity supports life on earth since people ultimately depend on biodiversity products and services on a daily basis, such as clean water, clean air and food products, as well as many other products such as wood products. Biodiversity is also essential in the medical field; medicinal plants still considered the most common medication tools in traditional medicine. On the other hand, diversity of plants, animals and microbes is an integral part of bio-medical research and pharmacology. Thus, loss in biodiversity means that we are losing, before discovery, many health benefits that ecosystems can provide. Ecotourism is another key service provided by biodiversity, in addition to the important role, that biodiversity play in preserving local heritage and symbols such as the connection between falcons and falconry.

### Known and threatened species

Table (6.1) shows the total number of species recorded in the Emirate of Abu Dhabi, in 2014 number of known species registered excluding invertebrates reached up to 1,074 terrestrial and marine species compared with 1,028 type in 2013, . Studies indicate that there are more than 2,000 recorded species of arthropods, the majority are insects. Records on vascular plants in the Emirate show that there are about 432 recorded species.

The table also shows the total number of threatened species including the three threatened categories of the IUCN Red List: Critically endangered (CR), Endangered (EN), and Vulnerable (VU), in addition to the number of species listed within these categories according to the local Red List of the Emirate of Abu Dhabi, if any.

**Table 6.1: Total known and threatened species \***

Class	Total number of known species			Total number of threatened species		
	2012	2013	2014	2012	2013	2014
Fish	247	449	540	10	27	11
Birds**	420	452	427	15	9	31
Reptiles**	70	70	51	5	6	5
Amphibians	2	2	2	0	0	0
Mammals**	54	55	54	16	15	16
<b>Total</b>	<b>793</b>	<b>1,028</b>	<b>1,074</b>	<b>46</b>	<b>57</b>	<b>63</b>
Arthropods (terrestrial)	>2,000	3,464	>2,000	-	0	-
Vascular Plants**	414	401	432	9	11	8

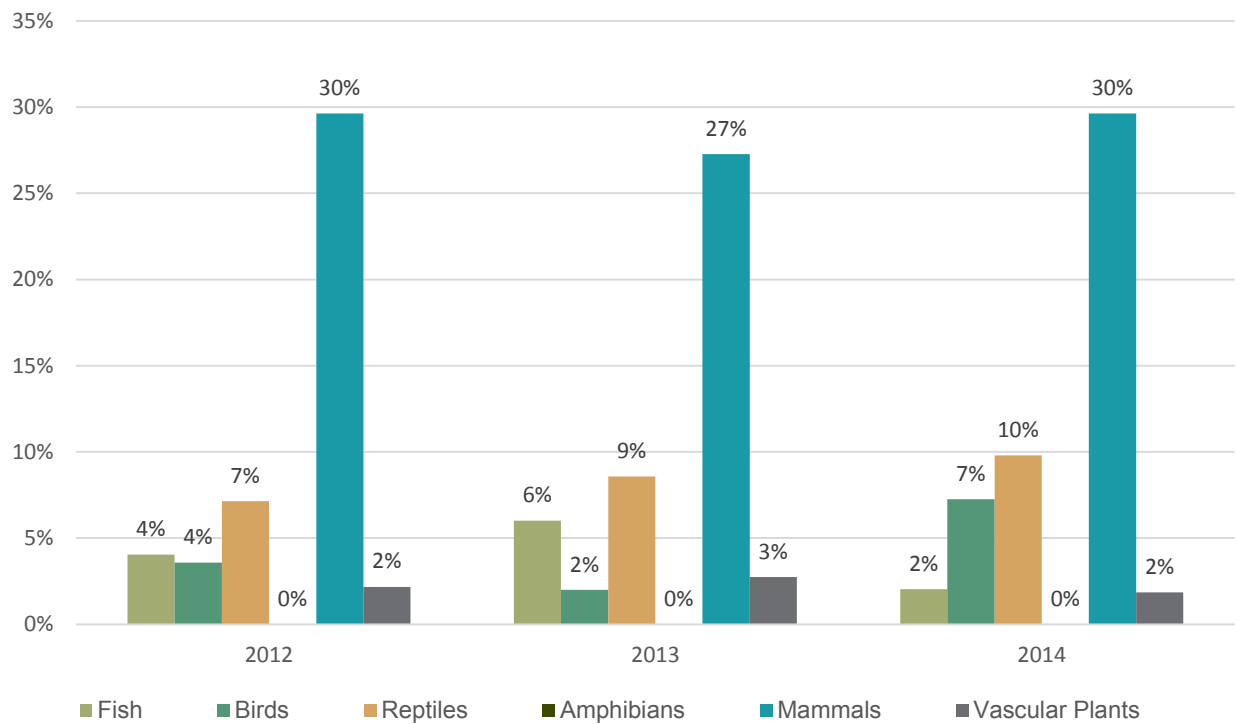
Source: Environment Authority – Abu Dhabi, Statistics Centre - Abu Dhabi

\* Include species classified under global and/or local red list threatened criteria.

\*\* Includes terrestrial and marine species.

Figure 10, shows the percentage distribution of the total threatened species from the total known species. The endangered species falls within the threatened categories of the global Red List, and other species within the threatened categories of the local Red List. The rate of threaten mammals increased in 2014 by 7% from 2013, likewise regarding threaten birds, the rate increased in 2014 by 24% from 2013. while each of fish, reptiles and vascular plants, whether on terrestrial or aquatic, threaten species rates decreased between 2012 and 2013 about 59% and 17% and 27% of the total known species of each class, respectively.

**Figure 10: Percentage of threatened species from total known species**



Source: Statistics Centre - Abu Dhabi

## Statistical Tables

**Table 1 : Air temperature by month - Abu Dhabi 2014**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	18.1	5.3	13.1	28.9	23.1
February	19.4	5.4	14.3	32.9	24.4
March	23.3	7.7	17.7	38.0	28.9
April	28.1	14.8	21.6	43.1	34.6
May	31.4	15.2	24.8	47.2	37.9
June	33.0	20.5	26.6	47.4	39.3
July	35.2	23.8	29.3	48.4	41.1
August	35.8	24.2	30.0	49.0	41.5
September	33.8	22.5	28.0	46.8	39.6
October	30.7	18.6	24.7	41.0	36.6
November	24.6	10.8	19.4	37.0	29.8
December	20.7	7.5	15.4	30.8	25.9

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 2 : Air temperature by month – Al Ain 2014**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	17.1	5.7	11.4	30.8	22.8
February	18.6	5.8	12.4	33.7	24.7
March	23.2	8.1	16.7	38.8	29.7
April	29.6	11.9	22.0	44.1	37.1
May	32.6	15.2	24.6	48.2	40.5
June	35.1	21.3	27.1	50.5	43.1
July	36.8	23.5	29.6	49.3	44.0
August	36.5	23.4	29.5	49.6	43.4
September	34.2	20.8	27.4	47.1	40.9
October	30.4	18.8	24.0	43.1	36.8
November	23.7	10.9	17.5	36.9	29.9
December	19.9	9.1	13.4	33.0	26.3

Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi



**Table 3 : Air temperature by month – Al Gharbia 2014**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	17.5	4.6	12.4	29.6	22.6
February	19.1	4.0	13.0	36.0	25.1
March	23.1	7.5	16.3	39.4	29.9
April	29.6	13.7	21.8	44.4	37.3
May	33.1	16.2	25.0	48.8	41.2
June	35.1	19.4	26.8	49.6	43.4
July	37.0	23.2	29.3	50.1	44.6
August	36.6	24.1	29.6	49.0	43.5
September	34.2	23.2	27.2	47.4	41.2
October	30.8	18.1	24.1	42.1	37.4
November	24.5	11.2	18.3	37.8	30.6
December	20.1	4.9	14.1	31.1	26.0

Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi

**Table 4 : Air temperature by month – The Islands 2014**

(Degree Celsius)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	18.5	8.6	15.6	27.6	21.4
February	19.3	9.0	16.2	33.0	22.4
March	22.9	11.6	18.9	38.6	26.9
April	27.7	15.6	23.0	41.5	32.4
May	31.5	19.8	26.4	44.4	36.5
June	33.0	22.7	28.2	43.8	37.8
July	35.1	24.2	30.6	46.7	39.6
August	35.4	24.8	31.2	47.9	39.5
September	33.7	25.0	29.7	44.3	37.6
October	31.5	21.4	27.7	40.3	35.2
November	25.7	14.0	22.5	37.1	28.9
December	21.6	11.3	18.6	29.2	24.5

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 5 : Rainfall in Abu Dhabi and Al Ain regions by month - 2014**

(Millimetres)

Month	Abu Dhabi		Al Ain	
	Heaviest fall in one day	Total for month	Heaviest fall in one day	Total for month
January	10.4	28.4	14.6	38.8
February	4.0	15.2	5.4	22.2
March	18.3	88.3	44.0	309.0
April	8.6	19.0	17.4	61.3
May	0.2	0.2	2.0	3.0
June	0.0	0.0	1.4	1.4
July	0.0	0.0	0.0	0.0
August	2.0	2.0	17.2	61.9
September	0.0	0.0	76.8	88.8
October	0.0	0.0	20.8	22.0
November	0.4	0.4	4.8	11.3
December	0.4	0.4	0.0	0.0

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 6: Rainfall in Al Gharbia and The Islands by month 2014**

(Millimetres )

Month	Al Gharbia		The Islands	
	Heaviest fall in one day	Total for month	Heaviest fall in one day	Total for month
January	4.4	19.4	9.6	19.6
February	1.2	2.7	1.0	3.8
March	60.0	117.5	8.0	19.8
April	6.6	20.2	4.0	10.2
May	0.0	0.0	0.6	0.6
June	0.0	0.0	0.0	0.0
July	0.0	0.0	0.0	0.0
August	8.8	9.0	0.0	0.0
September	0.0	0.0	0.0	0.0
October	1.8	3.4	6.6	6.6
November	0.0	0.0	1.2	1.2
December	4.4	5.2	4.0	6.4

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 7: Relative humidity by month - Abu Dhabi 2014**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	68.9	15.8	45.7	100.0	87.6
February	65.0	12.5	40.0	100.0	86.3
March	61.6	5.5	35.2	100.0	86.1
April	54.7	0.7	26.5	100.0	85.0
May	49.9	1.1	23.3	100.0	76.8
June	54.7	1.8	27.3	100.0	80.4
July	55.2	4.5	28.2	98.0	79.0
August	53.1	5.0	27.1	95.6	75.6
September	59.1	3.4	29.0	100.0	83.3
October	54.8	7.8	27.4	97.7	79.2
November	56.5	6.5	34.2	100.0	77.4
December	65.1	11.3	41.0	100.0	84.5

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 8: Relative humidity by month - Al Ain 2014**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	66.7	3.5	38.1	100.0	91.6
February	57.4	0.6	30.4	100.0	84.7
March	50.5	0.5	23.8	100.0	81.5
April	33.3	3.0	13.3	100.0	66.4
May	28.2	1.1	10.3	100.0	55.0
June	29.0	0.6	8.8	100.0	58.0
July	33.8	2.0	12.3	100.0	63.6
August	36.6	3.5	15.7	100.0	60.8
September	36.5	3.0	15.2	100.0	63.2
October	42.4	3.7	19.6	100.0	69.2
November	49.2	2.9	25.3	100.0	75.6
December	57.3	5.6	29.0	100.0	84.2

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 9 : Relative humidity by month - Al Gharbia 2014**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	73.7	17.1	50.9	100.0	94.6
February	66.4	11.0	43.8	100.0	89.4
March	55.0	5.9	28.6	100.0	83.9
April	42.8	4.0	20.5	100.0	76.4
May	34.6	2.0	14.5	100.0	65.3
June	36.6	3.0	15.0	100.0	68.5
July	38.2	3.8	15.9	100.0	66.6
August	45.8	6.0	21.6	100.0	72.5
September	48.4	2.8	22.1	100.0	78.5
October	50.8	7.9	25.1	100.0	79.3
November	56.3	8.2	31.5	100.0	81.7
December	68.1	12.0	40.7	100.0	91.8

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 10 : Relative humidity by month – The Islands 2014**

(%)

Month	Monthly average	Absolute minimum	Average minimum	Absolute maximum	Average maximum
January	83.0	22.5	66.5	100.0	92.6
February	73.6	13.2	54.3	100.0	88.1
March	69.3	11.6	44.9	100.0	88.0
April	67.1	5.6	38.0	100.0	88.4
May	64.2	6.7	32.9	100.0	87.4
June	64.1	4.8	35.3	100.0	85.0
July	67.7	6.3	42.5	100.0	85.4
August	69.2	10.8	46.2	100.0	84.7
September	71.1	11.0	49.6	100.0	85.1
October	66.7	9.6	44.9	100.0	82.1
November	62.3	14.0	45.2	100.0	77.6
December	74.4	14.0	57.4	100.0	86.5

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 11 : Wind speed by month - Abu Dhabi 2014**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	5.7	23.1	11.9
February	7.0	28.8	14.3
March	6.9	29.9	14.2
April	11.9	66.7	27.1
May	12.6	47.5	27.0
June	13.5	47.9	27.3
July	13.0	42.5	26.2
August	14.1	59.8	28.7
September	11.9	39.6	25.7
October	11.8	36.0	24.5
November	12.0	44.6	24.1
December	10.4	35.6	21.6

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

\*Knot = 1.15 mph

**Table 12: Wind speed by month - Al Ain 2014**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	5.0	35.0	11.3
February	6.1	38.9	13.5
March	6.2	38.1	13.4
April	10.9	82.8	27.3
May	11.6	73.1	29.6
June	12.0	73.4	28.4
July	11.6	64.8	27.1
August	11.4	63.4	28.1
September	10.7	67.7	26.7
October	10.3	53.6	25.2
November	9.9	49.0	22.7
December	8.6	42.8	20.0

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

\*Knot = 1.15 mph

**Table 13: Wind speed by month - Al Gharbia 2014**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	5.6	29.2	12.0
February	7.1	26.2	14.1
March	7.1	38.1	14.4
April	12.3	77.0	29.9
May	12.5	55.1	32.2
June	13.3	61.9	30.6
July	13.2	52.9	30.3
August	13.4	65.9	30.1
September	10.9	41.4	25.8
October	10.4	52.6	24.6
November	11.5	53.6	24.4
December	11.4	45.7	22.9

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

\*Knot = 1.15 mph

**Table 14: Wind speed by month - The Islands 2014**

(Knot\*)

Month	Average	Absolute maximum	Average maximum
January	8.1	29.7	14.1
February	9.5	25.5	15.5
March	7.4	31.9	13.5
April	15.1	69.5	28.0
May	13.8	55.8	26.7
June	16.3	49.7	28.8
July	15.0	47.5	28.0
August	15.0	56.2	28.1
September	13.0	41.0	24.3
October	12.2	50.6	22.2
November	15.4	50.8	26.6
December	15.9	43.9	26.0

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

\*Knot = 1.15 mph

**Table 15 : Daily total solar radiation by month - Abu Dhabi 2014**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	4,281	1,111	5,910
February	5,285	1,391	6,905
March	6,070	766.2	8,185
April	7,033	3,347	7,940
May	7,184	4,557	8,397
June	6,974	5,343	8,280
July	6,477	4,538	7,880
August	6,561	4,961	7,881
September	6,451	5,131	8,220
October	5,711	4,877	6,670
November	4,805	3,920	5,582
December	4,458	2,426	5,555

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 16: Daily total solar radiation by month – Al Ain 2014**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	3,843	725.2	6,480
February	4,679	1,036	7,170
March	5,179	854.1	8,057
April	6,773	2,293	8,033
May	6,933	3,975	8,211
June	6,840	4,997	8,364
July	6,491	3,562	8,090
August	6,541	4,423	7,527
September	6,478	4,669	7,466
October	5,702	4,060	6,337
November	4,974	3,443	6,809
December	4,568	3,458	6,325

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi



**Table 17: Daily total solar radiation by month - Al Gharbia 2014**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	4,319	453.0	5,330
February	5,254	877.5	6,288
March	5,862	1,101	7,447
April	6,880	3,892	7,908
May	6,722	4,061	8,226
June	6,527	4,690	8,404
July	6,135	1,493	8,086
August	5,975	1,167	7,389
September	6,033	1,410	7,078
October	5,541	4,616	6,271
November	4,568	2,436	5,570
December	4,235	1,073	4,657

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

**Table 18: Daily total solar radiation by month – The Islands 2014**(Watt/ m<sup>2</sup>/h)

Month	Average	Minimum	Maximum
January	3,565	452.2	5,460
February	4,555	830.3	6,440
March	5,378	708.9	7,274
April	6,631	3,822	7,843
May	6,671	4,181	8,146
June	6,900	5,293	8,044
July	6,521	4,247	7,714
August	6,012	4,056	7,454
September	5,500	2,061	7,225
October	4,521	1,740	6,577
November	4,103	1,084	5,855
December	3,774	1,170	5,198

Source: National Centre of Meteorology and Seismology , Statistics Centre- Abu Dhabi

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

Station Location	2009	2010	2011	2012	2013	2014
<b>Abu Dhabi</b>						
City Centre - Khadija School	8.9	9.7	8.3	5.6	10.6	9.1
Urban/ Residential - Khalifa School	5.9	8.3	7.5	5.7	5.7	5.6
Road Side - Hamdan Street	6.8	9.7	7.4	5.4	4.7	5.0
Urban/ Residential - Baniyas School	8.0	12.9	9.1	3.0	2.7	5.4
Industrial - Mussafah	8.4	6.6	7.4	5.3	5.4	7.5
Industrial – Al Mafrq	-	-	-	14.1	5.3	2.4
Urban area- Khalifa city	-	-	-	-	6.7	9.2
Urban area- Al Maqtaa	-	-	-	-	5.1	4.2
<b>Al Ain</b>						
Urban/ Residential - Al Ain School	2.9	5.1	8.8	4.9	8.0	7.7
Road Side - Al Ain Street	4.1	6.2	6.7	4.7	9.1	8.7
Regional Background area- Alqoa	-	-	-	-	13.1	4.3
Urban area- Swihan	-	-	-	7.4	5.9	4.1
City Center- Zakher	-	-	-	6.7	5.5	4.3
Urban area- Al Tawya	-	-	-	-	9.9	6.4
<b>Al Gharbia</b>						
Urban/ Residential - Bida Zayed	2.6	8.1	6.9	7.7	10.2	15.2
Road side - E11 Road	-	-	-	-	13.0	11.4
Industrial - Ruwais	-	-	-	-	19.2	17.6
City Centre - Gayathi School	6.6	6.1	5.3	3.9	4.9	10.2
Regional Background - Liwa Oasis	2.7	4.9	5.1	4.7	3.2	6.5
Industrial Regional Background – Habshan	-	-	-	-	8.2	11.1

Source: Environment Agency - Abu Dhabi

\* The annual maximum allowable limit for sulphur dioxide average concentration is 60 mcg/m<sup>3</sup>

Note: all historical data been modified according to the source.

**Table 20: Annual average of nitrogen dioxide concentration in ambient air by region**(Microgram/m<sup>3</sup>)

Station Location	2009	2010	2011	2012	2013	2014
<b>Abu Dhabi</b>						
City Centre - Khadija School	36.2	52.2	30.1	33.5	34.7	28.8
Urban/ Residential - Khalifa School	41.7	40.0	29.2	33.3	32.1	27.8
Road Side - Hamdan Street	49.3	47.9	46.4	46.2	56.7	47.7
Urban/ Residential - Baniyas School	27.1	30.9	28.1	29.3	31.3	32.5
Industrial - Mussafah	53.8	59.3	49.8	43.0	49.3	53.3
Industrial – Al Mafraq	-	-	-	44.0	41.2	49.8
Urban area- Khalifa city	-	-	-	-	25.6	34.7
Urban area- Al Maqtaa	-	-	-	-	31.0	42.0
<b>Al Ain</b>						
Urban/ Residential - Al Ain School	-	29.3	26.6	27.0	29.3	36.3
Road Side - Al Ain Street	3.2	4.8	4.1	48.7	42.0	52.0
Regional Background area- Alqoa	-	-	-	-	3.8	6.5
Urban area- Swihan	-	-	-	12.2	10.1	15.1
City Center- Zakher	-	-	-	40.8	29.0	28.4
Urban area- Al Tawya	-	-	-	-	18.4	20.5
<b>Al Gharbia</b>						
Urban/ Residential - Bida Zayed	15.7	17.6	17.3	22.4	19.8	17.0
Road side - E11 Road	-	-	-	-	17.9	26.4
Industrial - Ruwais	-	-	-	-	21.2	28.7
City Centre - Gayathi School	17.1	11.0	12.7	13.2	12.7	16.8
Regional Background - Liwa Oasis	3.0	3.5	3.7	3.4	2.7	4.6
Industrial Regional Background – Habshan	-	-	-	-	12.8	17.2

Source: Environment Agency - Abu Dhabi

Note: all historical data been modified according to the source.

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

Station Location	2009	2010	2011	2012	2013	2014
<b>Abu Dhabi</b>						
City Centre - Khadija School	52.4	79.9	90.7	94.8	96.4	89.2
Urban/ Residential - Khalifa School	49.5	64.7	77.9	73.4	71.1	94.3
Urban/ Residential - Baniyas School	48.5	81.8	90.7	65.2	72.5	103.9
Urban/ Residential – Khalifa city	-	-	-	-	116.1	102.6
Urban/ Residential – Al Maqtaa	-	-	-	-	102.2	78.5
<b>Al Ain</b>						
Urban/ Residential - Al Ain School	39.4	19.9	81.7	68.8	47.7	74.6
Regional Background area- Alqoa	-	-	-	-	111.3	98.5
Urban/ Residential – Swihan	-	-	-	21.9	106.2	101.5
Urban/ Residential – Al Tawya	-	-	-	-	106.7	102.5
<b>Al Gharbia</b>						
Urban/ Residential - Bida Zayed	21.6	87.3	87.2	66.2	68.6	99.7
Industrial -Ruwais	-	-	-	-	101.2	117.7
City Centre - Gayathi School	63.8	93.7	97.5	81.0	78.8	100.5
Regional background - Liwa Oasis	31.4	80.9	103.6	83.1	75.0	104.1
Industrial Regional Background - Habshan	-	-	-	-	113.1	96.6

Source: Environment Agency - Abu Dhabi

**Note:** all historical data been modified according to the source.

**Table 22: Annual average of particulate matter (PM10) concentration in ambient air by region**

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

Station Location	2009	2010	2011	2012	2013	2014
<b>Abu Dhabi</b>						
City Centre - Khadija School	150.7	121.8	139.1	154.7	134.8	92.8
Urban/ Residential - Khalifa School	100.6	74.3	137.6	174.5	136.7	82.5
Road Side - Hamdan Street	148.6	143.1	128.4	147.5	106.6	123.5
Urban/ Residential - Baniyas School	70.2	189.3	203.6	172.7	144.7	67.8
Industrial - Mussafah	203.3	226.7	182.2	188.5	163.7	142.3
Industrial – Al Mafrq	-	-	-	153.9	196.7	163.8
Urban area- Khalifa city	-	-	-	-	142.0	83.5
Urban area- Al Maqtaa	-	-	-	-	124.8	112.6
<b>Al Ain</b>						
Urban/ Residential - Al Ain School	114.3	96.4	138.1	158.3	115.0	105.4
Road Side - Al Ain Street	147.1	151.3	142.8	153.7	155.5	97.7
Regional Background area- Alqoa	-	-	-	-	145.8	95.5
Urban area- Swihan	-	-	-	73.4	135.7	92.8
City Cemter- Zakher	-	-	-	54.3	79.8	94.2
Urban area- Al Tawya	-	-	-	-	130.3	100.6
<b>Al Gharbia</b>						
Urban/ Residential - Bida Zayed	146.5	102.3	162.0	163.7	146.2	98.7
Road side - E11 Road	-	-	-	-	104.1	132.4
Industrial - Ruwais	-	-	-	-	76.8	121.9
City Centre - Gayathi School	143.6	128.4	161.4	174.3	143.9	95.7
Regional Background - Liwa Oasis	147.6	153.0	156.5	199.5	133.3	110.9
Industrial Regional Background – Habshan	-	-	-	-	151.2	106.0

Source: Environment Agency - Abu Dhabi

Note: all historical data been modified according to the source.

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

(Tons)

Business Sector	2009	2010	2011	2012	2013	2014
<b>Total</b>	<b>185,870</b>	<b>219,022</b>	<b>208,025</b>	<b>241,799</b>	<b>217,925</b>	<b>322,798</b>
Exploration and production	76,641	153,500	147,263	180,511	160,176	265,845
Independent operators**	*	52,790	45,076	44,299	41,773	43,999
Shared services	**	74	-	188	197	184.0
Marketing and refining	11,271	12,318	15,183	16,264	15,356	12,376
Gas processing	97,780	*	*	*	*	*
Petrochemicals	178	340	503	537	423	393.9

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	2009	2010	2011	2012	2013	2014
<b>Total</b>	<b>54,782</b>	<b>58,901</b>	<b>66,105</b>	<b>69,283</b>	<b>66,597</b>	<b>56,708</b>
Exploration and production	17,670	29,288	33,999	33,480	32,460	36,771
Independent operators**	*	2,336	2,427	2,426	2,370	2,324
Shared services	**	802	-	1,442	1,465	1,394
Marketing and refining	20,031	23,430	26,079	27,842	26,707	11,199
Gas processing	15,696	*	*	*	*	*
Petrochemicals	1,385	3,045	3,600	4,094	3,595	5,019

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	2009	2010	2011	2012	2013	2014
<b>Total</b>	<b>57,999</b>	<b>62,170</b>	<b>85,420</b>	<b>230,221</b>	<b>72,453</b>	<b>68,886</b>
Exploration and production	42,835	51,464	55,003	56,212	60,296	58,768
Independent operators**	*	1,166	1,013	1196	1,138	1,058
Marketing and refining	8,343	7,808	27,692	170,174	10,167	8,004
Gas processing	6,206	*	*	*	*	*
Petrochemicals	615	1,732	1,712	2,639	852	1,056

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	2008	2009	2010	2011	2012	2013	2014
<b>Total</b>	<b>21.0</b>	<b>21.0</b>	<b>23.0</b>	<b>27.9</b>	<b>26.4</b>	<b>26.6</b>	<b>30.0</b>
Exploration and Production	15.0	14.0	15.0	17.1	16.6	16.3	17.7
Independent Operators*	1.0	1.0	1.0	1.0	0.7	1.1	1.0
Marketing & Refining	4.0	5.0	4.0	6.3	5.7	6.0	6.3
Petrochemicals	1.0	1.0	3.0	3.4	3.4	3.3	5.0

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	2008	2009	2010	2011	2012	2013	2014
<b>Total</b>	<b>11.3</b>	<b>10.3</b>	<b>11.0</b>	<b>12.9</b>	<b>11.4</b>	<b>10.7</b>	<b>11.3</b>
Exploration and Production	8.1	6.9	7.2	7.9	7.2	6.5	6.7
Independent Operators*	0.5	0.5	0.5	0.5	0.3	0.4	0.4
Marketing & Refining	2.2	2.5	1.9	2.9	2.5	2.4	2.4
Petrochemicals	0.5	0.5	1.4	1.6	1.5	1.3	1.9

Source: Statistics Centre- Abu Dhabi

\* Total includes shared services sector

\*\* Data per capita has been updated as a result of updates on population estimates in the Emirate of Abu Dhabi 2006- 2014

## Explanatory Notes

### Glossary

This report contains certain terms specific to environment and necessary when analysing 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 <sup>(2)</sup>

### 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. In addition, 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 millimetre 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 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 daytime. It measures in the period where sun light not veiled as a result of clouds, fog or particles stuck (e.g., smog).

**Winds:**

It is the horizontal movement of air, and air moves either 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.

## 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 <sup>(2)</sup>.

### **Annual mean concentration:**

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

### **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 <sup>(2)</sup>.

### **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 (O<sub>3</sub>):**

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 (NO<sub>2</sub>):**

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 (NO<sub>x</sub>):**

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 (O<sub>3</sub>):**

A pungent, colorless, toxic gas 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 considered 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 maybe 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, and 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>.

## **Water Statistics**

### **Biochemical oxygen demands (BOD)**

Amount of dissolved oxygen required by organisms for the aerobic decomposition of organic matter present in water. This 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 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>.

### **Seawater:**

Seawater is water from a sea or ocean. On average, seawater in the world's oceans has a salinity of ~3.5 percent. This means that for every 1 litre (1000 ml) of seawater 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 seawater to produce water as the principal product of interest, and excluding system operation for agricultural purposes and treatment of wastewater 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 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.

**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 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, if the labor used the regular route without interruption or deviation. The occupational diseases also considered as work injuries.

## 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>.

## Biodiversity Statistics

**Biodiversity**

The range of genetic differences, species differences and ecosystem differences in a given area (United Nations, 1997).

**IUCN red list**

The IUCN Red list classification consists of the following categories:

- **Extinct (EX)**

A species is Extinct when there is no reasonable doubt that the last individual has died. A species is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the species' life cycle and life form (IUCN, 2001).

- **Extinct in the wild (EW)**

A species is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A species is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the species' life cycle and life form (IUCN, 2001).

- **Threat Categories**

Threat categories include the three threat categories: Endangered (CR), Endangered (EN) and Vulnerable (VU).

- **Species is classified into Critically Endangered (CR), Endangered (EN) or Vulnerable (VU)**

When its best available evidence meet one of the five criteria (A to E) of each category (see part five of the IUCN categories and criteria in the sources), which indicates that it's facing an extremely high risk of extinction in the wild in the immediate future (IUCN, 2001).

- **Near Threatened (NT)**

A species is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future (IUCN, 2001).

- **Least Concern (LC)**

A species is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category (IUCN, 2001).

- **Data Deficient (DD)**

A species is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A species in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate (IUCN, 2001).

- **Not Evaluated (NE)**

A species is Not Evaluated when it is has not yet been assessed against the criteria (IUCN, 2001).

**Total Number of Known species** refers to the total number of a particular type of species known, described and documented in a given class in a particular country or region (Abu Dhabi Emirate). Total number of known mammals and reptiles recorded include marine species. Total number of known bird species recorded includes residential and migratory bird species.

**Total Number of threatened species** refers to the total number of species facing a higher risk of global extinction or/and local extinction; those which are critically endangered (CR), endangered (EN), or vulnerable (VU) in the IUCN Red List and/or Local Red List.

Number of threatened species should be interpreted as the number of species known to be threatened within those that have been assessed to date; there are still species that have not yet been assessed.

**Extinction** is a chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the time-frames specified more taxa listed in a higher category are expected to go extinct than those in a lower one (without effective conservation action). However, the persistence of some taxa in high-risk categories does not necessarily mean their initial assessment was inaccurate (IUCN, 2001).

### Abbreviations used

- ADWEA: Abu Dhabi Water and Electricity Authority
- BOD: Biochemical Oxygen Demand
- EAD: Environment Agency - Abu Dhabi
- L: Liter
- Mcg: Microgram
- Mg: Milligram
- Mph: Mile per Hour
- EX: Extinct
- EW: Extinct in the wild
- CR: Critically Endangered
- EN: Endangered
- VU: Vulnerable
- NT: Near Threatened
- LC: Least Concern
- DD: Data Deficient
- NE: Not Evaluated
- OE: Over-Exploited
- WSL: Exploitation within Sustainable Limit
- IUCN: International Union for Conservation of Nature

### Data sources

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

### Symbols used

“-“Not Available

“>” number in reality exceeds what is documented in table.

## 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 expected in October 2016 for 2015 data.

## References

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