COMMUNITY

ENERGY

TECHNOLOGY

IN THE MIDDLE EAST

2010 Annual Report

IN THE MIDDLE EAST

Comet-ME is an Israeli-Palestinian organization providing basic energy services to off-grid communities in a way that is both environmentally and socially sustainable. We facilitate social and economic empowerment of the poorest and most marginalized communities in the occupied Palestinian territories through the construction of renewable energy systems (wind and solar), capacity building and reliable maintenance.

Our work grew out of long relationships and commitment to the marginalized Palestinian communities in south mount Hebron. Beginning as a voluntary initiative, with the first installations carried out in 2006, Comet-ME formally incorporated in Israel as a public benefit company in September 2009. Through our work in 2010 we have grown into a vertically integrated utility, providing basic energy services to 12 communities, approximately 1,000 people. Comet-ME is the leading provider of sustainable rural electrification services in the region, and is committed to provide basic energy services to all off-grid Palestinian communities in South Mount Hebron by 2013.

The following report covers our accomplishments throughout 2010, the principles of our methodology, and plans for the future.

Cover photo // Communal tent, Susya

Founders

Elad Orian

Noam Dotan

Community liaison

Ezra Nawi

Field coordinators

Wasim al-Jabari

Jalal al-Tamimi

Photographer

Eduardo Soteras

Board of Directors

Dr. Dan Rabinowitz

Adar Grayevsky

Dr. Danielle Shani

Yossi Mosel

Yoav Lahan

Roni Segoly

0/2 Where we work

In the southern part of mount Hebron, in an area called Masafer Yatta, a population of several thousand Palestinian farmers and shepherds live in shanty-like villages and in caves and tents. These people, often referred to as 'cave-dwellers', subsist on non-mechanized agriculture and herding. Geographically the region is located on the edge of the desert, which affects its climate, fauna and flora. It is arid (an average annual rainfall of about 280mm, and draught in recent years) with limited water sources which makes survival a difficult task.

The harsh natural conditions are exacerbated by the political conditions of occupation. Most of the region was marked as "Area C" by the agreements between Israel and the PLO. This means that control, both military and civil, is at the hands of the Israeli authorities and that the Palestinian Authority cannot provide the local population with services or infrastructure. 15 Jewish settlements and outposts have been built in the region since the 1980s, some on appropriated land. These settlements, even those considered illegal by the Israeli government, enjoy modern water, sewage and electricity infrastructure. Meanwhile, the rural Palestinian communities adjacent to them suffer recurring harassments, demolitions and violence at the hands of settlers and Israeli authorities.

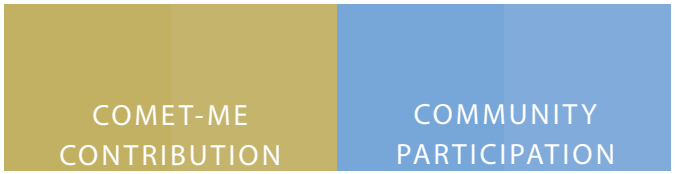
This goes to explain the unique situation of the communities with which we work. Their poverty and marginalization, and in particular absence of energy infrastructure, is more a product of the political situation than geography or economics. Our work is therefore also motivated by the desire to alleviate the unnecessary suffering imposed on these communities by conflict.

By 2013 we intend to complete installations in all the off-grid Area C communities in south mount Hebron. We have already installed one system in Area C outside of Bethlehem and intend to expand our work to other politically-deprived off-grid rural communities in the Palestinian territories, and elsewhere in the Middle East.

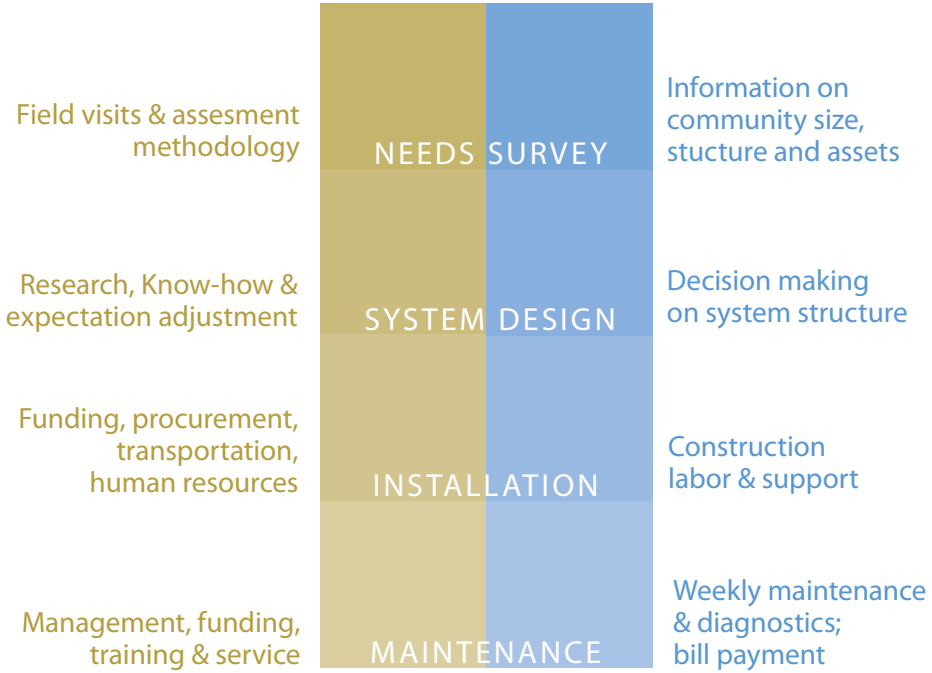
// Tuba

Our combined emphasis on **Community, Energy and Technology** is at the basis of our unique value proposition and allows us to offer appropriate, reliable and sustainable solutions to the poorest most marginalized communities in the region.

Partnership, Service & Development



We consider the communities we serve as both partners and clients. Our goal is to provide them with energy services that suit their needs in a way that is not only environmentally, but also socially and economically sustainable. The way to achieve this goal is through direct and long-term contact with the residents and a work model that allows for substantial community participation and ownership at every stage of the process.



The communities pay regular electricity bills at a rate equivalent to that charged by the Palestinian national electricity grid. We consider these payments crucial to the sustainability of the systems for a number of reasons. First, all payments are kept in trust on behalf of the communities, and are saved towards the future cost of replacing the batteries, which are the most important and expensive parts of the system. Second, regular payments incentivize the families towards rational consumption of electricity, and allow them to monitor their usage and understand the system better. Third, it encourages responsibility for the systems, with a clear message that the service is not a gift. Our experience so far has shown 100% collection rates, proving the value our systems bring to the community and the mutual trust we achieved through joint work.

The importance of basic energy services to **community development** and poverty alleviation cannot be overstated. Affordable renewable energy (RE) in particular has been broadly recognized by the UN and OECD as a central factor in achievement of the Millennium Development Goals. At Comet-ME we see how, in reality, basic energy alleviates poverty, improves health and empowers women.

The communities we work with live in a challenging economic climate where their agricultural produce competes against imported and industrialized crops. Energy services allow them to better integrate into neighboring markets and tap into their economic and creative potential.

Renewable energy infrastructure relieves community dependence on expensive and polluting carbon-based energy. Household lighting eliminates harmful indoor pollution, and enables children to read and study at night.

Women are the main beneficiaries of Comet-ME's work. Arduous manual and time-consuming chores traditionally assigned to women, many of which revolve around food production, processing and preservation, can now be performed by electric machines such as refrigerators, butter churns and washing machines.

ENERGY

Efficiency, robustness, sustainability

The key to using energy for development is in identifying the communities' needs and matching them with the appropriate technology. For the rural communities in south mount Hebron, who live in proximity to urban centers and industrialized markets, energy needs extend beyond the minimal supply of light and mobile phone chargers. As herding and dairy production are central to their livelihoods, using electricity to improve production and preservation is also important. Therefore, the systems Comet-ME installs aim to provide a daily average of 2.5 kWh per family, so as to support refrigeration and butter churns.

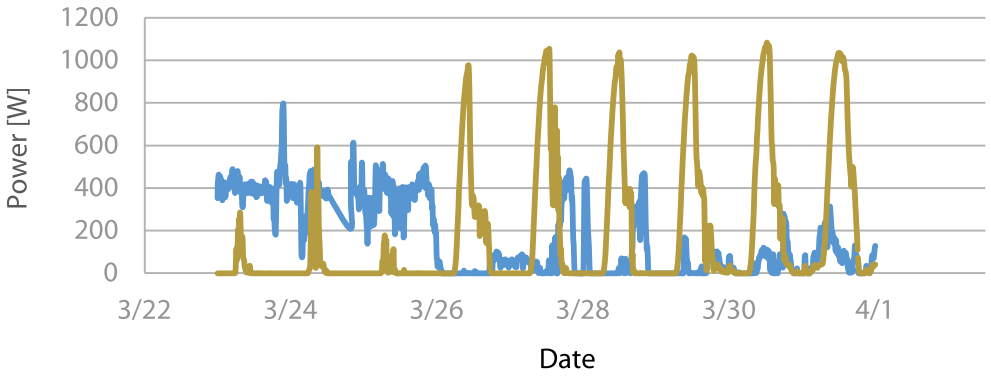
The most efficient way to meet the energy needs of these communities would have been through connection to the national electricity grid. However, this solution is unavailable to these communities due to mostly political reasons.

When it comes to finding the appropriate off-grid technology, RE solutions are undoubtedly preferable to carbon-based generators. Although the initial costs of installing a RE systems are substantially more expensive than the equivalent diesel generators, over the long run they are more economical. The running costs of generators include diesel and transportation – the price of both subject to sharp economic fluctuations. RE systems, properly planned and installed, require little maintenance and run on free fuel of sun and wind.

Hybrid wind & solar systems, like the ones we at Comet-ME build and install, offer uniquely appropriate technology, as they allow the communities to make the best out of these abundant natural resources.In terms of wind regimes south mount Hebron is considered the best area between the Jordan river and the Mediterranean. Moreover, the wind and sun complement each other. The wind is low in the morning, and picks up in the afternoon, as the sun sets, reaching its peak towards the night. Days that are cloudy also tend to have stronger winds. (see graph)

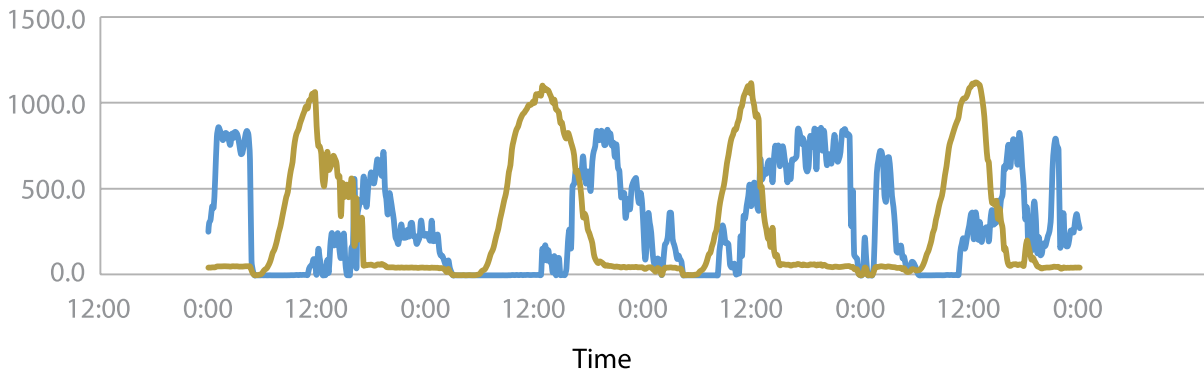
Data recorded by monitoring system installed in Isfai Foque through March and April 2011.

Wind and Solar power generated along the week



On low sun days (24 – 26) wind was high. On high sun days (27-30) wind was low.

Wind and Solar power generated along the day



Wind picks up in the afternoon as the sun goes down and subsides before sunrise.

This complementary dynamic extends energy generation duration throughout the day. In every off grid system the battery is the most critical and expensive component. It also has a limited life cycle. Having two generation systems that complement each other enables the installation of a smaller battery bank.

Our top priority is to assure the sustainability of the project. That is why we place unique emphasis on choosing components that are highly reliable, with proven field experience and good service.

Unlike the solar panels, which are based on imported advanced technology, the wind turbines we install are "home-brewed". We build them ourselves based on the Hugh Piggott model. This way we not only reduce costs of production and maintenance, but are also able to continuously improve reliability and efficiency and adjust the systems to the conditions on the ground.

Infrastructure for Knowledge Dissemination

Technology is knowledge and knowledge is power. We recognize that in highly technological projects such as ours, knowledge dissemination is an integral part of community empowerment. We therefore base our work on two core principles:

Open source

All technological details of our systems are available in the public domain. Our partnership strategy extends beyond the communities in which we work, to a global network of development and rural electrification practitioners. Sharing our experience with global partners, such as Engineers Without Borders and Wind Empowerment association, creates a uniquely short loop of technology development and implementation. Lessons learned in south mount Hebron can serve communities in Africa; developments made in student labs in the US can find their way to the field within weeks.

Local sourcing

Comet-ME procures inputs from local manufacturers whenever possible. Most of the AC system components, the mounts for panels and turbines and the construction materials are purchased from suppliers in Yatta, Hebron and Ramallah. Technology purchased internationally, we modify to fit local needs, and share the know-how on its specifications, installation and maintenance with our local partners. Building the wind turbines ourselves is a central aspect of our work in this regard. Most of the materials for the turbines are purchased locally. By developing the knowledge and practice in this field of renewable energy we also invest in our local technological infrastructure. We apply this principle to human resources as well. Comet-ME trains and employs Palestinian electricians from Hebron, who also work with the local maintenance teams in the communities, teaching them how to perform basic maintenance and diagnostics.

// Tuba

2010 Activities Overview

2010 had been a very meaningful for Comet-ME. Within one year we completed system installations in 10 communities, bringing reliable sustainable electricity to their caves and tents for the first time. The installations were carried out in two rounds.

1st round of installations: September 2009 - February 2010

COMMUNITY	Households	Rated Power (kW) Wind	Rated Power (kW) Solar	Avg. Daily production (kWh)
Umm Al Kheir 1	*8*		*3.2*	*16*
Umm Al Kheir 2	*8*		*3.2*	*16*
Tuba	*6*	*1*	*1.3*	*10*
Maghayir al Abeed	*3*	*0.35*	*0.7*	*4.7*
Isfey al Fouqa 1	*5*	*1*	*1.3*	*10.0*
Isfey al Fouqa 2	*3*	*0.35*	*0.7*	*4.7*
Isfey Tihta	*4*		*0.7*	*3.4*
Total	***37***	***2.7***	***11.1***	***64.8***

Project funded by German Foreign Office in cooperation with Medico International.

2nd round of installations:
June - December 2010

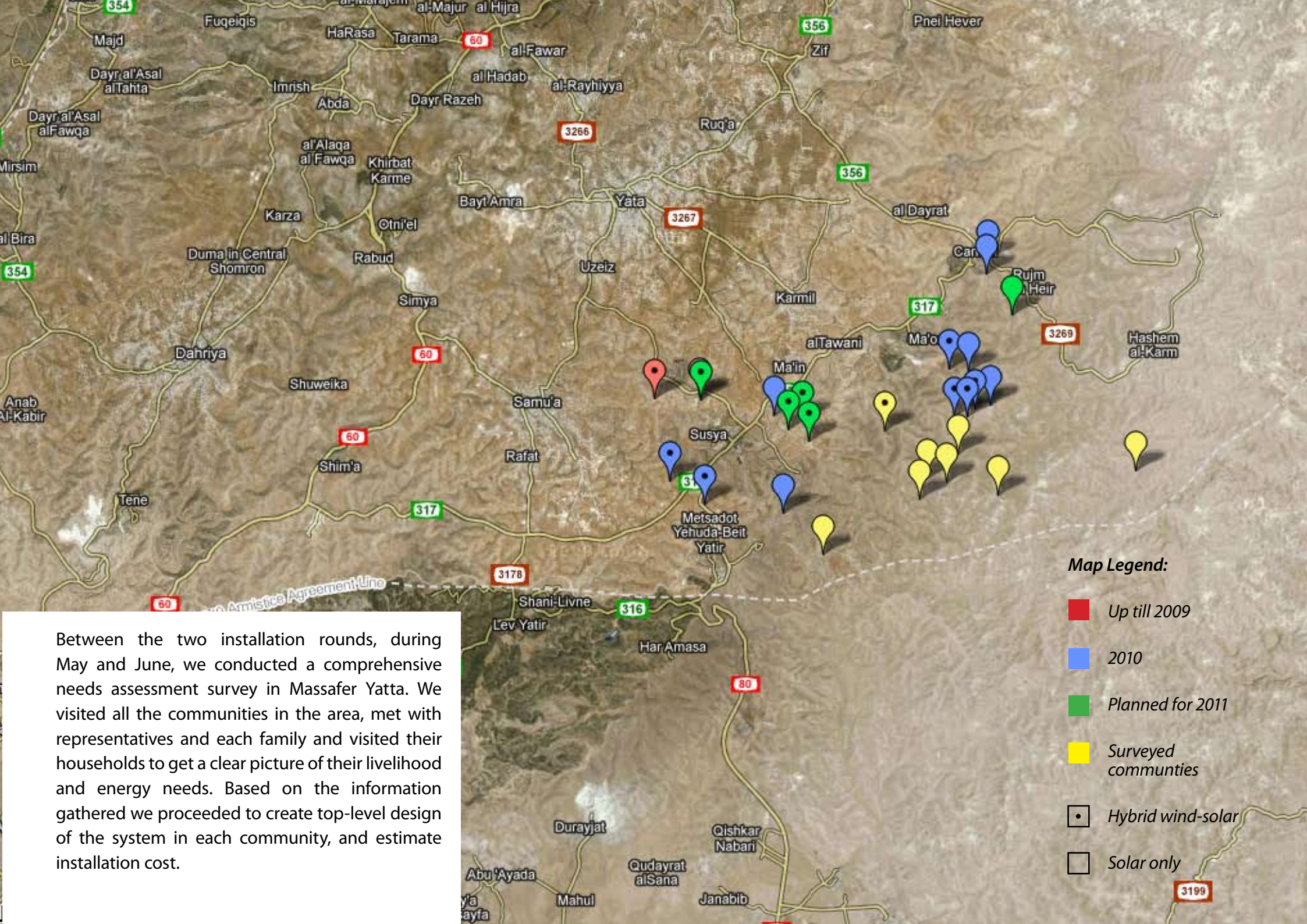
COMMUNITY	Households	Rated Power (kW) Wind	Rated Power (kW) Solar	Avg. Daily production (kWh)
Haribat a-Nabi	*8*	*1*	*1*	*8.5*
WadiJkheish	*6*	*1*	*0.5*	*6*
Bir al Eid	*4*		*2.1*	*10.5*
QawawisTah't	*2*		*0.6*	*3*
QawawisFoque	*4*	*1*	*0.8*	*7.5*
Total	***24***	***3***	***5***	***35.5***

Project supported by Engineers Without Borders Denmark, Swiss Olive Oil Campaign, German representative to Ramallah, Ireland representative to Ramallah and New Zealand Foreign Office.

All these communities are located in the area of Massafer Yatta in south mount Hebron, in Area C of the occupied Palestinian territories. In choosing the communities for installation, priority was given to the communities facing the most severe hardship due to occupation and political violence.

In addition, we installed a system in Rashaide community, outside of Bethlehem, in cooperation with Dan Church Aid.


TUBA



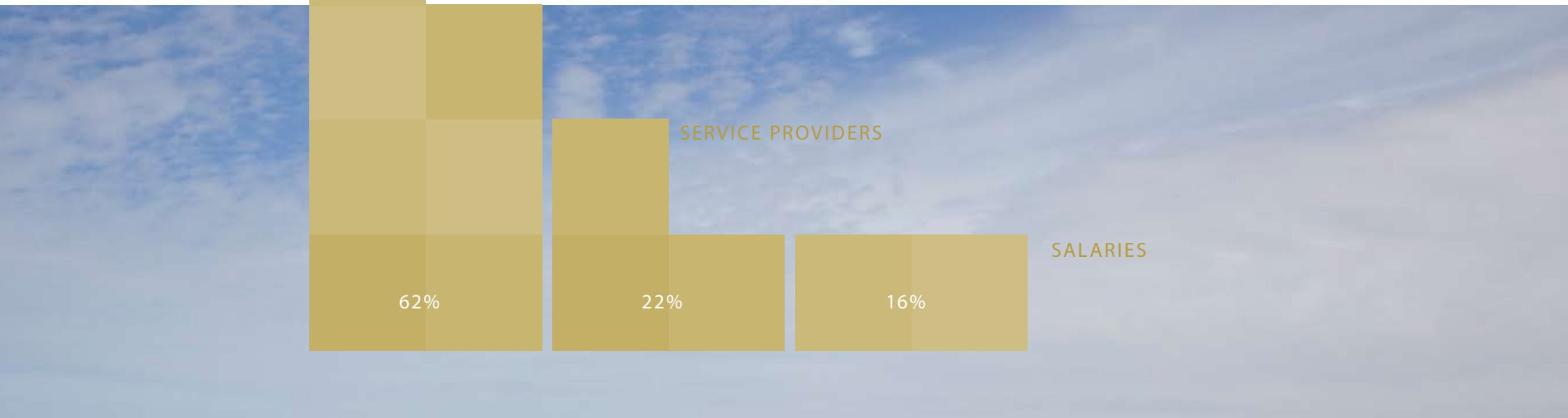
Between the two installation rounds, during May and June, we conducted a comprehensive needs assessment survey in Massafer Yatta. We visited all the communities in the area, met with representatives and each family and visited their households to get a clear picture of their livelihood and energy needs. Based on the information gathered we proceeded to create top-level design of the system in each community, and estimate installation cost.

During 2010 we at Comet-ME also deepened our commitment to capacity building. In March we taught a solar energy workshop for electricians at the Hebron Vocational Training Center. During the workshop we built with the students a demo solar system for the center. In July we went to the Technion in Haifa, to the Engineers Without Borders (EWB) summer program on sustainable development, where we taught a 3 day workshop on wind turbine construction and installation.

In stark contrast to the work we do in the field, Comet-ME co-founder Elad Orian was invited to attend the annual meeting of the Clinton Global Initiative (CGI) in September in New York City. Comet was given complementary membership of the CGI and made a commitment, to provide basic energy services to all the off-grid rural communities in south mount Hebron by 2013.

We look forward to meeting our commitment and have good reasons to believe we will. Within a short time, we have established our position as the leading supplier of renewable energy solutions to rural communities in the occupied Palestinian territories. Local and international development organizations regularly come to us to visit, learn, share information and find way to cooperate.

We are also proud that in a development environment challenged by corruption and waste, and daunted by conflict we have been able to sustain an effective and lean organization, based on firm cooperation between Israelis and Palestinians. Out of our 2010 annual budget of 1,030,819₪ , 62% of our expenditure went to materials for the systems which are directly benefiting the communities on the ground, and only 16% went to salaries.




// Tuba

THANK YOU

Comet-ME is grateful for all the local and international donors, partners, research institutions and individuals who have made our work possible through support, advice, and collaboration.

Medico International

Swiss Olive Oil Campaign

Dan Church Aid Denmark

Center for
Emerging Futures

IPCRI

Clinton Global Initiative

German Foreign Office

Ireland Department of
Foreign Affairs

New Zealand
Foreign Office

Hugh Piggott and
Scoraig Wind

Wind empowerment
association

Superwind Inc.

Bernard Amedai and

EWB international

EWB Denmark

EWB Princeton

EWB Technion

// Susya

GET INVOLVED

Comet-ME is always looking for supporters, partners and volunteers.

Please get in touch at info@comet-me.org

For more information visit our website www.comet-me.org

Or friend us on Facebook

// Maghayiral al Abeed
Photo: Yotam Ronen
// Activestills.org