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● Israel Municipality of Shfar'Am Sustainable Energy Action Plan (SEAP)





Municipality of Shfar'am

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Sustainable energy action plan (SEAP)

Municipality of Shfar'am
- Israel –

**Integral document of the sustainable
energy action plan**



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Executive Summary

Israel has been characterized many times in the past as an energy island, due to the unique challenges the country is facing. The Ministry of National Infrastructures, Energy and Water Resources (MIEW) in Israel, deeply acknowledging this situation is collaborating with the “Cleaner Energy Saving Mediterranean Cities, CES – MED” project to support selected municipalities in Israel in their effort towards energy sustainability.

The Municipality of Shfar'am is one of the 12 Arab cities in Israel (population of over 25,000 citizens). This unique characteristic along with the Mayor's commitment on energy sustainability rendered Shfar'am municipality as suitable applicant to be supported under CES – MED and have its SEAP development financed. This commitment constitutes a significant challenge for the municipality, which lacked the prior experience that some municipalities in Israel have with the Tag HaSviva Programme, the Israeli covenant for the reduction of energy consumption in the municipal buildings and facilities.

The Mayor of Shfar'am, Mr. Amin Anebtawi sees the opportunity of the Covenant of Mayors (CoM) as his mission to be a leader – to the general public, but especially to the Arab citizens of Israel. Shfar'am is already the first Arabic city to commit to the CoM and among the few Arabic ones participating in the Tag HaSviva Programme.

The local authorities intend to render Shfar'am as a tourist center, due to its many archaeological sites, for both Israeli and foreign tourists. Part of the vision for a cleaner environment and a better overall status of the Municipality of Shfar'am are the creation of better parking infrastructure, development of the public transport, reduction of environmental burden and better waste management.

During the SEAP implementation, the Municipality of Shfar'am is going to work closely with the rest of the Israeli Municipalities that are members of the CoM, as well as the Tag HaSviva Programme and the respective Ministries. The municipality has already implemented an extended adaptation of its administrative structures to support the SEAP implementation and to monitor the status of the program.

The involvement of all citizens and stakeholders of the municipality is considered crucial for achieving the set targets. Women volunteer groups are expected to play an important role, while they have agreed in the need to make Shfar'am greener and more responsible for the environment. In addition, students of all grades of education are important for the implementation of the proposed actions. Finally, the role of all new families that are about to be settled in a newly built area is significant, because the new neighborhood has to be built with sustainability and resource management in its forefront.

The total target of the SEAP implementation is to reduce the Carbon footprint of the Municipality with a total reduction of 27,705.27 tn CO₂ by 2020, which is 20% of the municipality's total emissions.

For the implementation of the SEAP the total budget is approximately 123.55 million NIS, including the mobilization of the necessary funds from private actors. The budget excluding the funds from private actors is 49.35 million NIS and the Municipality of Shfar'am will contribute to this with around 10%. The rest of the financial needs of the SEAP will be fulfilled from EU Funding Schemes, the Israeli Government and the Ministries of National Infrastructures, Energy and water resources, with the support of the Ministry of Finance and the Ministry of Environmental Protection as well as private funds that will be mobilized through the SEAP proposed actions.

According to the CoM guidelines, the year 2013 was selected as the baseline, because the data from this year are considered to be complete and reliable.

The Municipality of Shfar'am included in the Baseline Emissions Inventory all the compulsory sectors and three optional ones:

- Municipal Buildings / Equipment / Facilities;
- Tertiary (non Municipal) Buildings / Equipment / Facilities;
- Residential Buildings;
- Public Lighting;
- Transport (Municipal / Public / Private);
- Industry;
- Agriculture;
- Solid Waste Treatment.

For the Baseline Emissions Inventory, the IPCC emission factors have been adopted for all fuel types in accordance to the CoM Guidebook, except from electricity, where the local emission factor from the Israeli Electricity Company (IEC) was used. Moreover, the conversion rates utilized, wherever applicable, were according to the JRC guidelines for Southern Municipalities, the 2006 IPCC Guidelines and the CoM Guidebook for the European Municipalities. Finally, the Solid Waste Management sector's emissions were calculated according to the IPCC default method for the Methane (CH₄) emissions that are produced from the landfilling process.

The energy consumption occurs mainly from two sectors, namely the Residential Buildings and the Private Transport. The total energy consumption in the Municipality of Shfar'am is presented in the following spider chart:

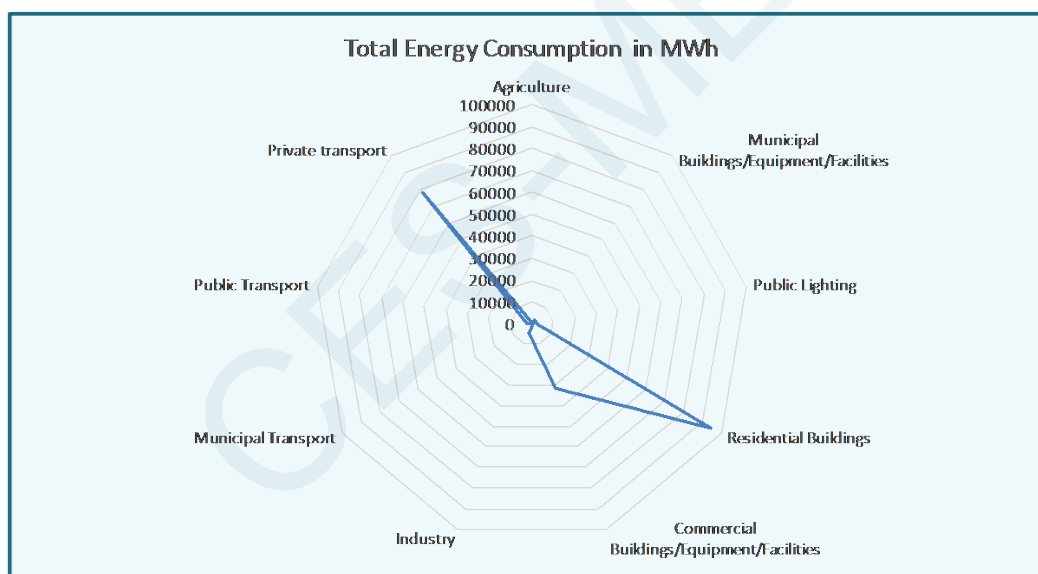


Figure 1 – Total Energy Consumption in MWh, Municipality of Shfar'am

The **Agricultural Sector** has a very small consumption of electricity according to data provided by the IEC.

The **Municipal Buildings and Facilities Sector** includes consumptions from the City Hall, the sports facilities, the community center and clubs, public and health buildings and the educational institutions. There are no municipal facilities for water pumping, which is undertaken by a private company. Around 70% of the sector's consumption occurs from the educational buildings.

As far as the **Municipal Lighting Sector** is concerned, it is attributed solely to the public street lights. There are no traffic lights and no illuminated parking lots. The total electricity consumption was available from the IEC.

The total energy consumption in the **Residential Buildings Sector** comes from three different sources, namely electricity, liquefied petroleum gas (LPG) and solar thermal facilities. The data for this sector were available from the IEC, the local gas company's (Pazgaz) average consumptions, and studies on the solar water heating facilities in Israel. The allocation of the consumptions in the Residential sector is presented in the following figure:

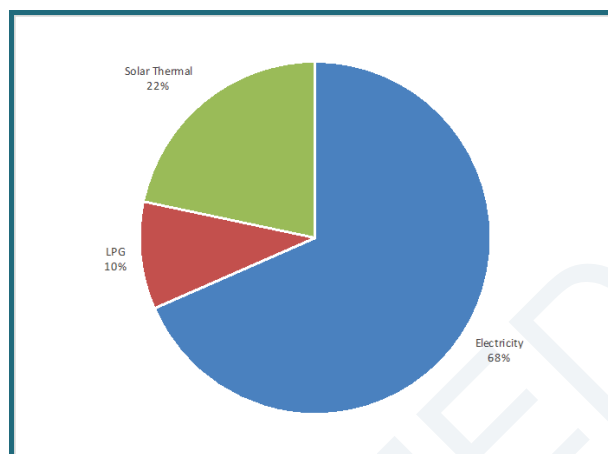


Figure 2 - Energy source allocation in the Residential Buildings Sector

The **Commercial Buildings, Equipment and Facilities Sector** consumes electricity from the Israeli Electricity Company, for both the water pumping facilities and the commercial buildings of the Municipality of Shfar'am. The vast majority of the consumption, almost 97%, is consumed from the buildings of the commercial sector.

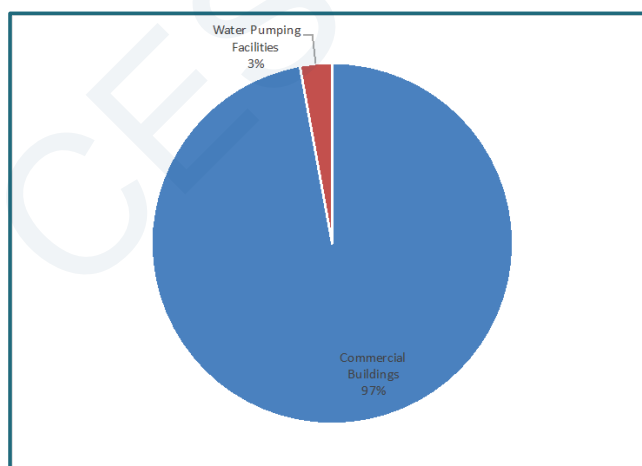


Figure 3 - Commercial sector electricity consumption

The **Industrial Sector** comprises of small companies, not heavy industries, but classified as industrial consumers by the IEC, which provided their total consumption for 2013.

Regarding the **Transport Sector**, emissions in the BEI occur from the Public and Private transport sections.

- There exists no **municipal fleet** in the Municipality of Shfar'am.
- Consumptions from **public transport** were not directly available from the company serving the area and an approach utilized included calculation of the total distance travelled within the local authorities' area from the public buses and the average consumptions for buses that were available from the Israeli Central Bureau of Statistics (CBS).
- The **private and commercial transport** section includes private cars, motorcycles, taxis, gasoline and diesel trucks, private buses and minibuses. The approach utilized was based on the average distance that each vehicle type covers within a year, which was available from the CBS for the baseline year and relevant studies by the Technion University on the amounts of the distances that are travelled within the local authorities' area.

There are no local electricity production facilities or heating / cooling production installations in the Municipality of Shfar'am.

As far as the **Solid Waste Management** emissions are concerned, there are two types of waste management, landfill and recycling. The data was available from the municipality's personnel. The amount of waste being recycled was less than 1% in 2013, while the rest was landfilled.

The **total emissions for Shfar'am Municipality** are presented in the table below.

Table 1 - Baseline Emission Inventory Summary (tn CO₂)

Sector of energy consumption	Electricity	Liquid Gas	Diesel	Gasoline	Solar Thermal	TOTAL
	tn CO ₂					
Agriculture	18.93	-	-	-	-	18.93
Municipal Buildings/Equipment/Facilities	1,371.35	-	-	-	-	1,371.35
Public Lighting	1,316.13	-	-	-	-	1,316.13
Residential Buildings	45,586.57	2,135.79	-	-	0.00	47,722.36
Commercial Buildings/Equipment/Facilities	21,845.09	-	-	-	-	21,845.09
Industry	3,153.72	-	-	-	-	3,153.72
Municipal Transport	-	-	-	-	-	0.00
Public Transport	-	-	644.42	-	-	644.42
Private transport	-	-	4,859.16	14,830.44	-	19,689.60
Solid Waste Management	-	-	-	-	-	18,300.00
TOTAL	73,291.79	2,135.79	5,503.58	14,830.44	0.00	114,061.60

The municipality's representatives, through the BEI identification, acknowledged the most significant sectors affecting the Municipality's carbon footprint. The residential sector contributes the most, with almost 41% of the total emissions, followed largely behind by the tertiary (19.2 %) and the transport sectors (17.8%).

According to the Baseline Emissions Inventory and the JRC Guidelines for the Southern Municipalities, the projection of the emissions for the 2020 in the Municipality of Shfar'am was realized according to the **Business as Usual (BAU)** scenario.

For the Municipality of Shfar'am, the total emissions for the baseline year (2013) were 114,061.6 tn CO₂ and the national coefficient k for 2013 in Israel is 1.21. Therefore, the forecasted emissions for 2020 are

$$Emissions_{CO_2}^{2020} = 114,061.6 \times 1.21 = 138,014.6 \text{ tnCO}_2$$

The actual reduction target undertaken by the municipality fulfils the CoM requirements and is set to 20%, corresponding to an overall reduction of 27,602.9 tn CO₂ by 2020. The emissions reduction targets are different for each sector included in the BEI. Each sector's contribution, in line with the adopted actions, is presented in the pie chart below.

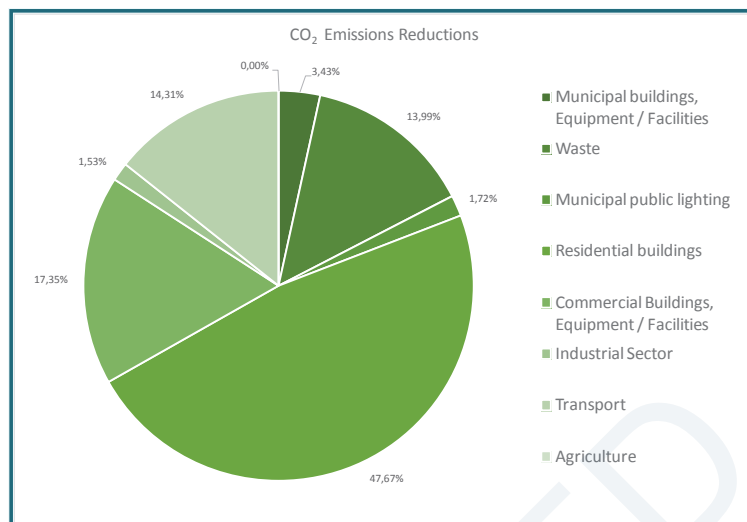


Figure 4 - Sectoral contribution in total CO₂ Emission reduction

The calculation of all emission reductions for the suggested actions in 2020 is calculated with the emission factor for electricity being 0.60 tn/MWh in 2020, due to the foreseen increased penetration of natural gas in the electricity generation mix.

The Municipality of Shfar'am has planned a set of actions for each sector. The actions consist of both awareness raising activities for the different stakeholders and the public, and of actions related to energy efficiency and energy production. The awareness raising activities are expected to have a significant contribution to the reduction of the carbon footprint, while promotion of recycling among the residents is a priority for the municipality.

As far as the energy efficiency is concerned, substitution of old electrical devices is included in the proposed actions for the Municipal and Residential Buildings, while the initiative "10% Voluntary Commitment Campaign" is proposed for all sectors to reduce their energy consumptions at an annual basis. In addition, the installation of Photovoltaics on the rooftops of the Municipal, Residential and Commercial buildings will be promoted, in order to reduce the electricity consumed from the grid and take advantage of the high solar potential the southern municipalities have.

The total list of actions is provided in Table 2 on the following page.

Table 2 - Summary of SEAP Actions

Action No	Action	Energy Savings (MWh)	CO ₂ Reductions (tn)	Cost (NIS)
Municipal buildings, Equipment / Facilities				
1.1	Green procurement procedures for municipal buildings	41.14	24.68	150,000.00
1.2	Upgrading the municipal buildings' lighting system	177.79	106.67	500,000.00
1.3	Certification of municipal buildings and facilities with ISO 50001	118.52	71.11	200,000.00
1.4	Upgrading the municipal buildings' and facilities' A/C systems	284.46	170.68	1,250,000.00
1.5	Energy Manager appointment in the Municipality	11.85	7.11	500,000.00
1.6	Energy refurbishment of selected municipal buildings as pilot projects	181.50	108.90	3,500,000.00
1.7	Awareness raising activities for municipal employees	47.41	28.45	50,000.00
1.8	Green schools' certification	61.98	37.19	100,000.00
1.9	The 10% commitment campaign for schools	41.32	24.79	100,000.00
1.10	Awareness raising campaigns for pupils/ students	16.53	9.92	40,000.00
1.11	Promotion of recycling		3,321.45	1,100,000.00
1.12	Awareness raising campaigns to reduce the amounts of discarded food (reduction of the organic content of waste)		553.58	100,000.00
1.13	Installation of 500kW PVs in municipal buildings' rooftops	600.00	360.00	4,000,000.00
Municipal public lighting				
2.1	Municipal lighting study	0.00	0.00	100,000.00
2.2	Municipal lighting system upgrade	1,232.00	739.16	5,195,000.00
Residential buildings				
3.1	The 10% voluntary commitment campaign	6,697.97	4,018.78	450,000.00
3.2	Promotion of Green Buildings' concept	1,181.99	709.20	6,450,000.00
3.3	Campaign for old fridges' substitution	4,639.14	2,783.48	5,000,000.00
3.4	Women groups on energy efficiency	2,757.99	1,654.79	500,000.00
3.5	Information & awareness raising activities	2,363.99	1,418.39	150,000.00
3.6	Initiatives supporting citizens' actions	788.00	472.80	50,000.00
3.7	Establishment of the municipal team	1,181.99	709.20	1,750,000.00
3.8	2 MW Photovoltaics in residential rooftops	2,400.00	1,440.00	17,100,000.00
Commercial Buildings, Equipment / Facilities				
4.1	Seminars to professional groups	566.41	339.85	2,000,000.00
4.2	10% voluntary commitment campaign	1,510.43	906.26	400,000.00
4.3	Promotion of green buildings' concept	755.22	453.13	2,500,000.00
4.4	Other information and awareness raising activities	377.61	226.56	100,000.00
4.5	4 MW photovoltaics on building rooftops	4,800.00	2,880.00	34,050,000.00
Industrial Sector				
5.1	Subsidized energy audits at a volunteer basis	272.57	163.54	1,700,000.00
5.2	Targeted training seminars	109.03	65.42	80,000.00
5.3	10% voluntary commitment campaign	327.09	196.25	50,000.00
Transport				
6.1	Transportation master plan	0.00	0.00	500,000.00
6.2	Improve public transportation	2,897.96	721.59	2,050,000.00
6.3	Cycling promotion and creation of related infrastructure	2,107.61 (2030) 1,204.83 (2020)	524.79 300.00	12,000,000.00
6.4	Promotion of walking, car sharing and car pooling campaigns	1,844.15	459.19	2,000,000.00
6.5	Improvement / development of parking infrastructure	2,107.61 (2030) 1,205.00 (2020)	524.79 350.00	10,000,000.00
6.6	Adoption of real time information in public transport	526.90	131.20	450,000.00
6.7	Promotion of eco-driving	5,210.40	1,103.16	550,000.00
6.8	Promotion of new technology buses in the public transportation	431.10	115.10	6,500,000.00
6.9	Other information and awareness raising activities	3,763.54	784.28	250,000.00
Agriculture				
7.1	Awareness raising activities	1.35	0.81	30,000.00
TOTAL		50,629.16	27,966.67	123,545,000.00

Chapter 1 - Overall Strategy

1.1 Shfar'am 2020 targets

Israel has been characterized in the past as an energy island, due to the unique challenges the country is facing. The large natural gas reserves recently identified and utilized will certainly decrease the country's dependence on external energy resources, but this still does not suffice. More actions need to be taken towards this direction in order to come closer to the self-sufficiency target.

The Ministry of National Infrastructures, Energy, and Water Resources (MIEW) in Israel, deeply acknowledging this situation is collaborating with the "Cleaner Energy Saving Mediterranean Cities - CES MED" project, financed under the EUROPAID Programme, to support selected municipalities in Israel in their effort towards energy sustainability.

The Municipality of Shfar'am has been selected as one of the 12 Arabic cities in Israel (population over 25,000 citizens). This unique characteristic along with the Mayor's commitment on energy sustainability rendered Shfar'am municipality as suitable applicant to be supported under CES MED and have its SEAP development financed.

As a result, the Mayor of Shfar'am, Mr. Amin Anebtawi, with the council members, agreed to the adherence to the Covenant of Mayors in March 2014, committing to a reduction of the municipality's GHG emissions by at least 20%. It should be noted that Shfar'am was only the second municipality to join the CoM in Israel.

This commitment constitutes a significant challenge for the municipality, which lacked the prior experience that some municipalities in Israel have with the Tag HaSviva programme, an Israeli covenant for the reduction of energy consumption of the municipal buildings and facilities. However, empowered by the work realized within CES MED framework, in mid-2015 the mayor signed the Tag HaSviva covenant, thus joining the Israeli initiative as well.

The overall target being set by the municipality for 2020 is 20%, placing emphasis on working closely with all community actors. The municipality will take all necessary measures on its facilities, establishing a good paradigm for the community, while it will place a lot of emphasis on collaborating with the public and achieving significant reductions from the residential, tertiary and transport sectors, with waste being also a priority for the local administration.

1.2 Current status

1.2.1 Geographical location and sites

Shfar'am is an ancient Arab city located in the North District in Israel at the entrance to Galilee. It is located 13 kilometers from the Mediterranean Sea and 20 kilometers from each of three cities, Haifa, Acre (Akko) and Nazareth, where many of the inhabitants are employed. The city is located on seven hills. The elevation of the city and its strategic location as the connection between the valleys and mountains of Galilee made it more than once the center of its district.

A map of the territory is provided in the figure on the next page.



Figure 5 - Shfar'am Municipality map

A settlement has existed in Shfar'am without interruption since the Roman period. Archaeological findings show that the city was under various occupations, and has been populated for centuries by a wide range of people including Muslims, Christians and Jews.

In 2008, a salvage dig was conducted in the southern quarter of the old city exposing remains from five phases in the Late Byzantine and early Umayyad periods. Shfar'am contains Byzantine remains, including remains of a church and tombs. The unique remains can be seen today, some have been renovated, and some are ancient ruins. The most important historical sites of the city include:

- A fort built in 1760 by Zahir al-Umar, on the remains of a Crusader fort.
- "The Tower" or "al Burj", which is an old Crusader fort located in the southern part of the city.
- The old market of Shfar'am, which has become an interesting tourist attraction.
- The Shfar'am Ancient Synagogue, recorded as being active in 1845. The tomb of Rabbi Judah ben Baba, from the 2nd century is still standing and Jewish believers come to visit it.
- Byzantine period tombs from the 5th and 6th century Christian community.
- St. Peter & St. Paul Church, located in one of the town's peaks near the fort, and built by Otman.
- Mosque of Ali Ibn Abi Talib (Old Mosque) built near the castle in the days of Sulayman Pasha.

Some indicative photos from the municipality are presented on the next page.



Figure 6 - Shfar'am Municipality in pictures

1.2.2 Demographic tendencies

Statistics compiled by the Mandatory (British) government in 1945 showed an urban population of 1,560 Christians, 1,380 Muslims, 10 Jews and 690 "others" (presumably Druzes) and a rural population of 3,560 Muslims.

A more recent depiction of the situation comes from the Central Bureau of Statistics (CBS) in Israel, according to which for 2012 the religious and ethnic makeup of the city comprised mostly of Israeli Arabs. More specifically, the municipality consists of 60.5% Muslim, 25.2% Christian, and 14.3% Druze. In 2012 there were 38,300 registered citizens in the city, the 40.4% being with 19 years of age or younger, 14.9% between 20 and 29, 21.1% between 30 and 44, 17.8% from 45 to 64, and 5.7% 65 years of age or older. Today the overall number of the population is near 40,000 residents, while there have been some new Bedouin families settling in the area recently.

The diverse population in the municipality, drawn from several different communities, gives the city a relatively cosmopolitan and multi-cultural ambiance.

The evolution of the area's population within the years is presented in the following diagram, based on data from the CBS.

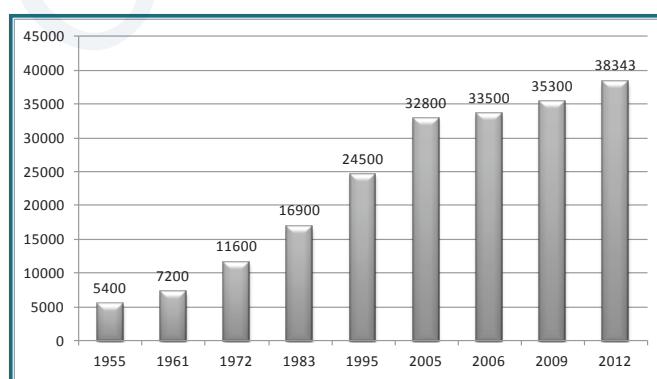


Figure 7 - Demographic tendencies in Shfar'am

1.2.3 Climate Characteristics

In line with the municipality's topography, the minimal height is 43m above sea level, the maximum 215m, with the average of 118m above sea level.

According to the Israeli Meteorological Service, the average temperature during the year varies according to the data presented in the table below.

Table 3 - Shfar'am Municipality Temperatures

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	17.3	18.6	21.7	15.3	29.2	31.9	34	33.8	32.2	29.7	24.8	19.5
Min	7.6	7.7	9.7	12.5	15.9	19.2	21.9	22.0	20.1	17.1	13.0	9.6
Daily Ave	12.5	13.1	15.7	18.9	22.5	25.5	27.9	27.9	26.2	23.4	18.9	14.5

In the figure below, the maximum daily average (Red), minimum daily average (Blue) and Daily average (Green) are presented. In addition, the monthly maximum (Purple diamond) and minimum (light blue diamond) can be seen. Temperatures are given in Celsius (Y axis), and Months (X axis).

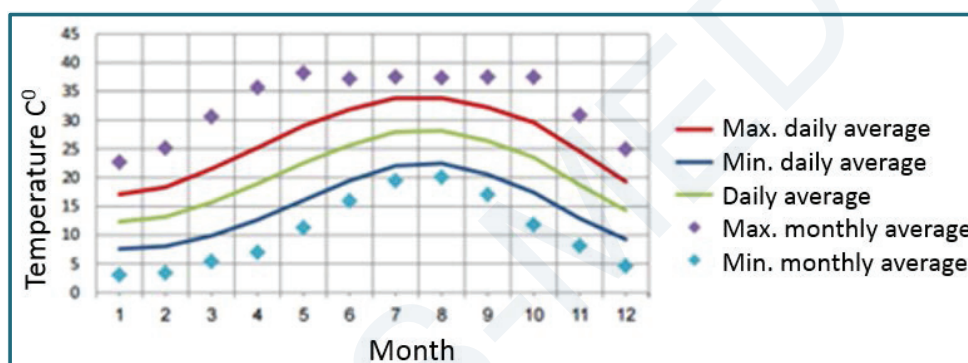


Figure 8 - Shfar'am Municipality Temperatures

1.2.4 Employment

Regarding the employment status of the citizens in Shfar'am, an overview picture is provided in the next paragraphs.

The total number of employees (salary and self-employed) according to CBS data for 2012 was 13,556 persons, namely a little over 35% of the total population. Almost half of these employees earn less than the minimum wage, with the discrepancies between men and women being vast. Around 20% of the population receives some kind of allowances by the state (pensions, unemployment allowance etc.).

The average salary is lower by 30% than the national average and the unemployment is about 20% (the national average is around 8%). The Socio-Economic rating is low: 3 (on a scale from 1-10, 1 being the lowest).

1.2.5 Existing Infrastructure

The total number of registered households is 8,402, while there are 202 buildings being built at the moment and another 222 near completion. Most of the residences are privately owned houses (max.

3 stories). There are no high-rise buildings and apartment homes in the city, as the population usually live in a traditional "hamula" form – extended families living on the same land. Because of land scarcity, plans exist for new neighborhoods that will be built in a more modern fashion – with relatively low apartment housing. The total municipality area is 19.77 km² with a Compact Scale (density) of 6 (on a scale from 1-10, 1 being the most compact).

Basic infrastructure is lacking in some areas of the town, including waste water, garbage etc.

There are public bus lines in the town, but they are few and not reliable enough. Out of a total of 11,900 vehicles, 9,500 are private cars with an average age of 10 years.

1.2.6 Complementarity with Municipal plans and other related actions

As mentioned in the above sections, the local administration of Shfar'am is trying to promote the concept of a Sustainable Energy Community (SEC), through its participation in the CoM, as well as the Tag HaSviva initiative.

Complementarity with other municipal plans and related actions in the region in this direction includes the planning for the municipality's expansion in order to accommodate the increasing population flows.

The city is planning to build a new neighborhood for young families. The options of young couples to build their house near the family one are getting more limited due to the scarce available areas. For this reason, the city is going to be the first Arabic town to build on governmental land designated for this population.

Adopting the SEC concept, the planning of the neighborhood will be modern, with sustainability and recourse management at its forefront. The mayor's and the municipal council's ambition is to make it the first Arab "smart-neighborhood". This includes smart streetlights with the newest LED technology, smart metering and control systems. In addition, the streets will be wide, and will include infrastructure for walking and cycling as well as good public transportation.

The houses will be built both by contractors and by private homeowners. Seminars are planned for the two separate groups on elements of green and energy efficient buildings which can be incorporated already in the planning stage (population density planned is 4-6 homes per Dunam (1,000 sq/m)).

In addition, a new Industrial Zone is planned. The plan is to make it a clean industry, mostly high-tech zone, which will be a place for employment for the local citizens (there is a relatively high level of unemployment). The high-tech and other services emit less pollution, and thus keep GHG levels low. Since it is a new area, planning in all aspects will be very important – waste management, Energy Efficiency, Green building elements, public transportation, smart management and advanced infrastructure.

The suggested actions to reduce the municipality's carbon footprint under Section 3 are in line with these priorities as well.

The Municipality is trying to get funding from different donors, to help develop Shfar'am to be the Beacon of the Arab Cities in Israel, and has been recently awarded a tender and received assistance from the Ministry of National Infrastructures, Energy and Water resources (MIEW) to replace old and inefficient streetlights in the town. The old streetlights in the old center were chosen for replacement, with the use of state of the art technology.

Shfar'am has also joined the Israeli "healthy city network". They shall have some important information days on several subjects, mostly preventive medicine. Those information days will be

conducted by physicians, nurses, physiotherapists – all well-known and respected in their profession, all citizens of Shfar'am.

Collaboration with additional stakeholders includes the Galilee society, namely the Arab national society for health research and services. This is a local NGO with many important and interesting activities, among which a pilot on wastewater treatment without the use of chemicals harming the environment. Other stakeholders the city is collaborating with include actors from the government, additional NGOs, IEC, health NGOs, youth organizations, scouts, and many more.

1.2.7 Complementarity with national actions

The decision for the municipality's adherence to the Covenant of Mayors is in line with the National Energy Efficiency Programme, which promotes the target of reducing electricity consumption between the years 2010 – 2020 by 20%, in order to decrease a state of chronic shortages. The programme started with a 200-250 million Shekel budget, approximately 42-52.5 million Euros, which is not enough to cover all the activities planned in its duration. In order to attain the necessary financial sources for the overall implementation of the efficiency programme, the National Recommendations Report requires establishing an energy efficiency fund. The programme approaches and examines each sector (household, industrial, commercial and public, LAs, new buildings, and agriculture) to determine where energy savings opportunities exist.

Although this national programme does not directly fund projects, it is the guide for all smaller MIEW budgeted programmes, which are directly connected to the national programme and concern energy efficiency actions in municipal buildings and facilities.

Another complementarity with a national action is the Tag HaSviva programme, which aims to improve efficiency in the consumption of energy resources, with an emphasis on electricity consumption, waste and water. It was launched in 2010 as a joint venture of the Union of Local Authorities in Israel (ULA) and the Ministry of Environmental Protection (MEP) with direct collaboration with the Israel Energy Forum and the Heschel Sustainability Centre. The programme aims to promote streamlining processes and save resources while achieving economic gain for the local authority's budget. It is partly based on the European model of Local Governments for Sustainability (ICLEI) and received European funding, as well as Israeli governmental funding. The clear and central goal of the Tag HaSviva is to help Israel come closer to 20% reduction in CO₂ emissions by 2020 by implementing an environmental efficiency programme at LAs not included in Forum 15.

1.3 Vision for the future

Shfar'am is one of the 12 cities defined as Arabic in Israel, with 69 local municipalities having predominant Arab population as well.

Therefore, the Mayor of Shfar'am, Mr. Amin Anebtawi sees it as his mission to be a leader – to the general public, but especially to the Arab citizens of Israel. As such, he has set a target to be the first Arab city in many aspects.

Shfar'am is already the first Arab city to commit to the CoM and among the few Arab cities participating in the Tag HaSviva Programme.

One of the main assets Shfar'am has is extensive history, with many archeological sites, excellent food, and diverse religions. The local leaders intend to contribute to the ongoing development of Shfar'am in a sustainable way.

Among their intentions is to render it as a tourist center for Israeli visitors, as well as tourists from out of the state. This will landmark Shfar'am as one of the most beautiful places in Israel, creating more

jobs for tour guides and for local businesses, mostly culinary, local art, jewelry, olive oil and other small businesses. In order to support this goal, the development of large parking lots outside the old center is planned, with shuttle busses bringing the visitors to the center, thus ensuring development and reduction of environmental burden (air pollution and congestion).

Part of the vision for a cleaner environment is better waste management. The local leaders have lately started to implement the waste management program, with waste separation of plastic, paper and cardboard. Other actions as part of the waste management include the designation of an area for the treatment of plant cuttings that can be treated within city borders for uses such as earth covering and heating.

Educating the young and working closely with the citizens, and especially women, who hold a significant position in the Arab family, is also a priority for the municipality and basic step in order to achieve its sustainability vision.

As stated by the Mayor "Our aim is to develop Shfar'am to a modern beacon of the Arab Society in Israel in tourism, sustainability, education, employment, housing and wellbeing. We aim to reduce our total city GHG by 20% by the year 2020 and set the next milestone for even higher targets".

1.4 Organizational and financial aspects

1.4.1 Coordination with national and local authorities

During the SEAP implementation, the municipality of Shfar'am is going to work closely with the rest of the Israeli municipalities that are members to the CoM, as well as the Tag HaSviva Programme and the respective ministries.

1.4.2 Adaptation of administrative structures

The Municipality of Shfar'am realized an extended adaptation of its administrative structures in order to be able to fulfil the needs of the SEAP and implement all the proposed actions and measures.

The Organogram of the Municipality of Shfar'am is shown in the next figure. The green nodes are the ones that are involved in the implementation of the plan with both resources and manpower.

It should be note that three persons have the most significant engagement for the SEAP's implementation, namely the Mayor's advisor Mr. Riad Hasuri and two members from the engineering department, Mr. Ayob Ayob and Ms. Maha Hamudi.

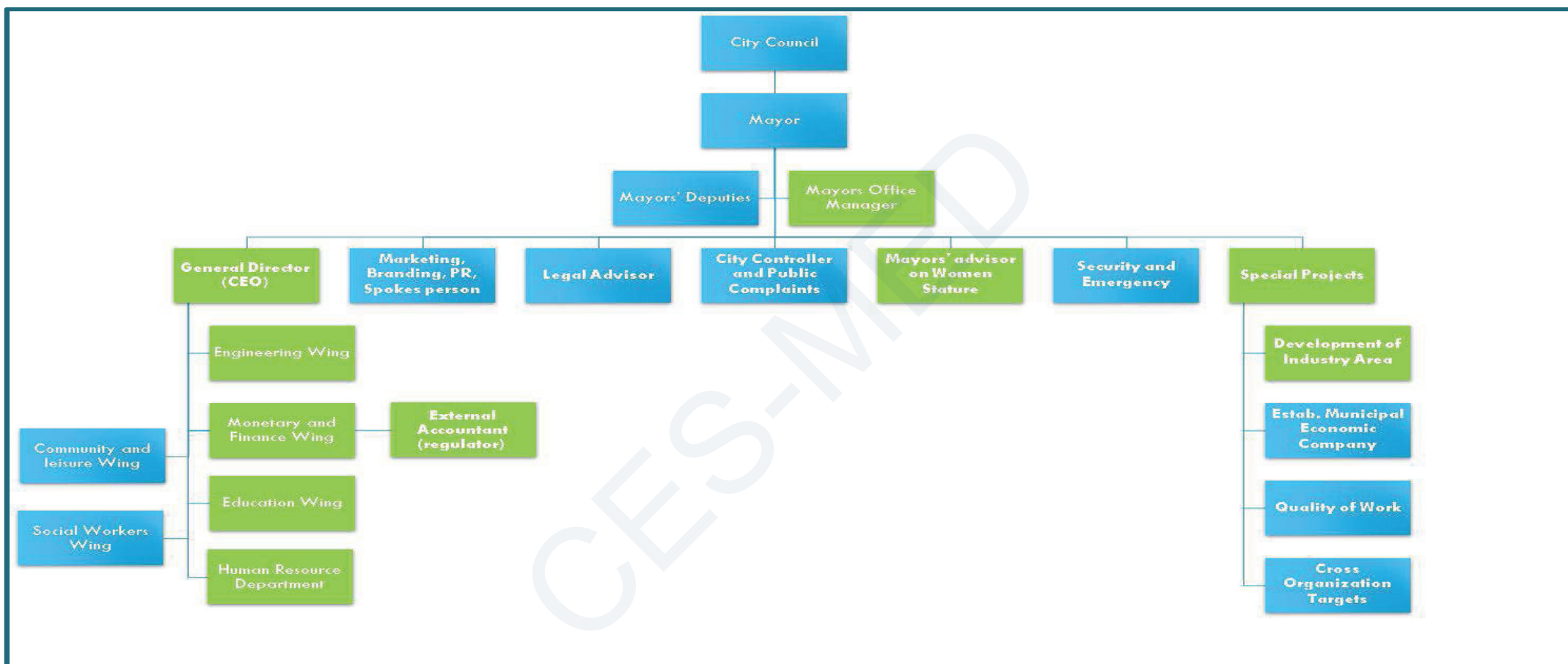


Figure 9 - Municipality of Shfar'am Organogram

1.4.3 Involvement of stakeholders and citizens

The involvement of all citizens and stakeholders is considered crucial for achieving the set targets.

As stated “Our city citizens are our most important resource. This is always true in Shfar’am, but especially in regards to GHG reduction. For this reason, we shall include everyone in the reduction program”.

Engaging the active women volunteer groups in this cause is only rational, since these groups are already supporting many other causes in the area. These groups have accepted the challenge of making Shfar’am greener and more responsible for the environment. The leading woman volunteers will receive training for energy efficiency at home, and they will then pass their knowledge to additional woman in small groups. We shall continue with the spreading of the knowledge, until all homes in Shfar’am will know how to save energy, and how to have a better quality of life.

In addition, in all schools several programs for GHG emission reduction shall be incorporated. The Ministry of National Infrastructures, Energy and Water resources and the Ministry of Education have developed a program (in Arabic) suitable for children from grades 1-9. This way all children will be taught on the importance of energy saving.

Students in the university are a very important asset as well. They will also take part in the transition the city is going through, will take part in the groups, and will lead some of the implementation and information seminars.

1.4.4 Budget – SEAP financing resources

LA budgets come from two main sources. The first source and largest portion of the budget comes straight from the national government and depends directly on the amount of residents. The second source is local taxes, which depend heavily on the socioeconomic level of the residents, number of businesses, and factories in the LA.

The annual municipal budget is 170 Mil. NIS (ca. 38 Mil. Euro). Out of this about 70% comes from the government, and only 30% comes from municipal sources.

For the implementation of the SEAP the total budget is approximately 123.55 million NIS, including the mobilization of the necessary funds from private actors. The budget excluding the funds from private actors is 49.35 million NIS and the Municipality of Shfar’am will contribute to this with around 10%. The rest of the financial needs of the SEAP will be fulfilled from EU Funding Schemes, the Israeli Government and the Ministry of National Infrastructures, Energy and Water resources, with the support of the Ministry of Finance and the Ministry of Environmental Protection as well as private funds that will be mobilized through the SEAP proposed actions. Any action to be implemented will have a clear budget and implementation plan and will be executed pending the approval of the annual budget, as required by the municipal regulations.

Chapter 2 - Baseline Emissions Inventory

2.1 Baseline Emission Inventory Methodology

2.1.1 Baseline Year

According to the Covenant of Mayors Guidelines, the recommended baseline year for the data that lead to the Emissions Reporting is 1990. The nearest to this year data that the Municipality of Shfar'am holds are data from year 2013, which are considered to be complete and reliable. Consequently, the year 2013 is selected as the baseline year.

2.1.2 Emission Factors and Conversion Rates

For the Baseline Emissions Inventory, the IPCC emission factors have been used for all fuel types in accordance to the CoM Guidebook, except from electricity, where the Israeli Electricity Company publication "Commitment to reduce Environmental Effects" was used.

The conversion rates that were used, wherever applicable, were according to the JRC Guidebook for Southern municipalities, or the CoM Guidebook for European Municipalities when there were no such data in the first one. Conversion rates for LPG were from the 2006 IPCC Guidelines.

The emission factors used in the calculations of the Baseline Emissions Inventory and all the conversion rates used in the BEI are explained in the table below.

Table 4 - Emission Factors (tn CO₂ / MWh) and Conversion Rates Used in the BEI

Energy Source	Emission Factor (tn CO ₂ / MWh)	Conversion Rates Used
Electricity	0.700	-
Liquid Gas	0.227	2.21 kg/m ³ 13.14 MWh/tn
Diesel	0.267	10 kWh/lt
Gasoline	0.249	9.2 kWh/lt
Solar Thermal	0	-

As far as the emissions from the Solid Waste Management sector are concerned, the IPCC default method is used to calculate the Methane (CH₄) emissions that are produced from the landfilling process and then it was considered that each ton of CH₄ produced equals to 25 tons of CO₂ equivalent.

2.1.3 Sectors to be included in the BEI

All the compulsory sectors of the SEAP guidelines are included in the SEAP calculations for the total energy consumption and emissions:

- Municipal Buildings / Equipment / Facilities;
- Tertiary (non Municipal) Buildings / Equipment / Facilities;
- Residential Buildings;

- Public Lighting;
- Transport (Municipal / Public / Private).

Out of the optional sectors to be included in the BEI, the consultant consortium in close collaboration with the municipality have selected **industries and agriculture**, which are responsible for a noteworthy contribution in the electricity consumptions, as well as **solid waste treatment**.

Especially, concerning the industrial sector, it should be noted that there is no heavy industry in the area of Shfar'am, only small industries.

2.2 Energy Consumption

The total energy consumption in the Municipality of Shfar'am is summarized in Table 5 below. The results in the table are further analyzed in the respective sub-sections.

Table 5 - Total energy consumption in Shfar'am

Sector of energy consumption	Electricity	Liquid Gas	Diesel	Gasoline	Solar Thermal
	MWh				
Agriculture	27.05	-	-	-	-
Municipal Buildings/Equipment/Facilities	1,959.08	-	-	-	-
Public Lighting	1,880.19	-	-	-	-
Residential Buildings	65,123.67	9,408.78	-	-	20,640.00
Commercial Buildings/Equipment/Facilities	31,207.27	-	-	-	-
Industry	4,505.31	-	-	-	-
Municipal Transport	-	-	-	-	-
Public Transport	-	-	2,413.55	-	-
Private transport	-	-	18,199.12	59,560.00	-
TOTAL	104,702.57	9,408.78	20,612.67	59,560.00	20,640.00

The total amount of energy that is consumed in the Municipality of Shfar'am is 214,924.02MWh.

2.2.1 Agricultural Sector

The Municipality of Shfar'am, according to the IEC data, presented a consumption of 27,049 kWh of electricity for 2013.

Table 6 - Agricultural Sector Energy Consumption

Consumer	Electricity (MWh)	Emission Factor	CO ₂ Emissions (tn)
Agriculture	27.05	0.700 tn/MWh	18.93

2.2.2 Municipal Buildings, Equipment/Facilities

This category includes all buildings managed by the Municipality of Shfar'am. The buildings include:

- the City Hall,

- sports facilities,
- community center and clubs,
- public buildings,
- health buildings, and
- educational institutions.

It should be mentioned that in Shfar'am there are no municipal facilities for water pumping, which is undertaken by a private company and reported in the tertiary sector facilities.

As far as the Municipal Offices and Structures are concerned, electricity is used for both operational and heating / cooling needs, while there is no usage of diesel or other types of fuel for the buildings' energy needs.

In Table 7, below, the electricity consumptions of each municipal building are being presented, according to the IEC data the Municipality has available.

Table 7 - Municipal Buildings/Equipment/Facilities Electricity Consumption

Site Type	Annual Electricity Consumption (MWh)	Emission Factor	CO2 Emissions (tn)
City Hall	132.56	0.700 tn/MWh	92.79
Sports Facilities	92.91		65.04
Community Center and Clubs	307.70		215.39
Public Buildings	7.84		5.49
Health Buildings	52.04		36.43
Educational Institutions	1,366.02		956.22
TOTAL	1,959.08		1,371.35

Figure 10 shows the allocation of the total consumption per sector of the Municipal Buildings/Equipment/Facilities, with the educational buildings being the most consuming category.

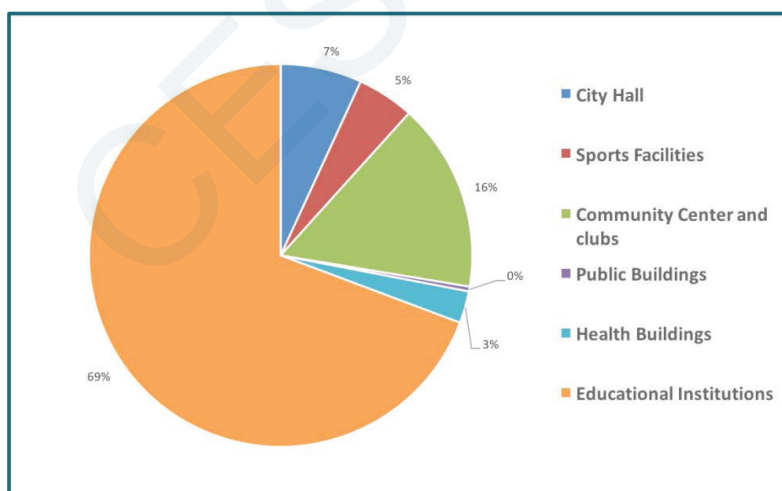


Figure 10 - Annual Electricity Consumption of Municipal Buildings, Equipment / Facilities

Especially on the educational buildings, there are four different levels of education, namely preschools, elementary schools, middle schools and high schools. Shfar'am Municipality has five (5)

High and Middle Schools and ten (10) Elementary Schools and Preschools. The following table includes the available data for the electricity consumption for each educational sector.

Table 8 - Educational Sector electricity consumption

Education Level	Annual Energy Consumption (kWh)
High and Middle Schools	617,937
Elementary schools	743,415
Preschools	4,672
TOTAL	1,366,024

The following pie chart shows the percentages of each education level's electricity consumption.

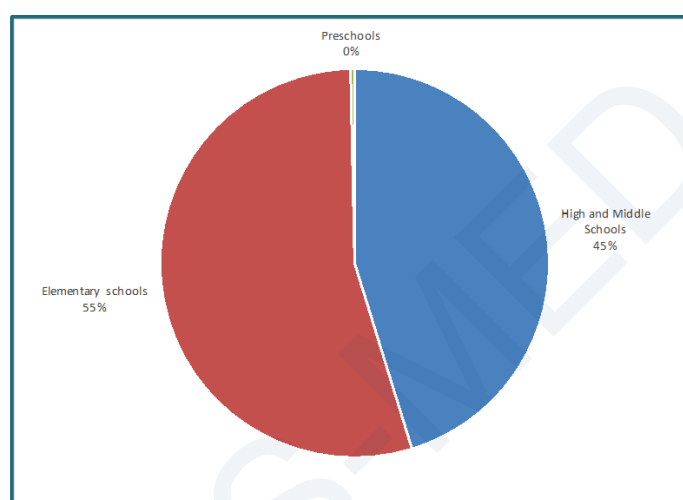


Figure 11 - Electricity consumption in the Educational Institutions

2.2.3 Municipal Public Lighting

As far as the public lighting sector is concerned, the only consumption comes from the street lighting. There are no parking lot lights, traffic lights or other kind of public lighting. The available data for the electricity consumed in 2013 for this category, according to the IEC, is shown in Table 9 as follows.

Table 9 - Electricity Consumptions for Municipal Public Lighting

Lighting Type	Annual Electricity Consumption (MWh)	Emission Factor	CO2 Emissions (tn)
Street Lighting	1,880.19	0.700 tn/MWh	1,316.13

2.2.4 Residential Buildings

Electricity

The residential sector is predominated with the use of electricity. The vast majority of house owners use electricity for all heating / cooling purposes, with a minor percentage being dedicated to cooking gas.

The total consumption of the residential sector in 2013 according to the IEC data is shown in Table 10.

Table 10 - Electricity Consumption in Residential Sector

Consumer	Electricity (MWh)	Emission Factor	CO ₂ Emissions (tn)
Residential sector	65,123.67	0.700 tn/MWh	45,586.57

Liquefied Petroleum Gas

Except from electricity, there is a small usage of cooking gas from the households in the municipality. For the identification of the Liquefied Petroleum Gas (LPG) consumption used for cooking, data at the national level was gathered from the gas company, Pazgaz.

According to Pazgaz, the average consumption for each household is 3 m³ monthly, or 36 m³ annually. With the number of households being 9,000, the calculations of the following table are realized. The conversion from m³ to kWh was realized using LPG density in gas form (2.21 kg/m³) and Net Calorific Value of 13.14 MWh/tn, according to IPCC 2006 guidelines.

Table 11 - LPG Consumption in Residential Sector

Consumer	LPG (MWh)	Emission Factor	CO ₂ Emissions (tn)
Residential sector	9,408.77	0.227 tn/MWh	2,135.79

Solar Thermal

According to the local authority's personnel, there are water-heating facilities that use solar power in order to heat water. The calculations are based on info available through web sources (Sustainable Business website and journal reports), according to which for each person in Israel, there are 0.56 m² of Solar Water Heaters. MIEW mentions also that the efficiency of SHWH is around 40-60%, so an average of 50% is used for the calculations. The average amount of solar energy in Shfar'am is 1,847 kWh/m² and the average solar panel is 2.5 m².

The calculations are according to the following mathematical formula:

$$\begin{aligned} \text{Annual output per person} &= \text{average efficiency} * \text{SHWH per person} * \text{average solar energy} \\ &= 0.50 * 0.56 * 1,847 = 517 \text{ kWh} \end{aligned}$$

And for the Shfar'am population of 39,920 (2013) the result is:

$$\begin{aligned} \text{Annual City output} &= \text{population} * \text{annual output per person} \\ &= 39,920 * 0.517 = 20,640 \text{ MWh.} \end{aligned}$$

The corresponding **emissions saved from the SHWH are 14,592.48 tn CO₂.**

Summary

The residential sector, in total, consumes energy from three different sources. The summarized data for the residential sector are presented in the following table.

Table 12 - Total energy consumption in Residential Sector

Source	MWh
Electricity	65,123.67
LPG	9,408.77
Solar Thermal	20,640.00
TOTAL	95,172.44

Figure 12 shows the allocation of energy consumption per energy source in the Residential Sector.

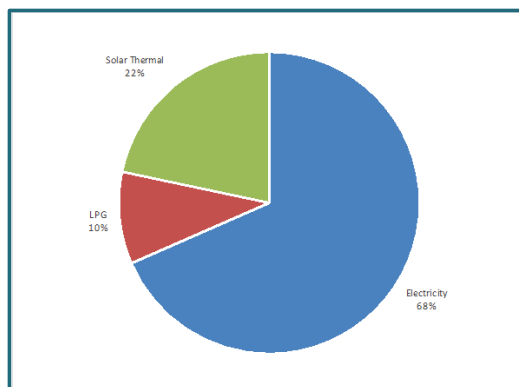


Figure 12 - Energy Sources in the Residential Sector

2.2.5 Commercial Buildings, Equipment/Facilities

Data from IEC for 2013 was used for this sector. The available data refer to the Municipality of Shfar'am and, apart from the commercial buildings, electricity consumption data for the water pumping facilities, managed by a private company, is included.

Table 13 - Consumptions for Commercial Buildings / Equipment / Facilities

Consumption Category	Electricity (MWh)	Emission Factor	CO ₂ Emissions (tn)
Commercial Buildings	30,312.66	0.700 tn/MWh	21,218.86
Water Pumping Facilities	894.61		626.23
TOTAL	31,207.27		21,845.09

The allocation of the consumption, as shown in the pie chart below, is dominated by the commercial buildings consumption, whereas the water pumping facilities consume only 3% of the total electricity.

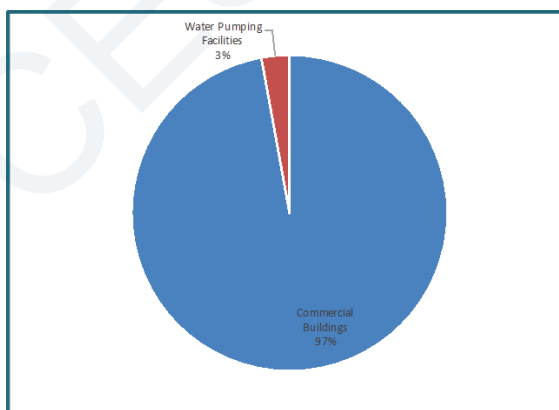


Figure 13 - Commercial Buildings/Equipment/Facilities Consumptions

2.2.6 Industrial Sector

The available industrial sector data come from IEC and refer to the annual consumption of electricity in the small local industries.

The total electricity consumption for the year 2013 is shown in Table 14 below.

Table 14 - Industrial sector consumption

Consumer	Electricity (MWh)	Emission Factor	CO ₂ Emissions (tn)
Industrial	4,505.31	0.700 tn/MWh	3,153.72

2.2.7 Transport

2.2.7.1 Municipal Fleet

According to the Municipality of Shfar'am, there exists no municipal fleet.

2.2.7.2 Public Transport

The data on public transport were not directly available from the company serving the area. The approach utilized includes the calculation of the total distance travelled for all the public buses' lines within the local authority's borders, based on the number of routes and the route frequency at an annual basis.

There are two (2) bus lines, bus line 1 and bus line 4, that cover the area of Shfar'am, making 50 routes daily at an annual basis. Each bus line travels 13 km within the local area of Shfar'am. This means that the total distance that each bus line covers equals to 237,250 km (18,250 routes per year*13 km per route).

The average consumption of the public buses at national level for the year 2013 was identified from the CBS to be 50.865 liters of diesel per 100 km. Table 15 below summarizes the results on public transportation consumptions.

Table 15 - Public Transport Fuel Consumption

Distance Traveled within LA (km)	Diesel Consumption		Emission Factor	CO ₂ Emissions (tn)
474,500	241,355.37 lt	2,413.55 MWh	0.267 tn/MWh	644.42

2.2.7.3 Private and Commercial Transport

Regarding private transportation, the number of vehicles registered at the area of Shfar'am is available from the Municipal Records. Based on the CBS publication concerning the average distance each vehicle type covered at the national level in 2013, and assumptions on the distance travelled within the local area of Shfar'am (study by Technion University) and average consumptions per vehicle type, the total energy consumption is calculated. The data concerning the consumptions are presented in Table 16.

Table 16 - Total Energy Consumption for Private & Commercial Transport

Vehicle Type	Number of Vehicles	Distance Traveled within LA (km/yr.)	Energy Consumption (MWh)	Emission Factor (tn/MWh)	CO ₂ Emissions (tn)
Private Car	9,887	5,412	36,920.8	0.249	9,193.3
Motorcycle	168	2,376	117.5	0.249	29.3
Taxi	48	39,100	1,726.7	0.267	461.0
Gasoline truck	1,822	4,752	21,666.1	0.249	5,394.9
Diesel truck	313	9,504	11,688.5	0.267	3,120.8
Bus	32	29,400	4,784.0	0.267	1,277.3
Minibus	62	16,665	855.5	0.249	213.0
TOTAL	12,332		77,759.1		19,689.6

The data in Table 16 above is based in data available by the CBS. All the assumptions and the results used for the calculations of the total energy consumption of the Private and Commercial Transport Sector are in Table 17 below.

The average consumption was identified based on the municipal personnel's input and the consultants' knowledge on the country. The percentages of distance travelled within the local authority's borders are based on a study by Technion University.

Table 17 - Academic studies assumptions and results used for Private and Commercial Transport calculations

Car Type	Average Distance Traveled (km/yr.)	Percentage of Distance Traveled within LA	Average consumption (lt/100km)	Fuel Type
Private Car	16,400	33%	7.5	Gasoline 95
Motorcycle	7,200	33%	3.2	Gasoline 95
Taxi	78,200	50%	9.2	Diesel
Gasoline truck	14,400	33%	32	Gasoline 95
Diesel truck	28,800	33%	45	Diesel
Bus	58,800	50%	50.9	Diesel
Minibus	50,500	33%	9.0	Gasoline 95

2.2.8 Final Energy Consumption

In Table 18 all the energy consumptions within Municipality of Shfar'am are presented, **totaling 214.92 GWh**.

Table 18 - Total Energy Consumption

Category		FINAL ENERGY CONSUMPTION [MWh]														
		Electricity	Heat/cold	Fossil fuels							Renewable energies					Total
				Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Plant oil	Biofuel	Other biomass	Solar thermal	
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																
Municipal buildings, equipment/facilities		1.959,08														1.959,08
Tertiary (non municipal) buildings, equipment/facilities		31.207,27														31.207,27
Residential buildings		65.123,67			9.408,77									20.640		95.172,44
Public lighting		1.880,19														1.880,19
Industriy	Non-ETS	4.505,31														4.505,31
	ETS															0,00
	Total	4.505,31														4.505,31
Subtotal		104.675,52	0,00	0,00	9.408,77	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	20.640,00	0,00	134.724,29
TRANSPORT:																
Municipal fleet																0,00
Public transport						2.413,55										2.413,55
Private and commercial transport						18.199,12	59.560,00									77.759,12
Subtotal		0,00	0,00	0,00	0,00	0,00	20.612,67	59.560,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	80.172,67
OTHER:																
Agriculture, forestry, fisheries		27,05														27,05
TOTAL		104.702,57	0,00	0,00	9.408,77	0,00	20.612,67	59.560,00	0,00	0,00	0,00	0,00	0,00	20.640,00	0,00	214.924,01

2.3 Local Electricity Production

There are no PV or other type of energy production installations in the area of Shfar'am.

Table 19 - Local Electricity Production

Locally generated electricity (ETS and large-scale plants > 20 MWe not recommended)	Renewable electricity produced [MWh]	CO2 emission factor [t/MWh produced]	CO2 / CO2- eq emissions [t]
Wind			
Hydroelectric			
Photovoltaic			
Geothermal			
TOTAL			

2.4 Local Heating / Cooling Production

There are no heating / cooling production installations in the area of Shfar'am.

Table 20 - Local Heat/Cold Production

Local heat/cold production plants	Heat/cold produced [MWh]		Energy carrier input [MWh]										CO2 / CO2-eq emissions	
	Total	From renewable sources	Natural gas	Liquid gas	Heating oil	Lignite	Coal	Waste	Plant oil	Other bioma ss	Other renewable	other	Fossil sources	Renewable Sources
Combined Heat and Power														
District Heating (heat only)														
Other														
TOTAL														

2.5 Solid Waste Management

Solid waste management is one of the optional sectors to be included in Shfar'am Municipality's BEI. According to the data collected for 2013, there are two types of waste management, landfill and recycling.

The data available from the Municipality of Shfar'am is displayed in Table 21.

Table 21 - Waste and Recycling quantities per type of waste

Type	Amount of Waste Collected (tn/yr.)
Garbage (not including yard trimmings)	23,000
Yard Waste	0
Waste to recycling	
White Paper and Newspaper	0
Cardboard	220
Glass	0
Metal	0
Plastic	8
Organic Waste	0
Total recycling	228
Yard Waste for recycling not included in the overall recycling rate	0
Total Collected Waste (Garbage+Recycling+Yard Waste)	23,228

For the calculation of the emissions regarding the Municipality's solid waste, the IPCC default method has been used. The method is based on the main equation that follows.

$$\text{Methane emissions (Gg/yr.)} = (\text{MSW}_T \bullet \text{MSW}_F \bullet \text{MCF} \bullet \text{DOC} \bullet \text{DOC}_F \bullet F \bullet 16/12 \cdot R) \bullet (1 - \text{OX}) \quad (1)$$

Where:

- MSW_T total MSW generated (Gg/yr.)
- MSW_F fraction of MSW disposed to solid waste disposal sites
- MCF methane correction factor (fraction)
- DOC degradable organic carbon (fraction) (kg C/ kg SW)
- DOC_F fraction DOC dissimilated
- F fraction of CH_4 in landfill gas (IPCC default is 0.5)
- $16/12$ conversion of C to CH_4
- R recovered CH_4 (Gg/yr.)
- OX oxidation factor (fraction – IPCC default is 0)

The IPCC default method assumes that all the potential CH_4 emissions are released during the same year the waste is disposed of. The method introduces various specific default values and recommendations, for use in countries with lack of statistical data for Solid Waste.

The calculation of the degradable correction factor (DOC) is based on the following equation.

$$\text{DOC} = 0.4 \cdot A + 0.17 \cdot B + 0.15 \cdot C + 0.3 \cdot D \quad (2)$$

Where:

- A Percentage of paper and textiles in SW
- B Percentage of garden and park waste and other organic putrescible in SW
- C Percentage of Food waste in SW
- D Percentage of wood and straw waste in SW

The approach for the calculation of the above factors was to initially divide the total collected waste in organic waste, paper and plastic, according to the national percentages for waste composition by weight (40% organic, 17% paper, 13% plastic). Out of these amounts, the recycled quantities were deducted, in order to come up with the quantities being landfilled and the revised factors.

According to the local authorities, there are installations in the waste landfill facilities that capture part of the CH_4 that is produced. According to Ayalon et al., the efficiency of CH_4 being captured varies from 40 to 90%. As far as Israel is concerned, the average efficiency that the paper proposes is 50%, so in the calculations this efficiency for the CH_4 capturing process is being used.

For the city of Shfar'am, the table on the next page with values for each one of the above variables occurs.

Table 22 - Waste Emissions Calculation factors

Variable	Value / Equation
MSWt	23 Gigagrams
MSWf	0.9902
MCF	1
DOC	0.1705
DOCf	0.56 (T average in Israel)
F	0.5
16/12	
R	0.73201 Gigagrams of CH ₄
OX	0

The result of (1), according to the Table 20 values, equals to 0.73201 Gigagrams of CH₄, which equal to **18,300.00 tn CO₂**.

2.6 CO₂ Emissions

The emissions of CO₂ for the sectors that have been described in the previous sections are available, in total, in the following table.

Table 23 - Total Emissions for the Municipality of Shfar'am

Sector		CO2 emissions [t]/ CO2 equivalent emissions [t]															
		Electricity	Heat/cold	Fossil fuels								Renewable energies					Total
				Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Biofuel	Plant oil	Other biomass	Solar thermal	Geothermal	
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																	
Municipal buildings, equipment/facilities		1.371,35														1.371,35	
Tertiary (non municipal) buildings, equipement/facilities		21.845,09														21.845,09	
Residential buildings		45.586,57		2.135,79										0,00		47.722,36	
Municipal public lighting		1.316,13														1.316,13	
Industries	Non-ETS	3.153,72														3.153,72	
	ETS (not recommended)															0,00	
	Total	3.153,72	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	3.153,72	
Subtotal		73.272,86	0,00	0,00	2.135,79	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	75.408,65	
TRANSPORT:																	
Municipal fleet																0,00	
Public transport							644,42									644,42	
Private and commercial transport							4.859,16	14.830,44								19.689,60	
Subtotal		0,00	0,00	0,00	0,00	0,00	5.503,58	14.830,44	0,00	0,00	0,00	0,00	0,00	0,00	0,00	20.334,02	
OTHER:																	
Agriculture, forestry, fisheries		18,93														18,93	
OTHER NON ENERGY RELATED:																	
Waste management																	18.300,00
Waste water management																	
TOTAL		73.291,79	0,00	0,00	2.135,79	0,00	5.503,58	14.830,44	0,00	0,00	0,00	0,00	0,00	0,00	0,00	114.061,60	

The solar thermal emissions from the Residential Sector are equal to 0, because their emission factor is 0 tn/MWh produced.

The total emissions in Shfar'am municipality equal to **114.061,6 tn CO₂**.

Chapter 3 - SEAP Actions

3.1 Target for 2020

The municipality's representatives, through the BEI identification, acknowledged the most significant sectors affecting the municipality's carbon footprint, namely

ly the residential sector with almost 42% contribution, followed largely behind by the tertiary (19.2%), and the transport sectors (17.8%). These sectors thus constitute the fields where the municipality's priority actions will be focused, while at the same time actions will be suggested in other directions as well.

In this respect, the use of the Business as Usual (BAU) scenario suggested by the JRC guidelines for South municipalities will be utilized for the calculation of the 2020 emission levels and the respective reduction target.

According to the guidelines, the calculation of 2020 emission levels is realized according to the equation below

$$Emissions_{CO_2}^{2020} = Emissions_{CO_2}^{Baseline\ year} \times k$$

For Shfar'am, the emissions for the baseline year (2013) were 114,061.6 tn CO₂. The national coefficient k for 2013 in Israel is 1.21. Therefore, the forecasted emissions for 2020 are

$$Emissions_{CO_2}^{2020} = 114,061.6 \times 1.21 = 138,014.6$$

The emission reduction target for Shfar'am needs to be at least 20% against the calculated 2020 emissions, thus 27,602.9 tn CO₂. The actions planned by the municipality in the 2020 horizon will lead in an overall reduction of 27,966.67 tn CO₂, thus fulfilling the requirement. In this respect, the actual reduction target undertaken by the municipality is 20%. Each sector's contribution in the overall reduction target is presented in Figure 14 below.

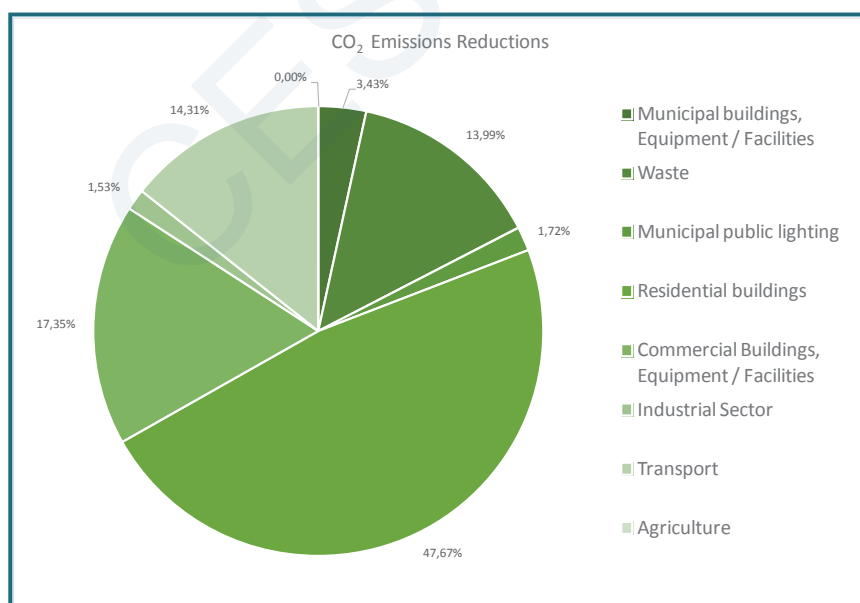


Figure 14 - Contribution per sector to the total CO₂ emission reduction

At this point, it should be clarified that the calculation of all emission reductions for the suggested actions in 2020 have been calculated with the national emission factor for electricity being 0.60 tn CO₂ /MWh in 2020 due to the foreseen penetration of natural gas in the electricity generation mix. This figure was provided by the Coordinator of the TagSviva Programme, under the Ministry of Environment and Union of Municipalities, based on projections of the IEC. This assumption was used in order to ensure that the municipality target set can be satisfied by the suggested combination of actions, even in the case that the national emission factor for electricity has significantly improved.

An overview table of the actions per sector, as well as the calculated emission reductions per action, is presented below.

Table 24 - Summary of the actions

Action No	Action	Emission Reductions (tn CO ₂)
Municipal buildings, Equipment / Facilities		
1.1	Green procurement procedures for municipal buildings	24.68
1.2	Upgrading the municipal buildings' lighting system	106.67
1.3	Certification of municipal buildings and facilities with ISO 50001	71.11
1.4	Upgrading the municipal buildings' and facilities' A/C systems	170.68
1.5	Energy Manager appointment in the Municipality	7.11
1.6	Energy refurbishment of selected municipal buildings as pilot projects	108.90
1.7	Awareness raising activities for municipal employees	28.45
1.8	Green schools' certification	37.19
1.9	The 10% commitment campaign for schools	24.79
1.10	Awareness raising campaigns for pupils/ students	9.92
1.11	Promotion of recycling	3,321.45
1.12	Awareness raising campaigns to reduce the amounts of discarded food (reduction of the organic content of waste)	553.58
1.13	Installation of 500kW PVs in municipal buildings' rooftops	360.00
Municipal public lighting		
2.1	Municipal lighting study	0.00
2.2	Municipal lighting system upgrade	739.16
Residential buildings		
3.1	The 10% voluntary commitment campaign	4,018.78
3.2	Promotion of Green Buildings' concept	709.20
3.3	Campaign for old fridges' substitution	2,783.48
3.4	Women groups on energy efficiency	1,654.79
3.5	Information & awareness raising activities	1,418.39
3.6	Initiatives supporting citizens' actions	472.80
3.7	Establishment of the municipal team	709.20
3.8	2 MW Photovoltaics in residential rooftops	1,440.00
Commercial Buildings, Equipment / Facilities		
4.1	Seminars to professional groups	339.85
4.2	10% voluntary commitment campaign	906.26
4.3	Promotion of green buildings' concept	453.13
4.4	Other information and awareness raising activities	226.56
4.5	4 MW photovoltaics on building rooftops	2,880.00
Industrial Sector		
5.1	Subsidized energy audits at a volunteer basis	163.54
5.2	Targeted training seminars	65.42

Action No	Action	Emission Reductions (tn CO ₂)
5.3	10% voluntary commitment campaign	196.25
Transport		
6.1	Transportation master plan	0.00
6.2	Improve public transportation	721.59
6.3	Cycling promotion and creation of related infrastructure	300.00
6.4	Promotion of walking, car sharing and car pooling campaigns	459.19
6.5	Improvement / development of parking infrastructure	350.00
6.6	Adoption of real time information in public transport	131.20
6.7	Promotion of eco-driving	1,103.16
6.8	Promotion of new technology buses in the public transportation	115.10
6.9	Other information and awareness raising activities	784.28
Agriculture		
7.1	Awareness raising activities	0.81
TOTAL		27,966.67

Analysis of the suggested actions per sector is provided in the next sections. It should be noted that for awareness raising activities conducted by the municipality, besides the implementation cost born by the municipality and its potential funding sources, the amount of the private funds mobilized is reported as well where relevant. This cost doesn't participate in the calculation of the NPV value.

3.2 Municipal Buildings, Equipment / Facilities

Although the buildings and facilities of Shfar'am Municipality contribute almost 1% in the total emissions, there are several actions being suggested by the Municipality, since these facilities constitute one of the optimal sectors for the implementation of on the ground energy saving activities and can set an example for the citizens and the employees. In the following sections, a comprehensive set of actions is being analyzed, in order to reduce the CO₂ emissions from this category.

The envisaged actions for this sector include both energy conservation and green energy production measures, with emphasis on energy saving activities. It is considered that in Israel there are relatively many opportunities to take advantage of the "low hanging fruits". Energy efficiency and PVs on building roofs are the most promising solutions, since due to the country's relatively small size, the establishment of RES facilities in need of space are especially difficult.

Apart from the above two, there is a third set of actions targeting the user through awareness raising activities. These activities not only try to set off a modification in the user's behaviour, but also to educate the younger generations in environmental and energy related issues.

The proposed actions are shown in the Table 25.

Table 25 - Proposed Actions for the Municipal Buildings, Equipment / Facilities

Action No	Action	Emission Reductions (tn CO ₂)
1.1	Green procurement procedures for municipal buildings	24.68
1.2	Upgrading the municipal buildings' lighting system	106.67
1.3	Certification of municipal buildings and facilities with ISO 50001	71.11
1.4	Upgrading the municipal buildings' and facilities' A/C systems	170.68
1.5	Energy Manager appointment in the Municipality	7.11
1.6	Energy refurbishment of selected municipal buildings as pilot projects	108.90
1.7	Awareness raising activities for municipal employees	28.45
1.8	Green schools' certification	37.19
1.9	The 10% commitment campaign for schools	24.79
1.10	Awareness raising campaigns for pupils/ students	9.92
1.11	Promotion of recycling	3,321.45
1.12	Awareness raising campaigns to reduce the amounts of discarded food (reduction of the organic content of waste)	553.58
1.13	Installation of 500kW PVs in municipal buildings' rooftops	360.00

3.2.1 Green procurement procedures for municipal buildings

Green procurement constitutes the procedure where the municipalities seek to procure goods and services with a reduced environmental impact throughout their life cycle. In this way selection of products and services that minimize environmental impacts takes place, including less energy consuming equipment. This action is envisaged for all energy consuming equipment and services purchased by the local authority of Shfar'am, with emphasis on office equipment, lighting and air-conditioning.

It is considered that this action will apply on all related municipal purchases and could lead to 10% energy savings from the related municipal consumptions till 2020, through the purchase of new equipment of high efficiency standards when required, or the gradual substitution of aged energy consuming equipment with more efficient one.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability of the action are presented in Table 26 below. The cost estimation refers to the additional cost of the highly energy efficient products compared to the compatible solutions.

Table 26 - Action 1.1 in numbers

Action 1.1: Green procurement procedures	
Duration	2016-2025
Total Implementation Cost (NIS)	150,000 NIS
Annual Energy Savings (MWh)	41.14 MWh
Annual Emission Reduction (tn CO ₂)	24.68 tn CO ₂
Funding Source	Own sources
Net Present Value (NPV)	38,800 NIS

3.2.2 Upgrading the municipal buildings' lighting system

According to studies, in a typical office building in Israel, lighting accounts for 30% of the overall electricity consumption. The action foresees the gradual replacement of all existing lighting systems in the municipal buildings and sports facilities till 2020, with more efficient technologies such as LED lights. At the same time, simple automations will be installed, such as timers or movement sensors, in order to reduce electricity consumption occurring outside normal office working hours. These

initiatives are expected to contribute with 25% energy savings against the buildings' BAU lighting consumptions.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability of the action are presented in Table 27 below. The calculation of the NPV has been realized for the expected lifetime of the system, over a 10-year period.

Table 27 - Action 1.2 in numbers

Action 1.2: Upgrading buildings' lighting	
Duration	2016-2020
Total Implementation Cost (NIS)	500,000 NIS
Annual Energy Savings (MWh)	177.79 MWh
Annual Emission Reduction (tn CO ₂)	106.67 tn CO ₂
Funding Source	Loans + Governmental funds (Min. of Energy)
Net Present Value (NPV)	316,000 NIS

3.2.3 Certification of municipal buildings and facilities with ISO 50001

ISO 50001 is based on the management system model of continual improvement also used for other well-known standards such as ISO 9001 or ISO 14001. This makes it easier for organizations to integrate energy management into their overall efforts to improve quality and environmental management.

This initiative utilizes the implementation of an Energy Management System in all related municipal facilities, taking into advantage the already established smart energy meters installed in the buildings, as well as software modules for energy monitoring of these meters already available in Israel. If necessary, additional monitoring equipment will be installed, if the existing one is not considered sufficient.

The implementation of an ISO 50001 system in the municipal facilities will be accompanied by training of the related personnel on the required administrative procedures and the certification of the municipality by an accreditation company.

The existence of this system will constitute a significant tool at the hands of the municipality in order to monitor the progress of the SEAP related activities in its premises. Moreover, according to the literature, the implementation of such systems can contribute to additional energy savings of at least 5%.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability of the action are presented in Table 28 below.

Table 28 - Action 1.3 in numbers

Action 1.3: ISO 50001 in municipal buildings & facilities	
Duration	2016-2020
Total Implementation Cost (NIS)	200,000 NIS
Annual Energy Savings (MWh)	118.52 MWh
Annual Emission Reduction (tn CO ₂)	71.11 tn CO ₂
Funding Source	Own sources + Min. of Energy
Net Present Value (NPV)	25,000 NIS

3.2.4 Upgrading the municipal buildings' and facilities' AC systems

The climate conditions in Israel are especially challenging during the summer, characterized by high temperatures and humidity. For this reason, air conditioning (A/C) is the most significant energy

consumer in buildings, with contribution percentages reaching up to 40% of the total office building energy consumption according to studies.

The specific action envisages the gradual replacement of all A/C split units in municipal buildings and facilities by 2020, with inverter A/C units of high energy class. At the same time, automations such as thermostats and timers will be installed, in order to reduce energy consumption beyond normal operating hours and temperatures. This activity will contribute with 30% energy savings of the specific category's consumptions by 2020.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability of the action are presented in Table 29 below. The calculation of the NPV has been realized for the lifetime of the equipment, considering a period of 10 years.

Table 29 -- Action 1.4 in numbers

Action 1.4: A/C upgrading in municipal buildings & facilities	
Duration	2016-2020
Total Implementation Cost (NIS)	1,250,000 NIS
Annual Energy Savings (MWh)	284.46 MWh
Annual Emission Reduction (tn CO ₂)	170.68 tn CO ₂
Funding Source	EU and Government (Min. of Energy)
Net Present Value (NPV)	55,600 NIS

3.2.5 Energy manager appointment in the municipality

One of the prerequisites of the municipality's adhesion to the Covenant of Mayors is the creation / adaptation of the municipal administrative structures, in order to establish the working team to implement and monitor the progress of the SEAP activities. Moreover, the implementation of an ISO 50001 system also requires the active engagement of an energy manager, to coordinate and monitor all related activities. In this respect, this action focuses not only on the satisfaction of the above mentioned prerequisites, but goes well beyond them.

The energy manager will not only be the responsible person to monitor the energy consumptions and provide the necessary solutions when a problem is identified, but will act proactively in order to ensure the good coordination of the whole municipal team for the proper implementation of the envisaged SEAP actions.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability of the action are presented in Table 30 below. The benefits related to the energy manager's appointment are considered multi-dimensional since strong coordination of the overall initiative is required, although strictly economic indicators are not beneficial. In case a member of the existing municipality staff is appointed to this position, this will have even greater benefits to the municipality.

Table 30 - Action 1.5 in numbers

Action 1.5: Municipality energy manager	
Duration	2016-2020
Total Implementation Cost (NIS)	500,000 NIS
Annual Energy Savings (MWh)	11.85 MWh
Annual Emission Reduction (tn CO ₂)	7.11 tn CO ₂
Funding Source	Governmental Funding (Min. of Energy, Interior)
Net Present Value (NPV)	< 0

3.2.6 Energy refurbishment of selected municipal buildings as pilot projects

In Israel exists the green buildings standard 5281/5282, which however is not mandatory for any kind of building, including the public ones.

However, the role of the municipal authorities, as of all public authorities, is to lead by example. The specific action focuses on the energy refurbishment of selected municipal buildings with significant visual impact on the residents (e.g. municipal hall, administrative buildings etc.), in order not only to significantly reduce the energy cost of these establishments for the municipality, but more importantly to demonstrate to the citizens the different available energy efficient technologies in Israel and their results.

This energy refurbishment is suggested to include actions such as insulation of external walls, double glazing, installation of external shading, roof insulation, installation of simple automations such as thermostats and timers, etc. For the selected buildings, part of these actions will also be the upgrading of the lighting systems and the A/C, as described in the action 1.4 above. A significant part of the action will also be the display of explanatory labels on the realized actions in plain sight, accessible to all the passing by citizens, as well as digital signs showing the current energy consumption.

The energy refurbishment will be realized in at least 3 municipal buildings, including at least one school building among them, with an overall estimated energy savings of 30%.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability of the action for the life duration of the project are presented in Table 31 below.

Table 31 - Action 1.6 in numbers

Action 1.6: Selected municipal buildings' energy refurbishment	
Duration	2016-2020
Total Implementation Cost (NIS)	3,500,000 NIS
Annual Energy Savings (MWh)	181.50 MWh
Annual Emission Reduction (tn CO ₂)	108.90 tn CO ₂
Funding Source	EU + Government (Min. of Energy, Environment, Building)
Net Present Value (NPV)	< 0

Although the action is not profitable, its benefits are not only in terms of reducing the buildings' energy cost, but also serve as pilot projects for the whole community, in order to demonstrate the available technological options.

3.2.7 Awareness raising and training activities for municipal employees

A step of significant importance, in order to promote and achieve the planned initiatives, is to have properly communicated the municipality's intentions and plans to the people engaged in these activities. In this respect, this action comprises of a set of targeted awareness raising activities towards the municipal employees. The aim of these activities is to have the municipal employees act as change agents, improving their behaviour and habits in order to achieve the envisaged results.

The set of awareness raising and training actions to be realized for the municipal employees of Shfar'am includes the following:

- Training workshops and seminars for the team members directly involved in the SEAP implementation and monitoring. This activity aims at the capacity building regarding SEAP development and project implementation of the employees directly involved in the SEAP implementation team. These workshops and seminars could be targeted on how to attract

financing from international donors, to manage the project implementation or focus on the exchange of best practices and ideas with other municipalities in Israel and abroad that face the same challenges. Workshops on the latest available know how in terms of energy efficiency and RES technologies are envisaged as well.

- Development and circulation of promotional material through the employees' e-mails on the benefits of energy efficiency and how simple behaviour changes impact the total consumption.
- Municipal contest for the administrative building with the highest energy savings achieved (in terms of %) due to users' behaviour change. This contest prize could be any incentive provided to the employees, such as two additional days off that year or the development of posters with the pictures and names of the employees that contributed to the goal. The aim would be to achieve energy savings through strictly behavioural change, such as turning off the lights, the A/C and office equipment when leaving the office, not leave open windows with the A/C on etc. This measure could be used during the first couple of years, when the rest of the energy efficiency interventions will be gradually taking place.

Related calculations on the action, in terms of initial cost, energy and emission savings, are presented in Table 32 below. Such actions are more difficult to be quantified; however, it is considered that the financial viability of the action is ensured.

Table 32 - Action 1.7 in numbers

Action 1.7: Awareness raising and training activities for municipal employees	
Duration	2016-2020
Total Implementation Cost (NIS)	50,000 NIS
Annual Energy Savings (MWh)	47.41 MWh
Annual Emission Reduction (tn CO₂)	28.45 tn CO ₂
Funding Source	Own sources
Net Present Value (NPV)	> 0

3.2.8 Green schools' certification

This action focuses on the selection of the schools that will participate in the action and the accompanying implementation of the required energy efficiency activities in the selected school buildings in order to acquire the green building certification. These actions will include simple energy efficiency activities, such as the installation of automations in the lighting and air conditioning, upgrading of the lighting system as well as monitoring of the energy consumptions through the smart meters. Following these actions' implementation, certification of the school by an accreditation company will be realized. All these activities realized in the schools will be properly communicated to the students, in order to explain them the significance of the action and the benefits to the environment.

The action is expected to be realized in minimum 2 schools, with an estimated energy savings of 25%. During the selection process of the schools, priority will be given to those with especially high energy consumptions compared to the rest.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability of the action are presented in Table 33.

Table 33 - Action 1.8 in numbers

Action 1.8: Green school's certification	
Duration	2016-2020
Total Implementation Cost (NIS)	100,000 NIS
Annual Energy Savings (MWh)	61.98 MWh
Annual Emission Reduction (tn CO ₂)	37.19 tn CO ₂
Funding Source	Own funding + Government (Ministry of Environment / Education)
Net Present Value (NPV)	59,500 NIS

3.2.9 The 10% commitment campaign for schools

Another set of action focusing on schools is the 10% commitment campaign. This ambitious action will be realized in other energy consuming sectors as well and is targeted to promote the environmental consciousness and personal responsibility against the environment and society among the citizens across all age and professional groups.

This campaign is a volunteering action, where schools choose to commit to a target of at least 10% reduction. This action is strictly based on modification of the energy behaviour of the students and the teachers, without any investments on energy efficiency equipment. This campaign can also take the form of a contest between the different participating schools, on identifying the one achieving the highest energy saving percentage.

Schools will be educating the students through lessons and thematic energy days, where dedicated professionals will be invited as well to explain the benefits for the environment and the significance of preserving energy. Moreover, through all awareness raising and capacity building activities realized, school children will put the corner stone for building an environmental consciousness and adopt an energy efficient behaviour in their houses and as adults.

The achieved energy savings will be validated against the energy bills and the meters' readings, while the schools that achieve the commitment will receive an honorary praise. The school to win the contest and its students will receive the School Energy Cup by the Mayor in an open ceremony, while the financial resources saved for the municipality will be invested in the school for simple energy efficient projects (automations etc.).

It is envisaged that from the municipality's schools participating in the campaign, at least half of them will exceed the commitment target of 10% and the rest will achieve savings below this goal.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 34 below. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 34 - Action 1.9 in numbers

Action 1.9: The 10% commitment campaign for schools	
Duration	2016-2020
Total Implementation Cost (NIS)	100,000 NIS
Annual Energy Savings (MWh)	41.32 MWh
Annual Emission Reduction (tn CO ₂)	24.79 tn CO ₂
Funding Source	Own funding + Government (Ministry of Energy, Environment, Education)
Net Present Value (NPV)	> 0

3.2.10 Awareness raising campaigns for pupils and students

Apart from the suggested actions above, this action has been designed for additional actions for those schools that are looking for more ideas for keeping and improving their achievements. Awareness raising activities will be designed and carried out by the education department of the municipality, utilizing also the educational material available from the MIEW.

These actions include the development of explanatory brochures, the implementation of a thematic energy day, excursions to energy saving projects in the municipality to show case the technologies and their results, as well as a drawing or essay contest on what the environment and energy means to them.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 35 below. As an awareness raising activity, it is considered that the action is beneficial to the municipality against the related costs.

Table 35 - Action 1.10 in numbers

Action 1.10: Awareness raising campaigns for pupils and students	
Duration	2016-2020
Total Implementation Cost (NIS)	40,000 NIS
Annual Energy Savings (MWh)	16.53 MWh
Annual Emission Reduction (tn CO ₂)	9.92 tn CO ₂
Funding Source	Own funding + Government (Min. of Education)
Net Present Value (NPV)	> 0

3.2.11 Promotion of recycling

As waste contributes a little over 16% to the total municipal emissions, the municipality of Shfar'am is dedicated to actively implement awareness activities to promote the recycling context, which is currently less than 1%.

The municipality wishes to promote recycling among the residents in order to achieve a 20% recycling rate by 2020. This will be achieved through the establishment of the related infrastructure (installation of recycle bins, collection of waste for recycling) and broad dissemination activities, such as info days for the citizens, dissemination of messages through radio, newspapers and television, especially using local media, production of promotional material (leaflets, brochures, posters) and perhaps billboard advertisements. Special events for school children will be realized as well.

The municipality will ensure that the proper infrastructure (recycling bins and vehicles) is available for the waste sorting and collection on the streets, including recycling of electrical devices. Furthermore, in order to lead by example, the municipality will install recycling bins in all municipal buildings and facilities, promoting the use of recycled paper for the local administration, in relation to green procurement action referred above.

Although no energy savings will be achieved through this action, the estimated emission reductions will be approximately 15%.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 36 below. The action is beneficial to the municipality against the related costs, since due to the waste volume reduction, a significant amount of landfilling fees is saved (550 NIS per tn of waste collected and landfilled), while the cost for collection of the waste for recycling is lower compared to the above mentioned. The larger part of the initial cost concerns the related infrastructure, assuming a density of 20 recycling bins per 1,000 citizens. Collaboration contracts will be signed with the respective recycling companies for the collection and handling of waste for recycling.

This action is a key priority for the municipality and it is further developed as project fiche.

Table 36 - Action 1.11 in numbers

Action 1.11: Recycling promotion	
Duration	2016-2020
Total Implementation Cost (NIS)	1,100,000 NIS
Annual Energy Savings (MWh)	0 MWh
Annual Emission Reduction (tn CO ₂)	3,321.45 tn CO ₂
Funding Source	Ministry of Environmental Protection + Municipal sources +EU
Net Present Value (NPV)	630,000 NIS

3.2.12 Awareness raising campaigns to reduce the amounts of discarded food

One major source of GHG emissions for the municipality is waste. In an effort to reduce emissions from this source, the municipality of Shfar'am is planning to launch an awareness raising campaign on reducing the organic content of waste, especially targeting the amounts of food being discarded, contributing at the same time on the preservation of resources. The awareness campaign will include the dissemination of messages through radio, newspapers and television, especially using local media, production of promotional material (leaflets, brochures, posters) and perhaps billboard advertisements. Special events for school children will be realized as well.

Although no energy savings will be achieved through this action, the estimated emission reductions will be approximately 2.5%.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 37 below. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs, since due to the waste volume reduction, the transport and landfilling fees will be reduced.

Table 37 - Action 1.12 in numbers

Action 1.12: Reducing the organic content of waste	
Duration	2016-2020
Total Implementation Cost (NIS)	100,000 NIS
Annual Energy Savings (MWh)	0 MWh
Annual Emission Reduction (tn CO ₂)	553.58 tn CO ₂
Funding Source	Own funding + Ministry of Environment
Net Present Value (NPV)	> 0

3.2.13 Installation of 500kW PVs in municipal buildings' rooftops

The solar energy potential for the country is one of the highest in the MEDA region, with the average amount of solar energy for Shfar'am being 1,847 kWh/m².

Due to the relatively limited space in the region, no ground PVs are considered, with rooftop PVs being the optimal solution. The municipality is planning to utilize the rooftops in selected municipal buildings so as to install 500kW. The produced energy will be covering the buildings' needs, while the remaining amounts will be injected to the grid, in line with the net metering system.

The municipality will apply to International Financing Institutions (IFIs) and Donors in order to secure the necessary related financing.

The calculation of electricity production from PVs is realized according to the equation below:

$$E = A * r * H * PR$$

Where:

E: The electricity produced (kWh)

A: Total solar panel area (m²)

r: Solar panel yield (Considered 15%)

H: Annual average solar radiation (1,847 kWh/m² for Shfar'am)

PR: Performance ratio, considering losses (range between 0.5 – 0.9, default value 0.75)

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 38 below. It should be noted that the NPV is calculated during the lifetime of the PV panels, namely for 20 years.

Table 38 - Action 1.13 in numbers

Action 1.13: 500 kW PVs in municipal rooftops	
Duration	2016-2020
Total Implementation Cost (NIS)	4,000,000 NIS
Annual Energy Savings (MWh)	600.00 MWh
Annual Emission Reduction (tn CO ₂)	360.00 tn CO ₂
Funding Source	Own funding + Loans (ESCO) + Min. of Energy
Net Present Value (NPV)	106,000 NIS

3.3 Municipal Public Lighting

The municipal public lighting sector consists of two main consumers, street and traffic lighting, with traffic lighting being almost negligible. Therefore, the suggested actions in this sector focus on street lighting, with the planned measures being low costs actions with immediate results.

Table 39 - Proposed Actions in the Municipal Public Lighting Sector

Action No	Action	Emission Reductions (tn CO ₂)
2.1	Municipal lighting study	0.00
2.2	Municipal lighting system upgrade	739.16

3.3.1 Municipal lighting study

As the municipality of Shfar'am doesn't currently have a municipal lighting study, it is considered a priority for the municipality since it will constitute the basis for the other actions to be implemented.

The study will be focusing on the lighting needs, identifying areas where light pollution phenomena may exist, against other areas in need of more lighting. At the same time, the luminosity of different types of lights bulbs in operation will be evaluated and verified through field visits and measurements with luxometers. Moreover, the study will focus on alternative technologies that could be utilized to offer the same lighting levels at lower consumptions, and evaluate their detailed economical behaviour, as well as the potential installation of light control systems.

The implementation of this study is not considered to derive direct energy savings and CO₂ reduction benefits, but it is seen as a prerequisite for the rest of the actions in the sector.

Some details regarding this activity are presented in the table below.

Table 40 - Action 2.1 in numbers

Action 2.1: Municipal lighting study	
Duration	2016-2017
Total Implementation Cost (NIS)	100,000 NIS
Funding Source	Own sources

3.3.2 Municipal lighting system upgrade

Municipal lighting is one of the key contributors in the municipal consumptions and thus an area where efficiency measures can be broadly implemented. The specific action focuses on four axes and is based on the lighting study that should be conducted first:

- 1st axis: Better maintenance of the system. This activity focuses on the proper maintenance of the system, so that damaged light bulbs are replaced as soon as possible with new and more efficient ones.
- 2nd axis: Update of the lighting system infrastructure. The lighting systems in the municipality are considered very old and dysfunctional, facing wiring problems, outdated infrastructure etc. This axis is targeted at the gradual renewal of the whole infrastructure, where considered necessary.
- 3rd axis: Introduction of LED technology and gradual replacement of old light bulbs. This action relates to the gradual replacement of the current operating lamps, which are Mercury and High Pressure Sodium lamps of 125W and 250W respectively, as soon as their lifetime is reached, with LED lamps, which are more efficient and have longer lifetime, sustaining at the same time the required brightness levels.
- 4th axis: Modification of the lighting grid's density. This action will lead to the more rational placement density of the lighting poles, especially in areas that are less densely populated, with the removal of redundant poles and the increase in their placement distance in the expansion areas of the lighting grid. Moreover, the introduction of LED technology can further result in the reduction of the light bulbs per pole, in order to have the same end result.

It is envisaged that an overall saving of 35% can be achieved through the enforcement of the above mentioned priority axes.

This action is a key priority for the municipality and it is further developed as project fiche.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 41. The NPV has been calculated over the project lifetime (11 years).

Table 41 - Action 2.2 in numbers

Action 2.2: Municipal lighting system upgrade	
Duration	2016-2020
Total Implementation Cost (NIS)	5,195,000 NIS
Annual Energy Savings (MWh)	1,232.00 MWh
Annual Emission Reduction (tn CO ₂)	739.16 tn CO ₂
Funding Source	Loans (ESCO) + Government (Ministry of Energy)
Net Present Value (NPV)	292,000 NIS

3.4 Residential Buildings

The residential sector in Shfar'am is the highest energy consumer and emitter, with almost 45% of the total municipal consumptions. Although, the Municipality does not have the possibility of direct interventions in terms of projects realization for the reduction of the homes' energy footprint, it is planning a series of actions in order to inform, educate, raise awareness and support the citizens in their activities.

The population's segmentation is significant in the community since 4 different groups are met: Muslim, Christian, Druze, and relatively new group of Bedouins. Due to the specific cultural characteristics of these groups much of the reaching out will be realized through local leaders – youth movements, religious leaders, council members, who have a significant impact on the local citizens. On the other hand, women and especially housewives are also a key target group for the municipality, since the phenomenon of women staying at home is more often met in this region.

The list of planned actions for the residential sector in the Municipality of Shfar'am is presented in Table 42.

Table 42 - Proposed Actions for the Residential Buildings

Action No	Action	Emission Reductions (tn CO ₂)
3.1	The 10% voluntary commitment campaign	4,018.78
3.2	Promotion of Green Buildings' concept	709.20
3.3	Campaign for old fridges' substitution	2,783.48
3.4	Women groups on energy efficiency	1,654.79
3.5	Information & awareness raising activities	1,418.39
3.6	Initiatives supporting citizens' actions	472.80
3.7	Establishment of the municipal team	709.20
3.8	2 MW Photovoltaics in residential rooftops	1,440.00

3.4.1 The 10% voluntary commitment campaign

This revolutionary campaign to be promoted across the different energy consuming sectors (residential, tertiary, industrial) in the whole municipality is an effort to increase the sense of responsibility towards the environment and the community, among the citizens in this case, by establishing an environmental consciousness.

The municipality will launch this program as a voluntary campaign, where citizens can participate in order to reduce their home's energy and carbon footprint, and more importantly to reduce their electricity bill, thus saving some money for the monthly family budget. This action is targeted to single homes or apartment buildings as well, each one identified as a single user.

The user will be able to fill in an application form (potentially online through the municipality's website) in order to participate in the program, accompanied with the last year's electricity bills for the respective house (apartment or building). During the year he will be given priority to participate in all educational and informational events organized by the municipality with advice on how to reduce energy consumption in the house with simple actions and change of his behaviour, and he will be sent brochures with this material as well. At the end of the year, the user will submit his electricity bills once more in order to prove a 10% at least of energy savings.

The municipality will organize a ceremony for all participants in the program and will provide honorary certificates to those who achieved the target of 10% reductions, while it will publish their names in the local newspapers and /or magazines, as an example.

This action is a key priority for the municipality and it is further developed as project fiche.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 43. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 43 - Action 3.1 in numbers

Action 3.1: The 10% voluntary commitment campaign	
Duration	2016-2020
Total Implementation Cost (NIS)	450,000 NIS
Annual Energy Savings (MWh)	6,697.97 MWh
Annual Emission Reduction (tn CO ₂)	4,018.78 tn CO ₂
Funding Source	EU + Government (Min. of Energy, Environment, Social Equality)
Net Present Value (NPV)	> 0

3.4.2 Promotion of green buildings' concept

The lack of mandatory application of the green building code of practice in Israel is one of the key issues behind the moderate energy behaviour of buildings in the country.

This action is targeted towards the promotion of specific elements of the green buildings' concept, that can be applied in existing or new buildings as well, with the target that the rates with which citizens adopt such types of measures will be increased.

Customized sets of potential interventions and actions will be suggested to the citizens through info days and awareness activities in the local media (local newspapers, tv and radio), as well as distribution of dissemination material (flyers, brochures etc.). These interventions will be mainly focusing for the existing buildings on the need to install shadings in the southern glazing and roof insulation, as well as paint the buildings' facade and roofs with cool colors, that reduce thermal absorption. For the new buildings, where required changes can be realized from the design phase, emphasis will be placed on the optimal orientation of the building, the need for increased natural lighting and natural ventilation, the inclusion of a minimum level of insulation in the buildings' exterior surfaces (walls and roof), as well as shading in the glazing. In addition to the above the use of cool colors will also contribute significantly to the reduction of energy losses. All these suggested activities will be accompanied by a brief cost estimation and analysis, explaining their benefits to the citizens not only from the improvement of living conditions in the house point of view, but more importantly from their contribution in decreasing energy related costs and bills.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 44. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs. Considering that in 15% of the existing or new households in 2020, measures in line with the green building's concept will be adopted to reduce the consumption by at least 10%, an overall reduction in the residential sector of 1.5% is estimated.

Table 44 - Action 3.2 in numbers

Action 3.2: Promotion of green buildings' concept	
Duration	2016-2020
Total Implementation Cost (NIS)	150,000 NIS
Expected Private Funds Mobilized (NIS)	6,300,000 NIS
Annual Energy Savings (MWh)	1,181.99 MWh
Annual Emission Reduction (tn CO ₂)	709.20 tn CO ₂
Funding Source	Own funding + Government (min. of Energy, building, Environment)
Net Present Value (NPV)	> 0

3.4.3 Campaign for old fridges substitution

Apart from air-conditioning (A/C) and lighting, the domestic white appliances are one of the highest energy consumers in the residential sector. Since Shfar'am is located on the hills and has lower cooling needs compared to other municipalities in Israel, the specific action promotes the substitution of one of the most energy consuming white appliances, namely the fridges.

According to the National Energy Efficiency Program – Reducing electricity consumption 2010-2020, by the Ministry of National Infrastructures, Energy and Water Resources in Israel, the expected annual energy savings per household due to the use of energy efficient refrigerators following the regulation change, as of 2012, is estimated at 1,278 kWh.

The municipality of Shfar'am will work closely with the MIEW, which has provided financial motives in the past for the substitution of domestic appliances (e.g. A/C, fridges), so that the purchase of a new fridge with the simultaneous retraction of the old appliance will be subsidized for at least 3,000 households at a rate of 30%.

The municipality will undertake the awareness raising of the citizens on this initiative and the coordination of this action, in close collaboration with the engaged Ministry.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 45 below.

Table 45 - Action 3.3 in numbers

Action 3.3: Campaign for old fridges substitution	
Duration	2016-2020
Total Implementation Cost (NIS)	1,500,000 NIS
Expected Private Funds Mobilized (NIS)	3,500,000 NIS
Annual Energy Savings (MWh)	4,639.14 MWh
Annual Emission Reduction (tn CO ₂)	2,783.48 tn CO ₂
Funding Source	EU + Government (Min. of Energy, Social Equality)
Net Present Value (NPV)	> 0

3.4.4 Women groups on energy efficiency

As previously mentioned, due to the specific cultural characteristics of this Arab community, where the average rate of women staying at home is significantly higher compared to other municipalities in Israel, the municipality is planning to work closely with them in order to reduce the residential sector's consumption. As these women are not working and stay in the house a considerable amount of hours, it is considered that with simple behaviour modification the deriving energy benefits can be very significant.

In this respect, women working groups on energy efficiency will be established throughout the municipality, under the coordination of the municipality's educational department. A number of approximately 100 working groups of 10-15 persons to gather at least once every two months are envisaged, impacting on this way on at least 1,000-1,500 households. These working groups will be exchanging ideas and practices on how to save energy under the guidance of experienced municipal personnel. The anticipated energy savings for the households participating in these groups are in the range of 10-15%.

This action is a key priority for the municipality and it is further developed as project fiche.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 46.

Table 46 - Action 3.4 in numbers

Action 3.4: Women groups on energy efficiency	
Duration	2016-2020
Total Implementation Cost (NIS)	500,000 NIS
Annual Energy Savings (MWh)	2,757.99 MWh
Annual Emission Reduction (tn CO ₂)	1,654.79 tn CO ₂
Funding Source	Own funding + Government (Min. of Energy, Environment, Social Equality) + EU
Net Present Value (NPV)	> 0

3.4.5 Information and awareness raising activities

Apart from the specifically thematic targeted awareness raising activities mentioned above, this action is of broader character, as it addresses all residents. Its aim is to enhance the environmental consciousness of the citizens through the following activities:

- Organization of “Energy days”, in line with its participation in the Covenant of Mayors initiative. In these energy days the importance of energy saving and protecting the environment will be stressed, through simple actions such as modification of the energy behaviour, changing incandescent lamps with fluorescent or LED lamps, importance of purchasing high energy class appliances, installation of solar panels for water heating in existing buildings etc.
- Projection of freely available environmental documentaries on the World Environment day on the 5th of June. Some documentaries that could be alternatively projected include:
 - “Home” documentary, a 2009 film by Yann Arthus-Bertrand.
 - “The Nature of Cities”, a 2010 documentary by Chuck Davis and Tim beatley.
 - “Power to the people”, a 2015 documentary and many more.
- Participation in “Earth hour” event by WWF, where people across the world turn their lights off for one hour on a designated day.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 47. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 47 - Action 3.5 in numbers

Action 3.5: Information and awareness raising activities	
Duration	2016-2020
Total Implementation Cost (NIS)	150,000 NIS
Annual Energy Savings (MWh)	2,363.99 MWh
Annual Emission Reduction (tn CO ₂)	1,418.39 tn CO ₂
Funding Source	Own funding + Min. of Environment
Net Present Value (NPV)	> 0

3.4.6 Initiatives supporting citizens' actions

Having described in the above sections the activities the municipality of Shfar'am will realize to stimulate energy savings among the citizens, this action is targeted to the initiatives realized to actively support the citizens in these actions.

Coordination and “soft” awareness raising activities are considered two important elements to facilitate the promotion and implementation of the above mentioned actions.

In this respect, the municipality will use its website for the coordination of these activities, announcing events that are going to be organized in a calendar, bringing together groups of concerned citizens through an official forum and offering advice and know how on line through this portal.

On the other hand, the municipality will prepare a number of leaflets, brochures, posters, animation videos and information material in general on the importance of energy and energy savings, and advice on how energy can be used more efficiently on a daily basis in the citizens' routine activities. All this material will also be available online, through the municipality's website.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 48 below.

Table 48 - Action 3.6 in numbers

Action 3.6: Initiatives supporting citizens' actions	
Duration	2016-2020
Total Implementation Cost (NIS)	50,000 NIS
Annual Energy Savings (MWh)	788.00 MWh
Annual Emission Reduction (tn CO ₂)	472.80 tn CO ₂
Funding Source	Own funding
Net Present Value (NPV)	> 0

3.4.7 Establishment of the municipal team

As mentioned before, coordination is considered very important for the attainment of the set goals in these awareness raising activities. For this reason, apart from the municipality's obligation under the CoM to appoint the persons administratively responsible to follow up and implement the SEAP activities, the municipality will further enforce this team with additional personnel, especially from the technical service and educational departments. Objective is to offer the citizens technical advice, and where possible also legal and financial one, on the energy efficiency measures and projects that they intend to do in their households.

An Energy Efficiency Department is thus going to be created in order to offer this support to the civilians with a team that has high knowledge in energy efficiency and conservation projects and measures. The department will also offer advice based on the other proposed measures of the municipality.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 49 below.

Table 49 - Action 3.7 in numbers

Action 3.7: Establishment of the municipal team (Energy Efficiency Department)	
Duration	2015-2020
Total Implementation Cost (NIS)	1,750,000 NIS
Annual Energy Savings (MWh)	1,181.99 MWh
Annual Emission Reduction (tn CO ₂)	709.20 tn CO ₂
Funding Source	Government (Min. of Energy, Interior, Environment)
Net Present Value (NPV)	> 0

3.4.8 2MW Photovoltaics on residential rooftops

The high levels of solar energy potential in the area of the Municipality favor the installation of photovoltaics on roofs of residential buildings. An information campaign targeted to promote the

installation of PVs on residential rooftops will be conducted, combined with the coordination and awareness raising activities mentioned before.

Related calculations on the action are presented in Table 50, in line with the method presented under the municipal sector PVs. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs. It should be noted that the investment for an average household is considered marginally beneficial in the 20-year life span. However, considering that energy prices will go up within this period, this is definitely an investment worth thinking of.

Table 50 – Action 3.8 in numbers

Action 3.8: 2MW Photovoltaics in residential rooftops	
Duration	2016-2020
Total Implementation Cost (NIS)	100,000 NIS
Expected Private Funds Mobilized (NIS)	17,000,000 NIS
Annual Energy Savings (MWh)	2,400.00 MWh
Annual Emission Reduction (tn CO₂)	1,440.00 tn CO ₂
Funding Source	Own sources
Net Present Value (NPV)	> 0

3.5 Commercial Buildings, Equipment / Facilities

Commercial buildings/equipment and facilities is the third largest energy consuming sector and the second highest concerning the GHG emissions. As in the case of the residential sector, the Municipality does not have the possibility of direct interventions in terms of projects' realization for the reduction of the sector's energy and carbon footprint; however, it is planning a series of actions in order to inform, educate, raise awareness and support the related stakeholders in their activities.

The list of planned actions for the commercial sector in the Municipality of Shfar'am is presented in Table 51.

Table 51 - Proposed Actions for the Commercial Buildings, Equipment / Facilities

Action No	Action	Emission Reductions (tn CO₂)
4.1	Seminars to professional groups	339.85
4.2	10% voluntary commitment campaign	906.26
4.3	Promotion of green buildings' concept	453.13
4.4	Other information and awareness raising activities	226.56
4.5	4 MW photovoltaics on building rooftops	2,880.00

3.5.1 Seminars to professional groups

Lifelong learning activities are a key for the continuous evolvement of citizens and the society. Based on this fact, and taking into consideration the contribution the tertiary sector has on the municipality's carbon footprint, the municipality intends to organize a series of seminars to targeted professional groups in order to promote the concept of energy management and energy saving practices and provide advice on ways to improve at low cost the energy efficiency of the related buildings and facilities.

The municipality of Shfar'am is orientated towards the realization of a series of seminar rounds, where in each seminar a different group of interested stakeholders will participate. These seminars will be differentiated depending on the size of the group of stakeholders being represented, so different solutions will be suggested for small buildings/ shops/ companies, and alternative options will be provided for medium or large size ones.

Since key energy consumers in buildings of the tertiary sector are mainly HVAC and lighting, whose consumption is highly determined by the energy behaviour of the buildings and facilities' users, suggested technical solutions per group of stakeholders may include simple modification of the users' energy behaviour, installation of automations and thermostats, increase of natural light and natural ventilation, use of cool colors, replacement of incandescent or fluorescent lamps with LED etc.

The stakeholders will express interest to participate in one of these free of charge seminars through an online application form, and they will be notified depending on their characteristics (size, building use etc.) on potential dates they can attend the seminar, when the groups are complete. It is considered that over the years at least a 10% of the stakeholders activated in the sector will attend the seminars, achieving through low or no cost actions a 15% energy reduction in their facilities.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 52 below.

Table 52 - Action 4.1 in numbers

Action 4.1: Seminars to professional groups	
Duration	2016-2020
Total Implementation Cost (NIS)	500,000 NIS
Expected Private Funds Mobilized (NIS)	1,500,000 NIS
Annual Energy Savings (MWh)	566.41 MWh
Annual Emission Reduction (tn CO ₂)	339.85 tn CO ₂
Funding Source	Own funding + Government (Min. of Energy, Economy)
Net Present Value (NPV)	> 0

3.5.2 10% voluntary commitment campaign

As in the case of the residential sector and schools, the municipality will launch this program as a voluntary campaign, where shop and business owners can participate in order to reduce their facilities' energy and carbon footprint, and more importantly to reduce their electricity bill. An additional reward for those achieving the target, compared to the residential sector campaign, will be the conferment of the "Energy friendly business label", which will be adopted as a marketing campaign by the municipality. In this way, businesses achieving their set targets will be able to display such a label as a sign of corporate responsibility.

The interested stakeholders will be able to fill in an application form (potentially online through the municipality's website) in order to participate in the program, accompanied with the last year's electricity bills for the respective facilities (offices, shops, etc.). During the year they will be given priority to participate in all educational and informational events organized by the municipality with advice on how to reduce energy consumption in their premises with simple actions and they will be sent brochures with this material as well. At the end of the year, the users will submit their electricity bills once more in order to prove a 10% at least of energy savings.

The municipality will organize a ceremony for all participants in the program and will provide the "Energy friendly business label" to those who achieved the target of 10% reductions, while it will publish their brands' names in the local newspapers and /or magazines, as an example.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 53. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 53 - Action 4.2 in numbers

Action 4.2: 10% voluntary commitment campaign	
Duration	2016-2020
Total Implementation Cost (NIS)	400,000 NIS
Annual Energy Savings (MWh)	1,510.43 MWh
Annual Emission Reduction (tn CO ₂)	906.26 tn CO ₂
Funding Source	Own funding + Government (Min. of Energy, Economy)
Net Present Value (NPV)	> 0

3.5.3 Promotion of green buildings' concept

This action is targeted towards the promotion of specific elements of the green buildings' concept, that can be applied in existing or new buildings as well, with the target that the rates with which business owners adopt such types of measures will be increased.

Customized sets of potential interventions and actions will be suggested to the business owners through info days and awareness activities in the local media (local newspapers, TV and radio), as well as distribution of dissemination material (flyers, brochures etc.). These interventions will be mainly focusing for the existing buildings on the need to install shadings in the southern glazing and roof insulation, as well as paint the buildings' facade and roofs with cool colors, that reduce thermal absorption. For the new buildings, where required changes can be realized from the design phase, emphasis will be placed on the optimal orientation of the building, the need for increased natural lighting and natural ventilation, the inclusion of a minimum level of insulation in the buildings' exterior surfaces (walls and roof), as well as shading in the glazing. In addition to the above, the use of cool colors will also contribute significantly to the reduction of energy losses. All these suggested activities will be accompanied by a brief cost estimation and analysis, explaining their benefits not only from the improvement of living conditions point of view, but more importantly from their contribution in decreasing energy related costs and bills.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 54. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 54 - Action 4.3 in numbers

Action 4.3: Promotion of green buildings' concept	
Duration	2016-2020
Total Implementation Cost (NIS)	200,000 NIS
Expected Private Funds Mobilized (NIS)	2,300,000 NIS
Annual Energy Savings (MWh)	755.22 MWh
Annual Emission Reduction (tn CO ₂)	453.13 tn CO ₂
Funding Source	Own funding + Government (Min. of Energy, Economy, Building)
Net Present Value (NPV)	> 0

3.5.4 Other information and awareness raising activities

Apart from organizing seminars, design and distribution of informative leaflets and brochures relevant to projects and funding schemes that act in favor of energy efficiency and green energy production is

being planned. Design of informative material is of outmost importance for the dissemination of ideas that can change the energy behaviour of the commercial sector.

The informative material will be produced and renewed several times each year, and will cover different aspects and directions in the energy efficiency and emission reduction. Case studies that act as prototypes will be included in the informative material, to encourage the commercial sector to reproduce exemplary actions.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 55 below. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 55 - Action 4.4 in numbers

Action 4.4: Other information and awareness raising activities	
Duration	2016-2020
Total Implementation Cost (NIS)	100,000 NIS
Annual Energy Savings (MWh)	377.61 MWh
Annual Emission Reduction (tn CO ₂)	226.56 tn CO ₂
Funding Source	Own funding
Net Present Value (NPV)	> 0

3.5.5 4 MW Photovoltaics on building rooftops

As mentioned before, the high levels of solar energy potential in the area of the Municipality favor the installation of photovoltaics on roofs of tertiary sector buildings. An information campaign targeted to promote the installation of PVs on these rooftops will be conducted, combined to the coordination and awareness raising activities mentioned before.

Related calculations on the action are presented in Table 56, in line with the method presented under the municipal sector PVs. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs. It should be noted that the investment for an average investment is considered beneficial in the 20-year life span and considering that energy prices will go up within this period, this is definitely an investment worth thinking of.

Table 56 - Action 4.5 in numbers

Action 4.5: 4 MW Photovoltaics on rooftops	
Duration	2016-2020
Total Implementation Cost (NIS)	50,000 NIS
Expected Private Funds Mobilized (NIS)	34,000,000 NIS
Annual Energy Savings (MWh)	4,800.00 MWh
Annual Emission Reduction (tn CO ₂)	2,880.00 tn CO ₂
Funding Source	Own funding
Net Present Value (NPV)	> 0

3.6 Industrial Sector

The industrial sector is being responsible for less than 3% of carbon emissions in the area of Shfar'am. It should be noted that there is no heavy industry in the local authority's area. There are only small workshops etc., which are classified as industries by the Israeli Electricity Company and are treated as such in the SEAP.

Table 57- Proposed Actions for the Industrial Sector

Action No	Action	Emission Reductions (tn CO ₂)
5.1	Subsidized energy audits at a volunteer basis	163.54
5.2	Targeted training seminars	65.42
5.3	10% voluntary commitment campaign	196.25

3.6.1 Subsidized energy audits at a volunteer basis

The Israeli legal framework does not obligate the relatively small industries in periodic energy audits. However, energy audits are a powerful tool in order to address the issue of low energy efficiency and related GHG emissions, since they can be used to identify the key areas allowing significant energy savings with simple actions of low or medium cost.

In this respect, the municipality of Shfar'am is planning to realize a program where subsidized energy audits will be offered to stakeholders from the industrial sector. These audits will be offered with the stakeholders' commitment that they are going to implement at least two low cost measures in order to improve their energy consumption profiles.

Efforts will be made by the municipality to ensure the necessary financing for this action in the framework of a state funded program, as those launched by the MIEW.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 58.

Table 58 - Action 5.1 in numbers

Action 5.1: Subsidized energy audits at a volunteer basis	
Duration	2016-2020
Total Implementation Cost (NIS)	600,000 NIS
Expected Private Funds Mobilized (NIS)	1,100,000 NIS
Annual Energy Savings (MWh)	272.57 MWh
Annual Emission Reduction (tn CO ₂)	163.54 tn CO ₂
Funding Source	EU + Government (Min. of Economy)
Net Present Value (NPV)	> 0

3.6.2 Targeted training seminars

Similar to the tertiary sector, the municipality of Shfar'am is orientated towards the realization of a series of seminar rounds, where in each seminar a different group of interested stakeholders will participate. These seminars will be differentiated depending on the size of the group of stakeholders being represented, so different solutions will be suggested for small industries, and alternative options will be provided for medium or large size ones. The areas these industries are activated are also very important for their grouping into different categories, since the production procedure of each industry

may be largely differentiated depending on the end product. The buildings of these industries will also be taken into consideration in these seminars.

The stakeholders will express interest to participate in one of these free of charge seminars through an online application form, and they will be notified depending on their characteristics (size, building use etc.) on potential dates they can attend the seminar, when the groups are complete. It is considered that over the years at least 40% of the stakeholders activated in the sector will attend the seminars, achieving through low or no cost actions a 5% energy reduction in their facilities.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 59.

Table 59 - Action 5.2 in numbers

Action 5.2: Targeted training seminars	
Duration	2016-2020
Total Implementation Cost (NIS)	80,000 NIS
Annual Energy Savings (MWh)	109.03 MWh
Annual Emission Reduction (tn CO ₂)	65.42 tn CO ₂
Funding Source	Own funding + Gov. (Min. of Economy)
Net Present Value (NPV)	> 0

3.6.3 The 10% voluntary commitment campaign

Similar to the tertiary sector, the municipality will launch this program as a voluntary campaign, where stakeholders from the industrial sector can participate in order to reduce their facilities' energy and carbon footprint, and more importantly to reduce their energy cost. The "Energy friendly business label" will be applicable to this group as well. In this way, businesses achieving their set targets will be able to display such a label as a sign of corporate responsibility.

The interested stakeholders will be able to fill in an application form (potentially online through the municipality's website) in order to participate in the program, accompanied with the last year's electricity bills for the respective facilities. During the year they will be given priority to participate in all educational and informational events organized by the municipality with advice on how to reduce energy consumption in their premises with simple actions and they will be sent brochures with this material as well. At the end of the year, the users will submit his electricity bills once more in order to prove a 10% at least of energy savings.

The municipality will organize a ceremony for all participants in the program and will provide the "Energy friendly business label" to those who achieved the target of 10% reductions, while it will publish their brands' names in the local newspapers and /or magazines, as an example.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 60. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 60 - Action 5.3 in numbers

Action 5.3: The 10% voluntary commitment campaign	
Duration	2016-2020
Total Implementation Cost (NIS)	50,000 NIS
Annual Energy Savings (MWh)	327.09 MWh
Annual Emission Reduction (tn CO ₂)	196.25 tn CO ₂
Funding Source	Own funding + Gov. (Min. of Economy, Energy)
Net Present Value (NPV)	> 0

3.7 Transport

Transportation is the second largest energy consumer in the municipality of Shfar'am, and the third largest contributor in the territory's GHG emissions. Since the municipality itself doesn't have any municipal fleet, all of its activities are targeted in the private and public transportation.

Table 61- Proposed actions for Transport

Action No	Action	Emission Reductions (tn CO ₂)
6.1	Transportation master plan	0.00
6.2	Improve public transportation	721.59
6.3	Cycling promotion and creation of related infrastructure	300.00
6.4	Promotion of walking, car sharing and car pooling campaigns	459.19
6.5	Improvement / development of parking infrastructure	350.00
6.6	Adoption of real time information in public transport	131.20
6.7	Promotion of eco-driving	1,103.16
6.8	Promotion of new technology buses in the public transportation	115.10
6.9	Other information and awareness raising activities	784.28

3.7.1 Transportation master plan

The transportation master plan is the key to success for all activities envisaged in the transportation sector, so that the activities are coherent and not simply segmented ideas. In this respect, this master plan constitutes the city's blueprint for planning, developing and operating its walking, cycling, transit and road networks over the coming decades, its horizon being not only 2020.

The plan has a twofold objective. On one hand to improve mobility and access in the city in a way that is safe and convenient and on the other hand to do so by minimizing auto congestion, air pollution, and noise.

Key areas of focus for the current plan will include integrating the concept of complete streets, updating modal share targets, advancing strategies to improve walking and cycling, and supporting transit-oriented development. The plan will also identify a number of modifications to road and transit infrastructure priorities to account for adjustments in growth patterns, emerging issues and strategic opportunities.

The implementation of this study is not considered to derive direct energy savings and CO₂ reduction benefits, but it is seen as a prerequisite for the rest of the actions in the sector.

Some details regarding this activity are presented in the table below.

Table 62 - Action 6.1 in numbers

Action 6.1: Transportation master plan	
Duration	2016-2017
Total Implementation Cost (NIS)	500,000 NIS
Funding Source	Own + Government (Min. of Transportation)

3.7.2 Improve public transportation

Public transportation is not considered good in the municipality of Shfar'am, so there is significant room for improvement.

The master plan intends to identify all the routes that are not adequately serviced so far, in order either to establish new bus routes, or to increase the frequency of the existing ones. Among the new bus routes for consideration are the connection to the highway (route 6), and also the inclusion of bus stops outside primary and secondary schools and an increase in their frequency during the start and ending hours of schools' operation. School related mobility is closely connected with the municipality's priority on increasing the pupils' mobility in a safe manner, reducing on the other hand the congestion created by parents' cars picking up their children. In this aspect, the routing of school buses, or "pedestrian" school buses where at least two adults will accompany children to school could be considered. Additional modifications to increase the transit possibilities for workers will be realized according to the master plan suggestions.

The public transportation in Shfar'am is conducted through private companies; however, the municipality intends to begin dialogue with them in order to ensure their collaboration in this initiative.

Some details regarding this activity are presented in the table below.

Table 63 - Action 6.2 in numbers

Action 6.2: Improve public transportation	
Duration	2017-2020
Total Implementation Cost (NIS)	50,000 NIS
Expected Private Funds Mobilized (NIS)	2,000,000 NIS
Annual Energy Savings (MWh)	2,897.96 MWh
Annual Emission Reduction (tn CO ₂)	721.59 tn CO ₂
Funding Source	Own sources
Net Present Value (NPV)	> 0

3.7.3 Cycling promotion and creation of related infrastructure

Although cycling is gradually gaining ground in the bigger cities in Israel, people in Shfar'am are not accustomed with it.

This particular activity focuses on three distinct levels for the promotion of cycling in the region:

- Extensive dissemination activities, through information campaigns on the benefits of cycling. These campaigns may include the use of dissemination material, such as flyers, brochures etc., posters or advertisements on the local media (tv, radio). These campaigns will be gradually enriched with information on the infrastructural improvements that the municipality will realize.
- Creation of the necessary cycling infrastructure (bicycle lanes) across the road network of Shfar'am.
- Establishment of a municipal bicycling sharing program. Within this program's framework, a number of bicycles will be available to the citizens at a low rental price, backstopped by a number of stations throughout the city, where the citizen may get on and off.

This initiative is quite ambitious, expands to the 2030 horizon and requires external financing for its implementation. The cycling paths envisaged are 12 km long.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 64, while an indication of the estimated emission reductions by 2020 is also provided. The action is a significant infrastructure investment that contributes to the improvement of quality of life, even though it is not considered economically viable. Additional indirect benefits should be considered for the project's profitability (the so called externalities) such as attraction of residents and tourists to the municipality, improvement of quality of life, environment and social conditions etc. Therefore, it is considered necessary for the city, even though it brings no economic profit directly to the municipal authorities.

Table 64 – Action 6.3 in numbers

Action 6.3: Cycling promotion and creation of related infrastructure	
Duration	2017-2030
Total Implementation Cost (NIS)	12,000,000 NIS
Annual Energy Savings (MWh)	2,107.61 MWh
Annual Emission Reduction (tn CO ₂)	524.79 tn CO ₂
Annual Emission Reduction (tn CO ₂) by 2020	300.00 tn CO ₂
Funding Source	EU + Government
Net Present Value (NPV)	< 0

3.7.4 Promotion of walking - Car sharing and car pooling campaigns

Walking is one the basic ways for citizens' mobility within a community, and especially a relatively small one like Shfar'am. This action is focused on a different series of activities that will promote walking across the municipality. Such activities include:

- Installation of walking signs throughout the city, informing the citizen on the distance and time required to reach the municipality's key sites. These signs could also include info on the calories required to cross such a distance.
- Improvement of the pavements, making them friendlier for walking. This can be achieved with better maintenance for the replacement of damaged or broken flagstone tiles, enlargement of the pavement where considered feasible, planting of trees and flowers.
- Creation of pedestrian roads, especially in the commercial zone, or close to low circulation roads.
- Renovation of parks or other public areas (squares etc.), making them more attractive to the citizen.
- Large scale awareness campaign on walking, the benefits for the health, as well as the possibilities provided in the municipality.

Another scale of this action is the promotion of car sharing and car pooling, for those citizens that choose to use this mean of transportation. The municipality's role in this is mainly that of the coordinator. The municipal website can be utilized in order not only to familiarize people with the concepts of car sharing and car pooling, but also to bring them together and be the connecting point among them. Thus, the citizens (website users) will be able to inform on their routes and the timing of their transportation, in order to be matched with other citizens with the same transport habits. The elaboration of a relevant mobile application could be also explored, instead of using the municipality's website.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 65. The action is a significant infrastructure investment that contributes to the improvement of quality of life, even though it is not considered economically viable. Additional indirect benefits should be considered for the project's profitability (the so called externalities) such as attraction of residents and tourists to the municipality, improvement of quality of life, environment and social conditions etc. Therefore, it is considered necessary for the city, even though it brings no economic profit directly to the municipal authorities.

Table 65 - Action 6.4 in numbers

Action 6.4: Promotion of walking - Car sharing and car pooling campaigns	
Duration	2016-2020
Total Implementation Cost (NIS)	2,000,000 NIS
Annual Energy Savings (MWh)	1,844.15 MWh
Annual Emission Reduction (tn CO ₂)	459.19 tn CO ₂
Funding Source	IFIs and Donors + Gov. (Min. of Transportation)
Net Present Value (NPV)	NPV < 0

3.7.5 Improvement/ development of parking infrastructure

Car congestion, as well as decreased transiting ability to the means of public transportation, are common problems the drivers face due to the inability to find a parking space.

In an effort to decrease the time and fuel spent by the drivers in their attempt to find a parking space and the limited use of the means of public transportation due to the lack of parking lots to facilitate transiting passengers, the municipality of Shfar'am intends to improve/extend the existing parking infrastructure and develop new ones where required. More specifically, the plan is to develop large parking lots in the outskirts of the center, and have municipal shuttles to the center. This is important in all days, but especially on weekends and holidays, since Shfar'am brings in quite a lot of tourists, and the municipality wants to develop the tourism even more.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 66. The overall investment is considered to have multi-beneficial effect on the municipality, since it will attract tourism and related income to the community and improve life quality. For the calculation of the NPV, externalities as the above mentioned should also be taken into consideration, since this is an infrastructure project of high cost, then cannot be repaid only from the rental of the parking spaces, that are expected to be made available for the public at relatively low prices or no cost at all.

This action is a key priority for the municipality and it is further developed as project fiche.

Table 66 - Action 6.5 in numbers

Action 6.5: Improvement/ development of parking infrastructure	
Duration	2016-2030
Total Implementation Cost (NIS)	10,000,000 NIS
Annual Energy Savings (MWh)	2,107.61 MWh
Annual Emission Reduction (tn CO ₂)	524.79 tn CO ₂
Annual Emission Reduction (tn CO ₂) by 2020	350.00 tn CO ₂
Funding Source	EU + Government (Min. of Transportation, Building, Energy)
Net Present Value (NPV)	N/A

3.7.6 Adoption of real time information in public transport

Real-time information for public transport provides timely and accurate data such as route number, final destination, waiting time, service disruptions, etc. Commuters can make decisions about modes of travel and travel routes based on the provided information. In Europe, as well as some other parts of Israel, cities are implementing real-time information systems and analysis show that these measures result in an increase of up to 6% of the public transportation passengers.

Related calculations on the action in terms of initial cost, energy and emission savings, as well as financial viability, are presented in Table 67 below.

Table 67 - Action 6.6 in numbers

Action 6.6: Adoption of real time information in public transport	
Duration	2016-2020
Total Implementation Cost (NIS)	450,000 NIS
Annual Energy Savings (MWh)	526.90 MWh
Annual Emission Reduction (tn CO ₂)	131.20 tn CO ₂
Funding Source	Government (Min. of transportation)
Net Present Value (NPV)	NPV>0

3.7.7 Promotion of eco-driving

The adoption of eco-driving principles by drivers is considered as a good way to significantly decrease a car's consumption. However, in order to be effective, simple advice to the drivers is not enough; specialized eco-driving training seminars should be realized. According to studies, these trainings lead to consumption reduction up to 20% directly after training and about 5% in the long run.

Based on these facts, the municipality of Shfar'am intends to realize a series of seminars targeted at the private transport professionals in Shfar'am. The seminars will be initially addressed at the taxi and public buses' drivers, with the aim to be expanded to the truck drivers as well.

These seminars will be subsidized by the municipality, which will be in close collaboration with all private transport sector companies activated in Shfar'am, in order to ensure that all their professionals will undergo this training, even a repeatable session if considered required, within the 2020 horizon.

The funding for this activity is expected to be ensured through sponsorships or funding programs by the related ministries.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 68. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 68 - Action 6.7 in numbers

Action 6.7: Promotion of eco-driving	
Duration	2016-2020
Total Implementation Cost (NIS)	550,000 NIS
Annual Energy Savings (MWh)	5,210.40 MWh
Annual Emission Reduction (tn CO ₂)	1,103.16 tn CO ₂
Funding Source	EU + Government (Min. of Transportation, Energy)
Net Present Value (NPV)	> 0

3.7.8 Promotion of new technology buses in the public transportation

Public buses in Israel are quite energy consuming according to the Central Bureau of Statistics (CBS) in Israel. Private transport companies are gradually proceeding to the partial renewal of their fleet with newer buses. The municipality of Shfar'am will be in close collaboration with the public transportation companies' representatives, in order to promote as much as possible new technology vehicles that are highly efficient.

This action has no cost for the municipality and is expected to contribute significantly in its carbon footprint's reduction.

Related calculations on the expected energy savings and emission reductions are presented in Table 69.

Table 69 - Action 6.8 in numbers

Action 6.8: Promotion of new technology buses in the public transportation	
Duration	2016-2020
Total Implementation Cost (NIS)	-
Expected Private Funds Mobilized (NIS)	6,500,000 NIS
Annual Energy Savings (MWh)	431.10 MWh
Annual Emission Reduction (tn CO ₂)	115.10 tn CO ₂

3.7.9 Other information and awareness raising activities

These awareness raising initiatives are in their majority targeting the citizens and their scope is to inform them in a coherent and aggregated manner on the following:

- Eco-driving principles and advice.
- Latest vehicle technologies (electric, hybrid, etc.), related costs and fuel savings.
- Alternative transportation patterns around the city (walking, cycling, car sharing and car pooling, transiting with public transportation etc.).

These awareness raising campaigns will be tailored made for each target group (senior citizens, teenagers, workers etc.) and will be realized through local media (radio, newspapers and tv), as well as posters, billboard advertisements and brochures/ flyers. This material will also be available by the municipality's website.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 70. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 70 - Action 6.9 in numbers

Action 6.9: Other information and awareness raising activities	
Duration	2016-2020
Total Implementation Cost (NIS)	250,000 NIS
Annual Energy Savings (MWh)	3,763.54 MWh
Annual Emission Reduction (tn CO ₂)	784.28 tn CO ₂
Funding Source	Own funding + Government (Min. of Transportation, Energy, Environment)
Net Present Value (NPV)	> 0

3.8 Agriculture

The agricultural sector in Shfar'am has a very small footprint on the total emissions, with less than 0.5% of the total CO₂ emissions of the municipality. The only source of energy for the sector that data is available for, is electricity and the municipality plans to organize some awareness raising activities for the farmers to consume less energy.

Table 71 - Proposed actions for Agriculture

Action No	Action	Emission Reductions (tn CO ₂)
7.1	Awareness raising activities	0.81

3.8.1 Awareness raising activities for farmers

The municipality plans to organize specific awareness raising actions for the farmers of the area of Shfar'am. These awareness raising activities will include seminars and lectures which will be accompanied by relevant printed material, in order to promote new technologies for farming and especially irrigation that are more energy efficient.

Another activity that will take place along with the seminars and the lectures is a survey about the production of woodchips in the territory and its quantification for future use, as no data currently exist

on this. The potential to use biomass from agricultural residues as a heating source (e.g. open fireplaces etc.) will also be examined after the survey's results are published.

Related calculations on the action in terms of initial cost and emission savings are presented in Table 72. As an awareness raising activity, it is considered that the action is exponentially beneficial to the municipality against the related costs.

Table 72 -Action 7.1 in numbers

Action 7.1: Awareness raising activities for farmers	
Duration	2016-2020
Total Implementation Cost (NIS)	30,000 NIS
Annual Energy Savings (MWh)	1.35 MWh
Annual Emission Reduction (tn CO ₂)	0.81 tn CO ₂
Funding Source	Own funds
Net Present Value (NPV)	< 0

3.9 Monitoring

Monitoring of the municipality's progress against the set targets is very significant, especially since it has to be realized in a frequent basis.

The following table includes the suggested indicators to monitor each action's progress against the initial objectives, in order any deviations from the target to be noticed quickly, and appropriate correction measures to be taken.

These indicators will be also utilized during the production of the actions' monitoring report to the Covenant of Mayors Office, in order to demonstrate the achieved progress and results.

Table 73 - Key performance indicators for the SEAP actions

Action No	Action	Key Performance Indicators	Measurement units
Municipal buildings, Equipment / Facilities			
1.1	Green procurement procedures for municipal buildings	<ul style="list-style-type: none"> Number of devices that were bought with green procurement procedures 	<ul style="list-style-type: none"> Device number
1.2	Upgrading the municipal buildings' lighting system	<ul style="list-style-type: none"> Number of lamps that were replaced with LED lamps Area covered with automations in lighting 	<ul style="list-style-type: none"> Number of lamps replaced each year m²
1.3	Certification of municipal buildings and facilities with ISO 50001	<ul style="list-style-type: none"> Number of buildings certified Average consumption in the certified buildings 	<ul style="list-style-type: none"> Number of buildings kWh/m²
1.4	Upgrading the municipal buildings' and facilities' A/C systems	<ul style="list-style-type: none"> Number of A/Cs that were replaced with new ones 	<ul style="list-style-type: none"> Number of A/Cs
1.5	Energy Manager appointment in the Municipality	<ul style="list-style-type: none"> Number of years that the Energy Manager is appointed and active Number and % of municipal infrastructure under his supervision 	<ul style="list-style-type: none"> Number of years Number and % of municipal infrastructure being supervised
1.6	Energy refurbishment of selected municipal buildings as pilot projects	<ul style="list-style-type: none"> Average consumption and savings per m² in the refurbished buildings Percentage of buildings that were refurbished out of the total number of buildings 	<ul style="list-style-type: none"> kWh/m² %
1.7	Awareness raising activities for municipal employees	<ul style="list-style-type: none"> Number of training seminars that were implemented Municipal employees that were trained 	<ul style="list-style-type: none"> Number of seminars Number of employees
1.8	Green schools' certification	<ul style="list-style-type: none"> Number of schools certified 	<ul style="list-style-type: none"> Number of schools
1.9	The 10% commitment campaign for schools	<ul style="list-style-type: none"> Total energy consumption in schools Average consumption per m² in each school Savings achieved per participating school in kWh and % 	<ul style="list-style-type: none"> kWh kWh/m² kWh and %
1.10	Awareness raising campaigns for pupils/ students	<ul style="list-style-type: none"> Number of campaigns that were implemented Students that were reached from the campaigns 	<ul style="list-style-type: none"> Number of campaigns Number of students
1.11	Promotion of recycling	<ul style="list-style-type: none"> Total amount of recycled waste in the 	<ul style="list-style-type: none"> tn/year

Action No	Action	Key Performance Indicators	Measurement units
		<ul style="list-style-type: none"> Municipality Total actions that were implemented to promote recycling Available infrastructure in terms of recycle bins coverage 	<ul style="list-style-type: none"> Number of seminars, leaflets and other actions Number of recycle bins per square km area
1.12	Awareness raising campaigns to reduce the amounts of discarded food (reduction of the organic content of waste)	<ul style="list-style-type: none"> Total amount of discarded food Total actions implemented to raise awareness 	<ul style="list-style-type: none"> tn/year Number of workshops, seminars, leaflets etc.
1.13	Installation of 500kW PVs in municipal buildings' rooftops	<ul style="list-style-type: none"> Installed capacity of PV on roofs Percentage of installed capacity compared to the initial target 	<ul style="list-style-type: none"> kWp % out of 500kWp
Municipal public lighting			
2.1	Municipal lighting study	<ul style="list-style-type: none"> Lighting study implementation 	<ul style="list-style-type: none"> YES/NO answer
2.2	Municipal lighting system upgrade	<ul style="list-style-type: none"> Lamps that were replaced with energy efficient MWh produced from PVs installed on lighting poles % of lighting grid covered by automations 	<ul style="list-style-type: none"> Number of lamps MWh %
Residential buildings			
3.1	The 10% voluntary commitment campaign	<ul style="list-style-type: none"> Total energy consumption in houses Average consumption per m² in residential sector 	<ul style="list-style-type: none"> kWh kWh/m²
3.2	Promotion of Green Buildings' concept	<ul style="list-style-type: none"> Number of buildings that were refurbished to become 'Green' Number of promotion actions and average attendance 	<ul style="list-style-type: none"> Number of buildings Number of seminars, leaflets etc. People attended each action
3.3	Campaign for old fridges' substitution	<ul style="list-style-type: none"> Number of fridges that were replaced with new ones 	<ul style="list-style-type: none"> Number of fridges
3.4	Women groups on energy efficiency	<ul style="list-style-type: none"> Number of events for women Attendants in each event Total number of engaged households 	<ul style="list-style-type: none"> Number of events Women attended each activity Number of households

Action No	Action	Key Performance Indicators	Measurement units
3.5	Information & awareness raising activities	<ul style="list-style-type: none"> Number of awareness raising seminars and information days Attendants in each event 	<ul style="list-style-type: none"> Number of activities People attended each event
3.6	Initiatives supporting citizens' actions	<ul style="list-style-type: none"> Number of actions implemented Attendants in each event 	<ul style="list-style-type: none"> Number of actions People attended each action
3.7	Establishment of the municipal team	<ul style="list-style-type: none"> Number of people that were consulted by the municipal team 	<ul style="list-style-type: none"> Number of people
3.6	2 MW Photovoltaics in residential rooftops	<ul style="list-style-type: none"> Installed capacity of PV on roofs Percentage of installed capacity compared to the initial target 	<ul style="list-style-type: none"> kWp % out of 2 MWp
Commercial Buildings, Equipment / Facilities			
4.1	Seminars to professional groups	<ul style="list-style-type: none"> Number of awareness raising seminars Attendants in each event 	<ul style="list-style-type: none"> Number of activities People attended each activity
4.2	10% voluntary commitment campaign	<ul style="list-style-type: none"> Total energy consumption Average consumption per m² in commercial sector 	<ul style="list-style-type: none"> kWh kWh/m²
4.3	Promotion of green buildings' concept	<ul style="list-style-type: none"> Number of buildings that were refurbished to become 'Green' Number of promotion actions and average attendance 	<ul style="list-style-type: none"> Number of buildings Number of seminars, leaflets etc. People attended each action
4.4	Other information and awareness raising activities	<ul style="list-style-type: none"> Number of leaflets, brochures etc. distributed People reached 	<ul style="list-style-type: none"> Number of leaflets, brochures etc. Number of people reached
4.5	4 MW photovoltaic panels on building rooftops	<ul style="list-style-type: none"> Installed capacity of PV on roofs Percentage of installed capacity compared to the initial target 	<ul style="list-style-type: none"> kWp % out of 4 MWp

Action No	Action	Key Performance Indicators	Measurement units
Industrial Sector			
5.1	Subsidized energy audits at a volunteer basis	<ul style="list-style-type: none"> Audits implemented at Industrial Facilities Measures taken by the industries that were audited 	<ul style="list-style-type: none"> Number of audits Number of Measures
5.2	Targeted training seminars	<ul style="list-style-type: none"> Number of training seminars Attendants in each event 	<ul style="list-style-type: none"> Number of seminars People attended each seminar
5.3	10% voluntary commitment campaign	<ul style="list-style-type: none"> Total energy consumption Average consumption per m² in industrial sector 	<ul style="list-style-type: none"> kWh kWh/m²
Transport			
6.1	Transportation master plan	<ul style="list-style-type: none"> Implementation of the transportation plan Percentage of the city area covered by the public transport 	<ul style="list-style-type: none"> YES/NO % in total area
6.2	Improve public transportation	<ul style="list-style-type: none"> Number of routes that included more buses Number of routes that were changed 	<ul style="list-style-type: none"> Number of routes Number of routes
6.3	Cycling promotion and creation of related infrastructure	<ul style="list-style-type: none"> Total area of cycling roads constructed Total bicycle parking areas constructed 	<ul style="list-style-type: none"> m² Number of bicycle parking areas
6.4	Promotion of walking, car sharing and car pooling campaigns	<ul style="list-style-type: none"> Area of pavements constructed/refurbished Number of walking signs installed Number of parks etc. renovated Number of awareness raising activities 	<ul style="list-style-type: none"> m² Number of signs Number of public areas Number of activities
6.5	Improvement / development of parking infrastructure	<ul style="list-style-type: none"> New parking infrastructure created Parking infrastructure renovated 	<ul style="list-style-type: none"> Number of cars hosted in the parking infrastructure
6.6	Adoption of real time information in public transport	<ul style="list-style-type: none"> Number of e-signs installed Number of passengers in each route 	<ul style="list-style-type: none"> Number of signs Number of people
6.7	Promotion of eco-driving	<ul style="list-style-type: none"> Number of seminars implemented Percentage of drivers that attended the seminars 	<ul style="list-style-type: none"> Number of seminars % out of total number of drivers

Action No	Action	Key Performance Indicators	Measurement units
6.8	Promotion of new technology buses in the public transportation	<ul style="list-style-type: none"> Number of buses replaced with new 	<ul style="list-style-type: none"> Number of buses
6.9	Other information and awareness raising activities	<ul style="list-style-type: none"> Number of leaflets, brochures etc. distributed People reached 	<ul style="list-style-type: none"> Number of leaflets, brochures etc. Number of people reached
Agriculture			
7.1	Awareness raising activities	<ul style="list-style-type: none"> Number of awareness raising seminars Attendants in each event 	<ul style="list-style-type: none"> Number of activities People attended each activity

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ANNEXES

CES-MED



ANNEX A – Consumption of Educational Buildings

Site Name	Annual Energy Consumption (kWh)	
High and Middle Schools	1	194.810
	2	10.662
	3	172.482
	4	196.555
	5	43.428
	TOTAL	617.937
Elementary schools	1	65.700
	2	87.246
	3	180.744
	4	67.420
	5	88.658
	6	65.556
	7	33.612
	8	49.272
	9	32.582
	10	72.625
	TOTAL	743.415
Preschools	TOTAL	4672
All Schools	TOTAL	1.366.024

ANNEX B – Project Fiches

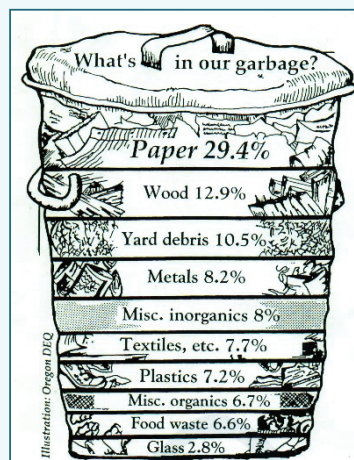
CES-MED



Promotion of Recycling - #1

1. General Presentation

Location	Start date	Project Lifetime
Shfar'am municipality area	2016	5 years
Project Owner / Lead Actor		
Municipality of Shfar'am		
Contact person		
Mr. Riad Hasuri, assistant to the mayor, with the assistance of Mr. Leiti Ganaim, environment consultant		



Summary of the Action

As waste contributes a little over 16% to the total municipal emissions, the municipality of Shfar'am is dedicated to decrease the impact of the waste environmental footprint by actively promoting recycling, which is currently calculated at rates lower than 1%.

The municipality's goal is to implement a large scale campaign that will significantly increase recycling among the residents in order to achieve a 20% recycling rate by 2020. This will be accomplished through the establishment of the related infrastructure (installation of recycle bins, collection of waste for recycling) and broad dissemination activities, such as info days for the citizens, dissemination of messages through radio, newspapers and television, especially using local media, production of promotional material (leaflets, brochures, posters) and perhaps billboard advertisements. Special events for school children will be realized as well.

Currently, the available infrastructure for recycling in the territory is very limited. The municipality will ensure that the proper infrastructure (recycling bins and vehicles) is available for the waste sorting and collection on the streets, including recycling of electrical devices. One of the first actions towards this direction is the actual identification (and not approximate one, based on which the current fiche is being developed) of the needed infrastructure, in terms of recycling bins frequency in the roads, as well as municipal buildings, including schools. The responsible municipal department will carry out this study, utilizing also the experience available from other municipalities with advanced recycling (e.g. Ramla) and the Ministry of Environment.

Furthermore, in order to lead by example, the municipality will install recycling bins in all municipal buildings and facilities, promoting the use of recycled paper for the local administration, in relation to green procurement that will also be implemented as part of the action plans.

It should be noted, that as a municipality in Israel, the population of the city is continuously growing, while the city limits are being expanded, with a number of smaller neighborhoods being gradually developed. The municipality's commitment also includes that in all these new neighborhoods, the necessary infrastructure for the waste management and collection of recyclable waste will be considered from the planning stage. For the time being, these areas include a new neighborhood which is currently being planned, as well as a new industrial park (mostly clean-tech, offices, and small workshops).

General Objectives of the Project		Principal partners and stakeholders				
1. Promote recycling among the residents in order to achieve a 20% recycling rate by 2020. 2. Lead by example and increase the recycling rate in all municipal buildings and facilities. 3. Include collection of recyclable waste in the initial planning for any new neighborhood being developed.		1. Ministry of Environment 2. Israeli municipalities with significant experience on recycling activities 3. Recycling companies 4. Environmental citizens groups				
Ultimate beneficiaries of the project		Link to municipal development plans / urban plans / other municipal or city programs				
1. Municipality of Shfar'am 2. Shfar'am citizens		1. This action has been proposed as part of the municipality's SEAP in the actions on waste management to be undertaken by the municipality. 2. It is the municipality's priority to treat locally tree and plants trimmings. The municipality has already designated an area for this treatment and is in the process of attaining the relevant approval from the regional planning committee. The treated trimmings will be utilized locally thus saving the need for transportation and landfilling fees, while they will be utilized in the regional parks.				
Estimated investment cost needed						
EUR:	250,000					
NIS:	1,100,000					
2. Technical Description						
Area(s) of intervention (sectors as specified in the SEAP proposed by CoM)		Main adopted Technology & Equipment				
Waste management		The project focuses on the collection of recyclable waste from the municipality and not on their treatment procedures. Thus, the adopted technology is not being examined, as it is an issue of the private company to treat the waste, while the focus is being given on the collection equipment. Waste separation containers in different shapes and different colors, depending on the type of waste (glass, paper, plastic, cardboard boxes, batteries etc.) will be adopted				
Site / Place			Status of the action			
The different recyclable waste treatment sites are outside the municipal area. The sites considered by the municipality for the installation of the recycling bins include all roads around residential buildings, as well as inside municipal buildings including the city hall, schools, kindergartens etc.			New	Planned	Under implementation	Following previous action

Start date	Project Lifetime	Previous or linked studies
Mid 2016	5 years	No previous studies on recycling are available at municipal level. However, for the better design of the recyclable waste's collection, existing data from the garbage collection company on the volume of waste being collected should be further studied.
Engineering Studies	The engineering department needs to make a clear plan as to the frequency and the locations to establish the different containers. In addition, since the available data from the garbage collection companies is not reliable enough, as there were relatively large gaps between different suppliers over the last few years, it is necessary to audit the quantities, as part of the implementation	
Implementation plan / Construction plan	<p>Following the implementation of the related engineering studies, the Procurement department of the municipality should revise the contracts with the waste collection companies and sign contracts with national and private companies for the collection of specific waste streams (plastic, cardboard, batteries and paper) and for the acquisition of the needed recycle bins, as they are quantified by the conducted engineering studies.</p> <p>The action is expected to be beneficial to the municipality against the related costs, since due to the waste volume reduction, a significant amount of landfilling fees is saved (550 NIS per tn of waste collected and landfilled), while the cost for collection of the waste for recycling is lower compared to the above mentioned (420 NIS per tn of waste collected). The larger part of the initial cost concerns the related infrastructure, assuming a density of 20 recycling bins per 1,000 citizens. Collaboration contracts will be signed with the respective recycling companies for the collection and handling of waste for recycling.</p>	
Other previous studies	No other studies are available	
Environmental impact assessment	Although the environmental impact assessment of the action has not been studied, it is considered that the action's impact is only beneficial in terms of environmental pollution, as lower waste volumes will be landfilled. At the same time, the waste disposal sites and recyclable waste treatment sites are both outside the community's limits, at relatively comparative distances, and thus no additional burden from waste transporting over longer distances is considered.	
3. Organization and procedures		
Formal approval		Legal responsible body
The city council needs to approve the SEAP plan. This is planned for the beginning of 2016 and will be subject to funding from the Ministry of Environmental Protection		<p>The municipality is the legally responsible body to conduct the necessary tenders for the action.</p> <p>Tenders will be held for the waste collection – general collection from homes – in separate streams, collection of specific waste such as paper, glass, batteries etc.</p>

Staff allocated to prepare, implement and monitor the action		Municipal / City Staff Training Needs	
A project manager is to be appointed. 1 half time employee can lead the project on all its facets, including the finance rising from the Ministry of Environmental Protection, approaching the different suppliers for the waste collection etc. The contracts with them should be signed with the assistance of the legal advisors of the city. All educational and awareness rising activities should be led by the same employee, who can be assisted by different lecturers to promote the awareness and build capacity throughout the city.		The municipal team is in need for training regarding the organization and monitoring of the recyclable waste's collection, as well as the different existing approaches (separation at the source, separation at the treatment centers) in order to choose better the most competent private contractor for the collection of waste.	
Technical Assistance Needs		Role of Partners	
<p>Technical assistance for the implementation of the engineering studies might be necessary. The municipality will first pursue collaboration with other municipalities with increased experience on recycling, such as Ramla, as well as the Ministry of Environmental Protection. In case further assistance is needed, this will be reconsidered after the start up period.</p> <p>Moreover, with regards to the awareness raising part of the action, which is equally important for its success, the Ministry can contribute significantly with texts available in Hebrew that would need translation into Arabic for the public.</p>		<ul style="list-style-type: none">• The Ministry of Environmental Protection has set a goal to reduce landfilled waste and promote recycling. To this end it has developed a program for waste management and source separation, with different colors of bins, and some end of the line solutions (composting of organic waste, recycling of paper, glass, tins, plastic etc.). The specific Ministry can contribute not only in terms of financing, but also with the knowhow it already holds in the process, as well as material on awareness raising activities.• Municipalities with significant experience on recycling could collaborate with Shfar'am municipality's team to exchange know how.• Recycling companies interested in acquiring Shfar'am municipality's contract will be invited in the dialogue and submit their integrated proposal on the technologies utilized on their part for waste separation and treatment, their suggestion on the density and location of the recycling bins and fees for the collection and treatment of the waste.• Environmental awareness groups will be invited for discussion during the action's implementation, in order to support and disseminate it as much as possible among the community's residents.	
4. Cost Estimates			
Initial and start-up expenses	EUR: 262,000	Net Present Value (NPV)	Assumptions
	NIS: 1,100,000		
Operational Costs (approx.)	EUR: 456,000	EUR: 150,000	The savings considered derive from the cheaper collection costs of recycled waste, when separated at
	NIS: 1,915,400		
Annual Income	EUR: 116,200	NIS: approximately	

(approx.)	(net)	631,000	source, compared to the expenses for collecting and landfilling them. Around 80,000NIS annually are for awareness raising campaigns and activities. The operational costs are covered from the gross annual created income. Revenues are calculated within the 5 year duration of the project
	NIS:488,100 (net)		

5. Funding Sources

Funding Source	Fund
Local Authority's own resources	The local authority can dedicate the necessary resources to manage the project and related awareness raising activities events and campaigns. It cannot finance the action itself.
National Funds and Programs	The Ministry for Environmental protection could potentially finance the action, or at least a part of it.
International Financial Institutions	Israeli banks against the expected annual cost savings. More detailed studies on the action's feasibility will be necessary.
EU Funds & Programs and other external funds	SUDEP or SUDEP like initiatives
Public-Private Partnerships	
Lined up Private Investments	
Loans and Potential Borrower	
Expected Annual Cost Savings to City Budget	The expected costs savings in the city's budget can finance the project's operation, and potentially a loan for the required initial infrastructure.
Other	

6. Projected Energy Estimates in 2020

Energy Savings (MWh/a)	Renewable Energy Production (MWh/a)
No energy savings are foreseen from the action	No renewable energy production is foreseen by the action
CO ₂ Reduction (tn CO ₂ /a)	
Target Year	2020
Net reduction on the Territory	3,321.45
Reduction as related to BAU Scenario	2.4%
Per Capita calculated reduction	83 kg CO ₂

7. Summary of Related Awareness Raising (AR) Actions
Awareness Raising related to the Action
A major challenge for the project is the citizens' participation in the initiative and the correct waste separation at the source. In order to persuade the citizens to recycle, broad dissemination activities will be organized, such as info days for the citizens, dissemination of messages through radio, newspapers and television, especially using local media, production of promotional material (leaflets, brochures, posters) and perhaps billboard advertisements. Special events for school children will be realized as well. At the same time, activities of educational character on waste separation will be conducted.
Awareness raising related to the Community
The achieved results in terms of recycling rates achieved as well as monetary and carbon dioxide savings for the community will be shortly reported by the municipal team at an annual basis, as a follow up action of the project's monitoring. At the same time, city employees will participate in info-days on the importance of waste management and the specific role the city has. Emphasis will be made on setting an example for the citizens coming to city hall and to other municipal facilities. These info-days will be held twice a year
8. Assumptions and risks
<p>The specific action is very ambitious, since it considers the rapid penetration of recycling in the citizens' everyday life. The recycling rates need to be increased to approximately 20% in order to achieve the emission reductions of 15% in just over 5 years.</p> <p>The risk of the citizens' reduced interest and participation in the initiative is the major risk for not achieving the set target. However, even in the worst case scenario that the foreseen recycling rates are not achieved by 2020, the only major impact on the community is that it will not reach the set target of a voluntary commitment. The gradual creation and expansion of the required infrastructure could also be considered, both for financing as well as acceptance by the citizen's purposes.</p> <p>An additional risk relates to the Ministry of Environmental Protection. The waste separation has been a wide project, implemented and promoted in many municipalities. However lately there has been some new assessments taken place within the ministry claiming that waste separation has additional external costs (mostly transportation), and in addition not enough end-solutions have been developed. For this reason, the national project is in somewhat instability. If there will not be funding for the project or if it will be postponed until end-solutions (plants) will be developed, it might not be the best time to start implementing the separation in Shfar'am.</p>
9. Key Success Factors
In case the action is initiated in full capacity, signaling aggressive stand on the matter, then it needs to be accompanied by an adequately aggressive communication campaign and work with the citizens and in schools to promote the recycling concept.
10. Next Steps
<p>Plan by the engineering department on the location and frequency of the recycle bins' placement.</p> <p>Procurement by the municipality of the new company to undertake the contract.</p> <p>Procurement by the municipality on the purchase of the recycle bins.</p>
11. Annexes / References to Annexes
<i>Not available</i>

Municipal Lighting System Upgrade - #2

1. General Presentation

Location	Start date	Project Lifetime
Shfar'am municipality area	2016	5 years
Project Owner / Lead Actor		
Municipality of Shfar'am		
Contact person		
Ms. Maha Hamudi, Engineering Department		



Summary of the Action

Municipal lighting is one of the key contributors in the municipal consumptions and thus an area where efficiency measures can be broadly implemented.

According to the municipality's available data, the municipal lighting system currently constitutes of Mercury and high Pressure Sodium (HPS) lamps. It should be mentioned that an accurate registry of all existing lamps per type is not available by the municipality. Approximate figures on the number of lamps and installed power per type are provided in the table below.

Type of lamp	Number	Watt
Mercury lamps	500	90 (50 and 125 W)
High Pressure Sodium	270	250
High Pressure Sodium	4,500	120 (various lamps of 70, 100 and 150W)

Already, the Municipality of Shfar'am has secured a 70,000 € financing from the Ministry of National Infrastructures, Energy and Water Resources for the implementation of a demonstration project, namely replacement of part of the old lamps. Since the amount mentioned wasn't considered enough to cover the replacement of the mercury lamps, the municipality decided to replace 140 out of the 270 HPS lamps of 250W. In this respect, 140 HPS lamps will be replaced by LEDs of 150W, thus leading to an annual savings of 56MWh (considering 4,000 operation hours annually), or 25,590NIS annually (6,090€), with an electricity cost of 457NIS/MWh and exchange rate of 1€=4.2NIS.

The cost of the purchase for 140 LED lamps of 150W is approximately 510€ per lamp, thus 71,400€ (300,000NIS), while the dismantling of the old lamps and the installation of the new ones will be realized by the municipality's personnel.

The Municipality of Shfar'am wishes to integrate this pilot initiative under an integrated action, which is the scope of this project fiche. The action on the municipal lighting system's upgrade focuses on four axes and is based on a lighting study that should be conducted first, and has also been included in the

municipality's SEAP:

- 1st axis: Better maintenance of the system. This activity focuses on the proper maintenance of the system, so that damaged light bulbs are replaced as soon as possible with new and more efficient ones. This activity is already being realized by the municipality and the plan is to intensify it as much as possible.
- 2nd axis: Update of the lighting system infrastructure. The lighting systems in the municipality are considered very old and dysfunctional, facing wiring problems, outdated infrastructure etc. This axis is targeted at the gradual renewal of the whole infrastructure, where considered necessary. The municipal team is already aware of the problematic parts of the infrastructure; however, their verification through the lighting study is desired.
- 3rd axis: Introduction of LED technology and gradual replacement of old light bulbs. This action relates to the gradual replacement of the current operating lamps, which are Mercury and High Pressure Sodium lamps of varying power, as soon as their lifetime is reached, with LED lamps, which are more efficient and have longer lifetime, improving at the same time the required brightness levels.
- 4th axis: Modification of the lighting grid's density. This action will lead to the more rational placement density of the lighting poles, especially in areas that are less densely populated, with the removal of redundant poles and the increase in their placement distance in the expansion areas of the lighting grid. Moreover, the introduction of LED technology can further result in the reduction of the light bulbs per pole, in order to have the same end result.

The current action fiche focuses on the 2nd and 3rd axis. At the same time, the 1st axis is planned to be implemented by the municipal staff at a more frequent basis. No added costs are envisaged for the specific activity, since the maintenance will be covered by the existing municipal staff. Under the 2nd axis, the difficulties faced by the municipality in terms of infrastructure are being elaborated. For its renewal, a broad investment should be realized. However, the specificities for the actions under this axis should come as a result of the lighting study to be conducted and in this fiche only specific identified needs are included. The same is valid for the 4th axis as well.

For the 2nd axis, there is a total of 22 poles that need replacement or upgrade. The envisaged cost for this action according to the municipality is 240,000 NIS (57,000€).

The 3rd axis constitutes a follow up of the demonstration project with the replacement of the rest of the 130 HPS lamps with LEDs of 150W, the replacement of 500 mercury lamps with LED of 40W and the replacement of the 4,500 HPS lamps of 120W, with LED lamps of 60 W. The specific size was selected in order to ensure the proper light quality on the road network. In this case, the envisaged costs are:

- 1,035,000 € (or 4,347,000NIS) for the purchase of the 4,500 LED lamps of 60W, at a cost of 230€ each.
- 66,300€ (or 278,460NIS) for the purchase of the 130 LED lamps of 150W, at a cost of 510€ each.
- 75,000€ (or 315,000NIS) for the purchase of the 500 LED lamps of 40W, at a cost of 150€ each.

The above prices can be ensured by the contractor for an order of this magnitude, including

The envisaged energy savings are calculated at 1,232 MWh annually, or 563,024 NIS (134,000€) monetary savings from the municipal budget.

General Objectives of the Project		Principal partners and stakeholders				
1. Reduce energy consumptions in the municipality by at least 65%. 2. Reduce light pollution. 3. Increase road safety by improving lighting levels.		1. Ministry of National Infrastructure, Energy and Water resources 2. Israeli Electricity Company				
Ultimate beneficiaries of the project		Link to municipal development plans / urban plans / other municipal or city programs				
1. Municipality of Shfar'am 2. Shfar'am citizens		This action has been proposed as part of the municipality's SEAP in the actions on street lighting to be undertaken by the municipality.				
Estimated investment cost needed		A demonstration program, based on a fund received by the Ministry of National Infrastructure, Energy and Water resources is currently under implementation (more info available under the description of the action).				
EUR:	1,237,000					
NIS:	5,195,000					
2. Technical Description						
Area(s) of intervention (sectors as specified in the SEAP proposed by CoM)		Main adopted Technology & Equipment				
Street lighting		The project focuses on the replacement of existing lamps with lamps of LED type. LED lamps are a widely adopted technology at the worldwide level, which is proven to lead to energy reductions even higher than 50%. No risks are associated with the adoption of the specific technology.				
Site / Place			Status of the action			
The whole municipal lighting system			New	Planned	Under implementation	Following previous action
Start date	Project Lifetime	Previous or linked studies				
Mid 2016	5 years	No previous studies are available at municipal level. However, for the better upgrade of the municipal lighting, the foreseen action on the conduction of a municipal lighting study should be realized first, so that its outputs are adopted when upgrading the system.				
Engineering Studies		A municipal lighting study to be realized by a specialized expert should be conducted. Based on this study's outputs, the planning of the whole upgrade will be adjusted and implemented.				

Implementation plan / Construction plan	Following the implementation of the related engineering studies, the Procurement department of the municipality should publish a tender for the acquisition of the required equipment.		
	The action is expected to be beneficial to the municipality against the related costs, since the achieved energy savings over a period of 5 years, as presented in the description of the action, are expected to bring the necessary payback		
Other previous	No other studies are available		
Environmental impact assessment	Although the environmental impact assessment of the action has not been studied, it is considered that the action's impact is only beneficial in terms of environmental pollution, not only LED lamps consume less energy, but at the same time their lifetime is four times more compared to the existing lamps, thus impacting less the environment when it is time for their retraction.		
3. Organization and procedures			
Formal approval		Legal responsible body	
The city council needs to approve the SEAP plan. This is planned for the beginning of 2016 and will be subject to funding from the Ministry of National Infrastructure, Energy and Water Resources.		The municipality is the legally responsible body to conduct the necessary tenders for the action, in order to acquire the necessary equipment.	
Staff allocated to prepare, implement and monitor the action		Municipal / City Staff Training Needs	
The specific action will be carried out by the existing staff of the responsible municipal department. The part time engagement of 1 person is considered satisfactory for the implementation of the action.		No specific training needs are envisaged for this action. However, the engagement of an experienced consultant for the conduction of the lighting study and in an advisory role to the municipality is considered essential.	
Technical Assistance Needs		Role of Partners	
Technical assistance for the implementation of the lighting study is considered necessary.		<ul style="list-style-type: none">• The Ministry of National Infrastructure, Energy and Water Resources is to be actively engaged in the activity, bringing its experience as well as a part of the required funds.• Since a large part of the project focuses on the improvement of the existing infrastructure, the participation of the Israeli Electricity Company in the action's implementation, where necessary, is considered important, especially where wiring issues are encountered.	
4. Cost Estimates			
Initial and start-up expenses	EUR: 1,237,000	Net Present Value (NPV)	Assumptions
	NIS: 5,195,000		

Operational Costs (approx.)	Already covered by the municipal budget	EUR: 69,500	<p>The “income” is based on the considered energy and monetary savings achieved at an annual basis from the municipal budget. For the calculation of the NPV, it has been considered equal to 3%. It should be noted that the action’s NPV is considered for 11 years (close to the lifespan of the lamps which is 12 years). The payback period is 10.3 years.</p> <p>Awareness raising costs of 15,000 NIS have been considered in the initial cost and an annual cost of 10,000 NIS has already been deducted from the savings presented.</p>
Annual Income (approx.)	EUR: 131,600 (net) NIS: 553,000 (net)	NIS: 292,000	

5. Funding Sources

Funding Source	Fund
Local Authority’s own resources	The local authority can dedicate the necessary resources to manage the project. It cannot finance the action itself.
National Funds and Programs	The Ministry for National Infrastructure, Energy and Water resources finances the initial demonstration phase.
International Financial Institutions	Israeli banks against the expected annual cost savings. More detailed studies on the action’s feasibility will be necessary.
EU Funds & Programs and other external funds	SUDEP or SUDEP like initiatives
Public-Private Partnerships	
Lined up Private Investments	
Loans and Potential Borrower	
Expected Annual Cost Savings to City Budget	The expected costs savings in the city’s budget can finance the project’s operation, and potentially a loan for the required initial infrastructure under an ESCO or a bank.
Other	

6. Projected Energy Estimates in 2020

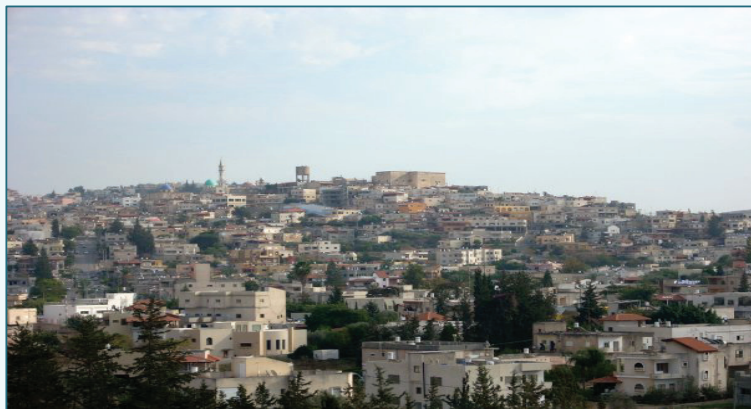
Energy Savings (MWh/a)	Renewable Energy Production (MWh/a)
1,232	No renewable energy production is foreseen by the action
CO ₂ Reduction (tn CO ₂ /a)	
Target Year	2020
Net reduction on the Territory	739.16
Reduction as related to BAU Scenario	0.54%

Per Capita calculated reduction	18 kg CO ₂
7. Summary of Related Awareness Raising (AR) Actions	
Awareness Raising related to the Action	
<p>Since the action is being realized on solely municipal infrastructure, reaching out to the citizens doesn't have significant impact for its success. However, the specific action can serve as a demonstration project for the community, in order to showcase a new technology and that the municipality is taking actual action to decrease its consumptions, leading the way to its citizens in order to contribute through their behaviour in energy savings.</p>	
Awareness raising related to the Community	
<p>The awareness raising tools to be used for informing the citizens on the action undertaken by the municipality, include press releases and articles in local newspapers and magazines, announcements in the social media and extensive project descriptions and reports on the results.</p>	
8. Assumptions and risks	
<p>No specific risks are associated with this action, since it is an activity based on a mature technology. Moreover, its success doesn't depend on the participation by the citizens.</p> <p>However, the risks concerning its financing, if this comes through Israeli banks or donors against the foreseen energy savings, is that the specific financing mechanism has been extensively tested in the country and thus the national actors are reluctant in adopting it.</p>	
9. Key Success Factors	
<p>For the specific action, there are no specific factors considered as key for its success.</p>	
10. Next Steps	
<p>Elaboration of the lighting study and identification of the axes 2 and 4 priorities.</p> <p>Efforts for the identification of more competitive prices for the quantity of the required lamps and procurement procedures by the municipal office, upon the</p>	
11. Annexes / References to Annexes	
<p><i>Not available</i></p>	

The 10% Voluntary commitment at the residential sector - #3

1. General Presentation

Location	Start date	Project Lifetime
Shfar'am municipality area	2016	5 years
Project Owner / Lead Actor		
Municipality of Shfar'am		
Contact person		
Ms. Maha Mahmudi – Engineering Department		



Summary of the Action

This revolutionary campaign to be promoted across the different energy consuming sectors (residential, tertiary, industrial) in the whole municipality is an effort to increase the sense of responsibility towards the environment and the community, among the citizens in this case, by establishing an environmental consciousness. The residential sector is a significant contributor in the municipality's carbon footprint, and for this reason the local authority is planning this targeted action throughout the municipality.

The residential voluntary 10% campaign is in synergy with additional actions such as the women's groups and the green schools' certification. The aim is to reach out to the citizens through different ways of communication, in line with the municipality's wish to reach all homes in the city. In this aspect, diverse levels of participation are envisaged with several somewhat overlapping campaigns. For this reason, the synergies between the different campaigns need to be carefully studied, in order to complement one another.

The municipality will launch this program as a voluntary campaign, where citizens can participate in order to reduce their home's energy and carbon footprint, and more importantly to reduce their electricity bill, thus saving some money for the monthly family budget. This action is targeted to single homes or apartment buildings as well, each one identified as a single user.

The user will be able to fill in an application form (potentially online through the municipality's website or in the municipal buildings, with assistance from the local staff) in order to participate in the program, accompanied with the last year's electricity bills for the respective house (apartment or building). During the year he will be given priority to participate in all educational and informational events organized by the municipality with advice on how to reduce energy consumption in the house with simple actions and change of his behaviour, and he will be sent brochures with this material as well. At the end of the year, the user will submit his electricity bills once more in order to prove at least a 10% of energy savings.

The action, as an awareness raising one, will be accompanied by the implementation of a large number of educational and informational events to be held throughout the year, and publicized in the local media, bill boards, municipal website, municipal Face-book page, WhatsApp lists. These will include among others lectures, movies, short workshops, locals sharing their success stories. The local staff will be advised by Energy Efficiency Experts as well as by the Israeli Green Building Association (or similar NGO) to assist with finding appropriate lecturers and additional contents. These will be held every 2-3 months, so as to keep the campaign lively and interesting. The events will take place in different parts of the city, to diverse

not only the content but also the location and uniqueness of each educational event.

The municipality will organize a ceremony for all participants in the program and will provide honorary certificates to those who achieved the target of 10% reductions, while it will publish their names in the local newspapers and /or magazines, as an example.

General Objectives of the Project		Principal partners and stakeholders			
1. <i>Educate home owners on energy efficiency practices and behaviour modification</i> 2. <i>Reduction of the residential sector's carbon footprint</i>		1. <i>Engineering department and SEAP team of Shfar'am Municipality</i> 2. <i>Ministry of National Infrastructure, Energy and Water</i> 3. <i>The Israeli Green Building Association (or similar), Energy Efficiency Expert.</i>			
Ultimate beneficiaries of the project		Link to municipal development plans / urban plans / other municipal or city programs			
1. Shfar'am citizens		1. This action has been proposed as part of the municipality's SEAP in the residential sector. 2. At the same time, this action places among other activities of educational and awareness raising character realized by the municipality in the past, and builds upon this experience.			
Estimated investment cost needed					
EUR:	107,000				
NIS:	450,000				
2. Technical Description					
Area(s) of intervention (sectors as specified in the SEAP proposed by CoM)			Main adopted Technology & Equipment		
Residential sector			The specific action focuses on educational and awareness raising program, and as such it doesn't envisage the adoption of any technology or equipment.		
Site / Place		Status of the action			
The action focuses on the residential buildings across the municipality		New	Planned	Under implementation	Following previous action
Start date	Project Lifetime	Previous or linked studies			
Mid 2016	5 years	No previous studies have been realized on the action. However, the engineering department of the municipality will find relevant lecturers, shows, movies etc. with the assistance of professionals such as the Israeli Green Building Association or similar body, and with Energy Efficiency experts.			
Engineering Studies	Not applicable for the specific action				
Implementation plan / Construction plan	Not applicable for the specific action				
Other previous	Not applicable for the specific action				
Environmental impact assessment	Not applicable for the specific action				

3. Organization and procedures	
Formal approval	Legal responsible body
The action has been a priority for the municipality and its formal approval is expected early 2016, along with the SEAP approval by the municipal council.	The municipal council is the legal responsible body for approval of the action. Since the action is of educational character, no other body will be engaged
Staff allocated to prepare, implement and monitor the action	Municipal / City Staff Training Needs
The engineering department staff is to be engaged in this activity for its implementation and overall coordination. As described above, the municipal staff will be responsible for the call for "interested citizens", preparing the online forms, assisting in filling out the forms for those who need it, organizing the participants lists, finding the lecturers, and other informational material, preparing and organizing at least 3-4 events each year. Although existing material from the municipality and the Ministry of National Infrastructures, Energy and Water resources may be utilized, it will have to be adjusted. Marketing and promoting the information days as well as finding more and more citizens to commit will be take place throughout the 5 year period. The engagement of 1 person (half time) from the municipality's personnel for the above mentioned actions is envisaged with assistance from an Energy Expert for the first two years.	<p>Some training needs for the municipal staff is considered necessary for the action's preparation and monitoring.</p> <p>The municipal staff needs to learn how to reach out, prepare the on-line questionnaires, what is needed for organizing an education day, who would be suitable lecturers, which tips to prepare for the homeowners, what adaptations should be made in existing materials (posters, fliers) etc. This type of activity does not need official training, but does need the consultant as a mentor. The first two years will create the basis for the following years, with additional challenges foreseen, especially in recruiting new residents for the program on the one hand, and keeping the first participants in the loop, maintaining their savings success, or making adjustments where savings are not being realized.</p> <p>As the present municipal staff is very much overworked and cannot add 50% to their workload, this action will need additional staff to be engaged.</p>
Technical Assistance Needs	Role of Partners
No technical assistance is required, due to the nature of the action	<ul style="list-style-type: none"> • The SEAP team will be in close collaboration with the Engineering department, providing all technical expertise considered necessary. • The Ministry of National Infrastructures, Energy and Water will provide all relevant educational material, while it is also expected to participate with a certain amount to cover the operational costs • The NGO: Israeli Green Building Association (or similar NGO) is expected to assist the action by providing names and recommendations for filling the content of the information and Educational events. • The Energy Expert will act as mentor for the first two years, more intensively in the beginning stages of the action, slowly building the capacity of the local staff.

4. Cost Estimates			
Initial and start-up expenses	EUR: 47,600	Net Present Value (NPV)	Assumptions
	NIS: 200,000		
Operational Costs (approx.)	EUR: 14,900	EUR >>>0	As a capacity building and awareness raising activity the calculated NPVs are extremely high. However, no income for the municipality is created by this action.
	NIS: 62,500		
Annual Income (approx.)	EUR: N/A	NIS>>>0	
	NIS: The action doesn't generate income, but energy savings for the citizens		
5. Funding Sources			
Funding Source		Fund	
Local Authority's own resources		Contribution up to 15% of the project's annual budget	
National Funds and Programs		Ministry of National Infrastructure, Energy and Water resources up to 100,000 NIS Or Ministry of Environment in the framework of capacity building projects' financing	
International Institutions	Financial		
EU Funds & Programs and other external funds		SUDEP or SUDEP like project	
Public-Private Partnerships			
Lined up Private Investments			
Loans and Potential Borrower			
Expected Annual Cost Savings to City Budget		Not Applicable	
Other			
6. Projected Energy Estimates in 2020			
Energy Savings (MWh/a)		Renewable Energy Production (MWh/a)	
6,697.97		N/A	

CO ₂ Reduction (tn CO ₂ /a)	
Target Year	2020
Net reduction on the Territory	4,018.78
Reduction as related to BAU Scenario	2.91%
Per Capita calculated reduction	100.5 kg per citizen
7. Summary of Related Awareness Raising (AR) Actions	
Awareness Raising related to the Action	
Awareness raising activities will be realized broadly to disseminate the upcoming 10% voluntary savings program for home owners. Info dissemination will be realized through the production of brochures and posters to be sent by post to houses and be visible in all municipal buildings respectively. Radio short messages in the initiative may also be utilized as well as direct outreaching to those who come to the municipal building for services, go to leisure activities and other meetings held by the municipal staff.	
Awareness raising related to the Community	
The results of the action at an annual basis will be widely communicated to the citizens to demonstrate the potential for energy and monetary savings that can be achieved, as well as the efforts being placed by the municipality to turn greener. An annual ceremony will be held for all participants, where those reaching the target will receive a certificate, and a sticker for their front door "I have saved, so can you". The certificates will be presented by the mayor.	
8. Assumptions and risks	
The main assumption and at the same time risk for the action is the interest of local home owners to participate in the voluntary campaign and adopt in real life the new knowledge they have acquired. In addition, in order to be evaluated for the 10% reduction, they must present their home electricity bill. This might be an obstacle for some people who value their privacy. It is also necessary to keep the campaign going so as to engage more and more participants, this is not always simple especially as the municipality's resources are very low, and cannot finance this awareness raising action without external financial assistance.	
9. Key Success Factors	
Appointing the appropriate person to lead this action is very important. This person will have the assistance and backing of the CES-MED team, the professional backing from the engineering team, as well as the energy expert as a mentor. In addition, the action has the full support of the Mayor and the municipal council. Finally, the action is not isolated but rather is part of the additional awareness raising campaigns planned for Shfar'am. Therefore, we expect a synergistic effect from the different campaigns that will take place in the city.	
10. Next Steps	
Approval of the municipality's SEAP. Approach donors to secure financing. Design of the program. Design and launch of the related awareness raising activities.	
11. Annexes / References to Annexes	
Not applicable	

Women groups on energy efficiency - #4

1. General Presentation

Location	Start date	Project Lifetime
Shfar'am municipality area	2016	5 years
Project Owner / Lead Actor		
Municipality of Shfar'am		
Contact person		
Mr. Riad Hasuri, assistant to the mayor		



Summary of the Action

The residential sector is a significant contributor in the municipality's carbon footprint, and for this reason the local authority is planning this targeted action throughout the municipality, under the coordination of the municipality's educational department. Shfar'am, as an Arab community, has specific cultural characteristics, such as the significantly higher average rate of women staying at home compared to other Israeli communities, as well as the tradition of the extended families living together or very closely.

Since women are in charge of their households and are the main contributors and regulators of the energy consumption and its different patterns, the municipality of Shfar'am is planning to work very closely with them in an effort to reduce the residential sector's electricity consumptions. The action is based on a series of trainings provided to a number of selected housewives, who in their turn will undertake to educate their extended families as well as other women in energy efficient activities. A number of approximately 100 working groups of 15 women will undergo an initial 2-day, part time (4-5 hours daily) training course on energy efficiency at home and advices to modify energy behaviour and save electricity and money. These trainings will be combined with a series of meetings, at the beginning every fortnight (4-6 meetings) for a period of 2-3 months, followed by bi-monthly meetings afterwards, in order to keep women highly motivated and have them exchanging on the progress realized with energy savings at home at first, and afterwards with transferring their knowledge to other women. These working groups will be exchanging ideas and practices on how to save energy under the supervision of experienced municipal personnel with the guidance of outsourced experts, while the women can also use their households' electricity bills to prove the progress realized and achieved results.

The women who are interested in participating in these seminars will be invited to express their interest in the educational department of the municipality, through filling in a form, in order to organize the groups. There will also be a process of reaching out to women from different families and from local women volunteer groups. Approximately 20 groups at an annual basis are envisaged, while effort will be placed to have women with a variety of ages in all groups. In case the interest by the women exceeds the municipality's expectations, the creation of additional groups will be considered, in order to satisfy the demand.

The trained women will transfer their knowledge at home and will work closely with their extended families (sisters, mothers and mother in laws, daughters etc.) in order to achieve significant energy reductions and monetary savings as well. The total number of impacted households by the envisaged action, directly and indirectly, is estimated at 3,500-4,000 over a 5 year period, covering almost half of the municipality's population. The anticipated energy savings for the households participating in these groups

from simple behaviour modification are in the range of 10%.

The whole action will be implemented and monitored by the educational department of the municipality. For the initial 2-day trainings, which will be conducted at a frequency of once every fifteen days, as well as the fortnight meetings for the first 2-3 months, the services of external consultants will be contracted, while in due course, practical advice from women who have reduced their household's electricity consumption may be presented as well. The municipal staff will have the overall control of the process, the responsibility for the preparation of some illustrated educational material to be distributed among them, as well as the responsibility for the organization of the follow up meetings at a bimonthly basis for the monitoring of the progress realized by these women and in order to keep their interest in the activity continuous. An NGO active in Shfar'am for the advancement of women has also agreed to be engaged in the initiative and support the municipality where needed, especially with the presence of its members in the bimonthly meetings and in order to ensure that the technical know how for the conduction of these trainings remains within the municipality.

It should be mentioned that for the provision of high quality trainings, the use of satisfaction questionnaires for the participating women will be realized, upon the completion of the short term trainings, including the fortnight meetings.

General Objectives of the Project		Principal partners and stakeholders			
1. Educate women on energy efficiency practices and behaviour modification		1. Educational department and SEAP team of Shfar'am Municipality			
2. Reduction of the residential sector's carbon footprint		2. NGO for the advancement of women, volunteer group			
		3. Ministry of National Infrastructure, Energy and Water			
Ultimate beneficiaries of the project		Link to municipal development plans / urban plans / other municipal or city programs			
1. Shfar'am citizens		1. This action has been proposed as part of the municipality's SEAP in the residential sector.			
		2. At the same time, this action places among other activities of educational and awareness raising character realized by the municipality in the past, and builds upon this experience.			
Estimated investment cost needed					
EUR:	119,000				
NIS:	500,000				
2. Technical Description					
Area(s) of intervention (sectors as specified in the SEAP proposed by CoM)		Main adopted Technology & Equipment			
Residential sector		The specific action focuses on educational and awareness raising program, and as such it doesn't envisage the adoption of any technology or			
Site / Place		Status of the action			
The action focuses on all the residential buildings across the municipality		New	Planned	Under implementation	Following previous action

Start date	Project Lifetime	Previous or linked studies
Mid 2016	5 years	No previous studies have been realized on the action. However, the educational department of the municipality, as well as the Ministry for National Infrastructure, Energy and Water have prepared in the past some educational material that needs to be adjusted to the current action's
Engineering Studies	Not applicable for the specific action	
Implementation plan / Construction plan	Not applicable for the specific action	
Other previous studies	Not applicable for the specific action	
Environmental impact assessment	Not applicable for the specific action	
3. Organization and procedures		
Formal approval		Legal responsible body
The action has been a priority for the municipality and its formal approval is expected early 2016, along with the SEAP approval by the municipal council.		The municipal council is the legal responsible body for approval of the action. Since the action is of educational character, no other body will be engaged
Staff allocated to prepare, implement and monitor the action		Municipal / City Staff Training Needs
The educational department staff is to be engaged in this activity for its implementation and overall coordination. As described above, the municipal staff will be responsible for the organization of the groups, the preparation of educational material and the follow up of the groups at a bimonthly basis. Although existing material from the municipality and the Ministry of National Infrastructures, Energy and Water resources may be utilized, it will have to be adjusted by the educational department. The full engagement of at least 1 person from the municipality's personnel for the above mentioned actions is envisaged during the preparation and monitoring phase. Although the action envisages the assignment of capacity building to external consultants, due to the lack of skilled personnel, in case the implementation of the trainings is realized by the municipal staff, then more human resources will be needed.		<p>Training needs for the municipal staff are not considered necessary for the action's preparation and monitoring.</p> <p>In case it is decided that the municipality staff will conduct the initial trainings, then the available staff will have to be evaluated and trainings will be necessary. Otherwise, no training needs are envisaged.</p> <p>However, it should be mentioned that the bigger problem for the municipality is the lack of employees to undertake the task, besides an overall coordination, and this is the reason the use of external consultants has been suggested.</p>
Technical Assistance Needs		Role of Partners
No technical assistance is required, due to the		<ul style="list-style-type: none">The SEAP team will be in close collaboration

nature of the action	<p>with the educational department, providing all technical expertise considered necessary.</p> <ul style="list-style-type: none"> • The Ministry of National Infrastructures, Energy and Water will provide all relevant educational material, while it is also expected to participate with a certain amount to cover the operational costs (consultant costs + educational material printing). • The NGO for the Promotion of Women Status in Shfar'am is expected to play a significant role in the motivation of women to participate in the trainings, in the efforts to keep them motivated as well as in the monitoring phase of the action. Moreover, it will constitute an additional player besides the municipality, who will gain the technical know how from the consultant and will be potentially be able to carry these trainings in the future in this or an alternative form.
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4. Cost Estimates

Initial and start-up expenses	EUR: 23,800 NIS: 100,000	Net Present Value (NPV)	Assumptions
Operational Costs (approx.)	EUR: 23,800 NIS: 100,000	EUR>>0	As a capacity building and awareness raising activity the calculated NPVs are extremely high. However, no income for the municipality is created by this action.
Annual Income (approx.)	EUR: N/A NIS: The action doesn't generate income, but energy savings for the citizens	NIS>>0	

5. Funding Sources

Funding Source	Fund
Local Authority's own resources	Contribution up to 15% of the project's annual budget
National Funds and Programs	Ministry of National Infrastructure, Energy and Water resources up to 100,000 NIS Or Ministry of Environment in the framework of capacity building projects' financing
International Financial Institutions	
EU Funds & Programs and other external funds	SUDEP or SUDEP like project
Public-Private Partnerships	
Lined up Private Investments	
Loans and Potential Borrower	

Expected Annual Cost Savings to City Budget	Not Applicable
Other	
6. Projected Energy Estimates in 2020	
Energy Savings (MWh/a)	Renewable Energy Production (MWh/a)
2,757.99	N/A
CO₂ Reduction (tn CO₂/a)	
Target Year	2020
Net reduction on the Territory	1,654.79
Reduction as related to BAU Scenario	1.2%
Per Capita calculated reduction	41.3kg
7. Summary of Related Awareness Raising (AR) Actions	
Awareness Raising related to the Action	
Awareness raising activities will be realized broadly to disseminate the upcoming training seminars for women and invite them to participate in the process. Info dissemination will be realized through the production of brochures and posters to be sent by post to houses and be visible in all municipal buildings respectively. Radio short messages in the initiative may also be utilized as well as direct outreaching through volunteer groups.	
Awareness raising related to the Community	
The results of the action at an annual basis will be widely communicated to the citizens to demonstrate the potential for energy and monetary savings that can be achieved, as well as the efforts being placed by the municipality to turn greener.	
8. Assumptions and risks	
The main assumption and at the same time risk for the action is the interest of local women to participate in the trainings, and then to adopt in real life the new knowledge they have acquired. At the same time, the municipality's resources are very low, and cannot finance an awareness raising action of such extend, that brings no direct financial benefits in the municipality.	
9. Key Success Factors	
Participation of the NGO of volunteering women in the community and support of this initiative is considered a key success factor for its success. The way the Arab citizens are closer connected as a community is also a factor considered important for the action's success. The interest of the regional authority in the action is exceptionally high, and it has the full support of the municipal council, although not officially approved yet, as described above.	
10. Next Steps	
Approval of the municipality's SEAP, Approach donors to secure financing, Initiation of the awareness raising activities related to the action and organization of the first groups.	
11. Annexes / References to Annexes	
<ul style="list-style-type: none"> N/A 	

Improvement/development of Parking Infrastructure - #5

1. General Presentation

Location	Start date	Project Lifetime
Shfar'am municipality area	2016	5 years
Project Owner / Lead Actor		
Municipality of Shfar'am		
Contact person		
Mr. Riad Hasuri, assistant to the mayor		



Summary of the Action

Car congestion, as well as decreased transiting ability to the means of public transportation, are common problems the drivers face due to the inability to find a parking space.

More than half of the energy consumptions realized by the private transportation sector in Shfar'am are due to the private cars in the city, with another significant percentage coming from the transport for private goods. The total number of cars registered in the municipality in 2013 was 9,887 vehicles. Based on data from the Central Bureau of Statistics in Israel (CBS), the annual distance travelled is 16,400km, out of which it has been assumed that one third of the distance is realized within city limits. The municipality aims to reduce through this action the energy consumption of private cars by 4%. Considering a linear relationship between the distance travelled and the fuel consumption, in order to achieve this target, the distance travelled by private cars within the city has to be reduced by almost 220 km per car at an annual basis.

In an effort to decrease the time and fuel spent by the drivers in their attempt to find a parking space and the limited use of the public transportation means due to the lack of parking lots to facilitate transiting passengers, the municipality of Shfar'am intends to improve/extend the existing parking infrastructure and develop new ones where required. More specifically, the plan is to develop the parking infrastructure in strategic places in the city in order to facilitate the citizens, as well as to establish large parking lots in the outskirts, and have municipal shuttles to the center, with focus on the tourists, since the municipality attracts a great number of people on a daily basis, but especially on weekends and holidays, and the municipality wants to develop the tourism even more.

The plan is to create approximately 1,500 parking lots, out of which 450 in the center of the municipality and 1,050 in the city outskirts. In order to create these spaces, it is suggested that three different parking lots of 150 spaces are created in different areas within the municipality, and one large one of 1,050 in its periphery, with the estimated land required for these being 0.4 hectares for each one of the 150 parking lots in the center and 2.8 hectares for the parking lot in the city outskirts.

Although land availability is a significant challenge in Israel, there are some available sites, usually of municipal or governmental property. These sites need to be carefully evaluated in order to decide which ones could be further utilized for parking purposes. A significant step in this direction is therefore the development of the transportation master plan, an action envisaged as well under the municipality's

SEAP. In this way, all actions currently being scheduled or to be scheduled in the future concerning the transport sector will have a common reference.

Due to the public nature of the land, there are no costs envisaged for its use. However, the procedure for their utilization for this reason could be quite lengthy and bureaucratic. Although costs may not be considered for the land purchase, the average cost for the construction of a single parking space according to studies (National Parking Association's Parking in America; Annual Review of Parking Rates in the United States and Canada, 2009) ranges from 1,000\$ to 15,000\$. Considering a cost of approximately 1,500€ for the construction of each parking lot in an open surface, a total cost of 2.25 million euro is estimated. These parking spaces will be offered to the citizens free of charge. An additional cost of 130,000€ is also considered for conducting the necessary feasibility study.

General Objectives of the Project		Principal partners and stakeholders				
1. <i>Reduce traffic congestion.</i> 2. <i>Reduce energy consumptions from private cars within the city by 4%.</i>		1. <i>Government</i> 2. <i>Citizens organizations</i> 3. <i>Transport company</i>				
Ultimate beneficiaries of the project		Link to municipal development plans / urban plans / other municipal or city programs				
1. Municipality of Shfar'am 2. Shfar'am citizens		This action has been proposed as part of the municipality's SEAP in the actions on transport to be undertaken by the municipality.				
Estimated investment cost needed						
EUR:	2,380,000					
NIS:	10,000,000					
2. Technical Description						
Area(s) of intervention (sectors as specified in the SEAP proposed by CoM)		Main adopted Technology & Equipment				
Transport		The project proposal doesn't promote the adoption of a specific technology or equipment				
Site / Place			Status of the action			
The specific sites in Shfar'am have not been yet identified. They will include three parking lots of 150 positions each within the city center (or 1 parking lot of 450 positions in total depending on the available land) and one parking lot of 1,050 spaces in the city outskirts. Identification of these sites is pending the implementation of a detailed study (transportation master plan).			New	Planned	Under implementation	Following previous action
Start date	Project Lifetime	Previous or linked studies				
Mid 2016	5 years	No previous studies are available at municipal level. However, for the better identification of the sites, the foreseen action on the conduction of a transportation master plan should be realized first, so that its outputs are adopted in this action.				

Engineering Studies	A transportation master plan to be realized by specialized experts should be conducted. Based on this study's outputs, the planning for the whole transport sector will be realized, including the selection of the sites. A feasibility study should also be realized, based on the selected sites, where the specificities of the construction needs and costs will be detailed.		
Implementation plan / Construction plan	The implementation of this project is one of the long term horizon. It is envisaged to be initiated in 2016, with the financing of the feasibility study and the transportation master plan and to be completed by the end of 2030. The actual implementation of the parking lots is depending on the cash flows to be secured.		
Other previous studies	No other studies are available		
Environmental impact assessment	Although the environmental impact assessment of the action has not been studied, it is considered that the action's impact is only beneficial in terms of environmental pollution, since not only the traffic congestion and air pollution will be reduced, but also the relevant noise levels will be reduced as well.		
3. Organization and procedures			
Formal approval		Legal responsible body	
The city council needs to approve the SEAP plan. This is planned for the beginning of 2016.		The municipality is the legally responsible body to conduct the necessary tenders for the action, in order to acquire the required land, where considered necessary.	
Staff allocated to prepare, implement and monitor the action		Municipal / City Staff Training Needs	
The specific action will be carried out by the existing staff of the responsible municipal department. The full time engagement of 2 persons is considered satisfactory for the implementation of the action.		No specific training needs are envisaged for this action. However, the engagement of an experienced consultant for the conduction of the transportation master plan and the feasibility study, including an advisory role to the municipality is considered essential.	
Technical Assistance Needs		Role of Partners	
Technical assistance for the implementation of the transportation master plan and the feasibility study is considered necessary.		<ul style="list-style-type: none">• The government will grant the necessary land if required.• The citizens' organizations will provide comments and support to the whole procedure.• The transport company	
4. Cost Estimates			
Initial and start-up expenses	EUR: 2,380,000	Net Present Value (NPV)	Assumptions
	NIS: 10,000,000		
Operational Costs (approx.)	EUR: -	EUR: <0	No operational costs are envisaged for the project, since it comprises of open parking space, with no security
	NIS: -		
Annual Income	EUR: -	NIS: <0	

(approx.)	NIS: -		and no lighting. No revenues are envisaged directly from the action, since the parking will be offered for free. A maintenance cost every 5-10 years should be considered as well. Indirect benefits include the increase of the quality of life and the boosting of the local economy, through the increase of the touristic flows.
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5. Funding Sources

Funding Source	Fund
Local Authority's own resources	The local authority can dedicate the necessary resources to manage the project. It cannot finance the action itself. It can also dedicate the land at its availability, if considered appropriate for the development of a parking space.
National Funds and Programs	The Ministry for National Infrastructure, Energy and Water resources could participate in order to cover part of the costs, indicatively for one of the parking lots in the center of the city.
International Financial Institutions	
EU Funds & Programs and other external funds	SUDEP or SUDEP like initiatives
Public-Private Partnerships	
Lined up Private Investments	
Loans and Potential Borrower	
Expected Annual Cost Savings to City Budget	No annual cost savings to the city budget.
Other	

6. Projected Energy Estimates in 2020

Energy Savings (MWh/a)	Renewable Energy Production (MWh/a)
2,107.61 MWh by 2030 (in total) 1,205 MWh by 2020	No renewable energy production is foreseen by the action
CO ₂ Reduction (tn CO ₂ /a)	
Target Year	2020
Net reduction on the Territory	350
Reduction as related to BAU Scenario	0.25%
Per Capita calculated reduction	8.75 kg CO ₂

7. Summary of Related Awareness Raising (AR) Actions

Awareness Raising related to the Action

Since finding a parking space in the center is a continuous problem of the residents, it is considered that low awareness raising activities should be focused on the parking lot in the city center, as the residents will very quickly learn about them and use them. More efforts should be focused on the tourists visiting the city, presenting the benefits of not taking the car in the city center but parking in the outskirts and then using the available public transportation. Info on how to visit Shfar'am should be updated in all related sites, while also local media can be used for notifying people on this as well. Since aim of the project is to make the visit to Shfar'am easier and more relaxing, reducing the time lost in traffic congestion and parking search, it is expected that the action will soon catch up among the visitors.

Indicative awareness raising activities in this direction include:

- Design clear signage for the parking lots indications and availability of the shuttles.
- Install electronic signs to indicate timing of shuttles
- Design clear signage for shuttle stops
- Design and distribute a touristic map (tourists' sites, restaurants, special fairs, shuttle routes).
- Communicate through local associations, local radio messages and interaction with guests.

Awareness raising related to the Community

The action's impact on the community will be directly noticeable by the citizens, as it is aiming on improving the quality of life and boosting the local economy. Results on the action could be publicized in the municipality's social media and website, after an operation period of one year.

8. Assumptions and risks

A basic assumption for this project fiche is that land availability is not a problem.

9. Key Success Factors

In order the project to succeed, it should ensure the visitors a comfortable transport to the city center, which from the time perspective is at least equal to the use of the private car, considering also the time required to find a parking. Therefore frequent shuttle bus service to the center is considered the key to success.

10. Next Steps

Selection of the most suitable spaces to serve as parking lots.

Development of the feasibility study and the transportation master plan.

11. Annexes / References to Annexes

Not available

ANNEX C – Citizens Awareness Promotion Plan (CAPP)

CES-MED



Shfar'Am

Let's make it cleaner and greener!

Preparing and including the “Awareness Raising Actions” component in the SEAP

In addition to the requirement linked to the public consultation of the SEAP, a Citizen Awareness Promotion Plan (CAPP) has to be elaborated by the municipality as part of the Sustainable Energy Action Plan document (SEAP).

Identification of CAPP actions through participatory training workshops

- *The CES-MED project has conducted a tailored communication and CAPP training workshop for the local authority and its communication team in coordination with (and attended by) the Focal Point and the SEAP Consultants. Prior to conducting the workshop, which was led by CES-MED key communication expert (KE), a three parts “Communication Kit” was handed on to the local authority and SEAP Consultant, who were asked to get acquainted with its content prior to conducting the training.*
- *The “Communication Info Kit” (annex1) includes:*
 - *Part 1: the “CAPP Guidelines” document: a tailored comprehensive manual prepared by CES-MED for the use of cities/municipalities on how to identify, plan and conduct awareness raising actions (Arabic, English and French versions)*
- *(http://www.ces-med.eu/images/CAPP/Annex_7_CAPP_v.4.0_02122014_EN.pdf).*
 - *Part 2 includes;*
 - *PPT Presentation of the CAPP Guidelines*
 - *Presentation of “how to prepare and implement a communication and an awareness campaign” showing techniques, materials and models*
 - *Pools of benchmark examples and references to best practices from across the world towards citizen engagement and behaviour change, with adaptation to the CES-MED cities context*
 - *Part 3: consists of 4 Tables to assess CAPP conditions and identify actions.*
 - *Table 1 is used to conduct a rapid investigation to identify awareness situation, levels and needs linked to behavioural change in the city; and to initiate discussions with the workshop participants towards the identification of target audiences and the SEAP CAPP actions.*

- *Table 2: presents the content of a plan to implement a CAPP action related to a Pilot Project.*
- *Table 3 presents the proposed actions related to the general sustainable energy challenges and to the city.*
- *Table 4: presents the proposed CAPP actions linked to each SEAP priority projects.*
- *During the workshop, the “Communication Kit” material was explained. The following discussions, assessment and analysis addressed awareness raising conditions and challenges, communication concepts and CAPP methodologies, tools, techniques before examining and multiple benchmark applications.*
- *A practical exercise was then conducted to specify the SEAP’s CAPP actions, whereby the local authority general awareness raising needs and SEAP’s priority actions (proposed in the Project Fiches) were looked over and proposed. In doing so, the template tables were “draftly” filled by the participants and the KE.*
- *Following the workshop, the participants have thoroughly reviewed the tables and finalized them with CES-MED KE and the SEAP Consultants, prior to including them in the SEAP (below).*
- ***The Communication Info Kit and specially the CAPP Guidelines are to be used as reference work manuals for the subsequent detailed planning and implementation of the CAPP actions proposed in the SEAP document and other similar awareness raising actions.***

Preparation of COMMUNITY AWARENESS PROMOTIONAL PLAN (CAPP)

Template 1- Situation analysis of Shfar'Am

Aim

The questions in the attached templates cover various areas of actions and levels of awareness linked to behavioral change. It has been used to conduct a quick investigation on the awareness situation and level of perception of the citizens in the city concerning renewable energy and energy saving.

The exercise of filling the templates has identified and assessed the conditions in the municipalities prior to preparing a CAPP and to answers a number of questions, including:

- 1) Who is the target audience of a CAPP?
- 2) What are the priority issues to be addressed by the CAPP (that also could be identified by the SEAP as priority actions)?
- 3) What is the level of awareness of key energy problems? And what are the first issues to raise awareness about?
- 4) What are previous awareness raising actions, so that the CAPP can build on them?
- 5) What is the situation as related to public consultation, based on which a public consultation is to be designed.

The exercise of filling in the template helped pointing out how raising awareness can be utilized as a tool for improved energy policy to facilitate implementation of its actions; it has allowed initiating discussions in the Communication Workshop and helped identifying appropriate campaigns and actions.

Specific objectives:

- (i) Provide the necessary information about the current conditions and the situation regarding awareness of energy saving and renewable energy,
- (ii) Help to identify the most appropriate a) **awareness raising campaigns** that would accompany the SEAP vision/strategy and b) the **awareness raising actions** that would accompany the priority actions determined in the SEAP.

Steps to follow:

- (i) The SEAP team of the municipality has filled in the templates based on their understanding and perception of the city's inhabitants. They were free to seek the opinion of a limited number of persons to help fill in the answers.
- (ii) The filled in templates were discussed in the "CES-MED Communication Workshops", which were led by CES-MED Communication Expert and attended by the SEAP consultant and the SEAP municipal team. In parallel, the vision/strategy of the city and the proposed pilot actions in the SEAP were reviewed as part of the workshop exercise.

The outcome guided the selection of the most appropriate awareness raising campaigns and actions of the SEAPs including the ones related to priority projects.

I. Identification of the target audience and the importance they give to Sustainable Energy (audience targeted by the awareness raising campaigns and actions)			
Age group	Very important	Important	Not important
Women	X		
Youth			X
Middle Age	X		
Seniors	X		
Other			

II. Identification of priority issues to be addressed by a sustainable energy action and their level of importance			
Issue	Level of importance		
	Very important	Important	Not important
High price of energy	X		
Availability/lack of energy	X	X	
Availability of transport	X	X	
Waste management	X		
Clean environment (translated to air pollution)	X		
Other			

III. Identification of level of awareness (energy problems) and education of energy related issues			
	Very aware (through media or research)	Aware but not convinced	Not Aware
Impact on environment (air pollution from energy production)			X
Cost of energy	X		X
Waste of energy	X		X
Climate change translated to climate change and global warming)			X
Ways to save energy consumption		X	X
Existence of renewable energy			X

IV. Previous awareness actions conducted by the city/municipality or by other actors	
Has the city or local authority done previous actions	Activities have started on waste management and energy efficiency thematic areas.
If yes, who conducted the actions (the city/municipality, NGO, national authority...)	The local municipality is leading the actions with the assistance from the ministry of energy and ministry of environment.
If yes, describe the action	<p>A group has been drawn together from women volunteers group, students and youth. They received some lectures and brought their ideas on how to pass on their knowledge to other women, how to make groups with different populations etc.</p> <p>The plan is to continue to form similar groups in order to make each and every household in Shfar'am aware on Energy Efficiency and energy saving. In addition, every family will have an "energy officer" after implementing a program in the schools.</p> <p>Advertisements have been disseminated on the municipality website and the Mayor's Facebook page.</p>
If yes, what was the budget and how did you fund it	The actions have been funded by the municipality's own budget.
If yes, outcome, impact and feedback	The aim and expected outcome is that every home in Shfar'Am will know about energy efficiency and energy saving and adopt a new behavior accordingly.

V. Public consultation	
Does the city practice public consultation?	The SEAP was presented to the council members, department heads, and several citizens.
Has the city done public consultations for SEAP?	Yes
Is it part of the legislative process?	Council members must approve the plan and confirm all parts. Such a process has been commenced; after presentation of the SEAP the council members were very impressed with the plan and very happy to support it.
Foreseen consultation(s)	NA
Does the city liaise with national institutions, stakeholders?	The municipality is working with several government ministries such as the ministry of energy, environment, education, economy, transportation and interior.

Situation analysis

From this study concerning the target groups and profile, it appears that the younger generation is mostly the group that needs more persuasion and where we need to suppress ambiguity and change their perceptions and behavior. They are not aware or informed of issues related to this subject. It is essential to raise awareness so that they become future ambassadors of sustainable energy in the territory.

The groups with which we can carry out the communication and get easily their involvement are mainly the women, middle age citizens and the oldest respondents. They have been identified as the one giving high importance to sustainable energy, were well aware about issues related to this sector and open to any information.

Concerning the identified priority issues, the population of Shfar'Am shows high importance to the price of energy and its availability, to transports and waste management. However, even though the population is aware of climate change occurring and the existence of renewable energy, it does not feel convinced about the level of importance of these issues and existing means to reduce the impact; Similarly, it remains very skeptical and difficult to convince.

The municipality of Shfar'Am is in the middle of conducting awareness raising actions and campaigns that are related to waste management and efficient energy and has high expectations on the return of a positive impact and a change of behavior. For that the municipality is using mainly educational gatherings and social media.

Finally, regarding public consultations, as part of the legislation of the city, they have been well carried out by the municipality, with its citizens and residential council members and have won good appraisal and support on the SEAP. This participative approach is considered crucial for the targeted achievements; therefore, the city is initiating communication and cooperation with the respective ministries as well as other municipalities.

Template 2.1

Proposed Communication or Awareness Raising Action related to Specific/Pilot Project: Women

1. Title of the Pilot Project

- Women's groups for energy saving in homes

2. Title of the Communication Action related to the pilot project

- You can save energy at home; it's in your hands
- [In Hebrew and in Arabic the term you, is in the feminine form]

3. Location

- Community center and homes

4. Summary of the Communication Action

General Objective: To save at least 10% electricity in all homes in Shfar'am while empowering women from all ages, socio-economic and ethnic groups.

Key message:

It's easy to save energy, save money and contribute to the environment –

It's in your hands

Theme: Getting responsible for a cleaner environment

Target group:

The main targets are the women in Shfar'am, as well as children (there will also be parallel work in the schools), so ultimately all families in Shfar'am. We expect this to also have a dissemination effect on the small and medium businesses in Shfar'am since they are mostly owned and operated by local citizens (usually men), that will see the results at home and implement some of the methods also at work.

Tools and channels:

- Initial two-day training and update meetings for capacity building:

- (1) The "core group": Starting with the group of volunteer women (some only volunteer, some also work part time as kindergarten assistants). This first "core" group will be taught what should be done at home to save electricity, why it's important, how to pass on the new knowledge. During their training they will start implementing at their own homes and learn what works better for them, receive answers to questions that might arise from their "real time" experience etc. A number of approximately 100 working groups of 15 women will undergo this initial 2-day, part time (4-5 hours daily) training course on energy efficiency at home and advices to modify energy behaviour and save electricity and money.
- (2) The dissemination: after this first stage they will lead other small groups of women, preferably from their family (their extended family), so each will work with 5-8 women (sisters, sisters in law, daughters, aunts). During this time, they will still have meetings (less intensive) to see how they are progressing as "tutors", if they have difficulties, questions etc. These meetings will be at the beginning every fortnight (4-6 meetings) for a period of 2-3 months, followed by bi-monthly meetings afterwards, in order to keep women highly motivated.

- (3) The snowball effect: the next stage will be to prepare their group to do the same – each of the 5-8 women who participated will take upon herself a small group of relatives and teach them how to save. Now this group will be escorted by the first group. In other words, we are making wider and wider circles, within family connections, always keeping the "tutors" with a support and guidance group.

It is very important that the first group of volunteers includes a mix from all the ethnic groups, and from different large families (hamoola).

- Awareness actions in schools:

In addition to the women's group there will also be a project in schools. There, the children will get the role of "energy officer" at home. They will have "homework" to do (bring data, follow the electricity bill, participate in competitions) Together, these two projects will involve all families in Shfar'am, as well as all school children and all women will be "covered".

- Billboards, flyers, website, billboards, newspapers.

5. Organization

- Roles and responsibilities:

- ✓ The communication Team: the project will be led by the SEAP municipal team headed by the assistant to the mayor, with two engineers on the team. The responsibility for the women's group will be supported by an appointed person (woman) in charge of the volunteers in the municipality. She will head the women's project and will report to the above team.
- ✓ The school project will be led by the education department in the municipality. Its 5 members will coordinate the project and meet every 2 weeks to follow the progress and needs. Female volunteer students will monitor / measure the progress and will also be part of the women's group. Male students will monitor / measure the school part of the project.

- Project lifetime: 5 years

- Link to other opportunities and/or events:

The project will be published on the municipality website, Facebook, and after the starting period, a billboards campaign will be launched. The school activity will be published in every school, through flyers sent to the pupils' homes, on each school's website, short bulletins and via WhatsApp messages.

There will be a competition between the homes, in each school, and between the schools. This action will be published both in the schools and in town. The winning students will receive a prize from their school, and all the winners together (first 3 places of each) will be honored by a prize from the Mayor in a public ceremony. Schools will link these events with other public events they have planned during the school year.

- Principal partners and stakeholders and their roles:

The Mayor, the municipal SEAP team, volunteer's groups, school masters, teachers, parents (especially mothers).

Staff training needs:

Since this project aims at reaching all the families in the town, it's quite a big operation. We believe it would be advisable to have the same energy expert who worked with the municipality for the past 18 months, and helped build the teams and the SEAP, lead the project together with the assistant to the

mayor and the 2 leading engineers. The complexity of the project is such that none of them can manage it on its own, in addition to their current job.

- The energy expert will also be the person leading the volunteer group, meeting every week and teaching them how to reduce their energy use at home, and how to pass this on when they start their own small groups.
- He would also be guiding the teachers how to instruct the children on what is needed at home, what projects to give them, how to set the competition into action and how to measure the success. He will therefore act as both the information expert, and the coordinator of the project.

Technical assistance and expert needs:

In addition to the experts mentioned above, there is a need for a professional for the PR the marketing needed for the project; As well as a graphic designer to come up with a good visual campaign for the project, including the brand logo, the flyers, website and magnets for all homes.

6. Cost estimate

Estimated implementation cost: The estimated implementation cost is 119,000 EUR (500,000 NIS) over the 5-year operation period, including the cost for awareness raising on the action.

Funding source: It will be funded by the municipal budget, the government – ministry of energy, environment, and education-, donations from local businesses or private funds.

Initial and start-up expenses and approximate operational Costs:

Energy expert for half a day a week (volunteer group course, teachers course (shorter course, more groups to cover all teachers, meeting with the leading team) + coordination of project)

500 man day for graphic designer and PR professional.

7. Next steps

- Initiation of the awareness raising activities related to the action and organization of the first groups.

8. Follow-up, evaluation and impact assessment

- The follow-up and evaluations will be ongoing.
- It is important that the women's groups progress and grow in the circles to "cover" all families in town. Therefore, all women that have participated should be listed and compared to the list of all residents. If there is a stop or slowing down of the "spreading effect", actions will be taken to "re-start"/ "boost" the project. It is expected to happen after some time, and this should be accounted for in the first planning (for example: another course for the next group of volunteers).
- The school competition should be annual and ongoing. The data from the competitions (i.e. electricity bills the children will bring) will give us the numbers needed to see how much is being saved. If the saving stops or starts to slow down – another boost should be given, this time in the school arena (for example an additional short course or some lectures for the teachers and headmasters, maybe a play or important movie for the pupils).

Template 3.1

Identification of CAPP CAMPAIGN TOPIC related to sustainable energy challenges

Once the Sustainable Energy challenges and priorities, general awareness raising priorities, and specific awareness raising needs related to SEAP actions have been identified, the CAPP's main areas of intervention and activities can be defined. The table below portrays the challenges, priorities and related AR activities.

Challenges:	Priorities:	Awareness Raising Priorities, Topic & Activities of CAPP Campaign
Municipal buildings: Green schools' certification and installation of 500kW PVs in municipal buildings' rooftops	<p>Promote certification of all schools with green label from the ministry of education and ministry of environment.</p> <p>Promote production of clean energy.</p>	<p><u>Topic:</u></p> <p>Learning both about the saving and about the process of all types of energy production –including oil, coal, PV.</p> <p><u>Activities:</u></p> <p>Launch an awareness raising campaign on new energy efficient buildings and technologies, aimed at professionals and decision-makers in that sector.</p> <p>Include energy saving in the curriculum.</p> <p>Launch competition between schools, between classes, having energy days for students, days with the parents, tours to a production site (Subjects: electricity; water; waste management; paper etc.).</p>
Residential Promotion of Green Buildings' concept	<p>Promote production of clean energy.</p> <p>Promote the construction of energy efficient buildings in the territory.</p>	<p><u>Topic:</u></p> <p>Raise awareness and capacity building, educate and inform users and professionals before the construction of the new neighborhood.</p> <p><u>Activities:</u></p> <p>Information days and short courses for home owners, people that want to renovate, others that want to build a new house.</p> <p>Information days and capacity building also for professionals in the building field (architects, roofers, window companies, external home painters, A/C and electrical appliances suppliers, insulation etc.).</p>

		<p>Provide consumers with Fact sheets on long-term energy saving for green buildings.</p> <p>Provide citizens with some practical tips on how to save energy in their homes.</p>
<p>Industry subsidized energy audits at a volunteer basis and targeted training seminars</p>	<p>Reduce voluntarily the emission and consumption in the industrial sector.</p> <p>Promote the “Energy friendly business label in businesses.</p> <p>Practice corporate responsibility.</p>	<p><u>Topic:</u></p> <p>Provide industrial stakeholders with some practical tips on how to save energy in their facilities.</p> <p><u>Activities:</u></p> <p>Reaching out to the industrial sector, inviting them to have subsidized audits, then create small groups from different sectors for "active" training seminars – representatives from this sector will learn but also be expected to implement and bring their successes to the group.</p> <p>Educational and informational forums organized by the municipality on how to reduce energy consumption in the industrial premises.</p> <p>Awareness raising and PR assistance inside the companies, as well as outside – towards stakeholders, shareholders, supply chain etc.</p>

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Template 3.2

CAPP activities as related to SEAP Priority Actions of Shfar'Am

This template will guide the municipality in the implementation of a strategy and the identification of adequate awareness raising activities according to the target group and its needs and related to the priority actions identified in the SEAP.

SEAP Priority Actions	Related CAPP Activities:
Awareness raising campaigns to increase of recycling [municipal buildings and facilities]	<p><u>Target Audience:</u> All local stakeholders: Civil society, private and public operators</p> <p><u>Key Message:</u> Reduce the billing cost for waste collection and transportation.</p> <p><u>Objectives:</u> Practice responsible and integrated waste management within the city. Increase the awareness for reducing the thrown amount of waste Launch an awareness-raising campaign on solid waste and its effects on the environment with a focus on recycling as a combative measure.</p> <p><u>Communication Tools:</u> Information lectures for municipality employees Posters in all municipal buildings and facilities Competition between buildings / departments Information via municipal intra-net Installation by the municipality of recycling bins in all municipal buildings and facilities promoting recycling of plastic bottles, batteries, paper Launch awareness operation: cleaning day in neighborhood and sorting with associations. Issue a «Clean» certificate for deserving neighborhoods Info days for the citizens, dissemination of messages through radio, newspapers and television, especially using local media, production of promotional material (leaflets, brochures, posters) and perhaps billboard advertisements. Special events for school children will be realized as well.</p>
The 10% voluntary commitment campaign [residential]	<p><u>Target Audience:</u> Residential sector (population) Construction professionals Schools (teachers, directors, students) Businesses and shops owners Religious leaders</p>

	<p><u>Key Message:</u></p> <ul style="list-style-type: none"> - You can be a pioneer and become energy friendly - Save 10% on your energy bill <p><u>Objectives:</u></p> <p>Reduce the facilities' energy and carbon footprint, and the energy costs Encourage the sale and installation of energy efficiency equipment in all urban areas (public and private).</p> <p><u>Communication Tools:</u></p> <p>Launch of residents' campaign: information lectures, conferences, radio programs.</p> <p>Launch of AR campaign towards professionals and decision makers: Equipment forums, Flyers, international exchanges for best practices</p> <p>Launch of AR campaign in schools (for parents): stickers for lights, posters, educational movies.</p> <p>Competition between homes, between neighborhoods</p>
<p>Women groups on energy efficiency [residential]</p>	<p><u>Target Audience:</u></p> <p>Civil society, more specifically women School students</p> <p><u>Key Message:</u></p> <p>Saving energy can benefit to your wallet Save energy, it is not eternal You have the power to switch off the power</p> <p><u>Objectives:</u></p> <p>Empower women to become a dissemination factor themselves Reduce the energy cost in households Encourage a change in behaviour by simple actions</p> <p><u>Communication Tools:</u></p> <p>Launching women working groups on energy efficiency for exchanging ideas and practices on how to save energy (see temp. 2)</p> <p>Organization of "Energy days" during which there will be small actions such as switching to LED lamps, exhibitions of high energy class appliances and solar panels...</p> <p>Participation in "Earth hour" event by WWF</p> <p>Projection of freely available environmental documentaries on the World Environment day</p>
<p>Municipal lighting system upgrade</p>	<p><u>Target Audience:</u></p> <p>Civil society, private and public operators</p>

[municipal lighting]	<p><u>Key Message:</u></p> <p>This installation will benefit the city at both environment and economic levels</p> <p><u>Objectives:</u></p> <p>Introduce LED technology and gradual replacement of old light bulbs. Promote the installation of similar equipment in other urban common areas - both public and private – through a renewable energy equipment forum aimed at relevant stakeholders.</p> <p><u>Communication Tools</u></p> <p>Better maintenance of the system; Update of the lighting system infrastructure Modification of the lighting grid's density</p> <p>All actions will be accompanied by visual information – on the poles, on electricity exchange boxes, in the municipal and local media.</p> <p>The fact sheets will include data on the importance of the project, its target, the advantages of LED, savings expected in %.</p> <p>Create an info center to inform citizens about new technologies</p>
Improve/ create parking infrastructure	<p><u>Target Audience:</u></p> <p>Civil society, more specifically young target group Private and public touristic operators</p> <p><u>Key Message:</u></p> <p>The heart of your town needs to breathe! A cleaner environment for your children</p> <p><u>Objectives:</u></p> <p>Promote the parking lot AND promote clearing the center of the town Reduce gas emissions and carbon footprint Encourage the use of shuttles, car sharing, bicycles</p> <p><u>Communication Tools</u></p> <p>Design clear signage for the parking lots indications and availability of the shuttles.</p> <p>Install electronic signs to indicate timing of shuttles</p> <p>Design clear signage for shuttle stops</p> <p>Design and distribute a touristic map (tourists' sites, restaurants, special fairs, shuttle routes).</p> <p>Communicate through local associations, local radio messages and interaction with guests.</p> <p>Communicate with social media to grab people's opinions and promote a bicycle day</p>

Recommendations:

These tables have been thought and prepared by the communes and municipalities. In this approach, they aim to promote in a particularly innovative and ambitious way the local communities' response to current challenges identified in the SEAPs, notably in the management of energy and the promotion of renewable energies. They allow us as well to identify the most appropriate communication actions to reach the local community.

In the case of Shfar'Am specifically, awareness-raising should be carried out on several fronts to encourage, motivate and alert civil society:

On one hand, the adults and senior target groups which, although aware about energy-related issues, have little engagement and involvement in the development of the renewable energies process towards a sustainable path. It is essential that they are given enough empowerment so they themselves get involved, learn to behave responsibly in relation to the environment, and actually become aware of their adherence to this cause.

On the other hand, it is essential for each and every family to become mindful of the many ways they could help, through awareness and message-spreading, and a continuous nurturing process of the younger population.

Therefore, it is important to use a leverage which we can use and base our communication upon such as:

Forming a positive perception to improve the efficiency of the populations' own energy consumption (e.g. using energy efficiency to save money in the long term). This will make people aware of the positive effect their actions can have on their global and local environments.

Educating the audience and offering helpful energy efficiency tips to reduce cost and usage through entertainment, talk shows, special guests and things happening. Engage with associations at the local and grassroots level to understand the population needs and opinions.

Adopting a comprehensive communication strategy adjusted to all stakeholders (Professional, head teachers, youth movements, religious leaders, associations...). Building a sustainable awareness plan adapted to the project in order to implement the concept of eco responsibility. Development and implementation of awareness raising measures and campaigns to distribute information and increase public acceptance, in particular with regards to large-scale renewable energy projects.

Enforcing laws to ensure the energy efficiency consequences of all their renovation projects, construction and planning to provide alternatives to classical highly polluting travel modes.

Using positive peer pressure through capacity building and awareness actions for women in Shfar'am to have them promote the concept (through educational actions shared with others and spread even to schools). Knowledge exchange through information, discussion and assistance provided by experts, Informal conversations, focus groups, or survey tools are required to learn more about the motivators and how to present the message to reflect them. Awareness starts in the households; empowering women to adopt more sustainable lifestyles will make them function as distribution/dissemination factors and be turned into real opinion sharing people.

Facilitating dialogue and exchange of experiences on climate change education through public events with representatives like well-known celebrities close to the heart of target audience. It will give the audience the feeling to be in control and in a position where they can plan a short-, medium-, and long-term strategy to manage their lives. More will be done in order to engage with all the other stakeholders in the government and on the level of local and national authorities to get their involvement through tailored messages and adequate tools.

Boosting lower energy consumption at the municipality level will encourage citizens to master their consumption, know about renewable and efficient energy, and encourage their production and use.

Last but not least, encourage the municipal Council to prepare a guide on the communication component which will incorporate specific measures in the policy of the city on how to reduce energy; establish communication between the municipality and the civil society and keep it constantly aware of projects and involve it. After all, the main behavioral barrier is a lack of awareness by consumers, retailers, industrials and other professionals.

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