



Sustainable Energy Action
Plan of Abasan Al-Kabira
Municipality
2016 - 2020

Aug 2015





Date: 2 August 2015

Version Number : 1

Owner: Abasan Al-Kabira Municipality

Status: Draft (Submitted to CoM).

To achieve a sustainable energy future for Abasan Al-Kabira, a transformational change in the way we use energy is needed.



The municipality board are committed to playing a role in tackling this issue. They recognises that it must lead residents, teritary and the public sector in a partnership in order to reduce carbon emissions in the city. As a mayor, I am pleased to introduce the first sustainable energy action plan which sets out an ambitious actions to reduce our carbon footprint. This plan has the potential also to create new jobs as well as other notable social and environmental benefits. By introducing

this plan, Abasan Al-Kabira joins thousands of cities in a commitment to reducing carbon emissions by 30 % by 2020. This target is a big challenge and the board commit to provide all availble resources for this to happen. However, it will need all of us in Abasan Al-Kabira to come together and work in partnership toward this goal. It will need all to play their part at how they use energy in the home, at work and throughout the day. It is ambitious but I am confident that we can meet this challenge and deliver the benefits of sustainable energy for all.

Eng. Mustafa Al-Shawaaf

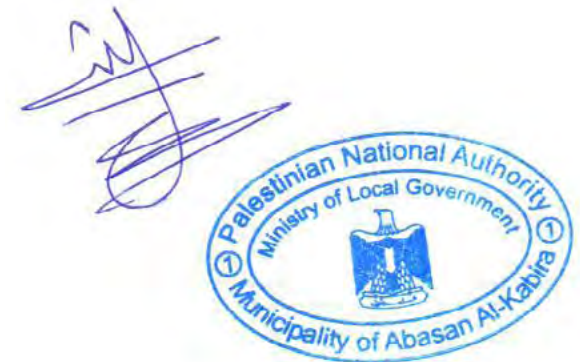


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Executive summary

Municipality of Abasan Al-Kabira developed its sustainable action plan trying to address climate change. Based on a 2010 as a baseline, it has committed itself to reduce the emission of CO₂ by %30 by 2015. To meet this target, a range of creative actions has been developed in order to guarantee outstanding achievement. These sixteen planned actions are categorized according to the intervened sectors as:

- 4 actions for the municipal buildings, equipment, facilities sector,
- 2 actions for the tertiary buildings, equipment, facilities sector,
- 4 actions for the residential building sector,
- 4 actions for the public light sector, and
- 2 actions for the municipal and private transport sectors.

Even though some intervened sectors are not under its jurisdiction, this will not restrict to the municipality as appropriate agreements can be arranged. These planned actions have the potential to reduce 8511 tons (30 %) emission of CO₂ by 2020. This reduction is larger than what's required by the CoM target by an amount of 2837 tons. This overall emission reduction corresponds to the planned energy saving and extra renewable energy production. It is expected to save 17773 MWh and produce 6293 MWh of renewable energy. The municipal board will actively explore for external and internal funding opportunities to support the delivery of our action plan.

1. Introduction

The municipal board of Abasan Al-Kabira has recognized the importance of tackling climate change. They have committed themselves as covenant signatory to allocate all needed resources trying to address this issue. The board has set a 2020 year target to be %30 CO₂ emission reduction. This target finds his way to be included in the municipality strategic development plan too. In order to guarantee outstanding achievement, the target is translated to

ambitious sustainable energy action plan (SEAP). This plan is firstly illustrating the baseline inventory of 2010 and then the planned actions are provided to meet the mentioned overall target. Even though some intervened sectors are not under its jurisdiction, this will not restrict to the SEAP team as appropriate agreements can be arranged. All who live and work in the locality is encouraged to play their part in reducing carbon emissions. Without their engagement and active participation it will be difficult to meet the targets. The SEAP should not be regarded as a fixed and rigid document, as circumstances change, and, as the ongoing actions provide results and experience, it may be necessary to revise the plan on a regular basis

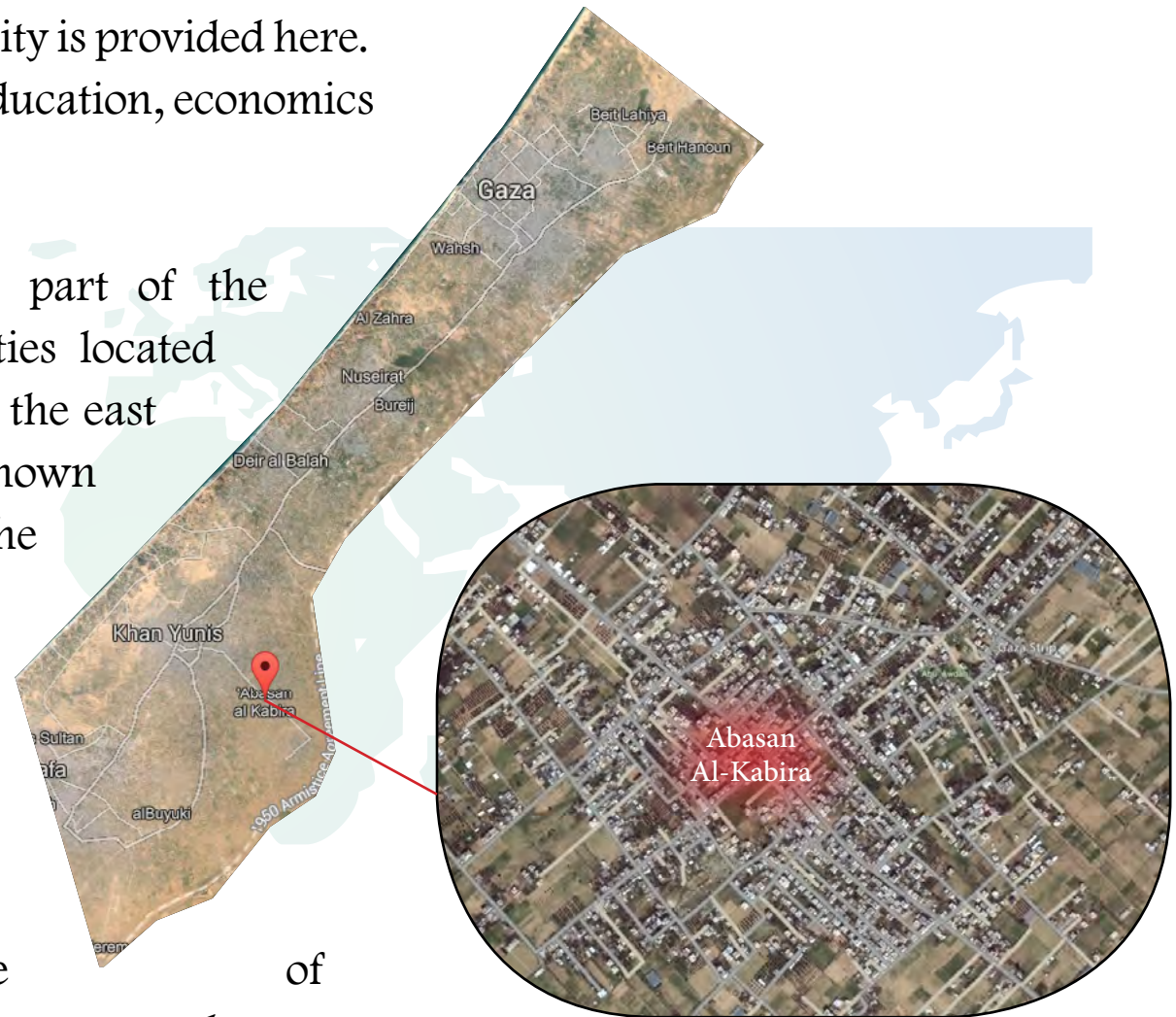


2. Abasan Al-Kabira City

General information regarding our city is provided here. This in terms of site, populations, education, economics and transportation.

2.1 Site

Abasan Al-Kabira Municipality is part of the aggregation of smaller municipalities located in Khan Yunis Governorate and to the east of Khan Yunis Municipality, known as the Easteran Area (Villages). The aggregation includes Bani Suhaila, Abasan AlKabira, Absan Al-jadedda, Khoza'a and Al-Qarara. Abasan Al-Kabira located in the south-east of the Gaza Strip, and follow to Khan Yunis governorate, it lies on the borders of the green line of 1948, Abasan Al-Kabira rising from the sea surface (78 m). stooping territory from north to south any of the (96 m) to (70 m) and are free of any mountains or valleys or any other terrain is flat land territory.



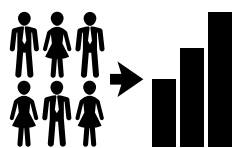
[See Google Maps](#)

The establishment

The Municipality of Abasan Al-Kabira was established in 1996, before which it was a municipal council. The area under the jurisdiction of the Municipality of Abasan AlKabira is 19,000 donums, 12,000 donums of which are agricultural lands. The area of influence 7025 donums, the urban areas is 6000 donums or the equivalent (4039 units).

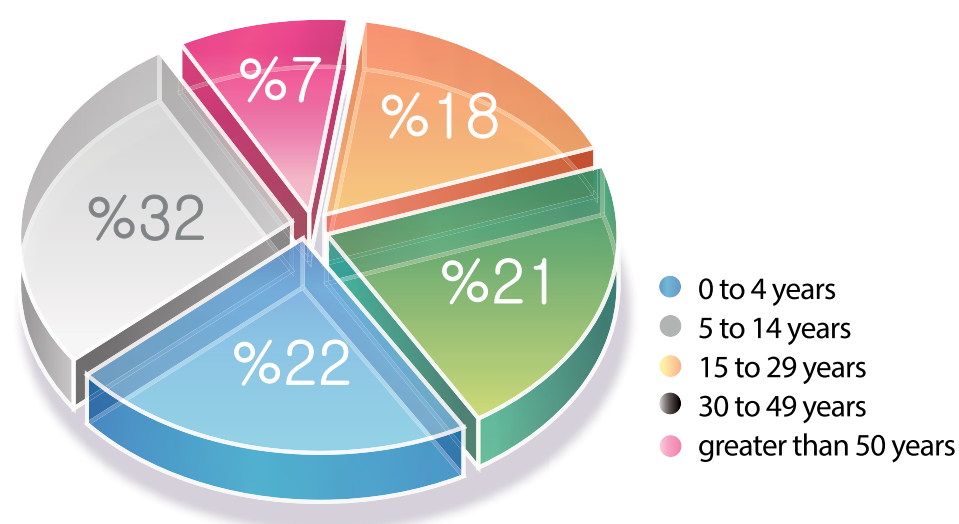
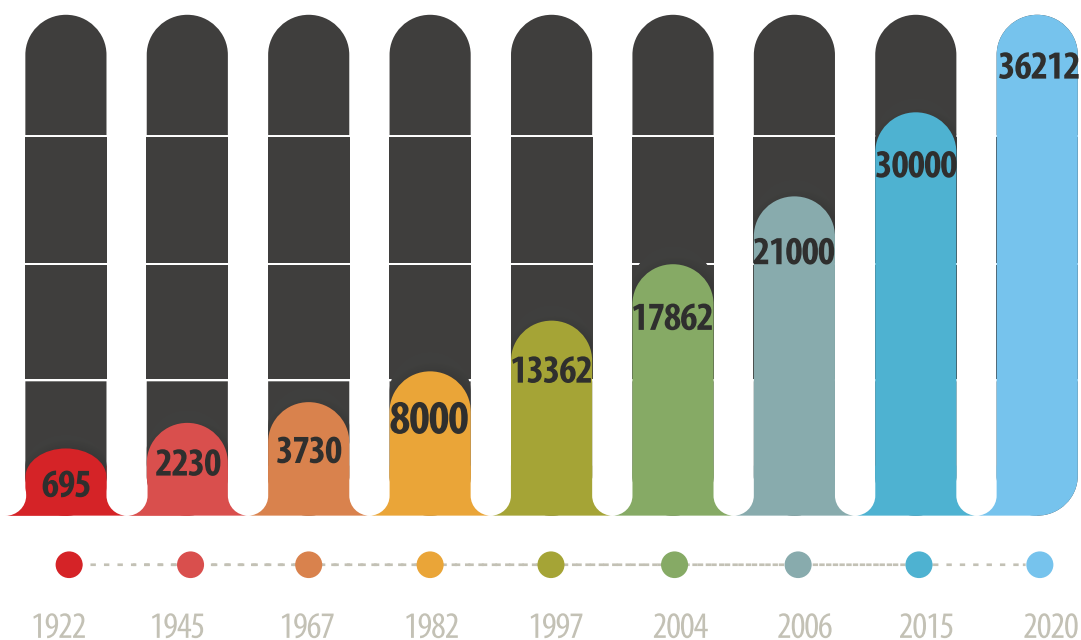


Population



A population of Abasan Al-Kabira in 1922 and in 1945 was 695 and 2230 person, respectively. In 1967, the number of inhabitants was about 3730 person. The estimated number of Abasan in 1982 was about 8000 person and that number had doubled to 13362 person in 1997. This number had been grown to 17862 person in 2004, according to estimates of the PCBS. In 2006, the number increased to 21000 persons. Current population is about 30,000 persons and it is expected to have normal growth rate of %6-5.5 annually for the coming few years years. This is greater than the national growth rate (Gaza population growth rate) which is %3.97 [PCBS, January 2004].

Population of Abasan Al-Kabira 1922 - 2020



Population /age (2015)



2.3 Education



Education is one of the most important sectors in the Palestinian society and hence it receives a higher attention by the Palestinian Government. National education system has two levels, primary and secondary level. The primary level covers grades till 9 for children aged between 7 and 16 years old. The secondary level covers grade till grade 12 of youth aged 18-17 years old. Most of schools in the municipality are operated by the government and there are no private schools in Abasan Al-Kabira. Currently, there are thirteen public schools. The total number of students enrolled is about 5346, 10897 are male and 5551 are female.

2.4 Economic Situation:

In Abasan Al-Kabira, the agricultural is one of the oldest economic sectors. It is adopted by the majority of the population and considered as one of the most key income source. Till 1994, most of the inhabitants were involved in agriculture activities. This situation has been changed a little to some governmental works due to Palestinian National Authority start-up in 1995. Due to Israeli siege policies that imposed to Gaza citizen, unemployment number has been rapidly increased. This results of %68 of unemployment labor.

The trade and industry activities in the town can be summarized as :

- Four metal workshops.
- Five wood workshops.
- building construction material workshops.
- Over 210 establishments for trading purposes (restaurants, household appliances, Hairdressing salons, clothing stores, ...etc.)

2.5 Transportation :

A total length of the city streets (either main or interior streets) is about 50. Approximately, %50 were paved. Regional roads are limited, namely Salah El-Dean Road and El Shohada Street.





3. Why SEAP is needed?

Most important reason is to protect the environment. It is well-known that the use of fossil fuels results in a number of counteractive environmental impacts. These include but not limited to greenhouse gas emissions and air pollution. Using renewable energy, these environmental impacts can help in reducing the amount of greenhouse gas emissions as a result of fossil fuels used. Another reason is to ensure that energy supplies are sustainable. In long run, it is not sustainable to rely on fossil fuels such as oil, gas and coal. These resources are exhaustible. To help future generations in dealing with environmental impacts and overdependence on fossil fuels, cities are encouraged to diversify their energy sources.



4 Baseline Emission Inventory

While there are a range of greenhouse gases responsible for climate change impacts, this section provides information that focuses only on carbon dioxide emitted from energy consumption of Abasan Al Kabira.

4.1 Methodology and data source

Here, the scientific methodology used in the estimation of emissions to air from their various sources is presented. There is a specific template is given by the Covenant of Mayors program for observing the energy consumption and the associated carbon emissions.

It examines mainly the buildings and transportation energy usage from both fossil fuels and renewable energies in a chosen year (termed afterward as the base Base year inventory). Then, the Carbon emissions are produced using specified emission factors. Here, the BEI has been developed using our national 2010 energy balance (see Annex I) as there is

no previous data available. In addition, this data is available for notational usage, hence the per capita methodology is applied using population data. The national population in 2010 was 4048403 persons where local populations was 25211 persons. Mathematically speaking, the local final energy consumption is calculated by

$$\text{consumption(local)} = \frac{\text{consumption(national)}}{\text{population(national)}} \times \text{population(local)}$$

In gathering BEI, the emission factors listed in Section 4.5.1 are used. These factors have already generated in line with the IPCC principles according to data provided by PCBS and shown in Annex III. Also, ton CO₂ emissions as the primary reporting unit. In order to convert from physical units that used by the energy balance, some conversions factors of Annex II are used. Besides the direct data which provided by the local council, the following primary sources of data have been consulted in the preparation of the BEI:



Palestinian Central Bureau of Statistics, 1999. Population in the Palestinian Territory, ~1997 2025. Ramallah - Palestine. Link: http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/gover.htm



Palestinian Central Bureau of Statistics, 2013. Emissions to Air, 2011. Ramallah - Palestine Link: <http://www.pcbs.gov.ps/Downloads/book1984.pdf>



Ministry of local governrates website (Arabic language) , Link: <http://www.molg.ps/ar/?p=30>

4.2 Base year inventory

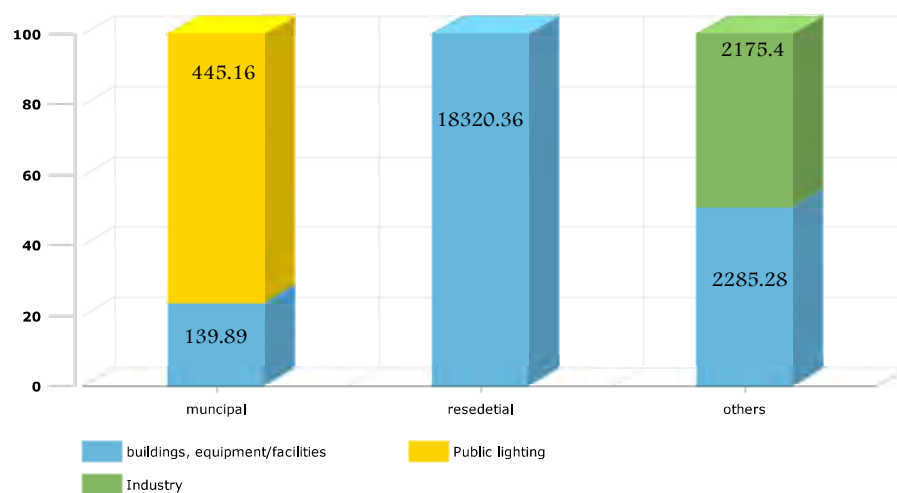
It is advised by the Covenant of Mayors that the local authority should choose the closest year to 1990 with the most comprehensive and reliable available data. In our situation, no comprehensive and reliable energy data were available before 2010. Thus, the baseline year for this SEAP is chosen to be 2010.

4.3 Intervened sectors

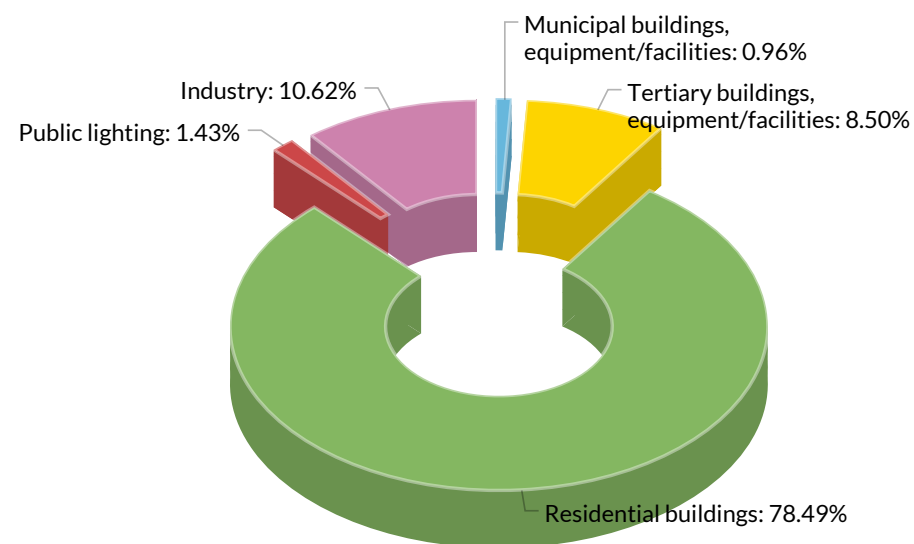
4.3.1 Buildings, Equipment, Facilities and Industries

This main sector comprises five key sub-sectors which are: (1) municipal buildings, equipment, facilities (2) territory buildings, equipment, facilities (3) residential buildings, (4) public lighting and (5) Industry. The estimated final energy consumption in this sector was equal to 50372.97 MWh in the baseline year. Emissions due to this consumption are equal to 23366.09 ton CO₂.

Buildings, Equipment, Facilities and Industries sectors



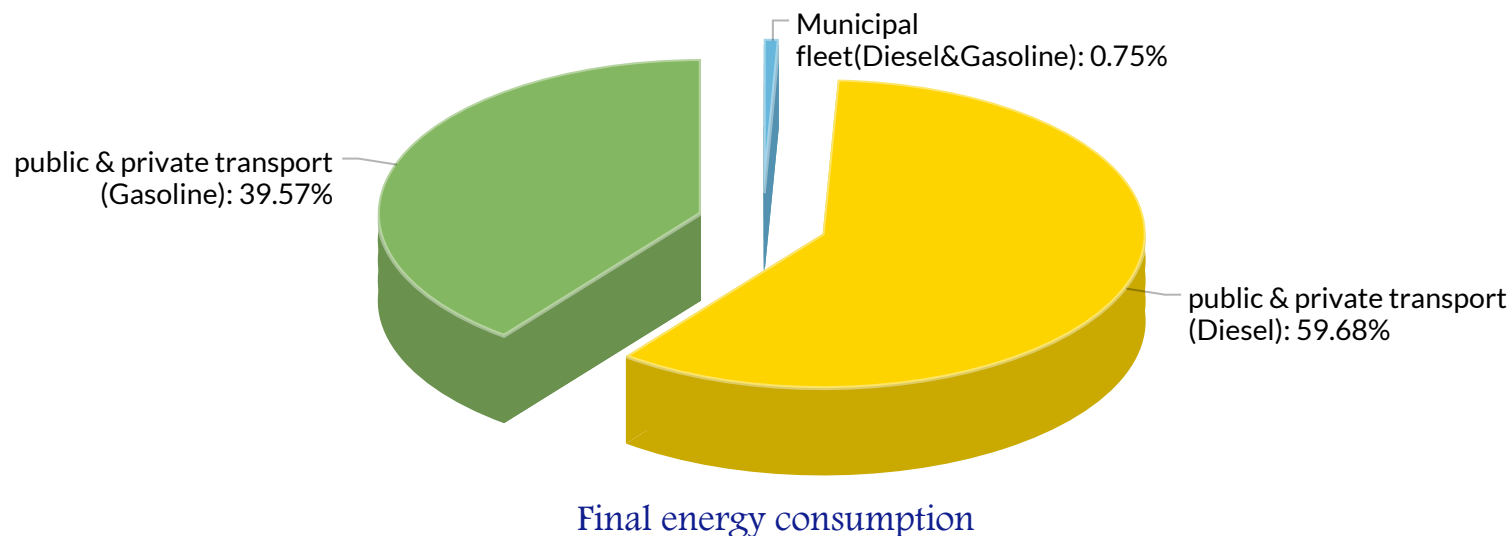
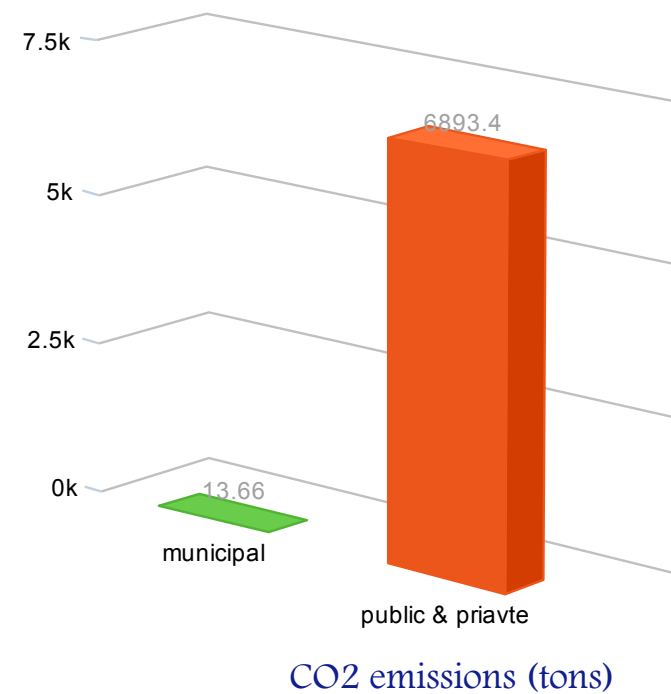
CO₂ emissions (tons)



Final energy consumption

4.3.2 Transportation

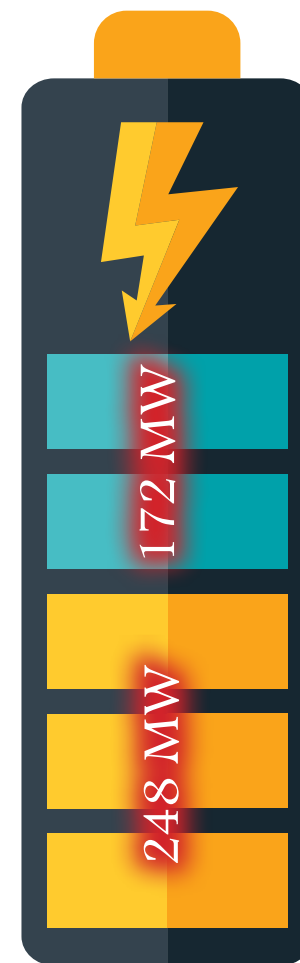
Two sub-sectors are examined here, municipal fleet and other transportation (public and private transport). Only the energy usage for both Public and private transport is available for the baseline year but not individually.



4.4 Final energy consumption

4.4.1 Electricity

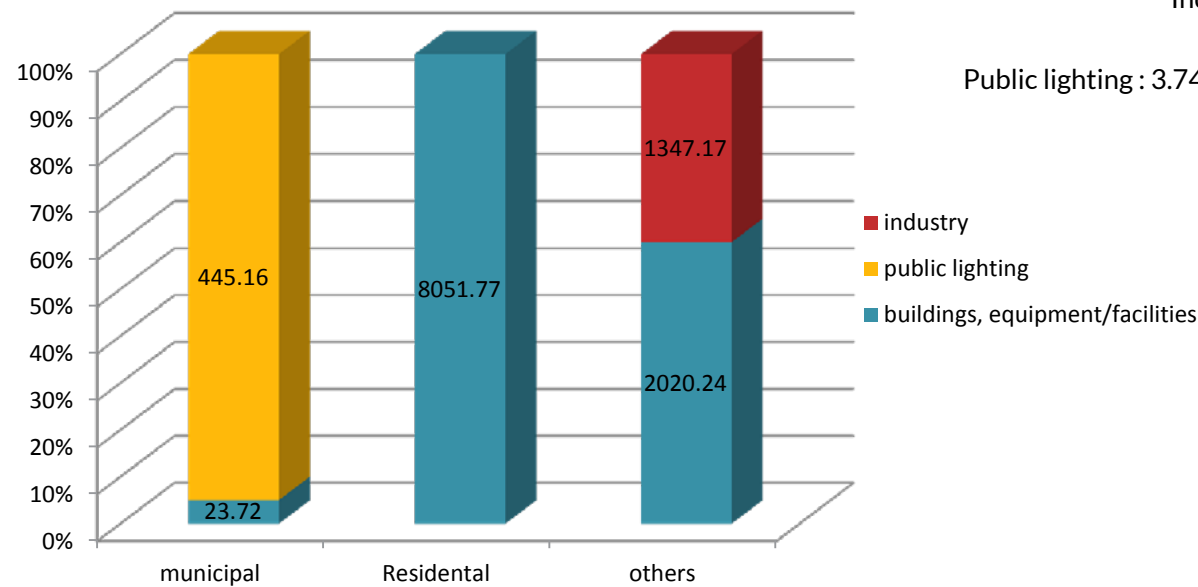
Generally, Gaza strip depends entirely on imported electrical energy sources. Most of the imported electricity energy is purchased from Israel. In 2002, Gaza Power Plant (GPP) company started delivering electricity energy. The GPP's maximum capacity is 140 MW, which delivered to the grid together with the electricity purchased from Israel and Egypt (120 MW and 28 MW, respectively). In 2006, the Israeli Air Force attacked the GPP and all six transformers of the plant were destroyed. Afterwhile, partial production was successfully resumed, reaching 65 MW at peak production and then a year later had reached to 80 MW. One year later, Israel imposes a blockade on the Gaza Strip, which severely restricts the import of necessary electrical equipments and fuel. At the beginning of 2008, Israeli government rejected a petition by human rights groups that call to reduce the Israeli's restrictions that imposed on Gaza. This continues the fuel and electricity supply shortage and hence further power cuts are experienced in all Gaza areas, including Abasan Al-Kabira municipality.



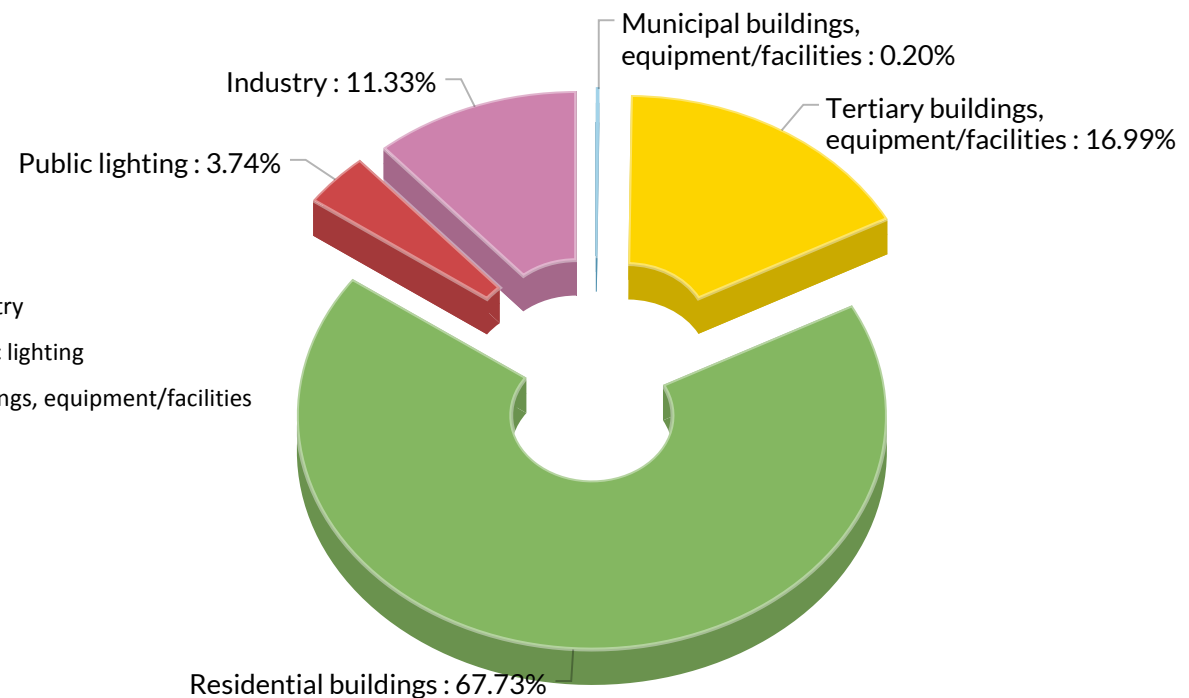
Total Demand :420 MW



Total energy consumption in Gaza is small compared to regional and international standards (World Bank, 2007). The residential sector is the largest energy consuming sector, about %70 of the total final electrical energy consumption.



CO₂ emissions -electricity/sectors (tons)



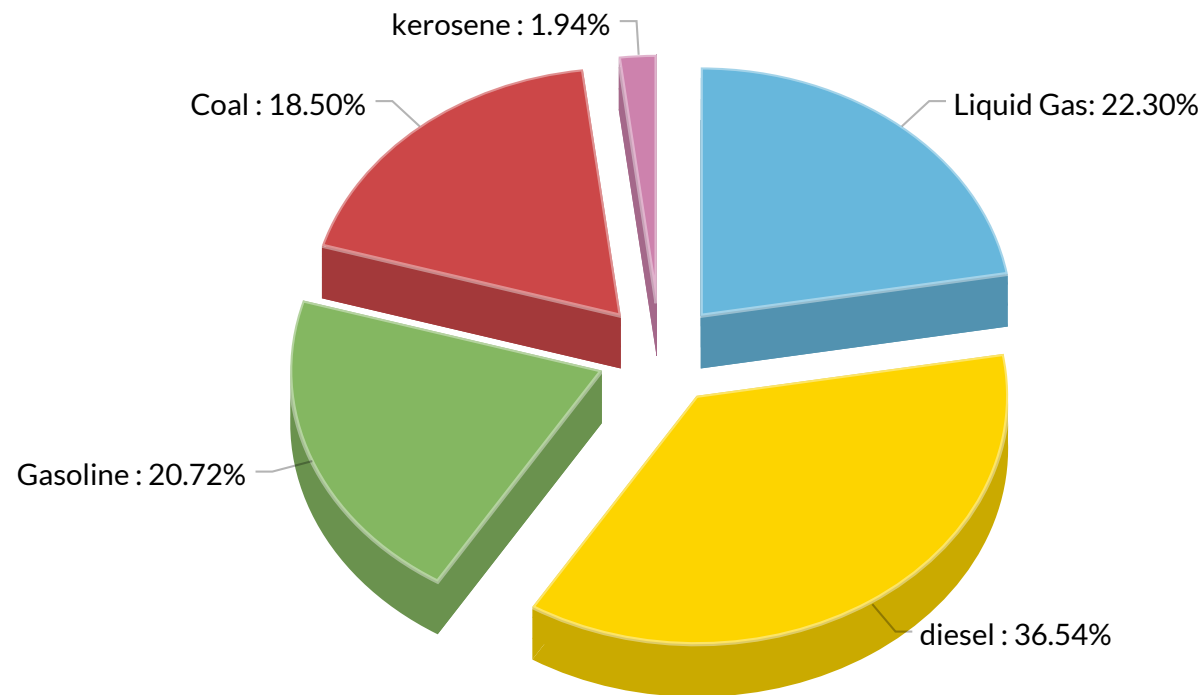
Final electrical energy consumption /sectors

4.4.2 Heat/Cold

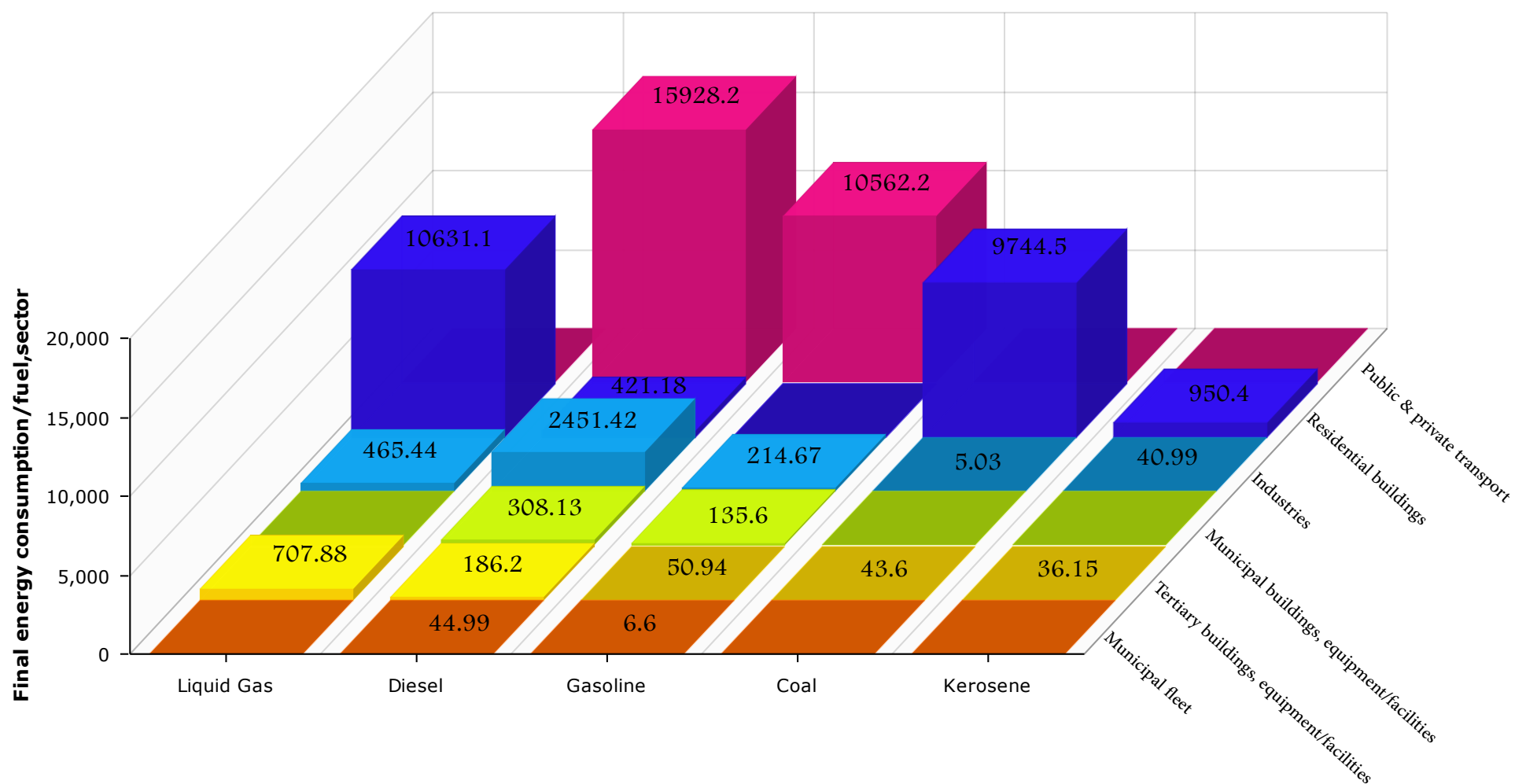
Commonly, five types of fossil fuels are used locally and hence its examined in this SEAP. They are liquid gas, diesel, gasoline, coal and kerosene.

4.4.3 Fossil fuels

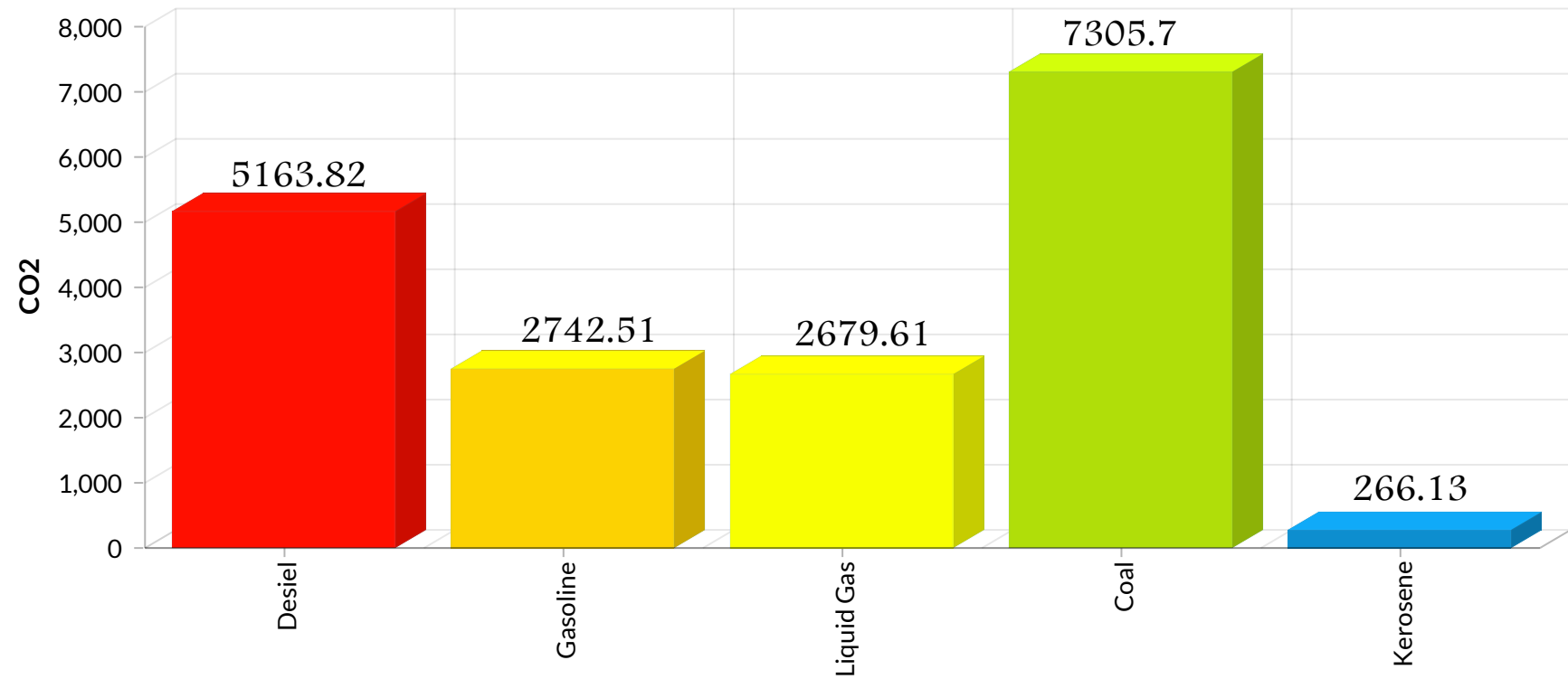
Commonly, five types of fossil fuels are used locally and hence its examined in this SEAP. They are liquid gas, diesel, gasoline, coal and kerosene.



Final energy consumption / fuel



Final energy consumption (fuel,sector)

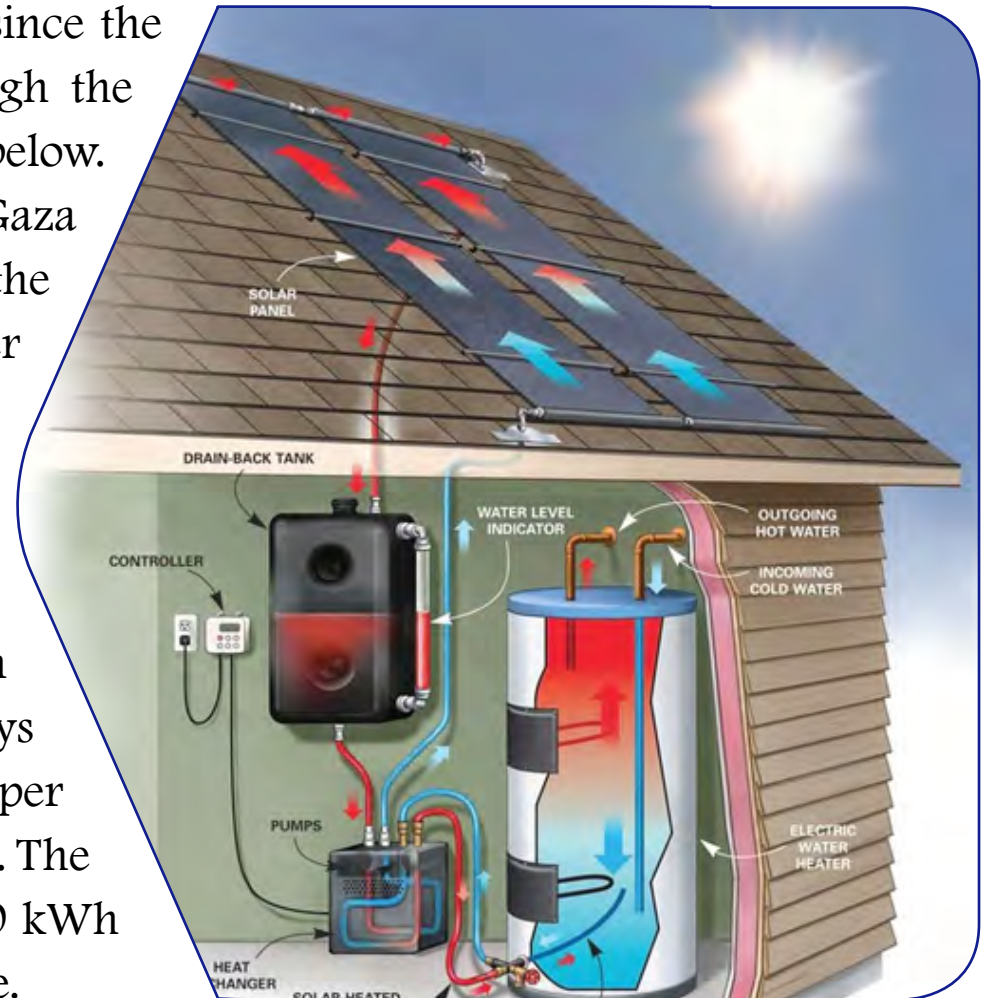


CO₂ emission (ton)/fuel

4.4.4 Renewable energies

Solar Thermal

Nationally, solar thermal energy is widely used since the early seventies for water heating. This is through the usage of solar collector panel, see figure shown below. According to 1996 statistics, more than %95 of Gaza houses use solar energy for water heating. Latterly, the percentage dropped due to the increasing number of apartments that are not equipped with this solar heating system. According to the latest survey of household energy by the PCBS, around %60 of households use solar heating system. However, the widespread usage does not necessarily mean an awareness of renewable energy. With 300 days of sun a year, solar water heaters are a cheaper alternative than using electricity for water heating. The system used is usually equipped with standby 3.0 kWh electric boiler that are mainly used in wintertime.



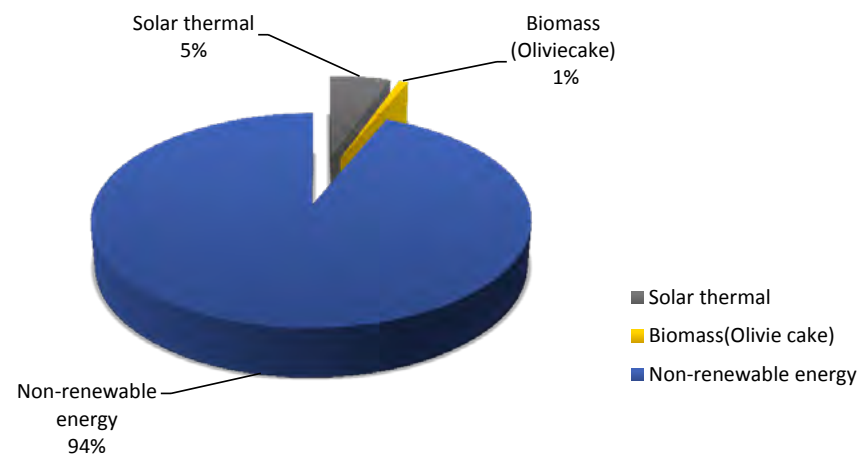
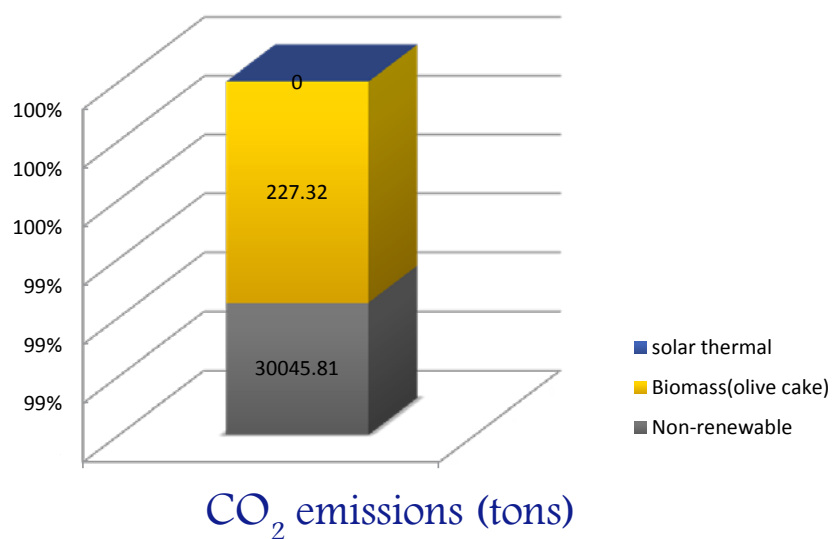
Source: Handyman website.

Olive cake

In addition to solar technology, there are other forms of renewable energy in use in the Palestinian Territory. Biomass, which is the use of agricultural waste for heating and cooking, is common in Abasan Alkabira municipality. Particularly, the olive cake, which is the olive solid remainder after the olive pressing. It is examined in this SEAP and listed under other biomass column.



Renewable energy



Final renewable energy consumption


4.5 CO₂ emission

4.5.1 Used emission factor

Based on data provided by the PCBS and shown in Annex II and III, the following emission factors in terms of ton/MWH are generated.

CO2 emission factors (t/MWH)		
1	Gasoline	0.24947
2	Kerosene	0.258857
3	Diesel	0.266739
4	Liquid gas	0.22716
5	Coal	0.746
6	Olive cake	0.36
7	Electricity	0.62

4.5.2 Results

Sectors	Electricity	Fossil Fuels					Renewable Energy		Total
		Liquid gas	Diesel	Gasoline	Coal	Kerosene	Olive cake	Solar thermal	
Buildings, equipment, facilities and industries									
	23.72	0	82.27	33.9	0	0	0	0	139.89
	2020.24	160.69	49.72	12.74	32.53	9.36	0	0	2285.28
	8051.77	2413.26	112.46	0	7269.4	246.15	227.32	0	18320.36
	445.16	0	0	0	0	0	0	0	445.16
	1347.17	105.66	654.53	53.67	3.75	10.62	0	0	2175.4
Subtotal	11888.06	2679.61	898.98	100.31	7305.68	266.13	227.32	0	23366.09
Transport									
	0	0	12.01	1.65	0	0	0	0	13.66
	0	0	4252.83	2640.55	0	0	0	0	6893.38
Subtotal	0	0	4264.84	2642.2	0		0	0	6907.04
Total	11888.06	2679.61	5163.82	2742.51	7305.7	266.13	227.32	0	30273.13

Note: reporting unit is CO₂ in tons

5. SEAP

This section illustrates the SEAP vision, target and both the ongoing and planned actions. These planned actions are proposed to reach the CO₂ emission reduction target by 2020. Also, it takes into account any local priorities and national initiatives. Ongoing actions are already underway while others will need further development and funding to proceed. Where applicable, an attempt to quantify the carbon been conducted. However, there are some actions are difficult to predict. Planned actions are categorized by intervened sectors. In order to guarantee the final result, each expected action's result is indicated in terms of energy savings (MWh) and CO₂ emissions reduction (tons). Finally, the expected results as well as their percentages, in comparison with baseline data for each target area are summarized.



5.1 SEAP Vision

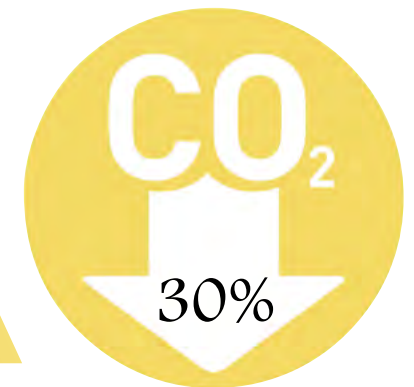
In line with the Covenant of Mayors objectives, the board of Abasan Al-Kabira municipality is setting the vision statement to be :

“The municipality of Abasan Al-Kabira, aim by its both current and planned actions towards a sustainable energy future where its energy consumption shall be reduced and the corresponding CO₂ emissions minimized.”



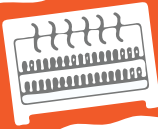



5.2 SEAP Target



In line with CoM guideline, the municipal board is setting this SEAP target as to reduce %30 CO₂ emission related to the BEI year by 2020. In order to meet this target, all the proposed actions are based on reducing energy consumption. It is appropriate here to explain what 1KWH energy consumption mean. Thus, a simple indication by the graph is shown below;



What Does 1 Kwh mean For Your Home ?

	13 MEALS MICROWAVED
	56 HOURS OF LIGHT FROM A CFL - 60 WATT EQUIVALENT
	40 MINUTES OF USE FROM AN ELECTRIC SPACE HEATER
	17 HOURS OF LIGHT FROM A 60 - WATT INCANDESCENT
	5 HOURS OF REFREGERATOR USE
	278 CHARGES FOR YOUR CELL PHONE

5.3 Current situation

The baseline year was chosen to be 2010 and related data are shown in Section 4. These emissions data are taken from the World Bank and PCBS statistics. Data for later years (~2011-2014) should be available at the end of 2015. In other word, there is no available data about the current situation, but it is expected to have %7 extra in the level of energy consumption per capita by 2020.

5.4 Meeting Target

Based on BEI, the Next table has summarized the results regarding the final energy consumptions, CO₂ emissions and renewable energy produced in the baseline year (2010).

In order to meet the SEAP target, several actions have been proposed. It is categorized based on intervened sectors. In addition, a number of already ongoing actions have been included. These actions (ongoing and planned ones) are proposed to guarantee the final and total target. When possible, the expected carbon reduction for each action has been reported, as well as the budget required for each sector.

BEI (2010)

Final Energy Consumption (MWH)	CO2 emission (tons)	Renewable Energy
72109.52	30273.13	4805.44
Expected population (2020)	36216	
Behavior change coefficient	7%	

Scenario in 2020 without actions

Final Energy Consumption (MWH)	CO2 emission (Tons)	Renewable Energy (MWH)
110837.52	46531.98	7386.31

Objectives

Energy Consumption (MWH) (↓)	CO2 emission (Tons) (↓)	Renewable Energy (MWH) (↑)
22167.51	9306.4	1477.3

5.5 Ongoing actions

By signing the Covenant of Mayors, the municipality of Abasan Al-Kabira has started to work toward reducing carbon emissions. Therefore, some preliminary actions have already been undertaken including:

Action
0.1

Conduct an electrical energy audit and perform actions identified.

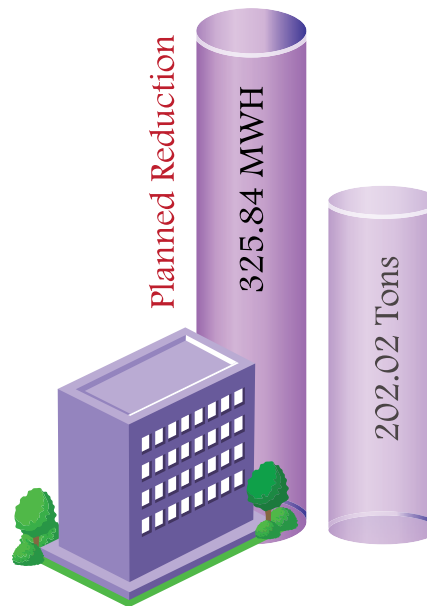
The municipality believed that a general energy audit campaign should be put into action in order to understand problems and priorities. European funded pilot project (Energy Efficiency through ICT-driven Behavioral Change in Public Buildings of Abasan Al-Kabira (ENERBE)) has been undertaken to make energy auditing and to promote more efficient use of energy in public buildings in Abasan Al-Kabira through ICT monitoring and control systems. To this effort, a prequalified number of approximately 30 public buildings (including municipal / governmental buildings and schools) with mid to high energy consumption from the Municipality of Abasan



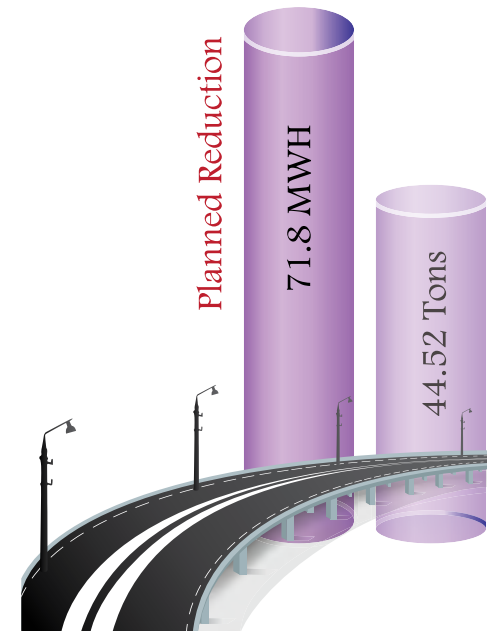
Al-Kabira will be equipped with energy smart meters for the purpose of measuring periodically the energy consumption of every single building. Although these buildings are not under municipal jurisdiction (some are belong to tertiary sector), an agreement with the owner of the potential sites to install the smart meters can be made. An integrated cloud-based platform will measure and analyze the energy consumed at any given period of the day (morning, noon, night, peak hours, etc.) from different sources, namely various appliances, air conditioning (A/Cs, HVACs), boiler (hot water), lights. Then all data and measurements will be integrated and analyzed, using specially designed Information Technology tools, algorithms and statistical methods, thus producing the energy consumption profile of every single building. Having those baseline ratings at hand, administrators of the pilot buildings and the Municipality of Abasan Al-Kabira will know near real time their energy consumption. On the basis of those ratings, as well as the results of the energy audits to be performed in the selected buildings at project start, the Municipality of Abasan Al-Kabira will engage every single public building in energy saving actions, such as alerts, incentives and other forms of information, with the aim to reduce the energy consumption at building level, at any given/desired moment. The specific objective of ENERBE is to reduce by at least %10 the energy spent in public buildings of the Municipality of Abasan Al-Kabira.



Municipal buildings,
equipment/facilities



Tertiary buildings,
equipment/facilities



Public lighting

Action
0.2

Install a photovoltaic system on the main municipal office building with a total capacity of 5 kW.

As mentioned in Section 4.4.1, there has been a serious deterioration in the supply of electricity in the Gaza Strip since January 2010. Currently, the Gaza Strip is suffering a shortfall in the provision of electricity needs ranging from %30 to %40 of the electricity total needs. As a result, 1.8 million Palestinians residing in the Gaza Strip, including Abasan Al-Kabira, must cope with scheduled electricity cuts of 12-8 hours daily. However, the main municipal office shouldn't experience a power outage to maintain the services asked and offered by residents. In order to contribute in finding a temporary solution to the electricity crisis, small diesel, electricity generators (5-3 kW) are used. However, this imposed extra financial head and increase CO₂ emissions. It was proposed to install solar panels on the roof of main municipal office with a total capacity of 5 kW to offset the need of electricity (or other temporary sources). These solar panels aim to generate up to %100 of the building energy consumption. In addition, this project is lowering electricity expenses of the municipality.

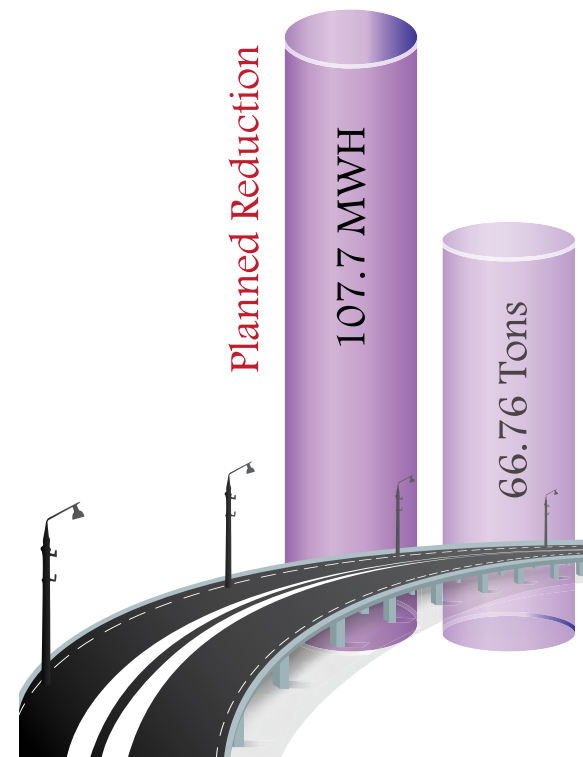


Municipal buildings,
equipment/facilities

Action
0.3

Replace current bulbs used with energy efficient types.

At 2010, Absan Al-Kabira has currently a revolutionary accretion in terms of paved public street. The total estimated length is 80Km for the interior and main streets. Two lighting capacities are used by the municipality, 125W for interior streets, and 250W for main streets. Street lighting operates normally at 7:00 pm to 5:00 am (10 hours / day). It is proposed to renovate public lights and replace the current bulbs used with energy efficient types. Therefore, it is expected that a co2 reduction of 66.76 can be gained. This action has already got grant approval from MDLF. Invest in clean, sustainable energy resources is a strategic target, and hence this sector can be supplied by solar park (see Action 4.1).



Public lighting

5.6 Planed action

The actions listed here are categorized by field of action as advised by CoM guidelines

5.6.1 Sector: Municipal Buildings, Equipment and Facilities



Action 1.1 Establish a policy such that all purchased equipments are consuming the least energy

The procurement department will declare in all tenders that preference is given to the offered equipment which rated as C or above according to EU energy efficiency rate. Also, preference is given to suppliers with recognized environmental policies.

Action
1.2

Install a 3Kwp photovoltaic system on every Municipal building and Facilities.

There are two remaining buildings managed and used by the municipality to serve residents. These buildings should not have power cut to maintain a high quality of public services. Similar to Action 0.2, it is proposed to install photovoltaic systems on these buildings. Promoting renewable energy systems is an extra advantage of this action, as this enables the resident to have firsthand experience with such systems and hence encourage them to use renewable energy technologies.



Municipal buildings,
equipment/facilities

Action 1.3

Replace current desalination stations with solar ones

Water is a key component for sustainable life. Nationally, municipalities are facing a challenge to balance between supplies and demand equation. Currently, groundwater is the main resource for water supply for all people. Due to lack of fresh water resources, the gap towards finding out solutions of the water problem has been increased. Water desalination is one of technical process to relieve the shortage of water. Since the 2020 projected water demand is nearly 182 MCM/year (PWA, CAMP 2001), desalination has become a key element of the Palestinian Water Authority strategic plan. Water desalination also could play a big role to mitigate the adverse environmental impacts associated with lack of fresh water for at least drinking purposes. A small desalination plant is proposed to be constructed to help people drink acceptable water quality. This plant should replace current electrical desalination stations and save about 310 MWH of energy consumption. Thus, the CO₂ emission related to municipal facilities is reduced to around 83 tons.



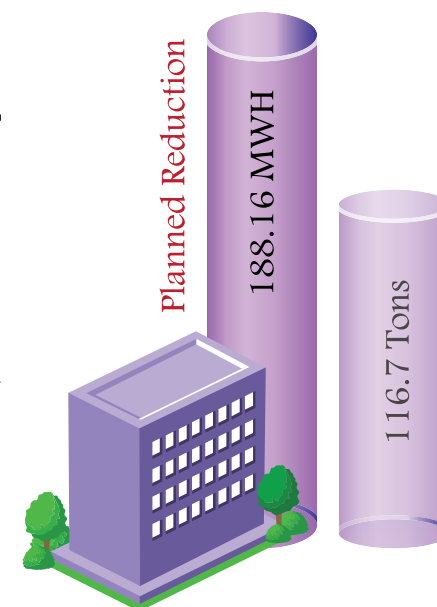
Municipal buildings,
equipment/facilities

5.6.2 Sector: Tertiary Buildings, Equipment and Facilities

Action 2.1

Install a 5KWp photovoltaic system on fourteen public buildings.

Further renewable energy systems may be installed on a number of potential sites, such as the schools, hospitals, fire stations and worship houses that are managed by the government. Although these buildings are not under municipal jurisdiction, an agreement with the corresponding authorities of the potential sites to install the renewable energy systems can be made. A total capacity of 70 kW in the form of solar panels shall be installed on the roofs of all fourteen public buildings. The electric power generated by these solar panels can be used directly in the buildings and therefore grant a reliable electricity supply. Unused electric power shall be fed into the electricity grid, which gives the owners a credit at the local electricity supplier equal to the amount of kWh fed into the grid. This credit will be accounted when buying back electricity when needed. These installations are to ensure the continuity of offering public services of the target building. In addition, this of course reduces the final energy consumptions and CO₂ emission,



Tertiary buildings,
equipment/facilities

Action 2.2 Build a green school

The green building concept was suggested in order to contribute in addressing climate change. Changing building practices alone can offset up to 6 billion tons of carbon emissions annually. The green school is a stand-alone building that relies only on renewable resources like rainwater and solar energy, instead of being supplied by the water and energy distribution networks. Also, this school is entirely dedicated to promoting environmental concepts for pupils. It may contribute to increase the awareness of renewable energy. Moreover, the project tries to qualify students and providing them with suitable tools to call for a better environment. This may help to push the population about the need of reducing the energy consumption. Given the current rapid deterioration, environmental situation, this project is particularly appropriate for Abasan Al-Kabira



5.6.3 Sector: Residential Buildings

Action 3.1 Conduct an electrical energy audit and perform actions identified.

As conducted in Action 0.1, it is expected to capitalize that pilot study to the residential sector and hence save %10 if this sector electrical energy consumption.



Action 3.2

Establish a policy for new residential buildings to use solar water heating



It is planned to issue a new policy for granting residential building construction permits. This policy should encourage residents to use mainly the solar panels for water heating. Toward this goal, the municipality will declare for financial incentives, this may include discounts on the permit fees for the new building. As mentioned in 2.4.4, around %60 of existing households use solar heating system. We ambitious to reach more than %90 of the households.

It is planned to issue a new policy for granting residential building construction permits. This policy should encourage residents to use mainly the solar panels for water heating. Toward this goal, the municipality will declare for financial incentives, this may include discounts on the permit fees for the new building. As mentioned in 2.4.4, around %60 of existing households use solar heating system. We ambitious to reach more than %90 of the households.



Residential Building

Action 3.3


Hold agreements with a number of suppliers of renewable and efficient energy systems

The municipality will try to enter into an agreement with a number of suppliers to offer renewable energy systems with reduced prices. This may encourage at least 40 % of residents to use the offered systems. These systems may include, but are not limited to photovoltaic systems and wind turbines. In addition, this may encourage to use energy efficient lights (LED technology). These are expected to offset electricity consumption by 2597.35 MWh annually with a corresponding CO₂ emission reduction of 1610.34 tons.



Residential Building

Action 3.4 Offset electricity used for lighting in residential buildings with 600kW solar park



As mentioned earlier, there has been a serious deterioration in the supply of electricity in the Gaza Strip since January 2010. It is well-known that a high percentage of electricity consumption used for lighting (around %21). Thus, It is highly recommended to deploy a solar park to offset this deterioration. This can be used only for lighting in the residential building through the use of smart meters that are expected to be installed through Action 3.1.



Residential Building

5.6.4 Sector: public light

Action 4.1

Supplying public street lighting with the electricity needed through a 300 kW solar park.

The overall objective of this action is to supply Abasan Al-Kabira public light with electricity based on solar energy instead of the electricity produced based on fossil fuel. Thus, a solar park with a capacity of 300 kW shall be constructed in order to indirectly supply the street lighting of Abasan Al-Kabira with electrical power. The electricity shall be fed into the grid as well and should cover the current power consumption of the street lighting. Through this, the illumination of public roads shall become more economically sustainable and would lower the expenses for electricity of the municipality to a high extent. Additionally, the wide-spread use of solar panels should raise public awareness for power generation based on renewable energy resources. Unused electric power shall be fed into



the electricity grid, which gives the owners a credit at the local electricity supplier equal to the amount of kWh fed into the grid. This credit will be accounted when buying back electricity when needed.



Action
4.2

Install adaptive street lighting control switches in all public lights.

It is predicted that around %20 of public light energy used can be reduced if adaptive street lighting control systems are installed. This would result to CO₂ emissions reduction of 89 tons annually



Public lighting



5.6.5 Sector: Municipal fleet

Our SEAP includes the reducing CO₂ emissions from the municipal's fleet, while either public and private transport is not involved. This is because they are out of municipal jurisdiction.

Action 5.1

Replace a number of municipal current vehicles to electric /solar ones



In next upcoming few years, the municipality aims to replace the three diesel vehicles with electric/solar ones. In addition, the remaining Gasoline vehicles will be renovated in order to

reduce CO₂ emissions. Moreover, procurement of fuel efficient vehicles is guaranteed due to Action 1.1. This is expected to offset the municipal fleet final energy consumption of Gasoline by %25 annually.



Action 5.2 Smart Drive Training

Encourage the assigned municipality driver to attend comprehensive smart driving training. This to help them to drive in a smart way to help in reducing the fuel consumptions cost and hence the CO₂ emissions too.

5.6.6 Sector: private and commercial transport

Action 6.1 Encourage people to replace their cars with modern and more efficient ones

Actual private and commercial fleet is often inefficient, this action aims to encourage and support the owner to replace their high-consumed cars with more efficient ones. This has potential to save around %25 of this sector emissions.



Private and commercial
transport

5.7 Results

Here, this SEAP's action is summarized, this is in terms of energy saving and CO₂ emission reduction belonged to intervened sectors. Based on BEI data, it was shown that these actions have a potential to save emissions around %30.



103.01

Municipal buildings
equipment-
facilities



318.72

Tertiary buildings,
equipment/facilities



5474.62

Residential
buildings



879.21

Public lighting



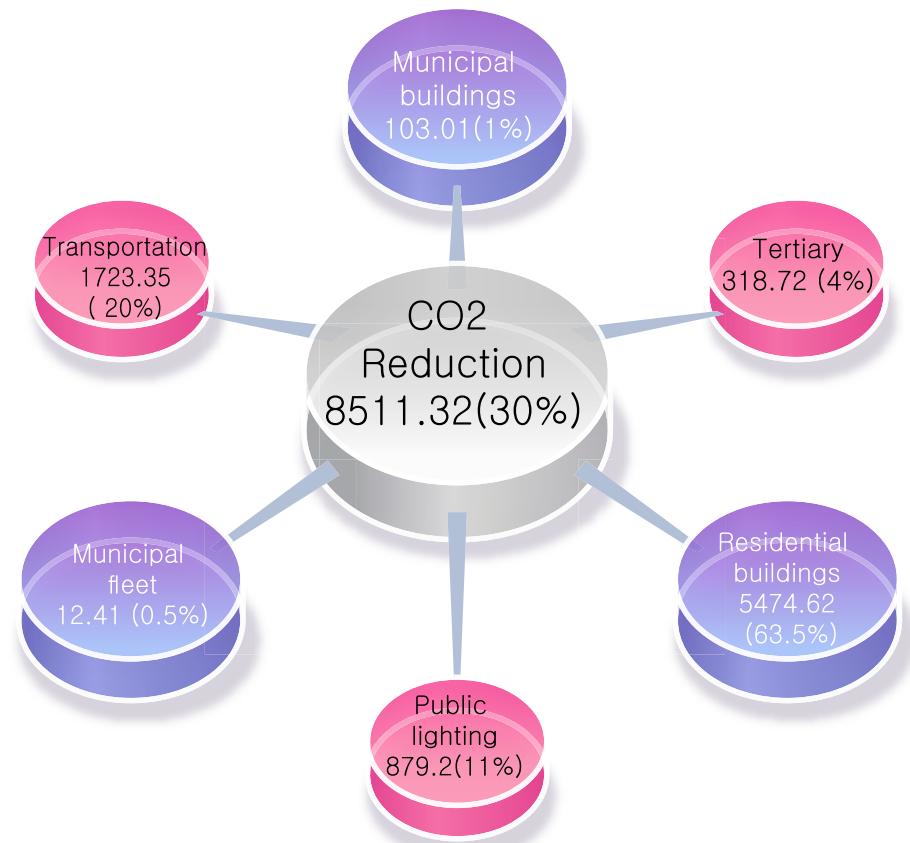
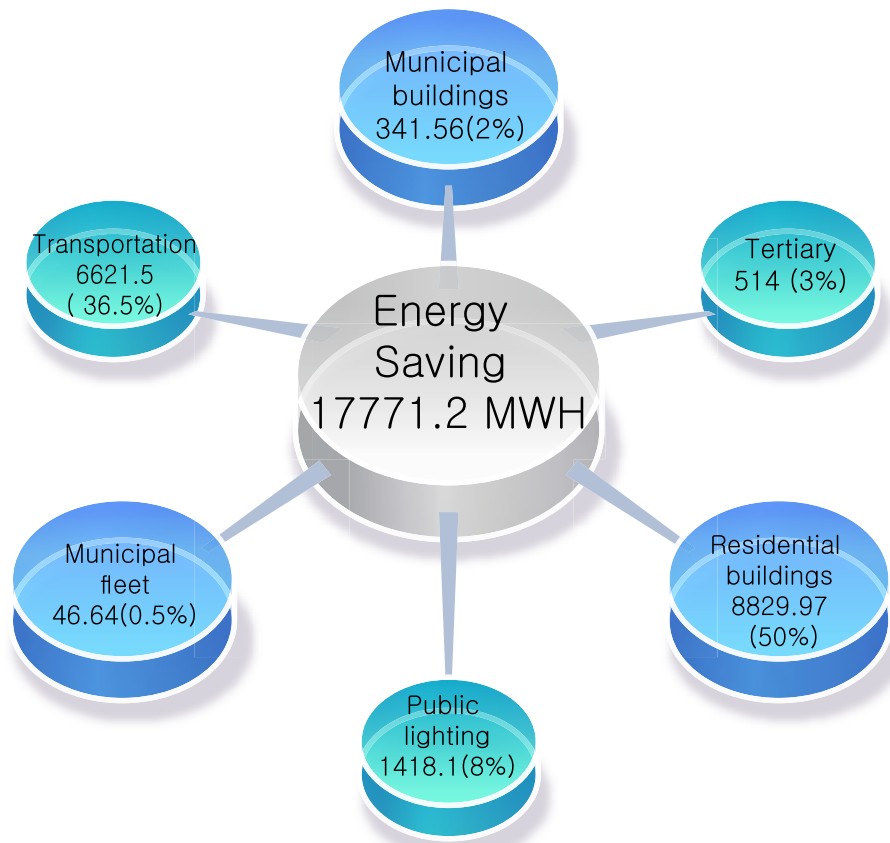
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Municipal fleet



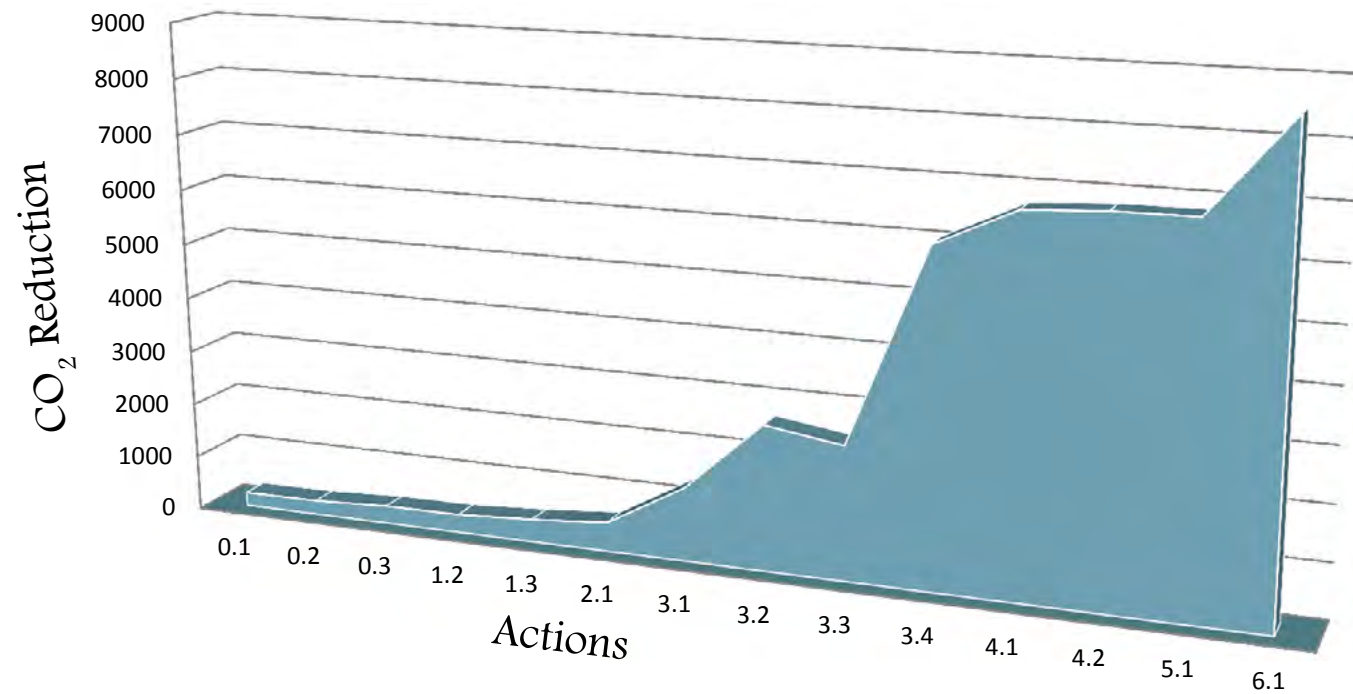
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Public & private
transport









Energy saving and CO₂ reduction

CO₂ Reduction (accumulative over actions)



	0.1	0.2	0.3	1.2	1.3	2.1	3.1	3.2	3.3	3.4	4.1	4.2	5.1	6.1
■ Co2 reduction	248.9	257.2	323.9	333.9	416.2	533.2	1338.2	2632.2	2424.2	6007.2	6686.2	6775.2	6787.6	8510.6

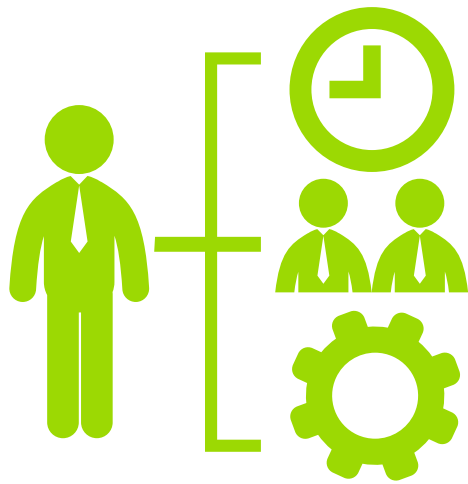
Sector	Actions														Total
	0.1	0.2	0.3	1.2	1.3	2.1	3.1	3.2	3.3	3.4	4.1	4.2	5.1	6.1	
	2.4	8.3		10	82.3										103
	3.86	13.44		16.1	308.1										341.7
	202					117									319
	325.8					188.2									514
							805	1294	1610	1765					5475
							1299	2087	2597	2847					8830
	44.5		66.7								679	89			879
	71.8		108								1095	144			1419
													12.4		12.4
													46.64		46.6
														1723	1723
														6622	6622
Total	248.9	8.3	66.7	10	82.3	117	805	1294	1610	1765	679	89	12.4	1723	8511
	401.5	13.44	108	16.1	308.1	188.2	1299	2087	2597	2847	1095	144	46.64	6622	17773

Note: These numbers are rounded to fit the space.

5.8 Human and financial resources

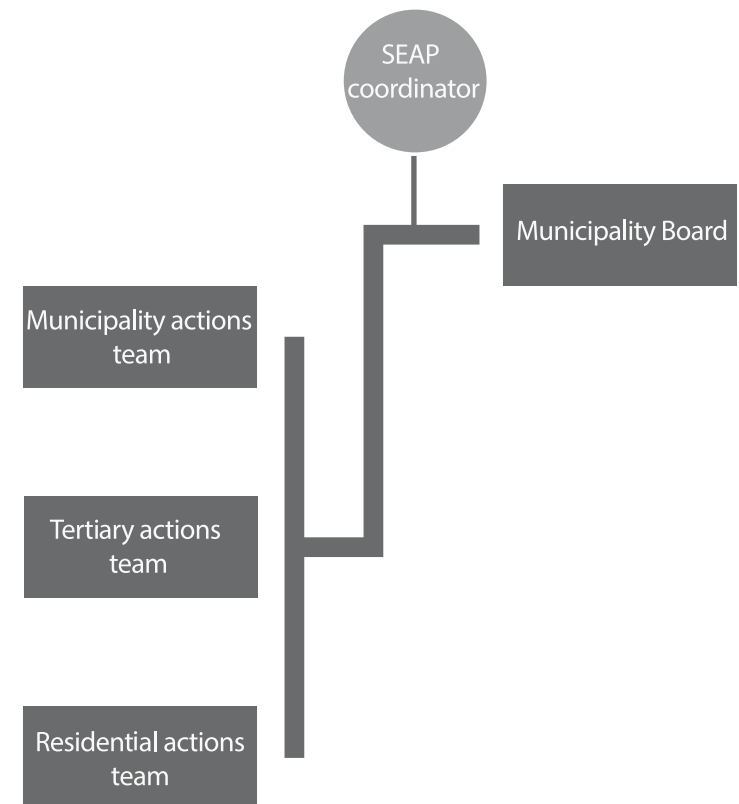
Appropriate levels of human and financial resources should be arranged in order to a successful SEAP. In the first year-quarter of the SEAP, the main task is to get and organized more details on funding, partners, tasks and outcomes for the planned actions.

5.8.1 Human resources



There will be a need for a SEAP team to supervise and co-ordinate the range of actions. The municipal board assigns the municipality executive manager as a coordinator for this SEAP action. He is responsible to guarantee the target achievement and he can allocate the staff needed in order for this task. There are experts across the city and nationally that can be utilized in

delivering this SEAP. Moreover, there may also be a number of organizations that can assist and cooperate. He is responsible to coordinate the work of SEAP groups with the municipality through the board. A regular reporting to the board is needed to indicate the SEAP progress. The initial administration structure is shown below and it can be modified upon necessary via the board approval.



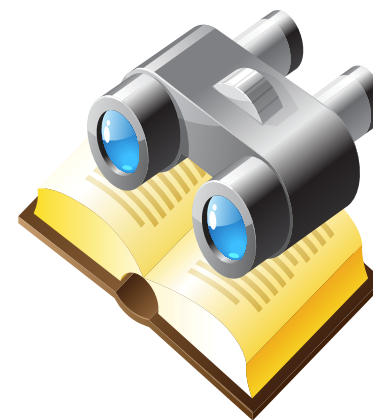
■ 5.8.2 Source of funding









As shown in sections of actions, there are ongoing actions and planned actions. The ongoing actions 0.3-0.1 are already funded while the planned actions are still under developing to find sources of funds. As may be known, there is no national plan for greenhouse gas emission reductions. Thus, grants and external funding are expected. This is the scenarios usually experienced in our local project, like what happened through actions 0.3-0.1 which have a total budget around €1,200,000 from EU. Refer to the filled SEAP template for more details.

■ 5.9 Monitoring

An annual report will be provided to the municipal board every year outlining progress on actions. It is recommended to change and adapt actions and emissions inventory on an annual in order to get the board approval. Also, an implementation report is planed to be submitted to the CoM office at least every second year starting from the submission date for evaluation, monitoring and verification purposes. An initial list of action performance indicators is shown below.



Sector	Action	Performance indicator
	Action 0.1: Conduct an electrical energy audit and perform actions identified.	<ul style="list-style-type: none"> • Number of auditing building. • Number of actions identified
	Action 0.2: Install a photovoltaic system on the main municipal office building with a total capacity of 5 kW	<ul style="list-style-type: none"> • Number of monthly MWh reduced • System Startup
	Action 1.1: Establish a policy such that all purchased equipments are consuming the least energy	<ul style="list-style-type: none"> • Number of parchment satisfying the policy. • Approved Policy printed copy
	Action 1.2: Install a 3Kwp photovoltaic system on every Municipal building and Facilities	<ul style="list-style-type: none"> • Number of installed systems. • Number of monthly MWh reduced. • System Startup
	Action 1.3: Replace current desalination stations with solar ones	<ul style="list-style-type: none"> • Number of replacing units
	Action 2.1: Install a 5KWp photovoltaic system on fourteen public buildings	<ul style="list-style-type: none"> • Number of installed systems. • Number of monthly MWh reduced. • System Startup
	Action 2.2: Build a green school	<ul style="list-style-type: none"> • Percentage of building construction.
	Action 3.1: Conduct an electrical energy audit and perform actions identified.	<ul style="list-style-type: none"> • Number of auditing building. • Number of actions identified
	Action 3.2: Establish a policy for new residential buildings to use solar water heating	<ul style="list-style-type: none"> • Number of involved/responding citizen
	Action 3.3: Hold agreements with a number of suppliers of renewable and efficient energy systems	<ul style="list-style-type: none"> • Number of involved/responding citizen • Number of suppliers.
	Action 3.4: - Offset electricity used for lighting in residential buildings with 600kW solar park.	<ul style="list-style-type: none"> • Percentage of construction progress. • Number of KW generated/used
	Action 0.3: Replace current bulbs used with energy efficient type	<ul style="list-style-type: none"> • Number of bulbs replaced
	Action 4.1: - Supplying public street lighting with the electricity needed through a 300 kW solar park.	<ul style="list-style-type: none"> • Percentage of construction progress. • Number of KW generated/used
	Action 4.2: Install adaptive street lighting control switches in all public lights.	<ul style="list-style-type: none"> • Number of installed switches.
	Action 5.1: Replace a number of municipal current vehicles to electric /solar ones	<ul style="list-style-type: none"> • Number of vehicles replaced.
	Action 5.2: Smarter Driver training	<ul style="list-style-type: none"> • Number of trained drivers.
	Action 6.1: Encourage people to replace their cars with modern and more efficient ones	<ul style="list-style-type: none"> • Number of cars replaced.

6. Conclusion

As covenant signatory, the Abasan Al-Kabira municipality has committed to allocate resources needed to try to address climate change. The CoM committed itself to reducing its overall greenhouse gas emissions to at least 20 % below 1990 levels by 2020. The municipal board is setting our target to be %30. Thus, ambitious and achievable targets are placed locally to meet this CoM target. This target is finding his way to be included in the municipality strategic development plan too. The target is translated to actions in order to guarantee outstanding achievement and summarized in this document (SEAP). The base line inventory is firstly illustrated for the year of 2010 and then a list of actions are provided to meet the overall target.

Even though some intervened sectors are not under its jurisdiction, this will not restrict the municipality as appropriate agreements can be arranged. We encourage who live and work with the municipality to play their part in reducing carbon emissions. Also, it is highly recommended to engage partners (organizations, community groups, businesses, etc.) to meet this SEAP target. Without their engagement and active participation it will be difficult to meet the targets. Thus, the SEAP will be regularly adapted in order to get involved with as many stakeholders as possible. The Municipality aims to organize a number of public, raising awareness campaigns about the benefits of using new energy-efficient technology.

The municipality of Abasan Al-Kabira target to reduce 8511 tons emission of CO₂ by 2020. This reduction is larger than what's required by the CoM target (%20) by an amount of 2837- tons. This overall emission reduction corresponds to the planned energy saving and extra renewable energy production. It is expected to save 17773 MWh and produce 6293 MWh of renewable energy. In conclusion, the municipality, by its participation and adherence to the Covenant of Mayors, aims to demonstrate that actions at a local level, however small, can have significant measurable effects in the fight against climate change.

7. Contacts and Further Information

Becoming Involved

We encourage who live and work with the municipality to play their part in reducing carbon emissions. Also, it is highly recommended to engage partners (organizations, community groups, businesses, etc.) to meet this SEAP target. Without their engagement and active participation it will be difficult to meet the targets. Thus, the SEAP will be regularly adapted in order to get involved with as many stakeholders as possible.

CONTACTS:

Dr. Ahmed Abu Ismaiel,
Municipality executive manager
and the SEAP coordinator
00970599745028
Abu_ismaiel@abasan.ps

Annex I: Final energy consumption of Palestine (Westbank/Gaza) 2010, in physical units [Energy balance by PCBS, 2010]

By	Solar Energy (MWh)	Electricity (MWh)	Gasoline (1000 liters)	Kerosene (1000 liters)	Diesel (1000 liters)	LPG (tons)	Olive cake (tons)	Wood and coal (tons)
Household	670263	2085419	-	15697	6585	134923	21793	360640
Teritary	-	834428	905	597	2911	8984	-	728
Industry	-	348919	3814	677	38327	5907	-	186
Transport	-	-	187656	-	249031	-	-	-
Total	670263	3268766	192375	16971	296854	149814	21793	361554

Annex II: Calorific value and equivalent weight of different fuels

Fuel	Equivalent weight (Ton/m ³)	Calorific value (GJ/Ton)
Charcoal and wood fuel	1	15.62
LPG	0.54	45.54
Gasoline	0.74	43.97
Kerosene	0.81	43.21
Diesel	0.87	42.50
Olive cake	1	16.75

Annex IV: Emissions factors, by fuel type (PCBS: emissions to air, 2011)

Fuel	CO2 emission factor (CO2 (tons) /fuel (tons))
Charcoal and wood fuel	3.23568
LPG	2.874205
Gasoline	3.047
Kerosene	3.107
Diesel	3.149
Olive cake	1.675



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