



COMMUNITY
ENERGY
TECHNOLOGY
IN THE MIDDLE EAST



2013 Annual Report



IN THE MIDDLE EAST

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Comet-ME is an Israeli-Palestinian organization providing basic energy and clean water services to off-grid communities using environmentally and socially sustainable methods. We facilitate social and economic empowerment of some of the poorest and most marginalized communities in the Occupied Palestinian Territories through installation of renewable energy systems (wind and solar), clean water services, capacity building and reliable maintenance.

Our work developed out of a long-lasting relationship and commitment to the marginalized Palestinian communities in South Mount Hebron. Initially a voluntary initiative, Comet-ME carried out its first installations in 2006, and formally incorporated in Israel as a public benefit company in September 2009. Today, we are a vertically integrated utility, providing basic energy services to more than 24 communities encompassing over 1,500 people. Comet-ME is currently the leading provider of sustainable rural electrification services in the region, and an innovator in the field of off-grid water technologies.

0/2 Who we are

Founders	Maintenance manager	Environmental engineer	Organizational development	Board of directors
Elad Orian	Waseem al-Jabari	Shira Kronich	Aya Shoshan	Dr. Dan Rabinowitz
Noam Dotan				Dr. Danielle Shani
Project manager	Community liaison	Community outreach	Financial management	Libby Lenkinsi
Ahmad Almasry	Ezra Nawi	Muhanad Alkharaz	Hadar Gafni	Oversight committee
				Yossi Mosel
				Dr. Yoav Lahan



0/3 Where we work

We work in an area called Masafer Yatta in the south Hebron hills, home to several thousand Palestinian farmers and shepherds living in caves and tents. Often referred to as the 'cave-dwellers', they subsist on non-mechanized agriculture and herding. The region is arid (an average annual rainfall of less than 250mm) which makes survival a difficult task.

Israeli military occupation makes matters even worse. Most of the region is defined as "Area C" in the Israeli-Palestinian Interim Agreement, meaning that Israeli authorities possess full military and civil control. Area C constitutes 62% of West Bank territory and includes the only available land and agricultural reservoirs which are essential for the viability of Palestinian economy and statehood.

The planning regime imposed by Israel in Area C severely discriminates against the Palestinian population. While Jewish settlements, some of which considered illegal by the Israeli government, enjoy modern water, sewage access roads and electricity, Palestinian communities adjacent to them lack these basic services because of a bureaucratic mechanism designed to prevent them from building infrastructure and to halt their socio-economic development.

This planning regime is not simply a technical matter, but a product of Israeli political agenda. Israeli authorities are impeding infrastructure development as part of a larger policy aimed at pressuring rural Palestinian communities to leave Area C and move into Palestinian urban centers, thus securing Israeli demographic dominance in the only remaining open areas of the West Bank.

The poverty and marginalization of these communities is therefore a product of the political situation more than geography or the economy. Our work is motivated by the desire to alleviate the unnecessary suffering imposed on these communities by conflict and political violence.



Energy Installation in Wadi el Rachim // Ala Qawasmī

0/4 How we work.

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 three core principles.

Community participation

We consider the communities we serve as both partners and beneficiaries. We invest in direct and long-term contact with the residents, and we use a work model that is based on substantial and meaningful community participation and ownership at every stage of the process.

Open source

All technological details of our systems are available in the public domain. Our partnership strategy extends to a global network of practitioners. Sharing our experience with global partners, such as Engineers Without Borders, Wind Empowerment association, and the UN Sustainable Energy for All Practitioner Network, 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 U.S. can find their way to the field within weeks.

Local sourcing

Comet-ME procures inputs from local manufacturers whenever possible. Most of the installation materials are purchased from suppliers in Yatta, Hebron and Ramallah. Building the wind turbines ourselves is a central aspect of our work. By developing the knowledge and practice in the field of renewable energy we invest in local tech infrastructure.

We apply this principle to human resources as well. Comet-ME trains and employs Palestinian electricians from Hebron, who also train local community members in basic maintenance and diagnostics. We develop a local knowledge base that serves as a source for future development.



Community Training in Comet-ME Center // Ryan Brand

2013 ACTIVITIES OVERVIEW . .

The Comet-ME Center for Appropriate Technologies

In the past year, Comet-ME's new center for appropriate technologies in South Mount Hebron has become a flourishing space for collaboration, innovation, and human connection.

The center is located in a renovated structure inside one of the communities we work with. The center serves as our base of operations, training and volunteer facility, workshop and warehouse, and as a research and development center for appropriate rural development technologies. It has become a unique place where people come together and work out concrete solutions to be implemented on the ground.

In the sustainable spirit of Comet-ME, our center is completely environmentally friendly and energy independent. We use only green energy sources, consume self-collected rainwater and recycle it for irrigation, and use non-polluting olive refuse as heating fuel.





Ryan Brand

Community Electric Maintenance Training

Members of local communities participated in a special rocket stove workshop organized by Comet-ME. This workshop is part of our efforts to introduce appropriate technologies in the south Hebron hills. These rocket stoves are cheap, simple and easy to build and maintain. They provide a suitable heating solution for off-grid communities in remote areas.



Adi Segal

Community Rocket Stove Workshop

Twenty volunteers from the communities we serve participated in a training workshop for energy system maintenance in Comet-ME's center. This was a unique opportunity to strengthen the bonds with the people we serve, while also providing them with the knowledge and skills they need to keep the systems functioning in the long-term. These volunteers now serve as community supervisors in their villages.

Blowing in the Wind

Self-Made Turbine Workshop

Comet-ME held a week-long comprehensive small wind turbine workshop, teaching Comet-ME staff and volunteers how to build a complete wind turbine from start to finish. The workshop included welding, generator building, wooden blades carving, assembling of parts and turbine erection. All of Comet-ME's turbines are self-produced using locally available materials in order to make long-term maintenance simple and easy.

Wind Turbine Workshop // photos by Ryan Brand





Collaborating for Impact

Space for Innovation and Knowledge Exchange

Comet-ME's center hosted a number of collaborative projects this year, connecting labs and experts worldwide with people who need technological solutions on the ground. This photo shows Jon Persson from Sweden, MSc graduate in Energy Science and Technology from University of Ulm, Germany. Jon is testing water quality in Comet's microbiology lab, set up in a cave.



Continuing the Tradition

photos by Tomer Appelbaum



Comet-ME's 2nd Volunteer Day



This year we continued the successful tradition of bringing volunteers from diverse backgrounds for a full day of work in the field. More than 50 Palestinian, Israeli and international volunteers worked together to improve the external facilities of Comet-ME's center. Together, we built nine new vegetable beds, planted fruit and vegetables, cleaned the pathways, and built a new compost facility. The volunteer day was a great success, demonstrating one of Comet-ME's fundamental principles - that joint concrete work can overcome barriers and establish hope and solidarity.





Comet-H2O: Water Program

2013 marks Comet-ME's entry into the field of sustainable off-grid water solutions. Water and energy are the two most urgent needs facing rural Palestinian communities, and are interdependent in many significant ways. Our water program builds on our extensive experience in the energy sector to provide comprehensive water facilities for communities struggling to survive in harsh natural and political conditions.



Water Installation in Qawawis // Jon Persson

Provision of Sustainable Water Services

In the south Hebron hills, families subsist on as little as 20 liters per capita per day – one fifth of the amount recommended by the World Health Organization. Communities currently rely on individual household cisterns, which are not sufficient for their needs. In the summer, families purchase water in tanks, paying 8 to 10 times the normal grid tariff. Expenses on water are one of the most serious financial burdens on families. Water quality in the cisterns remains unsupervised, with serious consequences for public health. The water is transported manually in buckets from the cisterns to the households, demanding arduous labor which is mostly performed by women. Agricultural development remains slow as there are no efficient ways to irrigate the crops.

Project Vision

The long-term goal of the project is to provide a community-level water solution that addresses the need for increased water supply, improved water quality, easy distribution in households and for irrigation solutions, and reliable treatment of wastewater. The project is based on integrating renewable energy pumping technologies, reliable water filtration, community distribution systems and wastewater treatment.



photos by Ryan Brand



Water Installation in Qawawis // Ryan Brand

Pilot Project

The first phase of the program, launched in 2013, is a pilot project involving the testing and evaluating of various technologies and methodologies to arrive at the best model for future implementation. Comet-ME researched, tested and evaluated pumping, filtering, and distribution technologies and integrated these components into an appropriate solution suite.

The pilot phase is implemented in the community of Qawawis, consisting of approximately 30 individuals. Community engagement was crucial for the development process. A comprehensive needs survey and a series of community meetings were held to understand the needs and identify solutions suitable for the village. Family members participated in the development process, providing constant input to allow better system design.

In 2014, Comet-ME plans the first large-scale implementation of the water solution, based on results from the pilot project. In the future, Comet-ME plans to implement the water solution in all 24 communities where it is currently working, and in other off-grid Palestinian communities in Area C.

Development of Rural Pumping Technologies

As an organization which is both highly technological and also based in the field, we are located in a unique position which allows us to integrate real needs with technology's promising possibilities. Many high-tech solutions currently produced in sophisticated overseas labs and factories fail to achieve large-scale adoption in developing areas because of real conditions on the ground which hinder their widespread use. Our goal is to bridge this gap by developing appropriate technologies which are suitable to the capacities, resources and needs of off-grid communities in developing areas.

Comet-ME has initiated a research and development project aiming to create a design for renewable energy pumps that can be easily and cheaply produced, implemented and maintained in rural off-grid communities across the world. We are developing two stand-alone pump designs which will be significantly cheaper to produce compared with existing off-the-shelf products, and much simpler to build. The simplicity and low cost of the designs ensure not only a large adoption potential, but also a reliable way to ensure that systems can be cared for locally in the long-term. Our designs consist of a wind-energy pump and a solar-energy pump.

Wind Pump // Noam Dotan



As part of this project, Ryan Brand of the Industrial Design MSc program in Delft University in the Netherlands worked with Comet-ME to create a dual action linear piston pump which will be included in Comet-ME's future designs. The piston pump was produced in parallel in a Dutch lab and in the village of Qawawis in the south Hebron hills, to test its suitability for field production and maintenance. Compared with common centrifugal designs in developing areas, this pump decreases mechanical complexity and the number of moving parts by using electromagnetic technology. This results in a simpler, more robust design.

Solar Dual Action Piston Pump



Installations

In 2013 we completed the largest installation in Comet-ME's history. The installation took place in the community of Wadi el Rachim, located near Susya. The community lies on the border of Area B and Area C, resulting in complete neglect and lack of infrastructure. This village is home to 21 families, consisting of approximately 170 individuals, as well as a primary regional school, kindergarten and a health clinic.

The installation consisted of 48 solar panels and one wind turbine. The total capacity of the system is 16 KWp, and the daily average production reaches more than 60 kWh. This project was jointly funded by Irish Aid and the Swedish Postcode Lottery.

Comet-ME currently provides renewable energy services to 24 communities encompassing more than 1,500 people.

Upgrades

Comet-ME is committed to providing high quality long-term reliable service. As time passes and communities grow, there is a need to expand the capacity of the systems to match new consumption levels. This year we implemented system upgrades in eight communities, increasing battery capacity, adding solar panels, upgrading equipment quality standards, and connecting new households.

Total Install
Base 2013

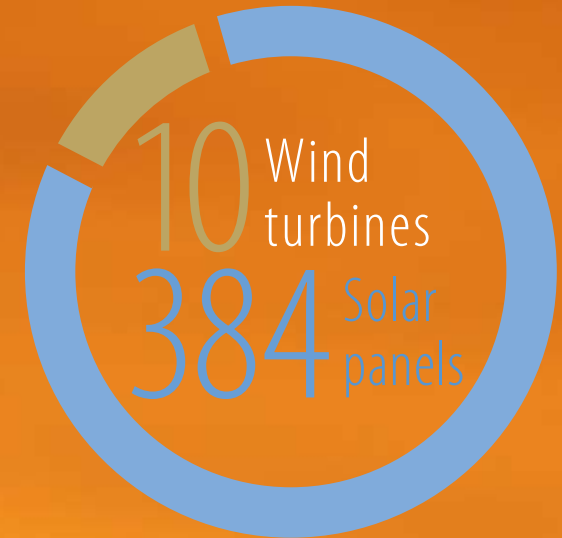
Tuba // Ryan Brand

24

COMMUNITY

1,507

Beneficiaries



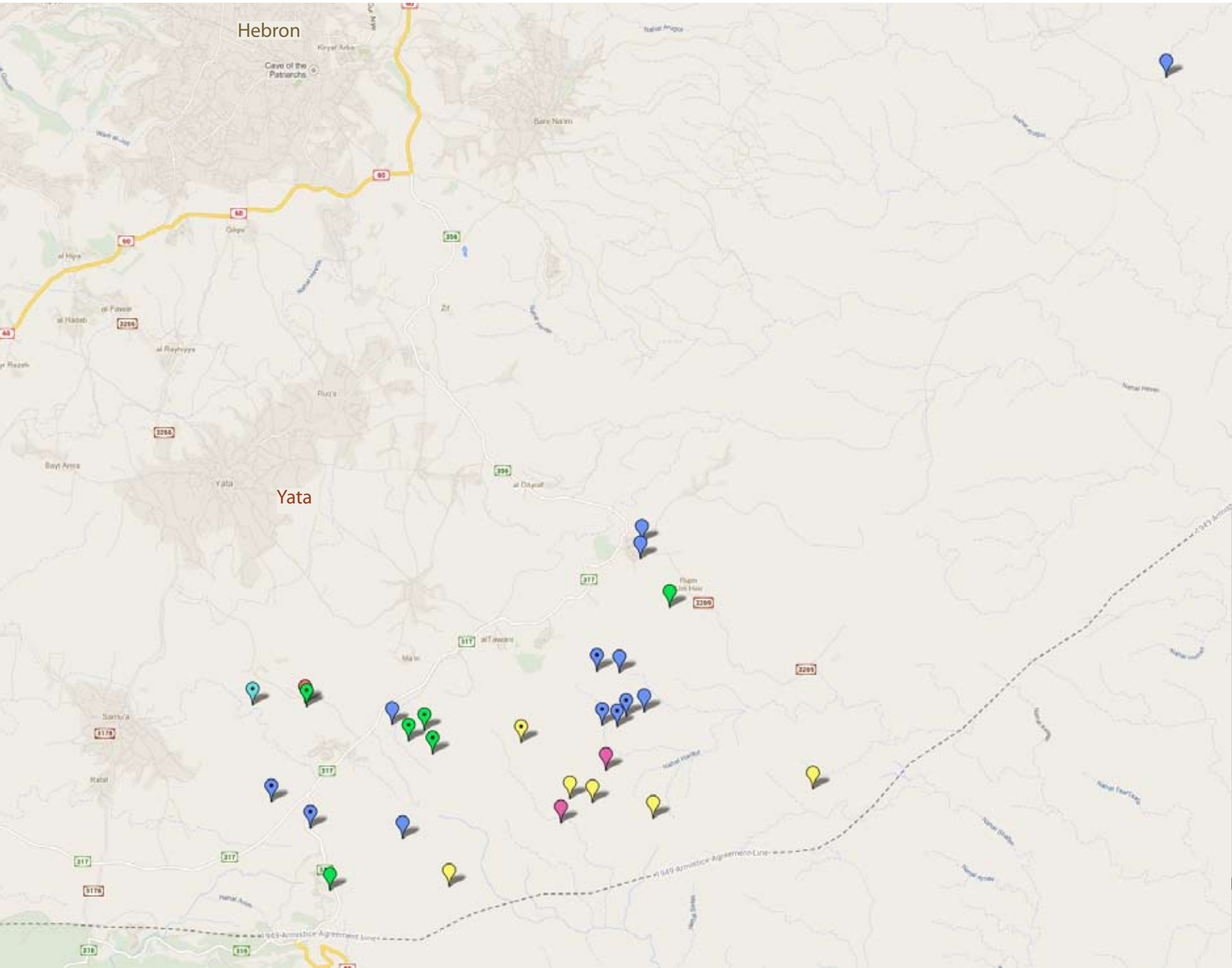
81.355

Total Rated Power (kW)

319.25

Avg. Daily production (kWh)

Map of installations



Map Legend:

- Prior to 2010
- 2010
- 2011
- 2012
- 2013
- Surveyed in 2010
- Hybrid wind-solar
- Solar only

South Mount Hebron region:











Wadi el Rachim // Tomer Appelbaum



Wadi el Rachim // Ala Qawasmi





“We need to ensure that the benefits of modern energy are available to all, and that energy is provided as cleanly and efficiently as possible.”

UN Secretary-General Ban Ki-moon, following the United Nations General Assembly’s unanimous resolution to declare 2014-2024 as the Decade of Sustainable Energy for All and to aim for universal energy access by 2030.

Comet-ME believes access to energy is a basic human right. We are proud to take part in the global effort to make sustainable energy for all a reality by 2030, and we are determined to continue fighting the demolitions and reaching a long-term energy solution for the communities of the south Hebron hills.

Lack of Permitting in Area C:

A Real Threat to Development Projects

Threat of demolition and lack of permitting for new systems continue to be the most pressing challenge we face today. Through intensive efforts, we were able to stall the demolitions of our systems and prevent any demolitions from happening, but we have not yet achieved a long-term legal solution to the problem. Lack of permitting for development projects in Area C continues to be the most significant obstacle to rural development in the West Bank, including rural electrification projects like ours.

Since 2012, Comet-ME has been fighting the threat of demolition to its systems by the Israeli authorities. Out of our 24 system, 14 systems are currently under concrete legal threat. More than 1,000 people depend on these threatened systems for livelihood, lighting and refrigeration.

Demolition orders and lack of permitting in Area C of the West Bank are a direct result of Israeli political agenda. Israeli authorities are impeding development projects as part of a larger policy aimed at pressuring rural communities in Area C to relocate into Palestinian urban centers, thus securing Israeli demographic dominance in the only remaining open areas of the West Bank.

Like all Palestinians in Area C, the residents of the south Hebron hills are subject to Israeli military rule, which is separate from the legal system that applies within Israel proper. They do not possess political and civil rights in the legal system that is imposed upon them. Impeding infrastructure projects in Area C is not only a controversial policy, but is also a direct breach of Israel's obligation as the occupying power to fulfill the basic needs of the occupied population under international law.



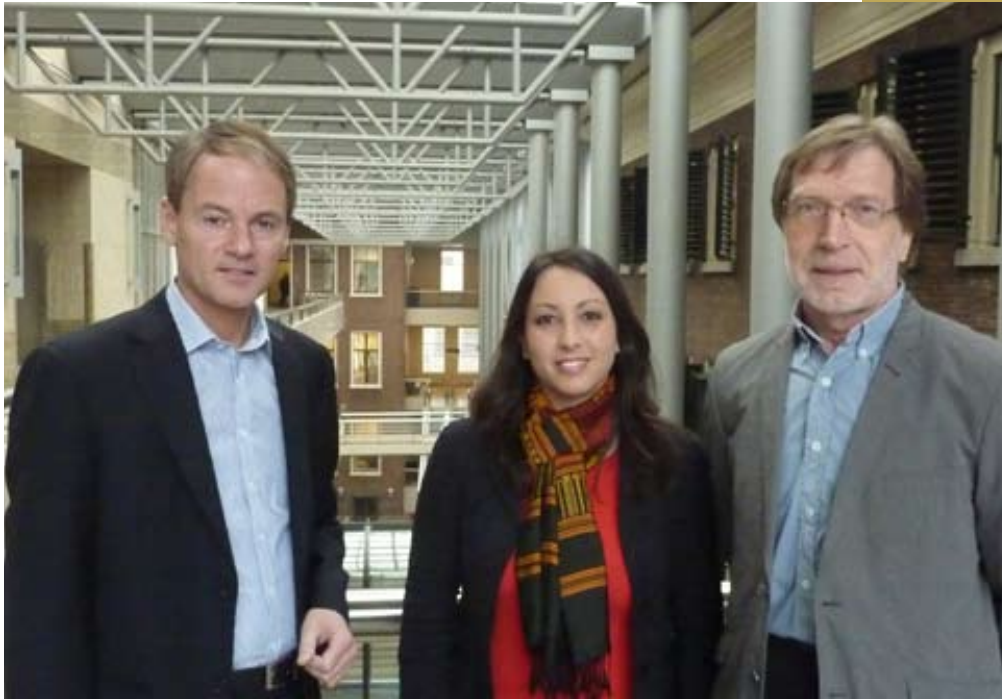
Clinton Global Initiative



Elad Orian presented Comet-ME's work in the 2013 Clinton Global Initiative annual meeting in New York City. Elad was selected to speak at the "Pitching for Partnership" session, in front of world leaders and some of the most influential philanthropists today.



Netherlands Advocacy Tour



This year, Aya Shoshan travelled to the Netherlands to raise awareness of the situation of vulnerable communities in Area C and the barriers placed by Israel to development projects. Aya met with the Minister of Foreign Affairs. Mr. Frans Timmermans, parliament members from the Socialist Party and D66, representatives of the Labour Party and the Green Party, advocacy groups such as Gate48, PaletineLink, A Different Jewish Voice, and the Rights Forum.



Ministry of Foreign Affairs

Elad Orian was one of the speakers in the Microgrid Deployment Forum 2013, as part of the International Solar Energy Society (ISES) Solar World Congress held in Cancun, Mexico. Elad presented Comet-ME's unique work model for microgrid installation and long-term sustainability in vulnerable and underprivileged communities.

ISES Solar World Congress





FUTURE OUTLOOK

Comet-ME's plan for 2014 focuses on two core activities: energy and water. In the area of energy, we are determined to continue our campaign to allow for new projects to take place on the ground. Dozens of communities, consisting of thousands of people, still lack access to energy. Through continued legal action and political and diplomatic efforts, we will continue to fight existing policies and search for long-term solutions.

In the area of water, Comet-ME plans to expand its operations on the two tracks we have chosen: provision of sustainable water services, and development of rural pumping technologies for large-scale dissemination. To expand our services operation, Comet-ME plans to extend its pilot project and implement a large scale installation. The installation will be based on knowledge and methodologies acquired in the pilot phase, and will include pumping, filtering, distribution and reuse. This installation will form a basis for future installations in the entire region.

In our pumping technologies program, Comet-ME plans to expand its current development operations and test additional pumping components. We are mapping partnership and collaboration opportunities which have the potential to significantly enhance the impact and up-scaling of this project.







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.



Donors

- Federal Republic of Germany
- Swedish Postcode Foundation
- Dutch Ministry of Foreign Affairs
- Irish Aid
- French Ministry of Foreign Affairs
- Rockefeller Brothers Fund
- Osprey Foundation
- Swiss Olive Oil Campaign
- Belgian Development Cooperation
- New Zealand Foreign Office



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- Hugh Piggott and Scoraig Wind
- Wind empowerment association
- Delft University, Netherlands
- Bernard Amedai and EWB international
- EWB Denmark
- EWB Princeton
- EWB Technion
- Bimkom
- Association for Civil Rights in Israel
- Rabbis for Human Rights
- Breaking the Silence

INVITATION

Our work is made possible through the generous donations of our friends and partners. Please consider supporting our work by making a [donation](#).



. . . GET INVOLVED

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

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

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