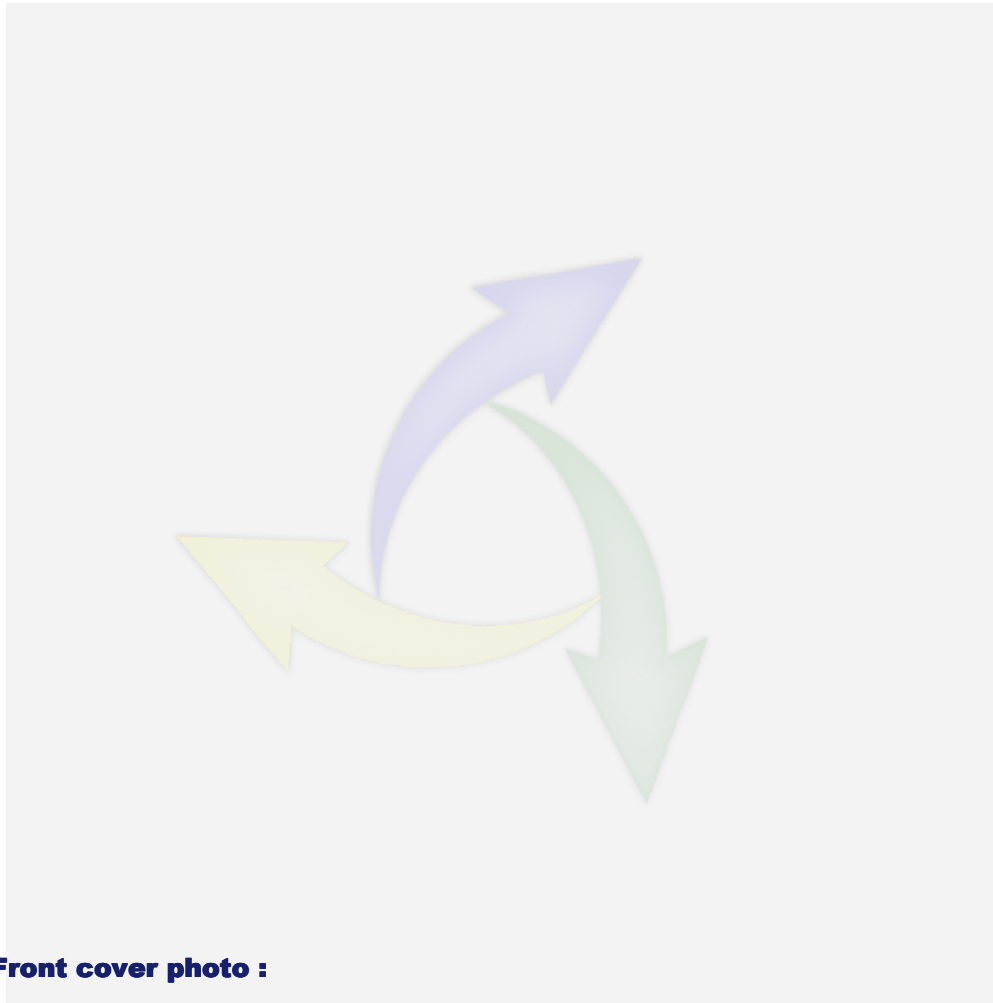


Transforming Wastelands into Homelands





Front cover photo :

On-site Team interacting with students from GUC school located in Matuail Landfill in Dhaka, Bangladesh (2011).

Photo Credits to Tahsin Hyder

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The origins of em[POWER]

Shaping a mindset of charity. That is what I feel is important.

My perspective is based on a balance of family culture, an evolving awareness and the ability to cherish requests for help. I was born and raised in North Jersey in a small town spotted with tiny farms within walking distance of my house. My family has origins in Italy and then Queens, NY on my father's side; and Germany and then El Paso, Texas on my mother's side. My mother and grandmother instilled a sense of awareness that has helped provide me with perspective on all aspects of my life. When I was young, my grandmother would take me to homeless shelters and soup kitchens as part of her routine volunteer work. I remember, as a



child, not fully understanding what I was seeing in the beginning, but eventually I realized there was something unusual about how happy they were to see us. The difference I noticed was in how other people outside the shelters would ignore us as we passed them on the street, whereas the people in the shelter would not. It seemed strange to me. This contrast in behavior was made more obvious one day in NYC, when a homeless woman approached us for money, but my mother would not give her any. In-

stead, she took her with us into a restaurant for lunch. At one point my mother got up to talk to an employee and while she was gone the people sitting next to us made fun of me and my sister for giving the woman food. I will never forget that.

Juarez, Mexico was where I found my next guiding event. When I was older, my grandmother took me into the more urban areas of Juarez and as we got off the bus, we found ourselves getting off in the middle of a four way intersection with a government soldier armed with an AK-47 at each corner. Then within moments of leaving the bus, we were surrounded by hundreds of children 5 years old and younger asking us for anything we could give. By the time we reached the edge of the crowd of children, my sister and I had given everything away, from gum and candy to money and hats. Later, near the Mexican side of the Mexico US border I encountered a community of people living in a border waste dump. These experiences became some kind of dormant catalyst, providing me with a problem that would reside in my mind, waiting to be solved. Though like any solution, it could not emerge in a vacuum. It required a reaction of ideas, people and words.

Years later, in graduate school, I found a new friend Muhammad Salman Khan of Karachi, Pakistan. We met in the main hall of the Rutgers Electrical Engineering building when he was lost, looking for a building called WINLAB that was 5 miles off campus with no direct mass transit connection. The university did not provide access to the building, which meant he would not reach it without a car, so I offered to drive him. During our trip we eventually reached a discussion of a community of people living in an unregulated Karachi landfill, and his work to support the community and the Al Khair school built on the site 20 years ago.

The original goal was the use of a wireless networking organization to provide that support. He was successfully able to work with Oracle to organize an endeavor that provides employable job skill training and later was able to provide a scholarship program. Eventually our discussion led us to the conclusion that wireless networking was not the most appropriate method for helping every member of this community of people living in garbage and this brought us to the idea that they were living in the means to help themselves. A new type of humanitarian aid strategy began to immerge from our ideas and eventually became the concept of *Renewable Resource Oriented Development*, the basis for em[POWER]. We helped coordinate the first on-site trip in 2008, with the help of NED University students of Karachi, to gather data, take pictures and show our support. The information gathered and the humanitarian aid strategy we created became the basis for poster presentation and interviews at an International EWB conference in Seattle. Three additional trips occurred in 2009 as a joint effort of Rutgers, Princeton and other international students and professionals. The first trip provided art supplies to some of the children of the Karachi landfill so that they could have a few hours of creativity that they might not have had. The following trip was to collect video footage of the environment for a short documentary. The most recent trip was to assess the most critical needs of the community. Additionally, work in Bangladesh has been expedited by an on-site trip by students from William and Mary and Rutgers and was successful in forging relationships with the local community and multinational organizations invested in the region.

While in the midst of trying to balance classes, research and this project, I realized something incredible, I was surrounded by friends like Salman Kahn and Tiffany Tong. We found ourselves, along with others, being drawn to the ideals that this concept stands for, in that we are simply trying to show the world that poverty can have a solution. The idea is then if one form of poverty can be solved then there is no reason why others cannot be. This provides a general realization: that eventually when we pass a person living under a blanket on the street, we no longer need to feel the pressure to ignore this person out of fear of our own helplessness; instead, like many other types of poverty, this represents a problem that can be embraced.

Ryan, Executive Director

Urbanization: A Growing Problem

The last century witnessed an unprecedented explosion in world population, rising from approximately 1.6 billion people in 1900 to 6.8 billion people in 2010. These numbers will continue to rise, with the vast majority of growth projected to occur in the megacities of the developing world. For the first time, the majority of the world's population lives in urban, rather than rural, environments.



The practical implications of this growth are immense: while wealthy developed nations have been able to finance the necessary infrastructure to accept growing populations, extremely poor nations are rarely in a position to do so. Yet economic opportunities in rural areas are extremely limited and people continue to flock to the slums of the megacities in search of higher wages and access to water, food, and energy supplies. The result will be massive unsustainable growth of impoverished sub-societies evolving in the shadows of expanding megacities.

The intersection of excessive population density with the lack of necessary infrastructure leads to extreme waste production that has nowhere to go but giant landfills at the fringes of the city limits. An increasing number of people have already flocked to these unregulated landfills, which are particularly attractive shelters for the destitute because they provide vast swaths of land that people can scavenge and burn through in search for food and scrap materials to sell. In this dangerous environment, these people often suffer from severe health problems, receive little formal education, are vulnerable to social evils, and live on the margins of society. This is where we come in.



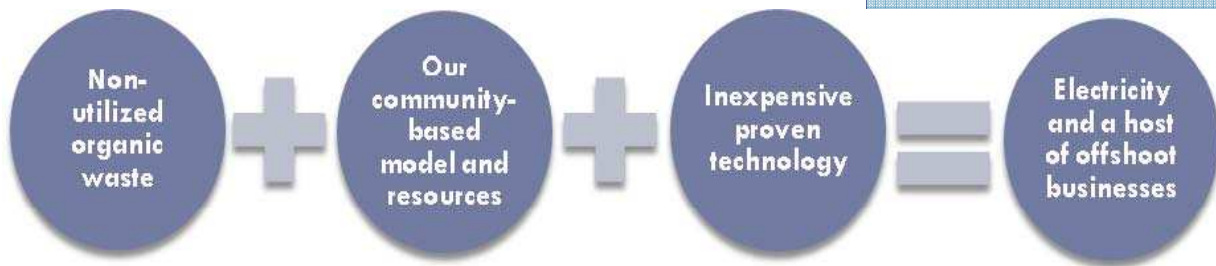
em[POWER] Energy Group, Inc. is a New Jersey-registered non-profit 501(c)3-pending organization that seeks to revitalize landfill communities throughout the world using a modular and scalable cooperative development model based on renewable resources.

By coordinating and streamlining the waste sorting process of landfill scavengers, the em[POWER] model will improve the sorting efficiency of recyclables, turn organic waste into electricity and high quality compost, and provide the nucleus for a host of community-owned businesses. This will in turn provide community access to electricity, enhance educational opportunities, improve local health, and raise worker wages, while reducing greenhouse gas emissions and waste overflow.

By having a series of autonomous co-op units around the world, em[POWER], as an umbrella organization can help them access markets which require scale for entry.

Our overarching vision is to convert a form of poverty into a mechanism that can be used by a community to improve their living conditions and allow them to make a positive contribution to society.

The em[POWER] Equation



Our Solution

By partnering with local high-impact and influential individuals and organizations, em[POWER] will teach these waste scavengers how to improve their quality of life. Many of our initiatives focus around alternative uses for organic waste, thus allowing the community to capture revenue from this currently-wasted resource. For example, inexpensive bio-digester technology can convert organic content into methane fuel that can power a generator while reducing greenhouse gas emissions. This electricity can be used to power essential community facilities such as schools and health clinics, thus enabling the development of community-owned businesses and income-generating activities that will provide additional services and revenue for the community.



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Pilot Project: Bangladesh

The Matuail Landfill in Dhaka, Bangladesh is the largest dumping site for Dhaka, a city of 14 million inhabitants that produces 3200-3500 tons of garbage every day. 1200 of these tons make their way to Matuail each day but a community of almost 10,000 households also call Matuail *home*. As in hundreds of other waste-scavenging communities around the world, Matuail's inhabitants generate income through low-margin scavenging in the mountains of garbage. Often, piles of trash are first burned to eliminate the organic waste content such as food, wood, or paper. Not only are these practices dangerous, but they are also inefficient and environmentally damaging.

As the phrase 'one man's trash is another man's treasure' implies, what we call 'waste' actually tends to hold great value when utilized properly. The first step towards collecting this lost wealth in Matuail is to work with local NGO's as we teach the community how to separate out the organic waste and turn it into compost that can be sold or used for local agriculture. The process will be continuously scaled-up until we can install a small-scale bio-digester to produce methane fuel, thus powering a generator and electrical infrastructure for the community.

Ultimately, we are driven by community development. We are conducting surveys to help us accurately and comprehensively identify Matuail's greatest needs and priorities. The generated electricity will allow the school to expand its capacity to include more students, provide vocational training to adults, and power computers. In the meantime, we are running fundraisers to raise much-needed supplies for its students. Electricity can also be used by local health clinics to improve their services and preserve temperature-sensitive medications or by community members to develop micro-enterprises that will give them the tools, opportunities, and confidence that they need to participate and succeed in society.

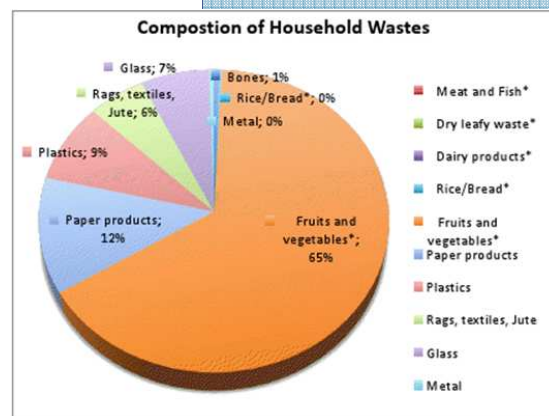


Waste Stream Analysis

Table 2.1-4 Physical Composition of Waste

source category	Income Level	Composition (%)					
		Paper	Food Waste	Wood & Grass	Plastics	Sand & Dust	Others
Dry Season							
Domestic waste by income group	Upper g.	12	49	21	2	1	15
	Middle g.	6	80	0	1	1	13
	Lower g.	4	71	1	2	17	5
	average	7	66	7	2	6	11
Business waste	Restaurant	2	97	0	0	0	1
	Shop, Hotel	4	89	1	1	0	5
	Market	5	53	23	3	6	9
	Public Facility	35	19	25	0	14	7
Street waste		2	4	10	0	73	11
Wet Season							
Domestic waste by income group	Upper g.	13	64	8	6	0	9
	Middle g.	10	72	4	8	0	7
	Lower g.	8	69	10	4	4	5
	average	10	68	7	6	1	7
Business waste	Restaurant	3	96	0	1	0	0
	Shop, Hotel	8	89	0	2	0	2
	Market	3	67	16	1	4	8
	Public Facility	31	19	14	11	20	4
Street waste		1	11	16	1	60	10

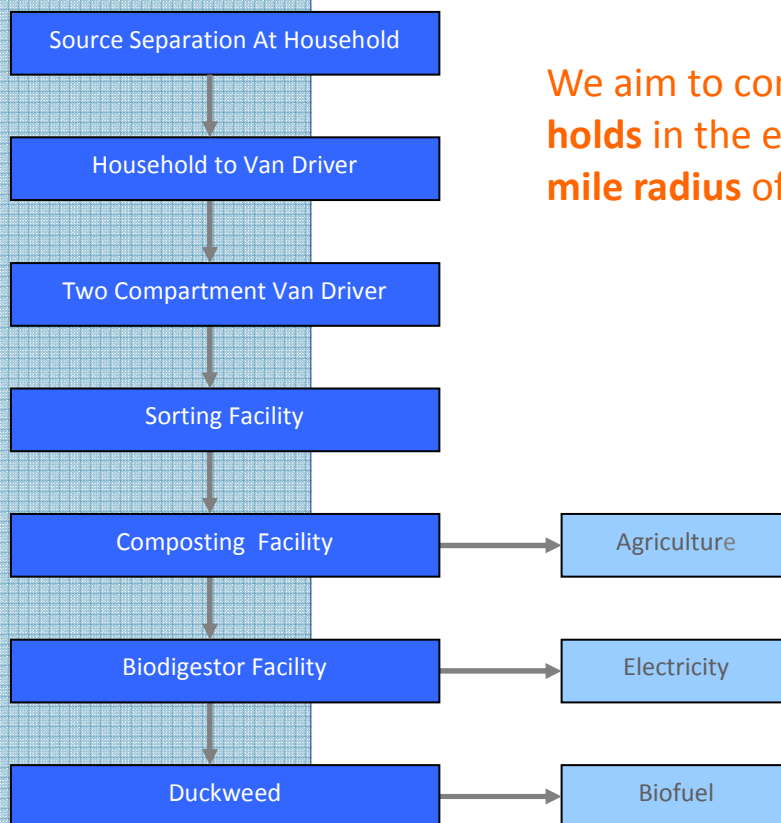
Source: JICA Study Team



Phase III Pilot Program Proposal and Business Plan in Action

em[POWER]'s Project Bangladesh has steadily evolved since its registration as a non-profit organization in April 2011. Project Bangladesh aims to utilize waste as a renewable resource to improve the livelihood of waste pickers in the Matuail Landfill of Dhaka. After creating and testing prototypes, Project Bangladesh entered into the Phase III implementation of the em[POWER]model in February of 2012.

em[POWER]'s Phase III pilot program will include developing and executing a household waste management system to prevent waste pickers from continuing to endanger themselves by burning off the organic waste. The burning off of the organic waste allowed them to sort out the inorganic materials which were sold for profit. Instead, pre-sorting the waste will improve the health of waste pickers while still allowing them to collect the inorganic materials. During Phase III, a sanitary sorting facility will be constructed outside the premise of the landfill. This facility will be used to properly and safely sort the waste, which will then be transported to the composting station and then transferred for anaerobic digestion. Composting stations will support local agricultural efforts while the digestion system will generate biogas which can be used to generate electricity for local facilities. Meanwhile vocational training will take place at a community center that will be constructed next to the sorting facility. This community center will host a number of facilities including onsite eco-toilets and potable water supplies.



We aim to convert **40 households** in the early stages, within a **1 mile radius** of the landfill in Dhaka.



Milestones for 2011-2012

January 2011

- em[POWER] Rutgers Chapter sends schools supplies and initiates pen pal program.

April 2011

- em[POWER] featured at the Clinton Global Initiative in San Diego, California.
- em[POWER] Energy Group, Inc. officially established as an NGO

December 2011-January 2012

- Vice President of em[POWER] Energy Group, Inc, Nasir Uddin visited Matuail Landfill. He was able to interact and meet with members of Grambangla Unnayan Committee, and Grameen Shakti, em[POWER] Interns, Van Drivers, Trash Traders, and Women co-op/Waste Pickers.

February 2012

- Solar Bottle Bulb Installation: Project Bangladesh's efforts to improve education at the Matuail Landfill begin with its key partnership with Grambangla Unnayan Committee (GUC). The onsite Project Manager for Project Bangladesh, Sejan Bari, helped oversee the installation of solar bottle bulbs to improve the lighting inside of the school.
- All Day Planning Meeting On International Projects: The International team met the US team at Princeton University in efforts to collaborate and share information and ideas for the implementation of Project Bangladesh's Phase III of the em[POWER] model.
- Building Compost Bin: Phase III of building the compost bin took place which will help support further development of the community garden near the landfill. The overall cost of constructing the compost bin was 4100Tk, which is about 50 USD.

April 2012

- em[POWER] participated in the Global Health & Innovation Conference at Yale University presented by the Unite for Site.

May 2012

- Construction of the Sorting Facility/Community Center began which will be used to host vocational training for waste pickers and will be accessible by the staff of GUC. The sorting facility will provide a safe environment for workers, sanitary latrines, and storage space for inorganic waste.
- em[POWER] established formal partnership with GREEN

June 2012

- Shafin Fattha and Farhan Nur Shabab, our consultant team on site, conducted audits to help understand the progress of Project Bangladesh.

August 2012

- em[POWER] placed as one of eight finalists in Startups for Good Challenge at the Social Good Summit.

Growing our Organization

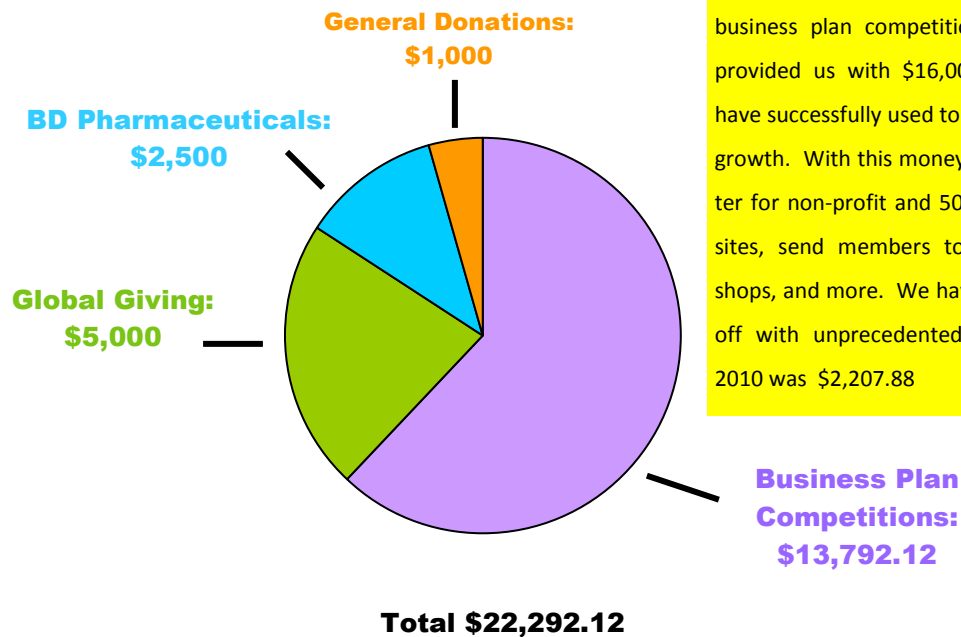
Results don't just come from good intentions and maintaining healthy finances is important if we are to continue making a strong contribution to communities around the world. As a non-profit organization, we rely heavily on charitable donations. Soon, these contributions will be tax-deductible, allowing for a clear win-win situation for everyone. In addition to the private solicitation of funds, we are also actively entering various business plan



em[POWER] Energy Group, Inc./Tahsin Hyder

competitions and pursuing grant opportunities and corporate sponsorships. We have also planned dedicated fundraisers and supply drives. Finally, we operate on a triple bottom line and our project focuses very heavily on sustainability, whether environmental, technical, or economic; we are therefore supporting endeavors at our project sites - ranging from the creation of small businesses or the generation of materials such as compost or recyclables - that will generate revenue and benefit both local community members and our organization as a whole.

Total Income for em[POWER] Energy Group, Inc, 2011-2012

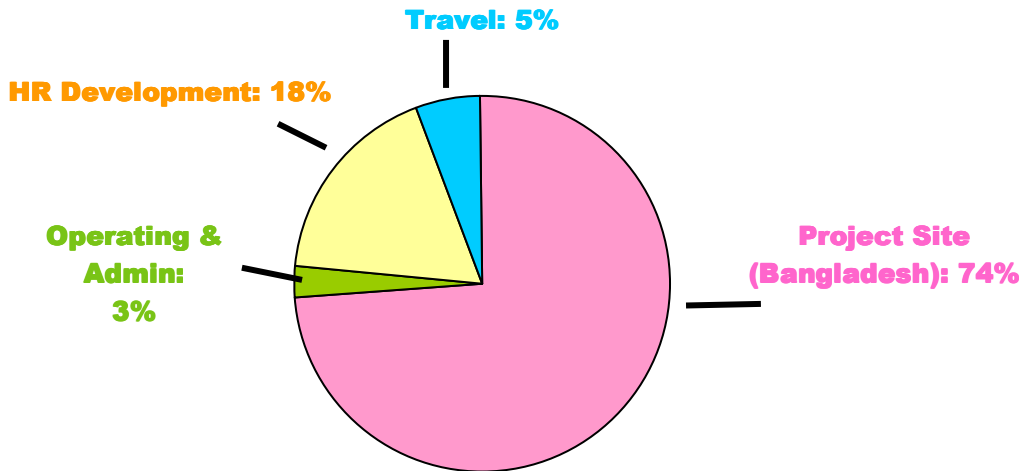


In 2010, our Business Development Team won three business plan competitions within one month. This provided us with \$16,000 of seed funding that we have successfully used to jump-start our organization's growth. With this money, we have been able to register for non-profit and 501(c)3 status, visit our project sites, send members to professional growth workshops, and more. We have seen our organization take off with unprecedented speed. Total expenses for 2010 was \$2,207.88

Financial Summary

With our generous donations we have spend 74% of our total expenses to help support our primary global project: project Bangladesh. The funds are being used to build the Community Center and Sorting facility which is crucial to help establish a safe working environment for the community of Matuail Landfill. It will also help host a variety of resources such as improving occupational health as well as education. In addition compost bins were installed to help support agricultural projects such as establishing a community garden. Due to this extensive project in Bangladesh, em[POWER] has sought to create a stable and well rounded team on site that will oversee the progress and expansion of the Pilot Program. Thus 18% has been invested for Human Resource Development. Our overall operating costs (development, admin, and traveling) make up 36% of our total expenses.

Total Expenses for em[POWER] Energy Group, Inc. 2011-2012



Break down of 2011-2012 Expenses

Project Site (Bangladesh)	\$8,100
Operating & Administration	\$300
HR Development	\$2,000
Travel	\$600
Total	\$11,000



What Is Your Ideal Home?

As working professionals and active students, you may have dreams of owning a beautiful home. But have you ever wondered how your life would be if you were to turn on a faucet and there was no water? What if you were unable to turn on the heat when it was cold outside? Students between the ages 5-14 attending the school within the Matuail Landfill created an art project exhibiting their visions of what would be the perfect home. The em[POWER] Rutgers Student Chapter helped fundraise money to order and send school and art supplies for these students and showcase their artwork.

All-day Planning Meeting on International Projects



On February 12, 2012, the International team met the US team at Princeton University in efforts to collaborate and share information and ideas for the implementation of Project Bangladesh's Phase III of the em[POWER] model.

Participants included members of the student chapters of Princeton and Rutgers University, interns, and professionals from SCS Engineers, Habitat for Humanities, and Yolo County Engineers. Members of the on-site Bangladesh Team were skyped in and collectively, members worked together to understand the current infrastructure of Matuail Landfill and the on-site School. In addition, legal findings on current policies were presented by Neha Kapadia (Legal Intern) to allow for a better understanding of government procedures that would affect the execution of the Pilot Program. Attendees then split up into breakout groups to develop and discuss specific methods that would be applied to implement an efficient household waste management system, while examining the effects of community development, composting, anaerobic digestion, and duckweed.

For More Information

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Facebook: [em\[POWER\] Energy Group](https://www.facebook.com/emPOWEREnergyGroup)

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