



UNDA project, on “Up-scaling Energy Efficiency in the residential and services sectors in the Arab Region

5th March 2019 -Amman - Jordan

Surveys & Studies on Energy Efficiency in Buildings

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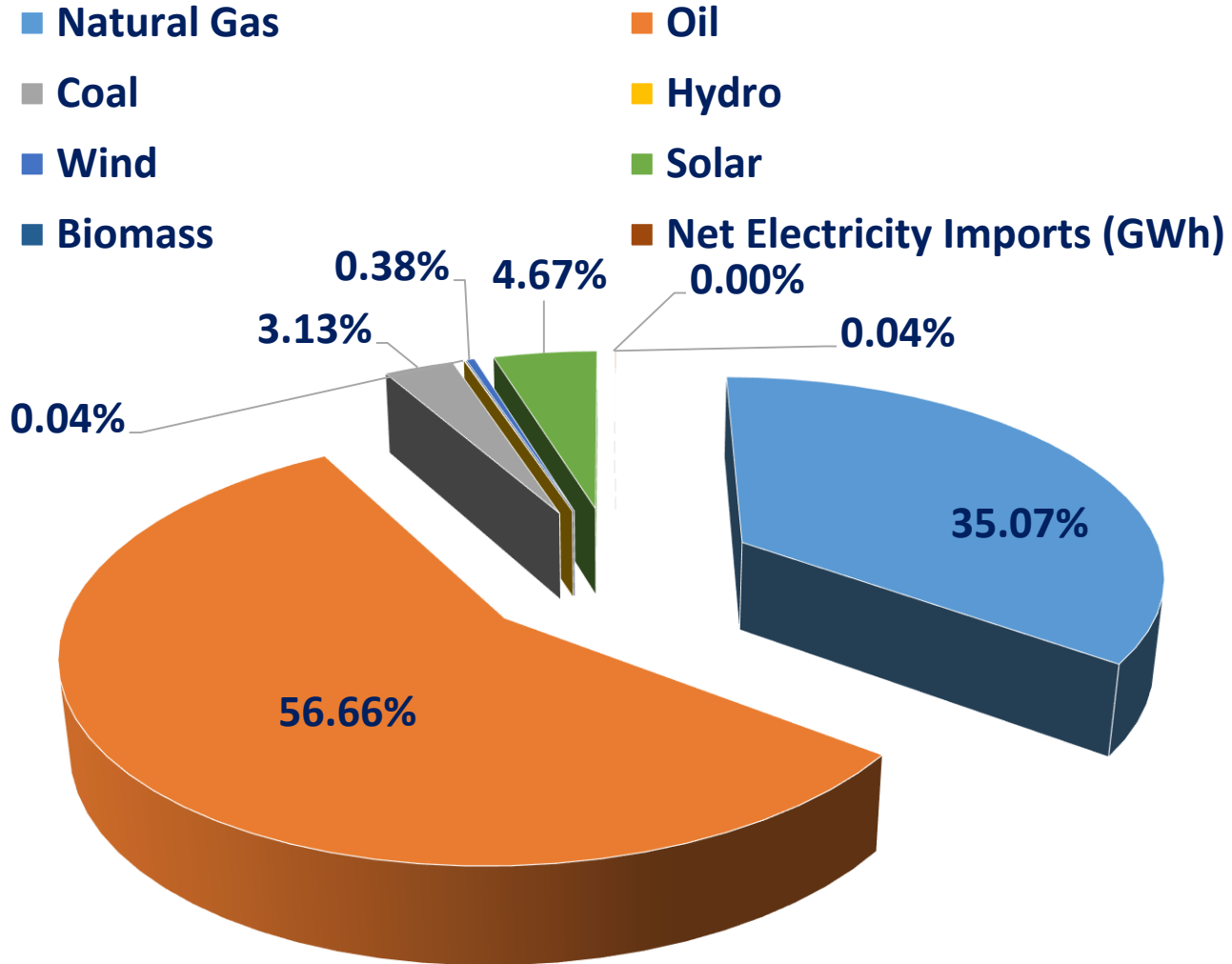
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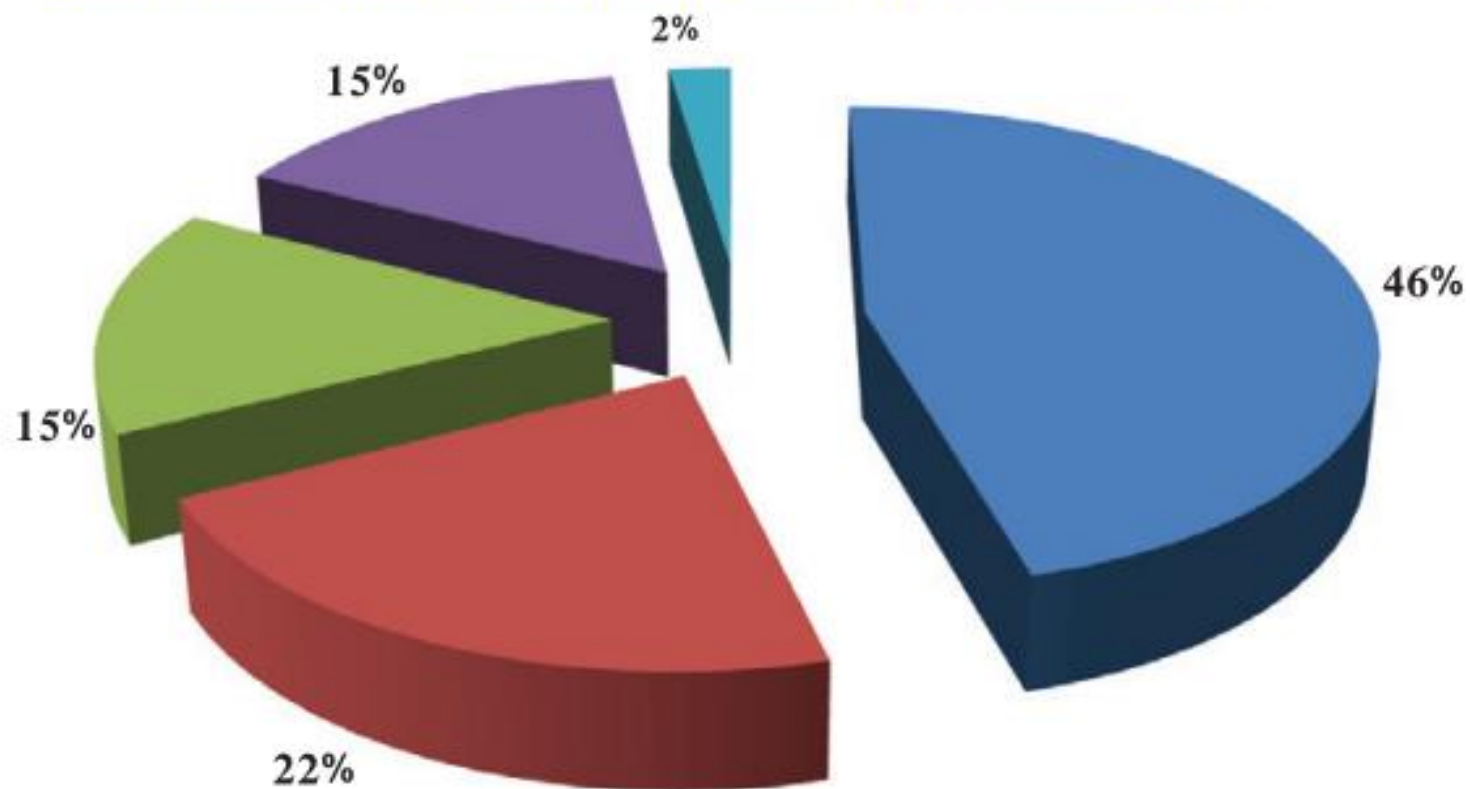
Energy Figures

National Energy Production (Mtoe)	0.5821
Net Imports (Mtoe)	10.2072
Total Primary Energy Consumption (Mtoe)	10.0087
RE share in Primary Energy Consumption (%)	5%
Total Final Energy Consumption (Mtoe)	6.9871
Total installed electricity capacity (MW)	4529
Total generated electricity (GWh)	20760
RE share in total installed capacity (%)	13.45%
Total generated RES-electricity (GWh)	1386
Electricity Consumption (GWh)	17503.8
RE share in Electricity Consumption (%)	7.92%
CO2 emissions (MtCO2)	23.14

PRIMARY ENERGY CONSUMPTION



Electrical Energy Consumption by Sector 2017



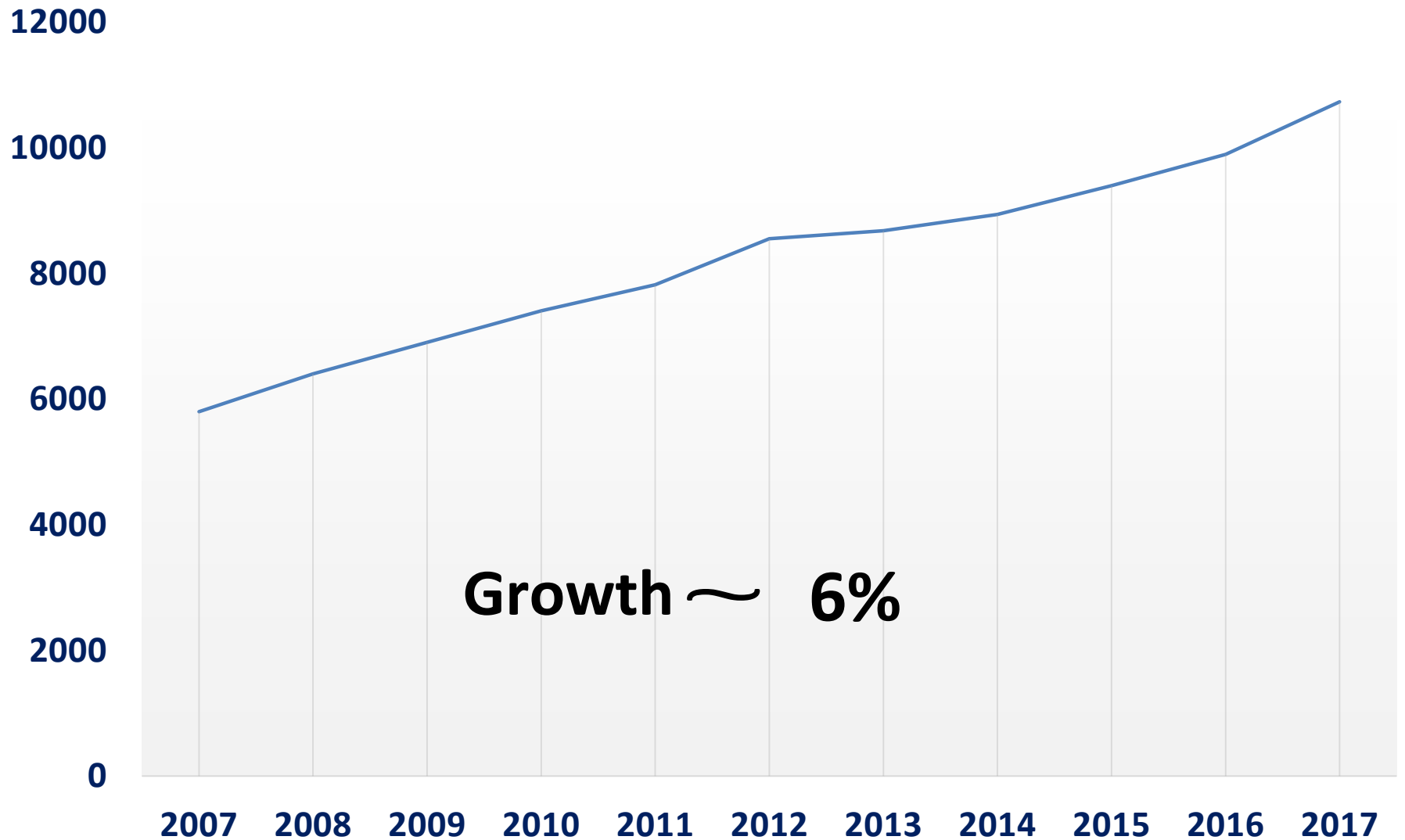
■ Household ■ Industrial ■ Commercial ■ Water Pumping ■ Street Lighting

Buildings (Commercial, Public and Residential) consumes more than

60%

**of the total electricity consumed
in Jordan**

Buildings' Sector Electricity Consumption GWh



Residential Lighting Survey

2010

1. The Survey was conducted for three areas: **Al-Sayegh Abdoon, Addawood Um-Assomag**, and **Al-Na'eer Albayader**
2. Coordination between relevant stakeholders: DOS, JEPCO, GAM, MEMR and MoPIC
3. The locations were selected in order to represent three different categories of electrical consumption (High, medium and low consumption levels)
4. Preparation of the questionnaire in cooperation with DOS
5. identify the houses that are connected to the same transformer for each area to facilitate the data collection and measurements
6. Data analysis in cooperation with DOS
7. Carry out electrical load measurement before & after lamp replacement
8. Conduct awareness raising seminars & workshops

Residential Lighting Survey 2010

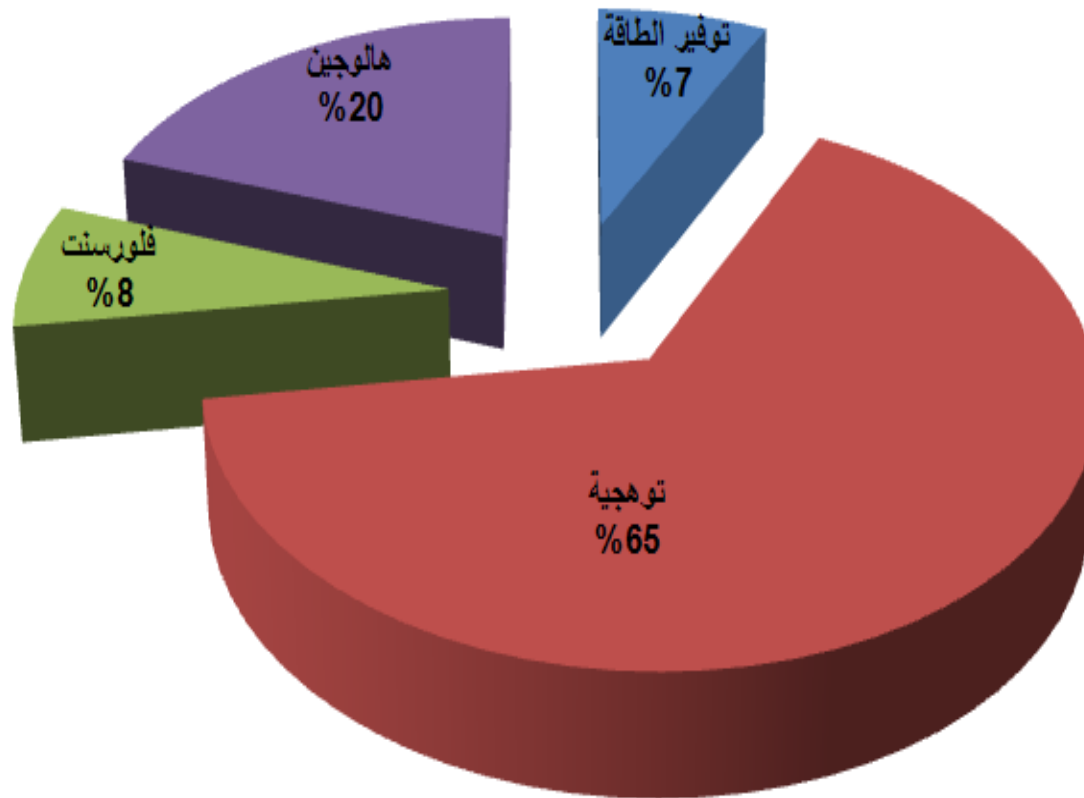
Survey Sample

Area	number of houses	Completed	Family was not at home	Family was not at home for long time	Rejected	Empty	Company	other
AlNa'eer Albayader	105	85	1	1	0	16	2	0
Addawood Um Assomag	505	318	38	41	17	71	7	13
AlSayegh Abdoon	109	51	7	9	12	16	7	7
Total	719	454	46	51	29	103	16	20

Residential Lighting Survey

2010

Lighting Load Breakdown

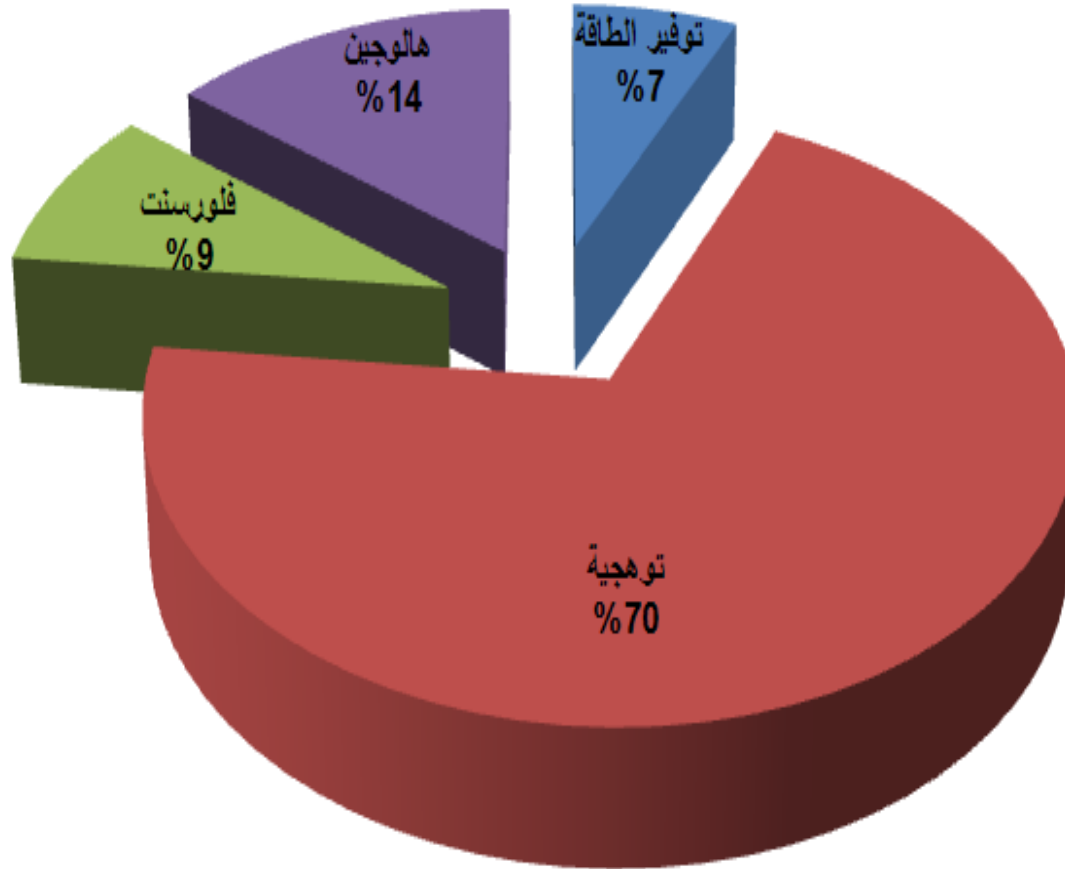


High Consumption Category

Residential Lighting Survey

2010

Lighting Load Breakdown

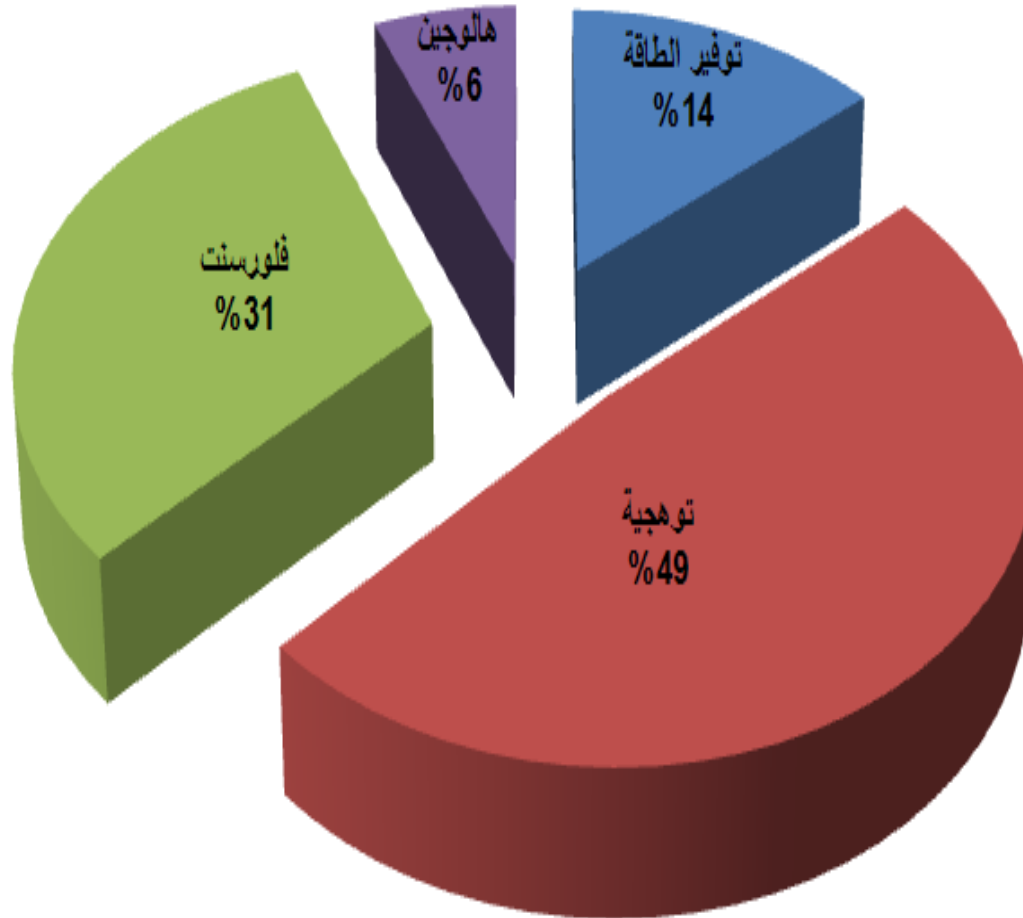


Medium Consumption Category

Residential Lighting Survey

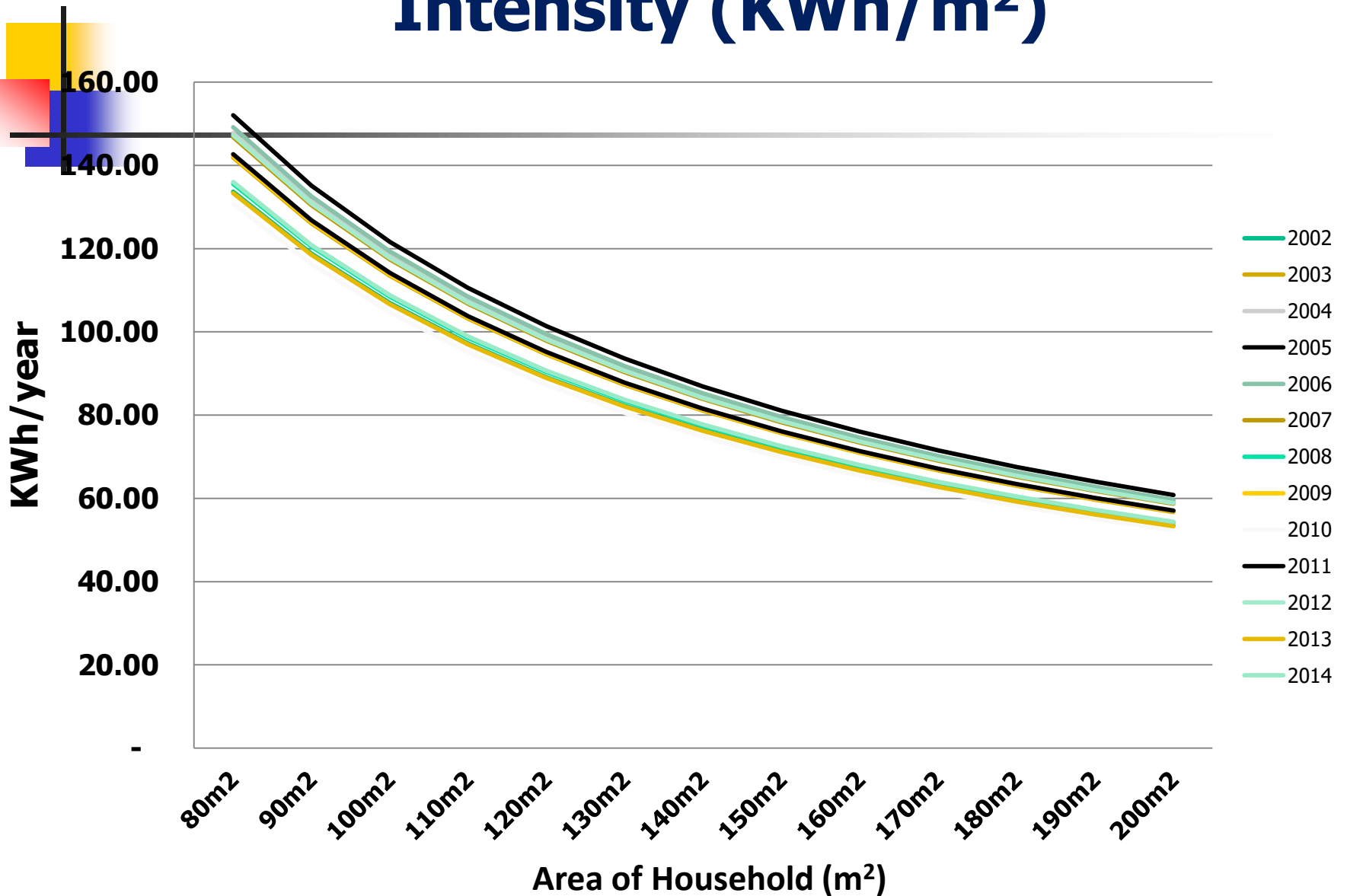
2010

Lighting Load Breakdown

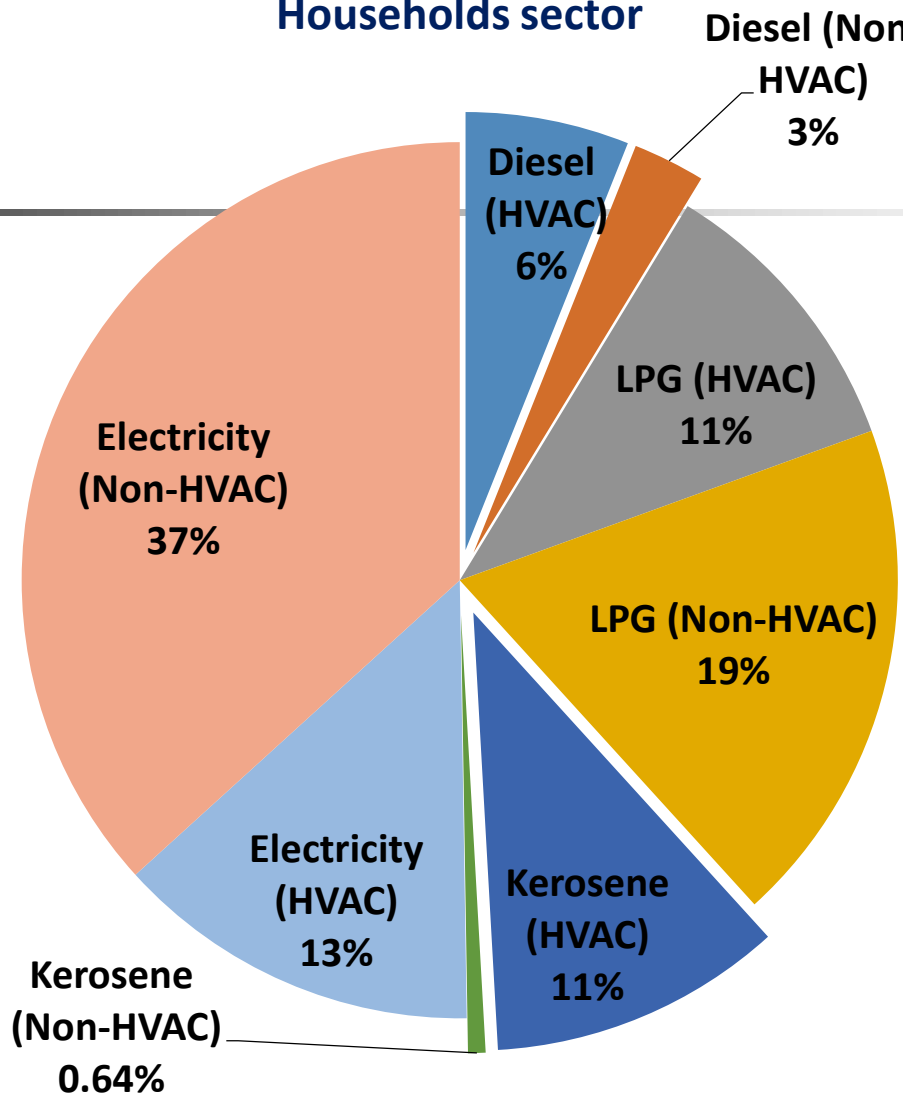


Low Consumption Category

Average Household Electricity Use Intensity (KWh/m²)



Space Heating/cooling Share in the energy consumption for Households sector



Source: Survey- for Residential sector by MEMR in 2013)

Survey in the Jordan Valley (ongoing)- 2019

Three municipalities were selected in the Jordan Valley for this Survey.

The survey was carried out under the framework of the Jordan Valley Link project/Green technology.

- 1. Ashouneh Alwosta municipality**
- 2. South Aghwar municipality**
- 3. Tabaqet fahel municipality**

Survey in the Jordan Valley (ongoing)- 2019

The included **sectors** in this Survey are:

1.Schools.

2.Mosques

3.Commercial Sector (Shops).

Stakeholders

1. Department of Statistics (DOS)	2. CBOs
3. Ministry of Industry and Trade	4. Electricity Distribution Companies
5. Ministry of Awqaf and Islamic Holy Sites	6. The Ministry of Education
7. The Center for Strategic Studies at Jordan University(CSS)	8. JREEEF
9. Schools in the targeted Municipalities	10.Imams of mosques within the selected sample
11.Owners of shops within the selected sample	12.Municipalities
13.Jordan Valley Authority	

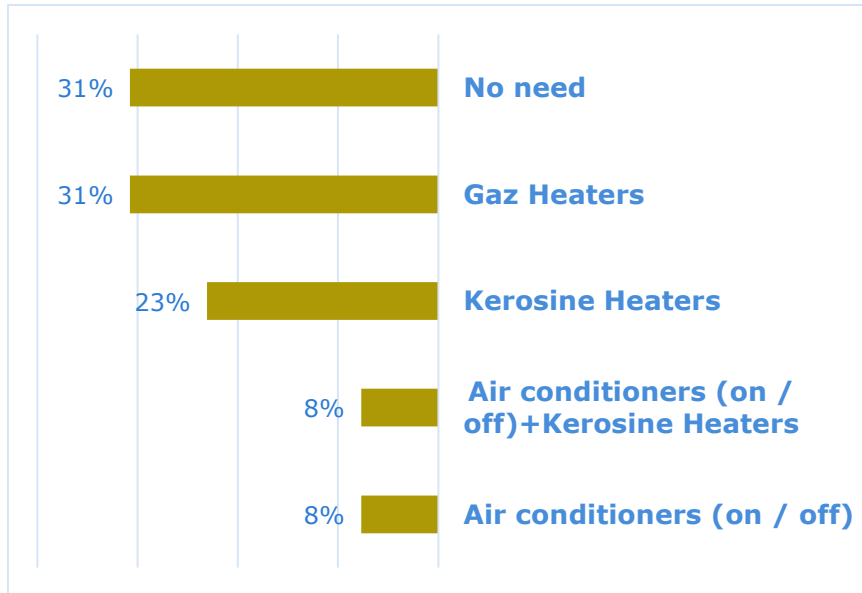
Survey in the Jordan Valley (ongoing)- 2019

The represented sample for each sector in each municipality

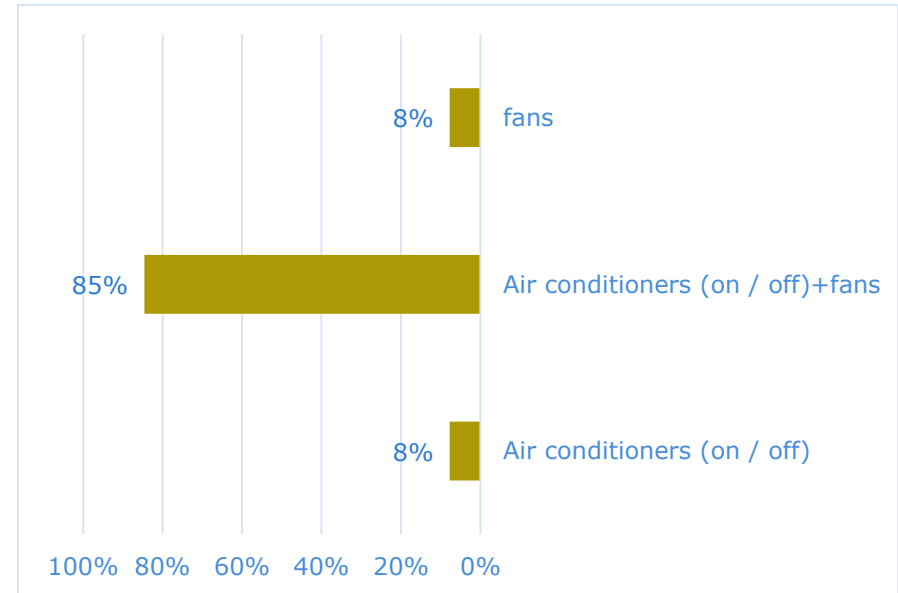
Sector/municipality (Sample Size)	Ashouneh Alwosta	South Aghwar	Tabaqet fahel
Commercial (Shops)	71	61	40
Schools	30	28	12
Mosques	30	27	30

Survey in the Jordan Valley (ongoing)- 2019

Schools' Energy Usage at Tabaqet Fahel- Preliminary Results



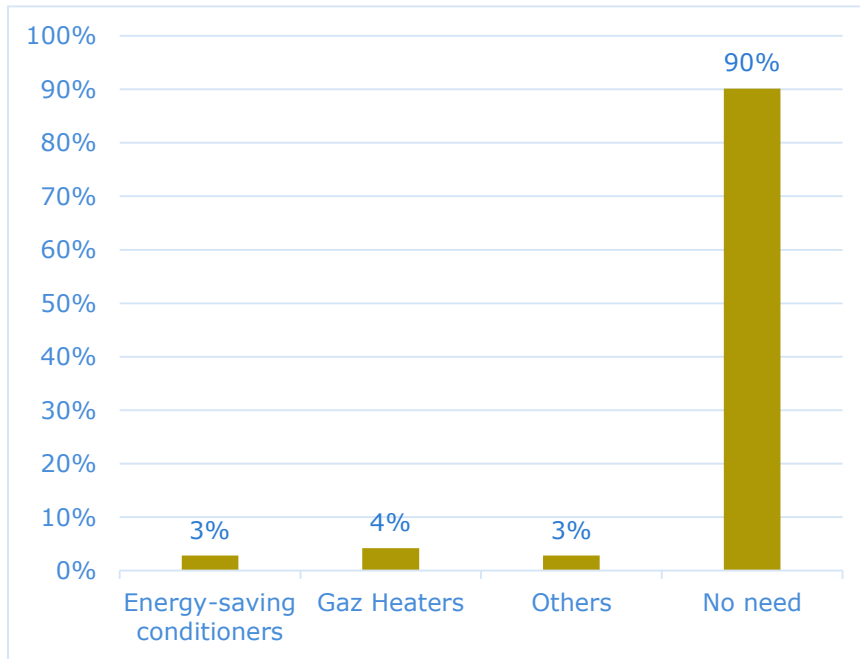
Type of used heating system in Schools (Tabaqet Fahel)



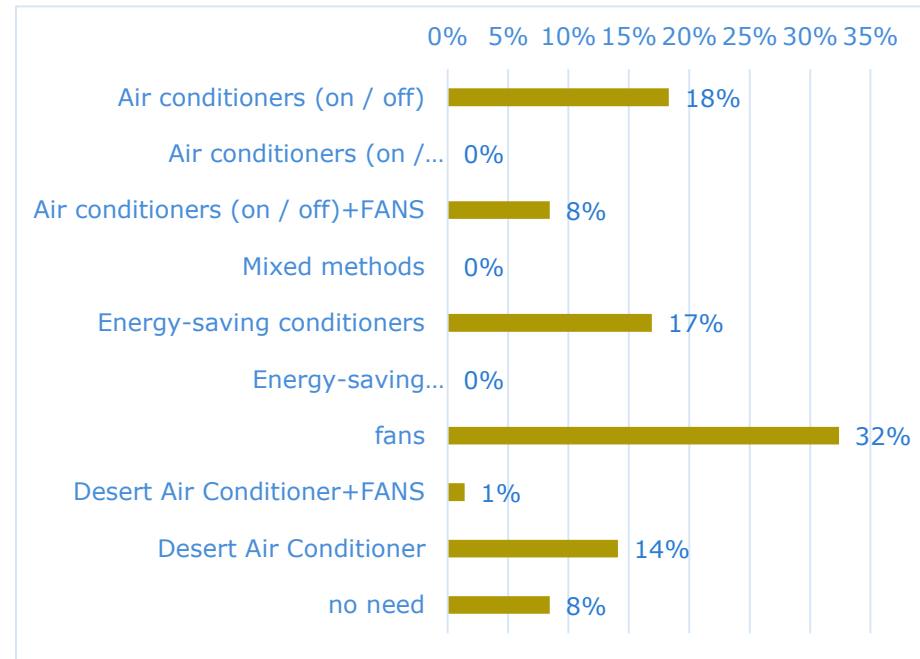
Type of used cooling system in Schools (Tabaqet Fahel)

Survey in the Jordan Valley (ongoing)- 2019

Shops' Energy Usage at *AlShouneh* *AlWosta*- Preliminary Results



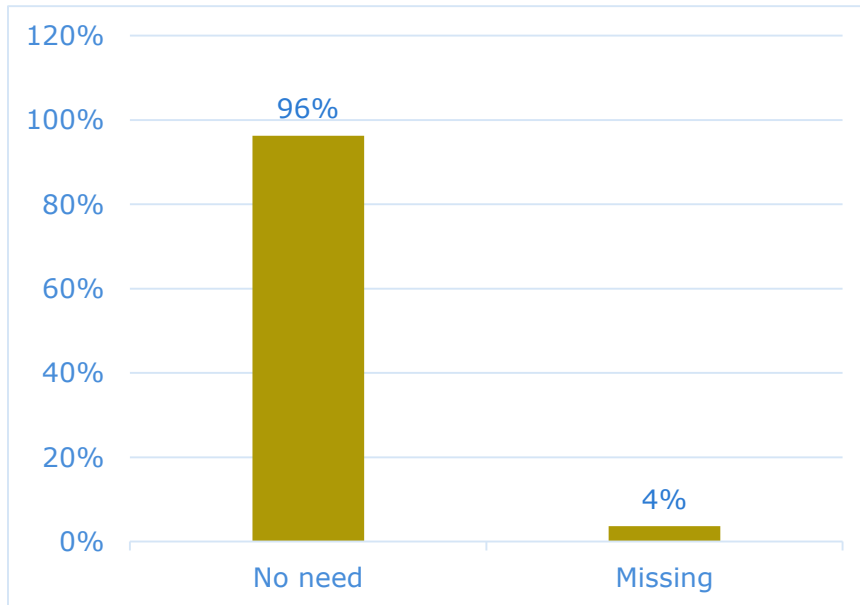
Type of used heating system in shops (AlShouneh AlWosta)



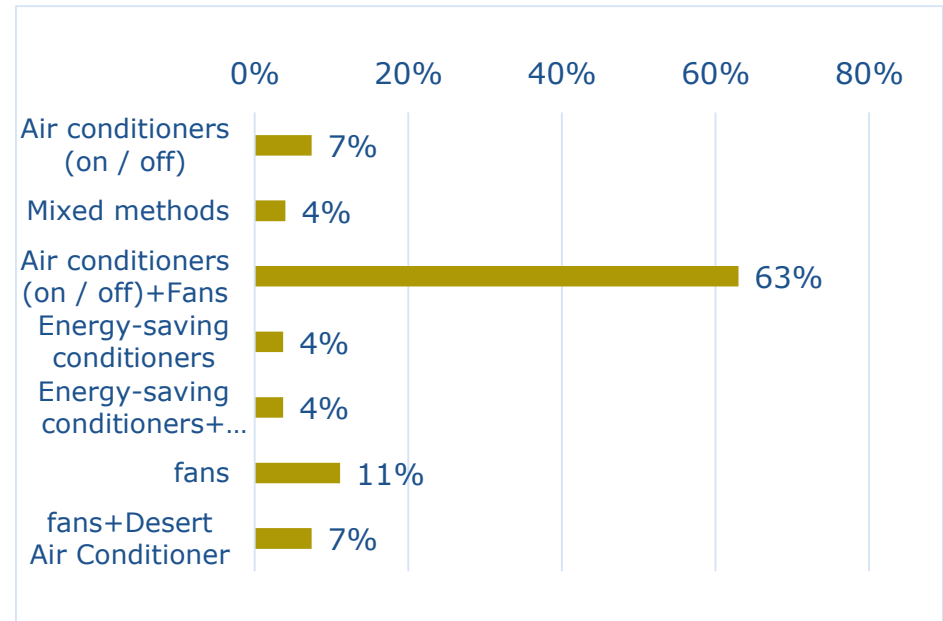
Type of used cooling system in shops (AlShouneh AlWosta)

Survey in the Jordan Valley (ongoing)- 2019

Mosques' Energy Usage at South Aghwar - Preliminary Results



*Type of used heating system in
mosques(South Aghwar)*



*Type of used cooling system in
mousques (South Aghwar)*

Energy Efficiency in Public Buildings

Around 7% of the total electricity consumption.

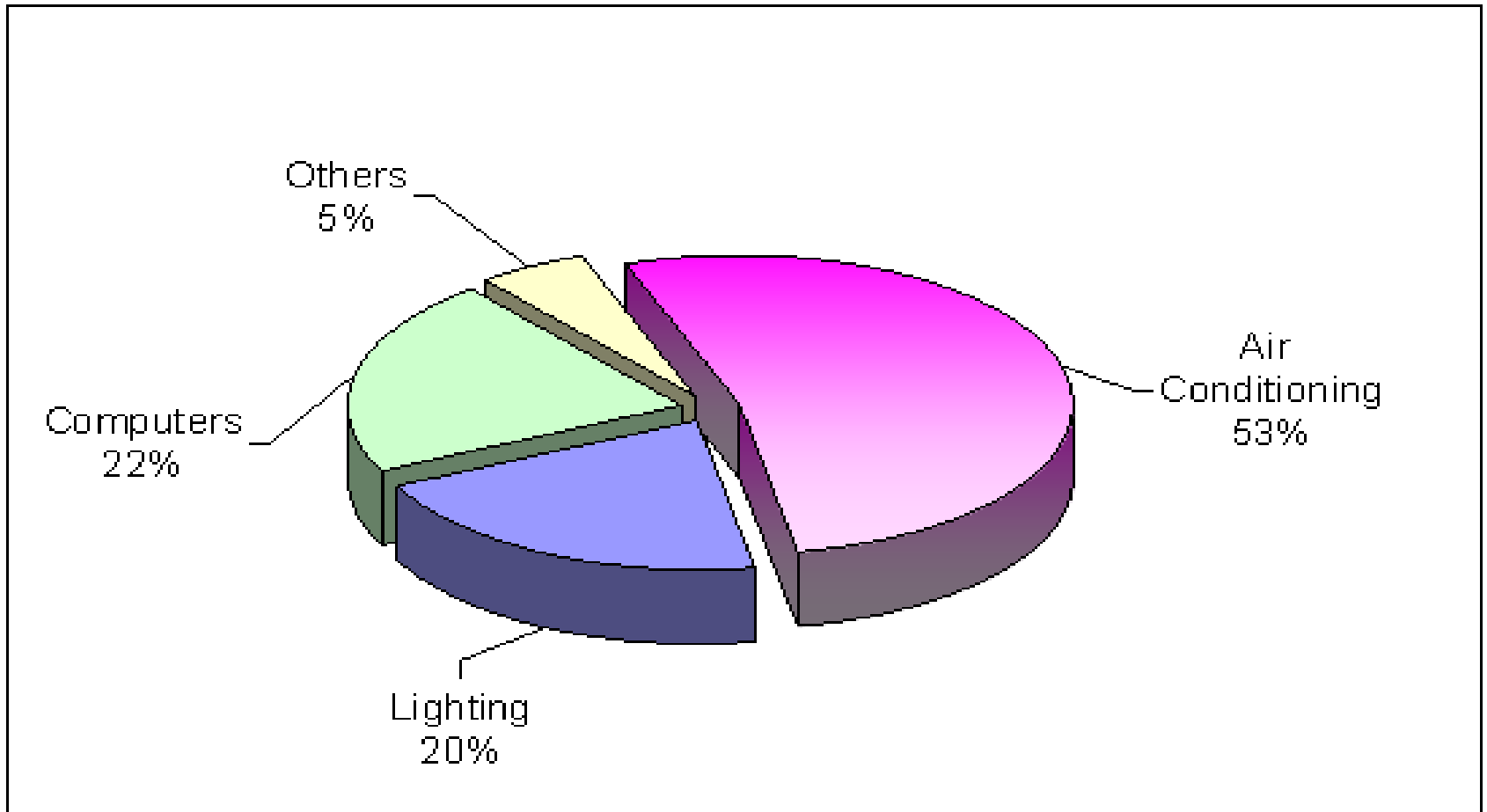
Equal to: 1020 GWh/year

If 20% is saved:

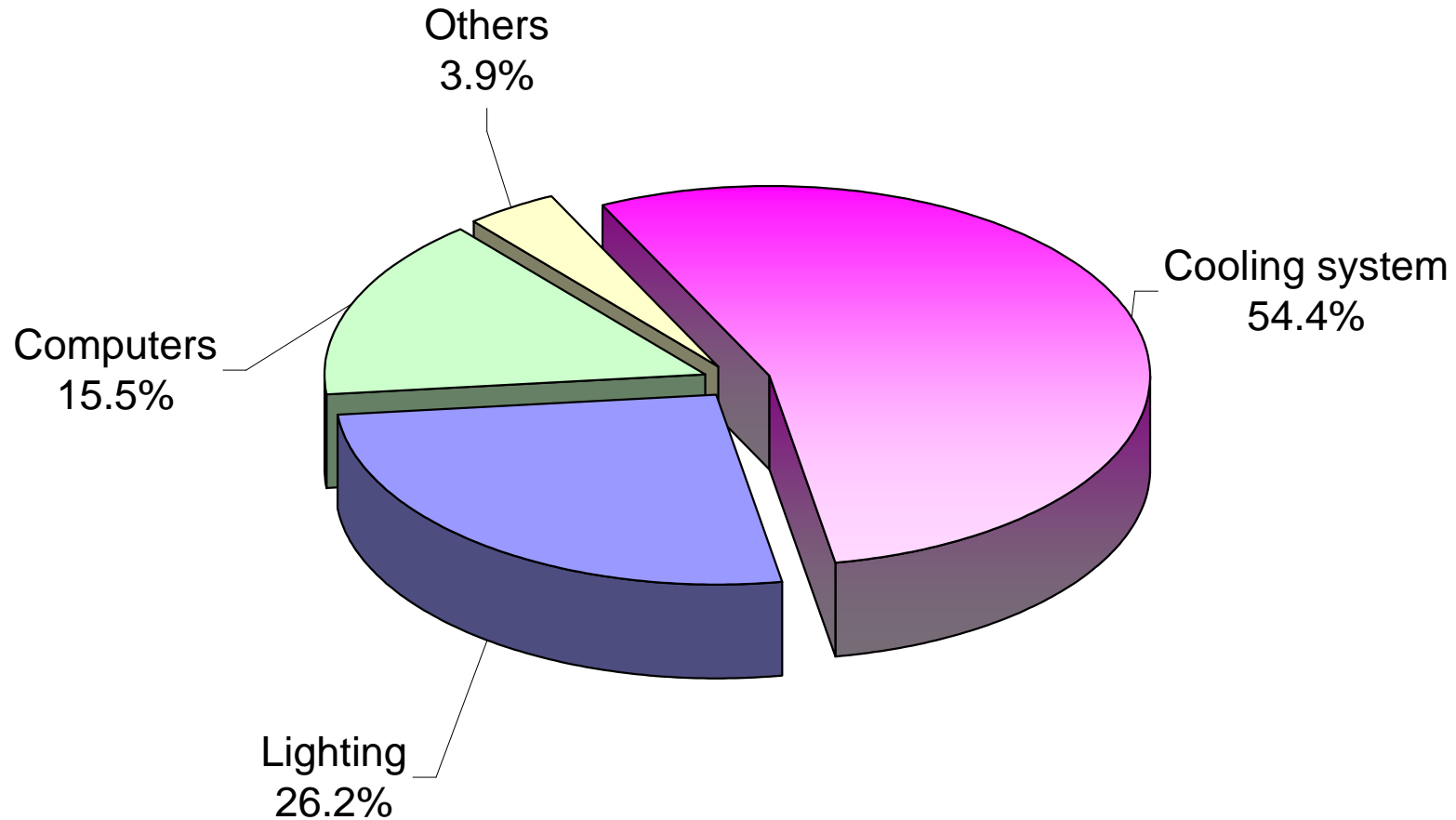
204 GWh/year saving

53 Million JoD/year

Break down of Electrical Energy Consumption “Ministry of Planning” - 2018

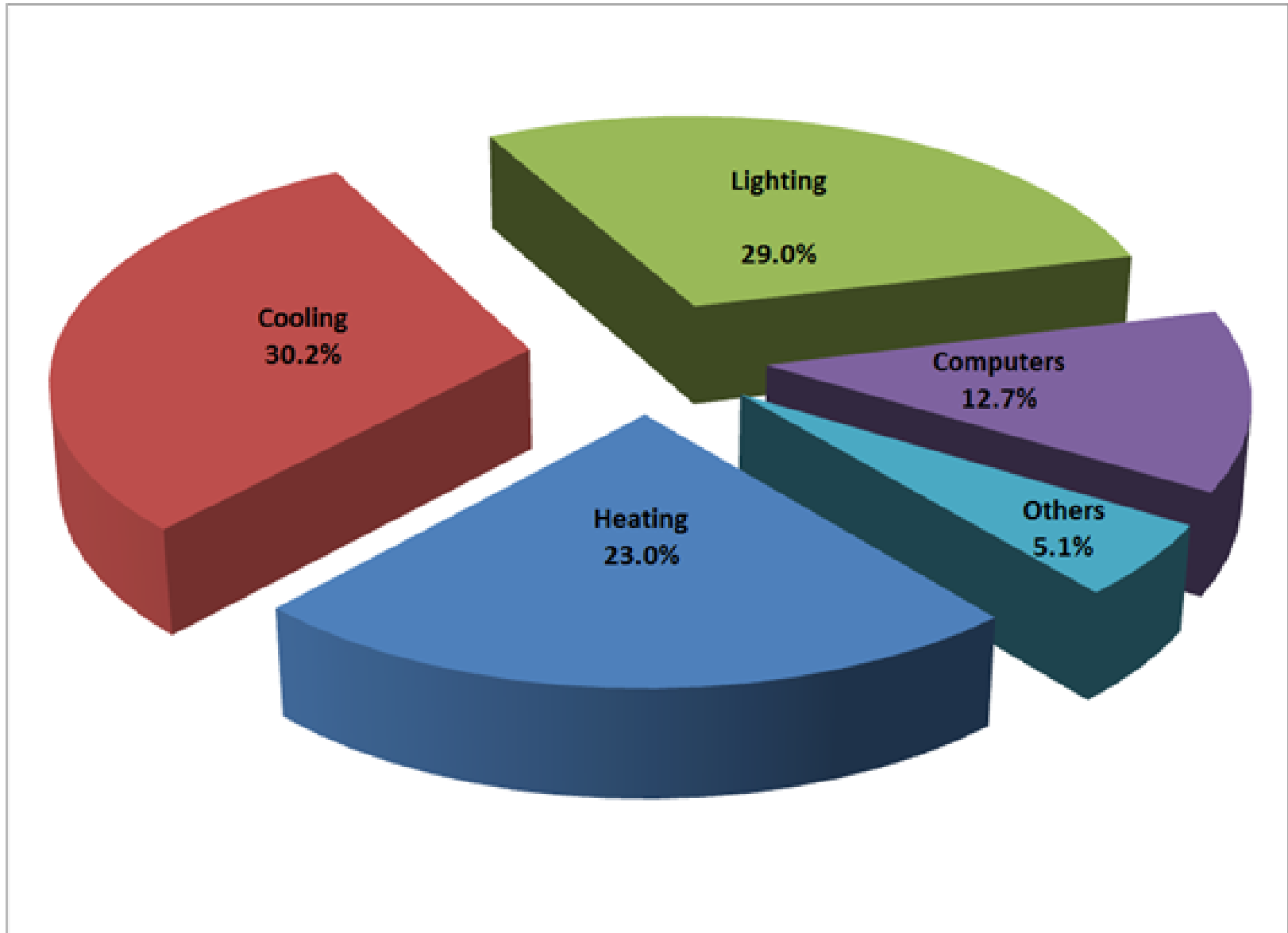


Break down of Electrical Energy Consumption “Ministry of Industry and Trade” - 2009



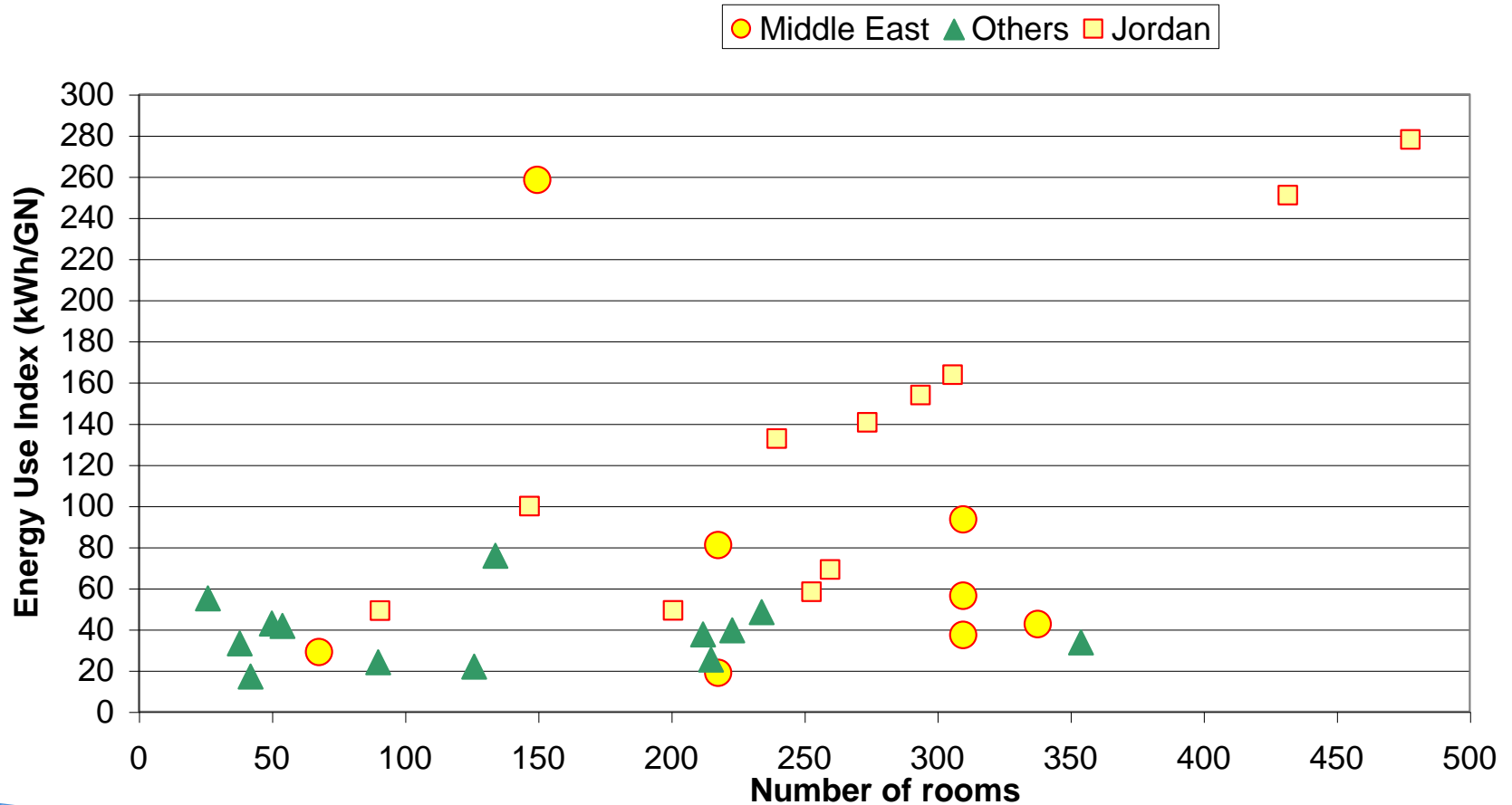
Royal Scientific Society

EE Study 2012

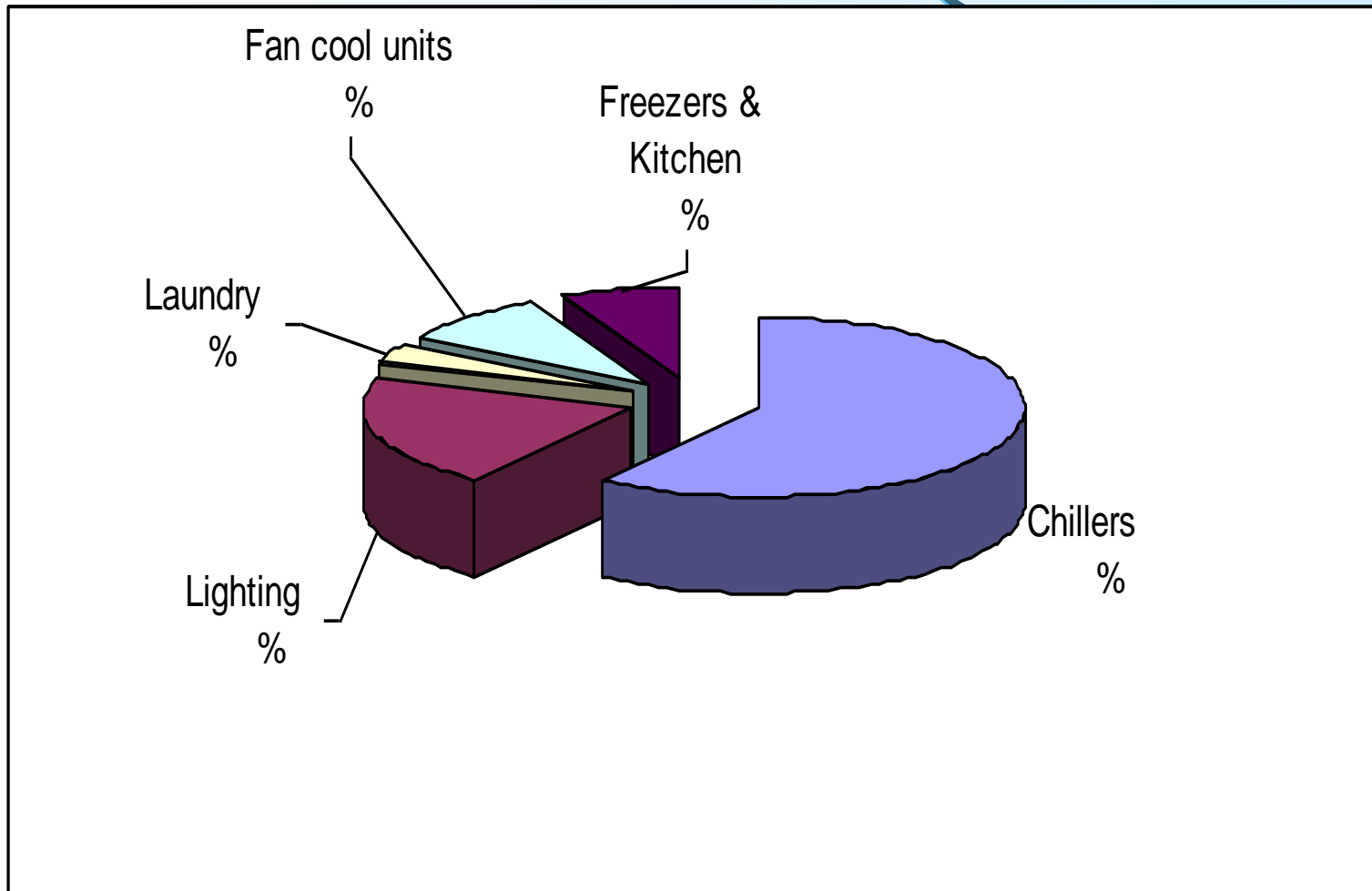


Energy Efficiency in Hotels Sector

Energy use index vs. Number of rooms



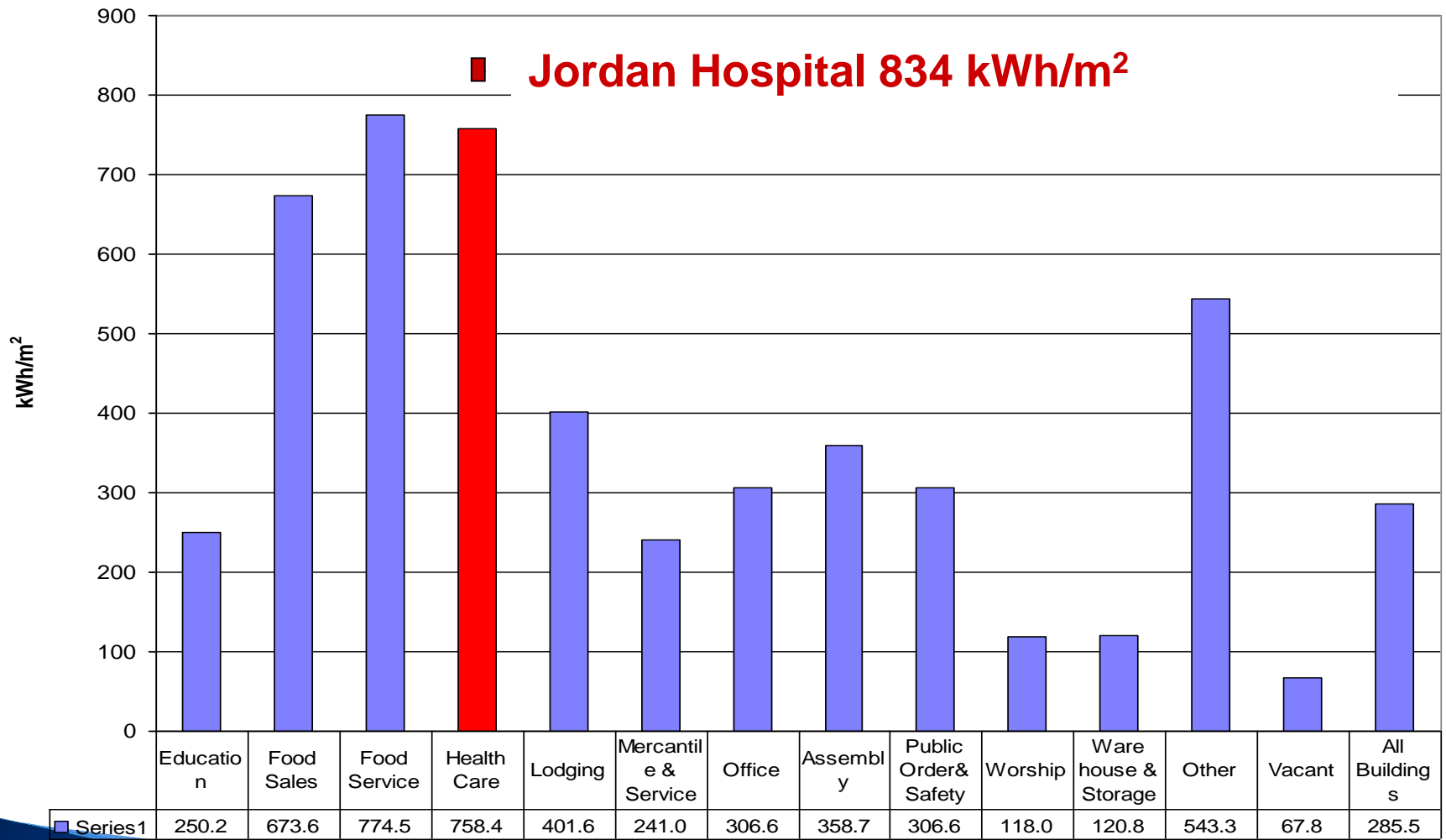
Electricity Consumption Distribution 4 star Hotel - 2006



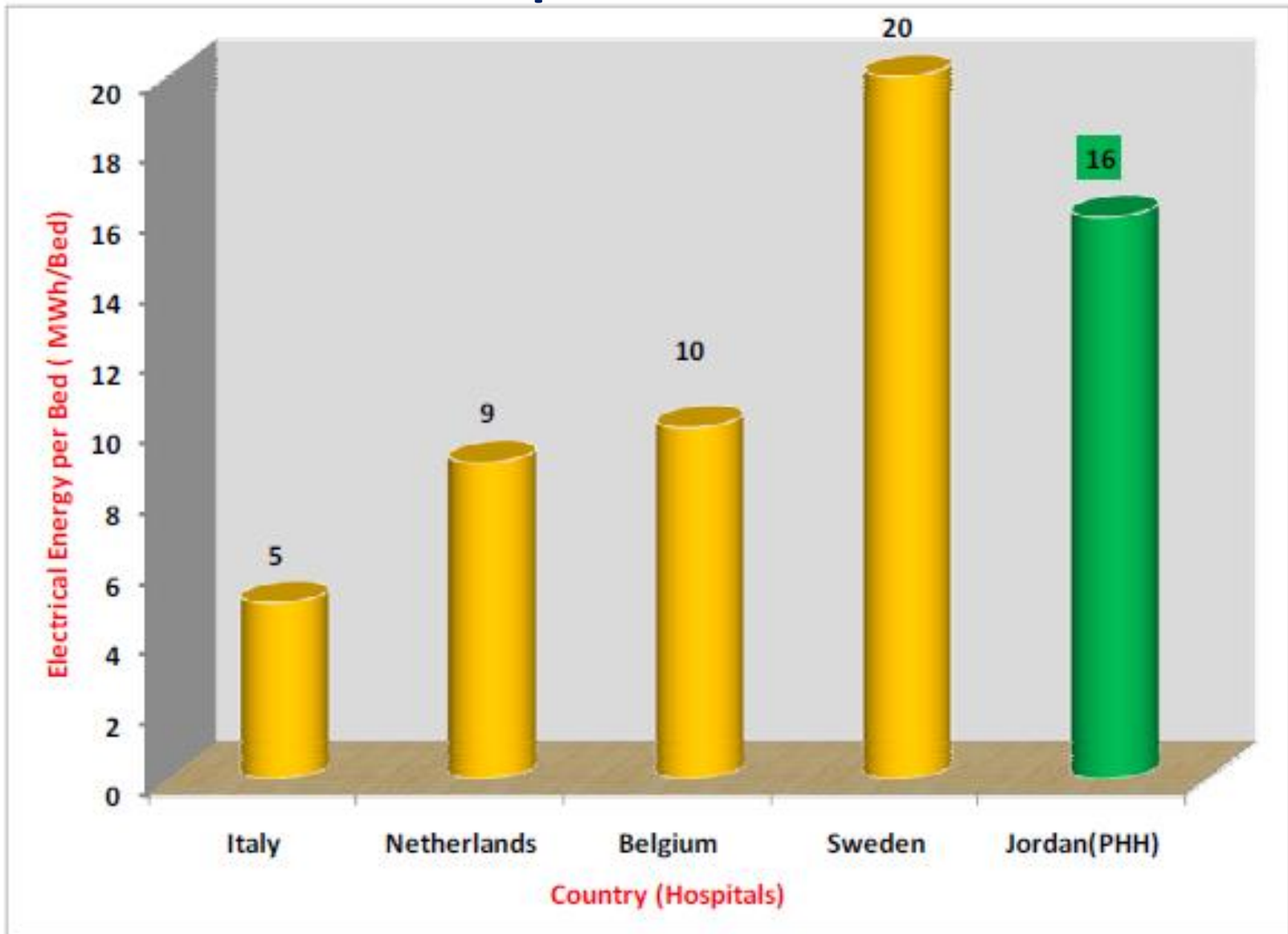
Total energy consumption vs. occupancy

Month	Energy cost (JD)	Guest Night (GN)	Avg. monthly temperature (°C)	Specific Energy Consumption (JD/GN)
Jan.	8,866	2,838	14.2	3.12
Feb .	6,652	3,464	16.5	1.92
Mar.	14,454	9,929	19.6	1.46
Apr.	16,973	9,543	23.8	1.78
May	20,257	7,774	27.8	2.61
Jun.	19,525	6,094	30.3	3.20
Jul.	24,601	10,106	31.9	2.43
Aug.	27,767	15,779	31.5	1.76
Sep.	20,894	7,959	29.5	2.63
Oct.	16,368	6,726	26.2	2.43
Nov.	9,314	3,180	20.5	2.93
Dec.	10,525	3,714	15.2	2.83

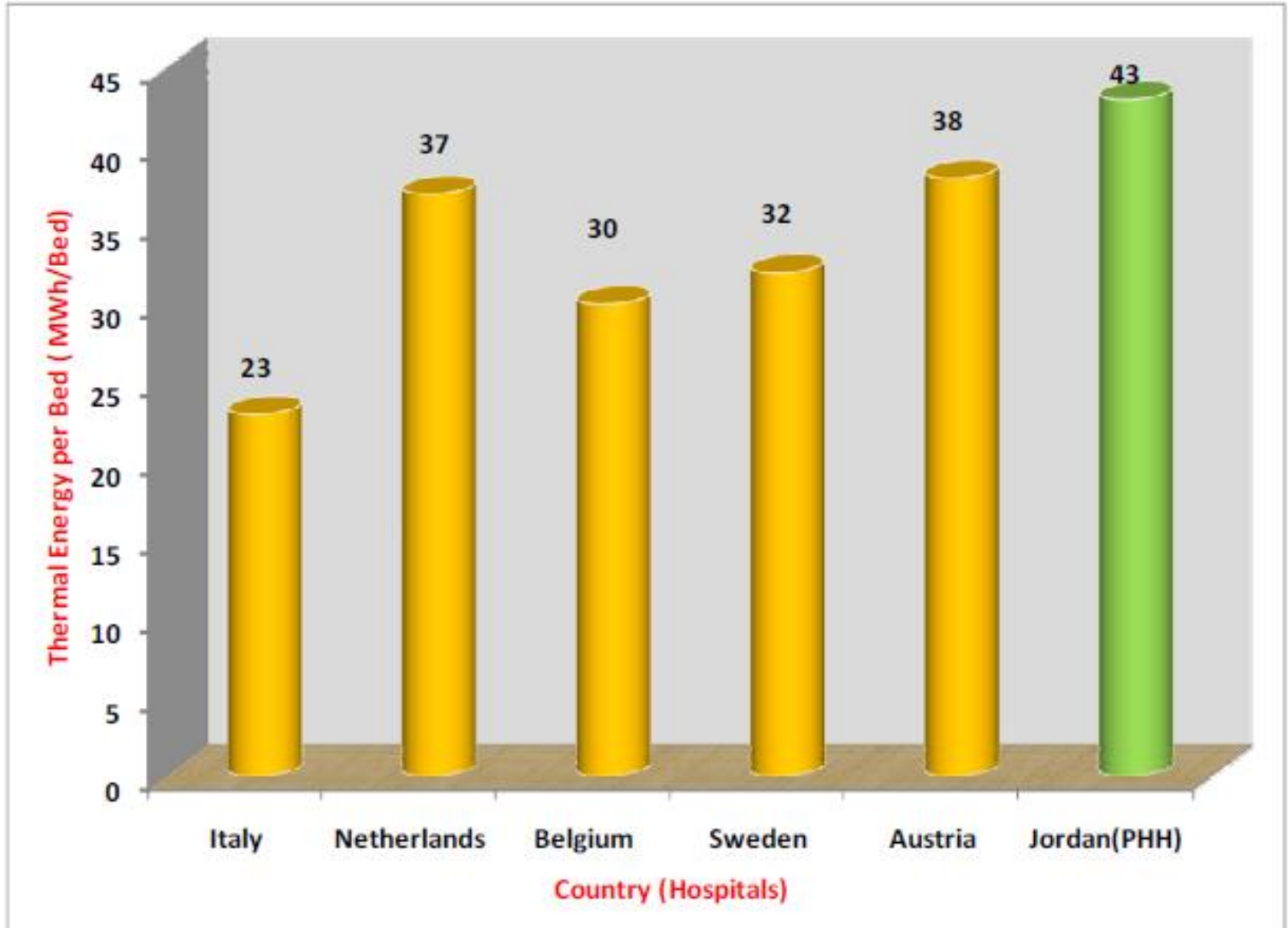
Energy Efficiency in Healthcare



Healthcare Benchmark Hospital - 2008



Healthcare Benchmark



Energy Efficiency in Public Schools

Schools Heating Program

School	Area (m2)	Specific Thermal Energy Required for space Heating (For base case)	Specific Energy Consumption (Electrical)	Lighting Power density (Lighting Connected Load/ area)
		(kWh/m ²)	(kWh/m ²)	(W/m ²)
Ajloun Governorate				
Anjara Secondary School for Girls	2,050	37.0	9.16	13.4
Sakhra Secondary School for Girls	2,623	45.6	6.34	17.04
Ain Jannah Secondary School for girls	1,823	29.5	7.68	10.6
Anjara Primary School	1,655	29.1	8.69	5.6
Ain Jannah Secondary School for boys	2,817	21.3	11.67	8.73
Ebbin primary school for Boys	937	50.5	20.57	20.67
Samta primary school	522	60.7	5.58	11.71
Ebbin Eblin Secondary school for Boys	1,623	54.9	4.87	9.4
King Talal Secondary school for Boys	1,204	47.0	5.48	9.3
Ras Munif secondary school for Boys	803	42.5	7.00	5.6
Saqr Quraish Primary School for Boys	826	37.3	7.47	13.8
Hai Nemer secondary school for Girls	1,565	21.2	8.10	3.5
Al-Jabal Al-Akhdar Secondary school for Girls	1,125	34.0	6.41	14.6
Ajloun Secondary school Girls	3,259	29.8	4.80	12.8
That Al-Nitaqein School	688	32.1	9.07	8.58
King Abdullah II for excellence School	2,360	14.8	25.01	26.2
AlTafileh Governorate				
Harith Bin Omair School	1,496	31.0	6.89	18.38
Busairah Primary school	1,429	38.1	7.9	10.29
Fatima Al-Zahra' Secondary School	2,785	26.1	5.07	12.37
Fatima Al-Zahra' Primary School	1,698	28.5	14.59	15.02
Waad Zaid School	2,115	27.0	5.55	9.66
Zain Al-Sharaf School	2,232	33.4	10.40	10.30

National Impact of Energy Efficiency

Company Name	Total Cost Saving (JD)	Energy Consumption (JD/Year)	Saving %	Pay Back Period (Yr)	Investment Required (JD)
Arab Center for Heart and Special Surgery	67,989	313,832	22%	1.8	123,102
Radisson SAS Hotel (Amman)	35,168	243,276	14%	0.4	15,731
Radisson SAS Hotel (Aqaba)	68,275	196,196	35%	1.3	87,544
Le Meridian Hotel (Amman)	117,962	452,883	26%	1.9	382,387
Grand Hyatt Amman Hotel	117,962	579,554	20%	2.1	235,285
Movenpick Resort & Spa Dead Sea	70,821	665,025	12%	0.8	60,052
Movenpick Resort Aqaba	86,449	358,223	24%	1.9	164,819
Four Seasons Hotel (Amman)	120,307	648,569	19%	1.4	170,670
Jordan Kuwait Bank	17,854	103,505	17%	1.3	23,579
Industrial Development Bank	4,020	33,065	12%	2.9	11,711
TOTAL	793,806	3,917,828	20%	1.6	1,274,880

Thank for your Attention