

2013



INNOVATIVE ENERGY AND ENVIRONMENTAL TECHNOLOGY PROGRAM

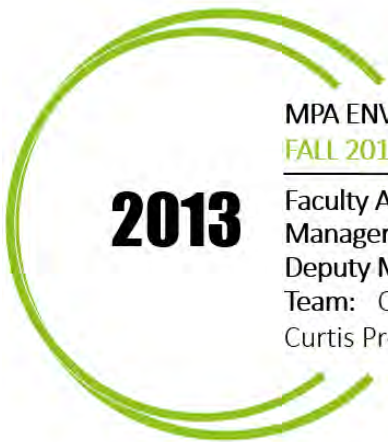
PROVIDING SMALL BUSINESSES WITH GRANTS OF UP TO \$100,000 TO DEVELOP
INNOVATIVE ENERGY AND ENVIRONMENTAL TECHNOLOGIES IN NEW YORK STATE

**INNOVATIVE ENERGY AND ENVIRONMENTAL TECHNOLOGY PROGRAM
IMPLEMENTATION PLAN**

COLUMBIA UNIVERSITY
FALL 2013 MPA ENVIRONMENTAL SCIENCE AND POLICY



The Innovative Energy and Environmental Technology Program strives to encourage the growth of small businesses in New York State through the support and development of technologies that promote a cleaner environment and more secure sources of energy.



2013

MPA ENVIRONMENTAL SCIENCE AND POLICY

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Faculty Advisor: Professor Louise Rosen

Manager: Rachel Hamburger

Deputy Manager: Jordan Villars

Team: Olin Berger, Li Chen, Corey Davis, Brian Filiatraut, Eda Gimenez, Curtis Probst, Wen Qui, Robert Thollander, Guillermo Zamacona

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Executive Summary

New York Senate Bill 1120 (SB 1120)ⁱ was introduced by State Senator George D. Maziarz of New York's 62nd district. The bill authorizes the creation of the Innovative Energy and Environmental Technology Program, which provides grants up to \$100,000 to small businesses in order to encourage and support the commercialization of energy and environmental technology innovations. Government officials have realized the potential of innovative energy and environmental technology developments to help resolve New York's ongoing issues related to economic growth, energy use, and environmental damage. Investment in innovative energy and environmental technologies can facilitate new product developments within small businesses as well as motivate the transformation of more mature industries.

The lack of early stage funding currently acts as a barrier to the commercialization of innovative technologies. Senate Bill 1120 will provide early stage funding necessary for small businesses to fully develop, license, and commercialize new energy and environmental technologies. These innovations will lead to increased employment levels within the state, will help alleviate the burden of environmental damage stemming from current technology, and will increase the resiliency and sustainability of the state's energy supply.

This program, the Innovative Energy and Environmental Technology Program, will be created within the Empire State Development Corporation. The program is administered as a competitive grant program. Applicants will be judged under 3 main criteria: the strength of the business plan, the potential for job creation, and the ability of the technology to address energy or environmental problems in New York State. These criteria are designed to ensure that grantees are aligned with the main goals of the program and have a high probability of long-term economic success. Additionally, the design of the program is staggered to develop the program over the course of 4 years to help ensure that the program has ample time to develop effective outreach and ensure a reliable pool of qualified applicants for the program.

Ultimately, SB 1120 was developed to help ensure that New York State continues to develop a strong economy, and has a reliable and sustainable source of energy to give it a strong footing for future economic development. SB 1120 would invest in the future of New York State and help us to develop new industries in the environmental and energy sectors, securing both the economic future and the long term environmental sustainability of the state.

I. Introduction

Following the Introduction, Sections II – IX will lay out the details of the 2013 IEETP Implementation Plan. In order to facilitate the discussion, the report will follow with a Case Study in Section X to walk through the grant process from beginning to end. Sections II and III correspond to the strategic analysis performed and the program precedents used in order to guide the framework of the IEETP. Sections IV - IX concern the program design and the depth of its functions. These sections will begin with the structure of the program and will follow with a detailed discussion of the programs functions. These include the metrics and indicators of success used to manage the program, in addition to the program's overall budget, staff, and timeline. Finally, the Appendices will include the staffing summaries, detailed timelines, and the sample grant application packet. Essentially, the 2013 IEETP implementation plan will seek to achieve the objectives of SB 1120.

Overview of NYS Challenges

The economic challenges facing New York and its energy and environmental sectors are both great and widespread. Unemployment levels have averaged approximately 8% since the economic recession of 2008; levels of high unemployment and slow job growth have come to characterize New York. These problems have been further exacerbated by the energy and environmental challenges we face on a global and local level.

New York relies heavily on natural gas as a source of electricity. In 2011, 30% of the state's energy was produced by natural gas that provided 12,467 trillion BTUs of energy – more than three times the amount generated by the state's second largest energy source, nuclear power. In comparison to traditional fossil-fuel sources, natural gas produces less GHG emissions and less traditional pollutants like carbon dioxide and particulate matter. However, much of the state's natural gas is imported. The dependence on out-of-state fuel sources increases New York's exposure to fluctuations in fuel prices and disruptions in energy supplies, which could challenge the reliability of our electrical supply and cause economic damage. Moreover, there is scientific consensus that emissions from fossil fuels such as natural gas contribute to climate change. Climate change is projected to cause increases in temperatures and sea levels in New York as well as increasing the frequency of extreme weather events, such as Hurricane Sandy. These issues pose grave consequences for both the state's vulnerable infrastructure and its 8 million citizens. The implementation of SB1120 will take a unique approach to mitigating some of these issues.

By capitalizing on the opportunity for economic growth posed by the state's energy and environmental problems, SB 1120 will address these challenges by investing in innovation in these fields. SB 1120 creates the Innovative Energy and Environmental Technology Program (IEETP) to provide grants of up to \$100,000 to small businesses actively developing technologies that will either address environmental problems, increase energy efficiency, or develop renewable energy technologies. By investing in these fields, the IEETP will stimulate job growth within New York's small business sector, while simultaneously addressing the state's energy and environmental concerns.

II. SB1120 Background & IEETP Challenges

Designed to enhance urban renewal, especially within NYC, in 1968 the NYS Urban Development Corporation Act (NYSUDC) created the Empire State Development Corporation (ESD)ⁱⁱ to finance projects that promote economic growth and diversify the state's economyⁱⁱⁱ. In order to spur economic development in the state, SB 1120 amends the NYSUDC to create the Innovative Energy and Environmental Technology Program, a competitive grant program that funds innovative energy and environmental technologies^{iv}. As New York's chief economic development agency, the ESD will implement and oversee the program beginning September 2014. Funding for the IEETP is subject to budget appropriations of the Empire State Economic Development Fund^{v,vi}.

SB 1120 and the implementation of the IEETP will address a wide array of challenges faced by the economy, in addition to those of the energy and environmental sectors. While similar initiatives such as the Department of Energy's Clean Energy Grant Competition and the Business Incubator and Innovation Hot Spot have evidenced support for programs like the IEETP, several barriers are still anticipated in its implementation^{vii,viii}. These challenges^{ix} and the related stakeholders are summarized in Table 1 and include:

Challenges in Resources and Intellect – The difficulty in understanding new technologies, the inability of innovators to secure early-stage capital, and the lack of experience or entrepreneurs or small business owners to commercialize new technologies may challenge the success of the program.

Challenges in Information Accessibility - Once technologies have reached the market, one reason for failure may stem from the inability of the benefits of new technologies to be realized by consumers, leading to insufficient adoption of technologies.

Challenges in Socio-Economic Dynamics – A weak entrepreneurial culture in the state or those companies with competing interests may inhibit the adoption of the IEETP. Moreover, media and public attention on the failure of certain government funded clean-tech companies may generate additional opposition (e.g., Solyndra)^x.

Those challenges listed above and the expected outcomes of the IEETP are expected to impact a variety of stakeholders, including the following:

- ❖ *Consumers* – Increased consumer interest in technologies such as rooftop solar panels and hybrid/electric cars suggests an increasing receptivity to similar technological developments across corporate and individual demographics.

- ❖ *Research centers and universities* – Given the size of the energy market, research organizations maintain a large stake in developing technologies with the potential to improve the efficiency of energy generation, transmission, distribution, and consumption.
- ❖ *Businesses* – Small businesses in the “Green Economy” may receive direct support from the new business opportunities envisioned by the IEETP. However, while some businesses that are part of the existing energy paradigm may not support innovative technologies that challenge their business models, others may also make use of new opportunities to improve their own processes via such technological innovations.
- ❖ *Regulators* – Various regulatory agencies may support or oppose the implementation of IEETP. While those in charge of environmental protection may support the development of innovative energy and environmental technologies, regulators of companies responsible for existing businesses (i.e. the NYPSC, which governs the utility sector) may find it difficult to balance the threat new businesses pose on existing industries.

The challenges and their related stakeholders are summarized in *Table 1* below.

Challenges	Key Stakeholders
Resources and Intellect	Innovators, Investors, Business Professionals
Information Accessibility	New and Small Businesses, Entrepreneurs, Mature Businesses, Investors
Socio-Economic Dynamics	Research & University Institutions, Investors, Private and Public Institutions, Media, Public Investments

Table 1. Summary of Barriers to Success and Identified Stakeholders

Essentially, the acknowledgement of these stakeholders and the consideration of their potential interactions with the program’s implementation were used to facilitate the overall design of the Innovative Energy and Environmental Technology Program^{xi,xii}.

III. Program Precedent

Overview

- ❖ The existing organizational structure of the Empire State Development Corporation and similar program precedents lay the foundation of the organizational structure of the IEETP.
- ❖ Similar program precedents include New York's "Small Business Revolving Loan Fund", California's Energy Innovations Small Grant Program and the Connecticut Energy Finance Investment Authority.
- ❖ The program design for the IEETP will be designed through a benchmarking analysis of three programs with similar goals and methodologies in New York and California.

SB 1120 requires the Innovative Energy and Environmental Technology Program to be housed within the Empire State Development Corporation. The structure for this program relies upon the existing organizational structure of the ESD as well as the precedents set by programs with similar goals and methodologies within NYSERDA and the New York Power Authority (NYPA). The staffing patterns and job descriptions of the IEETP stem from the required functions and goals of the program. The amount and organizational distribution of employees is designed to facilitate the growth of the program within a three-year start-up period while staying within the bounds of the projected program budget.

The recommended program design of the IEETP was informed by similar programs in New York and California. Within New York, the ESD's Small Business Revolving Loan Fund allocated \$50 million during 2010-2011 period in loans of amounts totaling up to \$125,000. Of this \$50 million, New York State funded \$25 million. In order to develop our program to a scale similar to that of the Small Business Revolving Loan Fund, roughly \$20 million of NYS funding would be needed to accommodate the IEETP's maximum grant award of \$100,000. A more cautious estimate, befitting a newly funded program, would be \$5-10 million over the course of the first three years of the program's existence^{xiii}.

Our team also considered California's Energy Innovations Small Grant Program. This program distributes \$2.6 million worth of grants annually. The grant allocation of the IEETP in its third year approximates this amount^{xiv}.

An additional agency examined was the Connecticut Energy Finance Investment Authority, referred to as the Connecticut Green Bank^{xv}. The Connecticut Green Bank, created in July 2011, has approximately 26 full time equivalent (FTE) employees and is in its third year of operation. Once the differences in state populations and economies are accounted for, and differences in the mandate of each organization are considered, the Connecticut Green Bank serves as a good comparison to assess the staffing of the IEETP, which grows to 18 FTE by its third year.

IV. Program Design

Overview

- ❖ The legislation defines four key terms for IEETP – Innovative Energy Technologies, Innovative Environmental Technologies, Small Businesses, and Eligible Costs.
- ❖ The application requirements list the required application package including at least six types of documents to assess the grantee's businesses product, procedure, or device.
- ❖ ESD must submit an annual report detailing the progress of the IEETP, which must include each grant recipient's business contact information, a description of the product or process involved, the size and use of the grant awarded, and specific indicators of success.

Legislative Requirements

The legislative requirements of SB 1120 shaped the design of the Innovative Energy and Environmental Technology Program. The following list supplies key terms defined within the legislation:

- ❖ **Innovative Energy Technologies:** Technologies and procedures that produce, distribute, save and/or store energy that focus on renewable energy sources, such as solar, wind, and hydroelectricity, amongst others.
- ❖ **Innovative Environmental Technologies:** Environmentally supportive or benign technologies and procedures that reduce risk, increase cost-effectiveness, and improve efficiency of processes and products relating to pollution control, waste management, site remediation, environmental monitoring, and/or recycling.
- ❖ **Small Businesses:** Businesses located and operating within New York State that are independently owned and operated, and are involved in the development of innovative energy and environmental technologies. These companies must maintain 100 or less employees, of whom 80% must be fully employed in-state full time.
- ❖ **Eligible Costs:** Costs linked to working capital, equipment, or leasehold needs, and/or commercialization of products and procedures.

Application Requirements

Senate Bill 1120 requires that grant applications to the IEETP include an assessment of the grantee's business product, procedure, or device, including:

- ❖ The marketability and technical value of product,
- ❖ Measurable outcomes from product manufacturing and sale, including jobs retained or created and the salary levels of these jobs,
- ❖ An estimated timeline of product's manufacture and sale,
- ❖ A description for grant need,
- ❖ A budget enumerating how the grant will be used, and
- ❖ The applicant business' plan for obtaining other funding for product development, marketing, and distribution.

The ESD may only provide one grant to any single business within the same year, which must only be used for eligible costs. The ESD, in consultation with NYSEDA and the DEC, will develop grant evaluation criteria considering the economic impact and technical feasibility of the product, the ability of the applicant to locate funding from other sources, and the applicant's financial commitment to its business plan.

The grant application must also detail the potential of the product to improve public health, the environment, quality of life, or economic growth. Additionally, the potential for economic benefits of the product must likely be realized within a period of six to twelve months or a period of no more than three years.

SB 1120 stipulates that the ESD submit an annual report detailing the progress of the IEETP no later than September 1 each year. This report must include each grant recipient's business contact information, a description of the product or process involved, the size and use of the grant awarded, and specific indicators of success (primarily the economic and environmental impacts). Nothing in the annual report will require the disclosure of intellectual property related to product confidentiality, whether or not patenting protects such information ^{xiv}.

Application Development

The IEETP will be housed within the ESD, which will be responsible for selecting, approving, and monitoring grant recipients. The program application will mimic the NYS Consolidated Funding Application (CFA), in order to be consistent with other programs that provide funds to small businesses in the state. The CFA is a statewide electronic application designed to reduce bureaucratic impediments and increase efficiency by allowing applicants to apply for multiple state funding sources using a single electronic application^{xvi}. Use of this application will also increase the geographical reach of the IEETP as the CFA program is run through ten Regional Economic Development Councils (REDCs) throughout the state^{xvii}.

Annual Reporting

The legislation requires that prior to the beginning of every year, beginning on September 1, 2014, a detailed report will be submitted to the Governor's Office and to the members of the State Assembly requesting this report by the IEETP Program Manager. This report shall include, amongst other items deemed necessary, the names and locations of grant recipients; descriptions of the technologies/processes commercialized; the amount and purposing of each grant; the total project costs per grant recipient; and the number of jobs created or retained over the grant period.

Summary

Legislative requirements have been met by adhering to definitions used in the IEETP: Small Businesses, Innovative Environmental Technologies, Innovative Energy Technologies, and Eligible Costs. Through detailing contents of the application package, applicants will prepare required documents for the authority to assess their eligibility. The annual report submitted by ESD will track the progress the IEETP will have made each year.

V. Metrics and Indicators of Success

Overview

- ❖ Goals of the IEETP include growing the economy, increasing energy independence and mitigating the environmental externalities of current energy use.
- ❖ To measure success in achieving IEETP's goals, we will rely primarily on three metrics: jobs created, energy import reductions and emission reductions.

The goals of the IEETP include growing the economy through job creation, increasing energy independence through innovative technology and renewable energy, and mitigating environmental externalities through CO₂ reduction. Three primary metrics will be used to measure success in achieving these goals:

1. Jobs Created

Full-time equivalent (FTE) jobs created will be self-reported by grant recipients and verified using tax forms. The number of jobs created will form the primary measurement.

As an extension of jobs created, increased real wages paid as a result of grant funding will be considered a metric of success that compounds the job creation metric. This highlights the impact that jobs created will have on the economy. Average salaries or wages of jobs created will be submitted by each grantee. All else equal, more successful recipients will have higher average wages paid as a result of the bill. Additionally, increases in wages paid can be calculated across the grant program as a whole. This will create a secondary metric regarding the total monetary impact of the grant program on the economy in NYS. As with the number of jobs created, wages will be self-reported but may be verified via tax documents^{xviii}.

2. Energy Import Reduction

Another metric for program success focuses on energy impacts of grantee companies and/or those making use of their products/processes. The two primary mechanisms to measure the long-term ability of the program to achieve greater energy independence will be the increase in energy generation via domestic renewable sources, and the decrease of energy consumption attributable to grantees' innovation in energy efficiency via products or operation process.

For awarded companies that focus primarily on energy generation technologies, the long-term impact of those generation technologies will be assessed via self-administered reports and verified by data from relevant power suppliers or regulatory agencies. The installed capacity (in megawatts) of these companies will be calculated across the portfolio of grant recipients to estimate the amount of additional renewable generating capacity supported by the IEETP.

For funded companies that focus primarily on energy efficiency technologies, the long-term impact of installation of energy efficiency programs will be assessed via self-administered reports and verified by data from energy savings contracts or industry standard savings

calculations. The net reduction in energy usage from installation of technologies supported by such companies (in megawatt hours-equivalent) will be calculated across the portfolio of recipients to estimate the total reduction in energy usage supported by the IEETP^{xix}.

3. Emission Reduction

The program also encourages economic growth with fewer environmental externalities, and focuses particularly on greenhouse gas emissions and other forms of air pollution as demonstrated in *Figure 1*. The most significant issue is CO₂.

CO₂ emission reduction will be assessed by two mechanisms:

1. The decrease of CO₂ emission due to the replacement of fossil fuel usage by clean energy, and
2. The decrease of overall emission due to the reduction of energy consumption via increased efficiency technology.

Fossil Fuel Emission Levels - Pounds per Billion Btu of Energy Input			
Pollutant	Natural Gas	Oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Carbon Monoxide	40	33	208
Nitrogen Oxides	92	448	457
Sulfur Dioxide	1	1,122	2,591
Particulates	7	84	2,744
Mercury	0.000	0.007	0.016

Figure 1. Fossil Fuel Emission Levels for Natural Gas, Oil, and Coal (lbs/BTU)

The data will be reported by each grantee according to their report on energy impacts. The NYSERDA and NYDEC are responsible for providing guidelines, establishing emission factors for calculations, and verification of the reporting framework.

The metrics and indicators of success help to ensure accountability, transparency, and continual improvement throughout its life span. Success of the program is defined as qualitatively and quantitatively fulfilling our mission statement each year as described by the metrics and indicators above.

Summary

The three main metrics of the program impacts (jobs created, energy reductions, and emissions reductions) are the essential guidelines to program design and implementation. These metrics are both the selecting criteria for grant awardees, and the metrics by which we track the progress of the program and evaluate of performance of grant recipients.

VI. Program Staffing

Overview

- ❖ The agency responsible for the IEETP (ESD) is determined by the legislation.
- ❖ The organization structure of the IEETP follows its functions, and is similar to that of other grant programs such as:
 - ESD's Small Business Revolving Loan Fund and the California State's Energy Innovations Small Grant Program.
- ❖ The IEETP's staffing goals are as follows:
 - Take advantage of the existing resources and knowledge of the institutions involved.
 - Create a structure to run the program and use existing ESD personnel in areas such as accounting, human resources, and legal to reduce costs.
 - Use a flexible staff structure, which will increase the number of professionals over time in order to meet program goals.

Critical Program Functions

SB 1120 requires the IEETP to be carried out by ESD. In order to meet the goals for the program, the ESD must properly execute the following critical program functions:

Management

SB 1120 calls for coordination between ESD, NYSERDA, and the New York DEC. A Steering Committee will be created at the onset of the program to represent interests of DEC, NYSERDA, and ESD. The Steering Committee will act as a "Board of Trustees", appoint the Program Manager and oversee policies regarding the use of research.

The Program Manager will liaise between the Steering Committee and the IEETP's internal staffs. He or she will also hire an Assistant Manager to be the day-to-day manager of the ongoing program activities.

Research

An interdisciplinary research effort is required in order to ensure market and technological feasibility of commercialized environmental technologies. This team will be led by the Research Coordinator who will be a full-time employee at ESD. The research will be provided by multiple third-party organizations.

In order to provide grantees with the highest chance of achieving the desired outcomes of the program, the IEETP must provide grantees with support regarding technical aspects of each project as well as market information for the

commercialization of the project. Technical support includes market research reports regarding industry particular technologies, guidance in licensing and patents, and one-on-one support from experts in specialized fields. Market support includes the analysis and determination of potential consumers, development of product niche, and budget allocation support.

Promotion

The IEETP must make the potential availability of grants known to potential grantees. Apart from soliciting grant applications, the IEETP must also implement a framework for recognizing suitable applicants for the program. This framework shall include the potential for commercialization of the technology, job creation stemming from the grant, and the environmental or energy-related benefit from the technology.

Applicant/ Grantee (“Customer”) Support

Successful guidance of grantees will be achieved by monitoring the technological and commercial development of each project and providing suitable support when required. After the first year of the IEETP, we have developed a position that will oversee the progress of each project and will work closely with each grantee by facilitating all the support needed.

Performance Analysis

The IEETP will perform an annual self-analysis focusing on its mission statement as reflected in the measurable outcomes of each of its grant projects. This will allow the ESD to measure the success of the IEETP regarding its ability to reach these goals.

These reports will be submitted by the IEETP Program Manager to the Governor’s Office, and to the members of the State Assembly requesting this report, no later than September 1st. This report shall include items such as the names and locations of grant recipients; descriptions of the technologies/processes commercialized; the amount and purposing of each grant; the total project costs per grant recipient; and the number of jobs created or retained over the grant period.

IEETP Staff

Six roles will be required to properly execute the IEETP. The functions of each role are discussed below. The timing of staff additions is discussed in the section entitled “Organization Structure”.

Program Manager: The Program Manager provides strategic leadership for the IEETP, is responsible for the employees of the program, and corresponds with liaisons from the IEETP advisory bodies (NYSERDA and DEC).

Assistant Manager: The Assistant Manager will work directly under the supervision of the Program Manager and will act as support to the Program Manager’s needs.

Applicant Liaison: The Applicant Liaison is the first point of contact between applicants and the IEETP. They promote the program within the business community and coordinate with other institutions to ensure a robust and continuous applicant pool.

Research Coordinator: The Research Coordinator is responsible for providing support information to grantees. Through collaboration with third party research firms, this professional gathers technological feasibility and other data for the purpose of grantee support.

Business Analyst: The Business Analyst evaluates the market for grantee technologies, as well as all other research criteria related to the evaluation of grant applications.

Performance Analyst: The Performance Analyst monitors the progress of current grantees towards program goals and completes research and evaluations of their progress.

Organization Structure

The reporting structure for the IEETP is shown below. While there will only be one Program Manager and one Assistant Manager, multiple individuals will fulfill the other roles within the organization as the program grows over time.

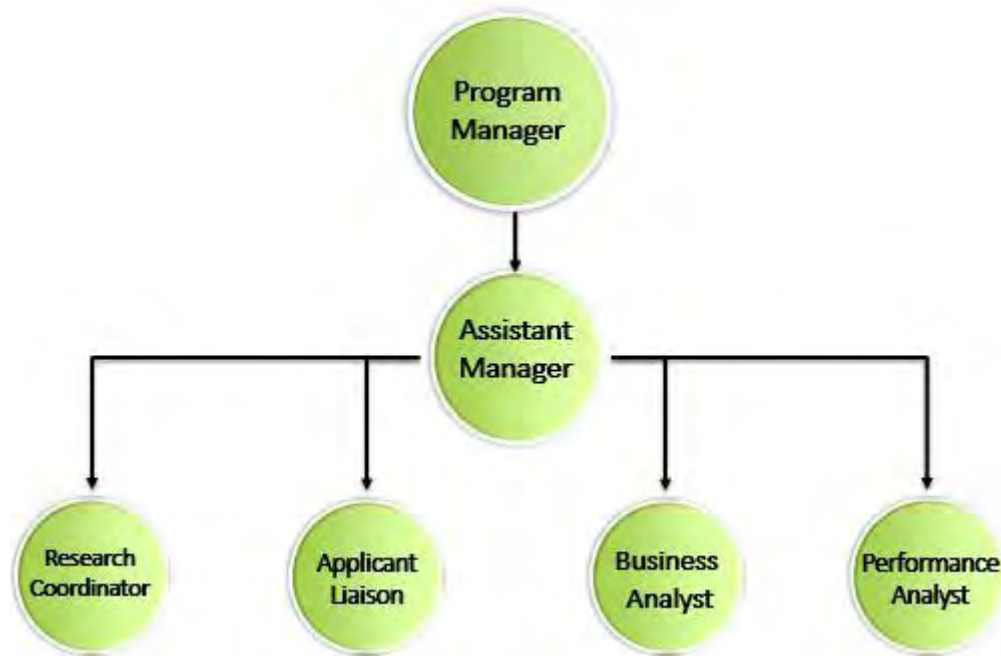


Figure 2. IEETP Organizational Structure

Staff projected growth

- ❖ Year 1 includes 8 full time positions at ESD.
- ❖ At full capacity in the third year, 18 full-time positions at ESD will be required.

Summary:

We are proposing a new staffing structure for the IEETP, which will be located at the ESD. We will use some of ESD's current staffing resources (e.g. accounting, legal and human resources) in order to minimize costs. A Program Manager will be responsible for the success of the program. The size of the staff will increase each year to achieve the program goals. The IEETP will start in Year 1 with 8 full-time positions and will grow to 18 full-time positions by Year 3 when the program is at full capacity. Staff will be distributed across 4 main functions – Research Coordinators, Business Analysts, Performance Analysts, and Applicant Liaisons.

VII. Program Budget

Overview:

- ❖ The total IEETP budget is scheduled to grow from \$1.3 million in the first year of operation to \$4.0 million by Year 3 as the program becomes larger and more established.
- ❖ The IEETP budget assumes a modest allocation from ESD and relies upon third-party research to minimize program costs and maximize program efficiency.
- ❖ By Year 3, the majority of the budget is spent on the grants themselves.

Per the legislation, the IEETP will be funded out of appropriations from the ESD and will generate no revenue of its own. Accordingly, the IEETP is designed to run on a relatively small budget, as there is no guarantee that significant funds will be available for its implementation. Our program budget was derived from comparable programs and assumes a reasonable allocation from the total ESD budget. The program costs are comprised of four main categories summarized below: (a) grants, (b) research, (c) personnel costs and (d) other (non-personnel) costs.

Grants

The cost of each grant is the core expense of the program. By the time the program operates at capacity (Year 3), grants will constitute the largest single program expense. SB 1120 limits grants to \$100,000. There is no minimum grant size required but, in order to develop consistency in approach, our team established three grant levels:

1. \$25,000 (“Bronze”);
2. \$50,000 (“Silver”); and,
3. \$100,000 (“Gold”).

The smaller grant amounts (Bronze and Silver) are designed to provide early-stage funding for applicants that show promise, but need to commit additional capital of their own or secure sources of alternative funding before receiving a larger grant amount. This procedure is consistent with the requirements of SB 1120 that focus on the amount, timing, and source of additional funds for the applicant’s product or process.

Research

One of the primary goals of the legislation is to rigorously examine applicants and their applications. This assessment involves research conducted by third-party sources and coordinated by program staff. Using third-party research will be more cost-effective and should provide better analysis than creating a research organization for this program. Third-party research will also provide an independent verification of the technical or economic merits of a grant application,

which may reduce potential conflicts of interest that would otherwise result if program staff were solely responsible for applicant evaluation.

Our team estimated a total research budget of:

- ❖ \$300,000 in Year 1;
- ❖ \$400,000 in Year 2; and,
- ❖ \$500,000 in Year 3.

These estimates are based on the assumption that each grant approved may require ~\$10,000 of specific research in connection with evaluating its application. Our team also assumed ~\$250,000 of research each year would be necessary to develop the infrastructure needed to assess applications and to monitor and assist prior grantees.

Staffing

Staffing costs include salaries and other associated costs. These include: payroll taxes^{xx}, benefits including health insurance and retirement plans^{xxi}, and costs of other human resource functions that vary directly with headcount and include training and payroll accounting^{xxii}. These figures are based upon preliminary research, but further analysis would be required to ascertain the precise cost structure of the ESD^{xxiii}. The costs per person are applied to the staffing projections previously discussed to derive aggregate staffing costs.

Other (Non-Personnel) Costs

Our team estimated \$200,000 per year for other program costs, including the allocated costs associated with existing ESD functions such as accounting, human resources, information systems and legal costs. General and administrative expenses, such as office space and supplies, are assumed to be absorbed by ESD and are not allocated specifically to this program. Further analysis would be required with existing ESD staff to refine the precise cost structure and determine whether further cost savings are possible.

Budget Summary

Based upon the four line item categories discussed above, a complete budget for the first three years of program operation is shown *Table 2*.

	Year 1			Year 2			Year 3		
	#	\$ per	Total	#	\$ per	Total	#	\$ per	Total
Grants:									
Gold (100K)	1	\$100	\$100	9	\$100	\$900	17	\$100	\$1,700
Silver (50K)	1	\$50	\$50	2	\$50	\$100	4	\$50	\$200
Bronze (25K)	<u>2</u>	\$25	<u>\$50</u>	<u>4</u>	\$25	<u>\$100</u>	<u>6</u>	\$25	<u>\$150</u>
Total grants	4	\$175	\$200	15		\$1,100	27		\$2,050
Research			\$300			\$400			\$500
Personnel:									
Senior	1	\$97	\$97	1	\$99	\$99	1	\$101	\$101
Mid-level	6	\$70	\$420	11	\$71	\$785	14	\$73	\$1,019
Junior	<u>1</u>	\$52	<u>\$52</u>	<u>2</u>	\$53	<u>\$106</u>	<u>3</u>	\$54	<u>\$163</u>
Total personnel:	8		\$569	14		\$991	18		\$1,283
Non personnel:			\$200			\$200			\$200
TOTAL:			\$1,269			\$2,691			\$4,033

Table 2. IEETP Line Item Budget for 3 Years (000s)

Budget Analysis

Figure 3 shows the total budget broken down into the four line items previously discussed for the first three years of the program. The key take-away from this chart is the significant growth in the annual budget (\$1.3 million to \$4.0 million) attributable to the expected expansion of grants (from 4 in Year 1, to 27 in Year 3).

Figure 4 shows the same amounts as a percentage of yearly total budget. The critical point here is that by Year 3 of the program, over half of all program expenses will be allocated to grants and a decreased proportion will be attributed to overhead costs.

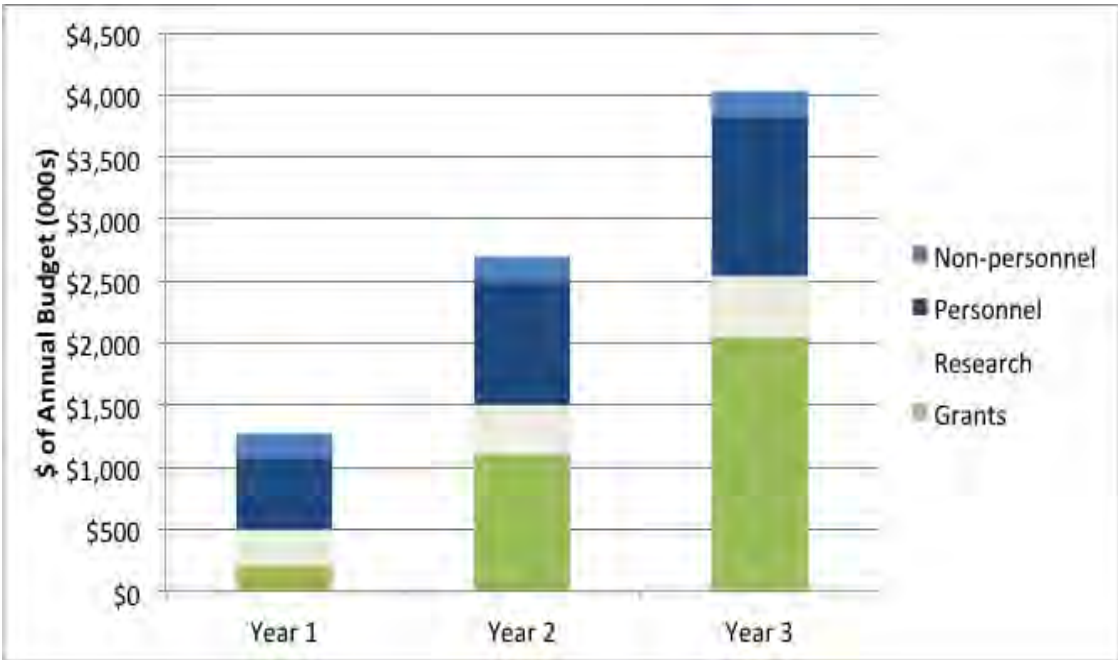


Figure 3. Total Budget (\$), Years 1-3, by Line Item

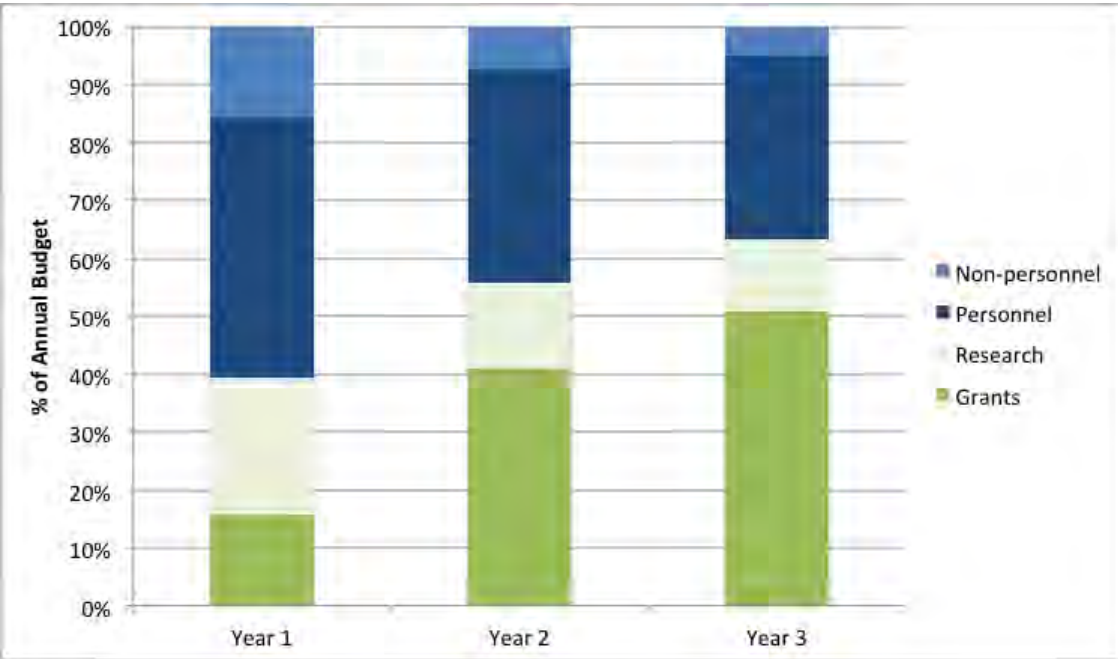


Figure 4. Budget (%), Years 1-3, by Line Item

Future Budgets

Having established an initial budget, it is equally important to establish general procedures for creating future budgets. As illustrated in *Figure 5*, the budgeting process has three steps. First, the budget is developed with the consideration of factors such as the economic climate, level of appropriations from ESD, and the success of similar programs. The second step of the budgeting process is measuring performance, which will examine factors such as actual versus budgeted amounts, the number of applications and grants, and the performance of grantees. The third step involves the evaluation of the success of the IEETP. Program feedback will be incorporated into staff reviews, program changes, expense levels and resource allocation. All this information will assist in preparing the budget for the upcoming year, as the cycle repeats itself.

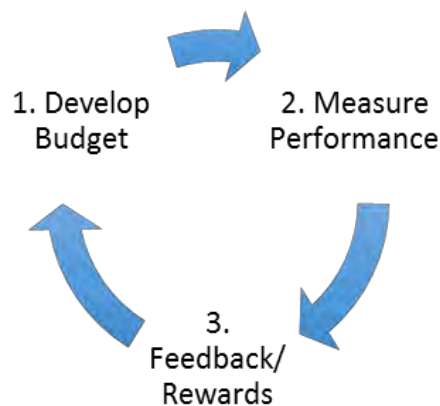


Figure 5. Budgeting Process Schematic

Summary

The IEETP budget (\$1.3 million in Year 1; \$4.0 million in Year 3) is based upon certain factors including legislative limitations, market opportunity, required staffing and selective outsourcing. There are 3 categories of grants dispersed in order to meet the different financial needs of applicants. By Year 3 when the program is at full capacity we hope to award 17 \$100,000, 4 \$50,000, and 6 \$25,000 grants. A process has been developed to evaluate and modify future budgets to respond to changes in the legislative, regulatory or market environment.

VIII. Performance Management

Overview

The performance management of the IEETP centers on the ability to properly score grantee applications and monitor and track success of grantee awards.

- ❖ The IEETP will weight grantee applications based on the feasibility of technology solutions, business models, market assessment, and its match with program goals.
- ❖ The IEETP will receive feedback based on metrics reflecting program goals, allowing the program to adapt future changes in the market or legislation.

Performance management occurs throughout the pre-award and post-award stages of the grant process. The goal of performance management is to ensure that every step taken by the IEETP and its grantees contributes to the final program goals.

In the pre-award stage, the IEETP team needs to cooperate with liaisons from NYSERDA and DEC to determine the program's definition of success and develop metrics to measure program performance. Performance management of the IEETP is comprised of three main categories summarized below:

1. Evaluating grantee applications,
2. Tracking and measuring grantee awards,
3. Internal program evaluation.

Evaluating Grantee Applications

The IEETP will award a set number of grants per year based on a number of criteria. These criteria include technological solution, business model, market assessment of the technology, and alignment of the business and technology with the goals of the IEETP. These assessment components are given a weight of 20%, 20%, 30%, and 30%, respectively, to capture their relative importance to the overall consideration of the application (*Figure 6*). These four criteria will assess the feasibility of the product and how it will best achieve IEETP's goals.

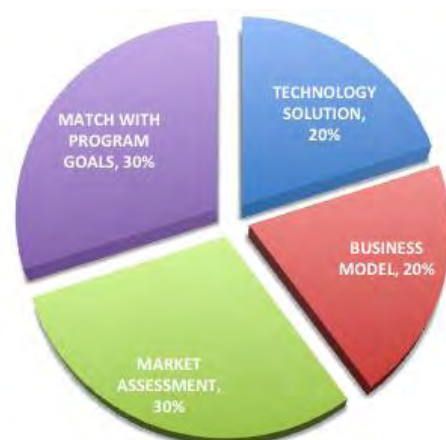


Figure 6. Weighted Grant Application Criteria

Figure 7 displays the conceptual framework of the IEETP scorecard to properly assess all incoming applications. Using the scorecard in the Appendix, the IEETP team will judge each grantee application against the four weighted criteria.



Figure 7. Example IEETP Grantee Applicant Scorecard Rubric (%)

Tracking and Measuring Grantee Awards

Our performance management design allows the IEETP team to keep track of grantee performance throughout the operation of the program. After grants are released, grantee-submitted reports will be generated every quarter with program performance analysts providing immediate feedback. After six months, grantees are required to submit formal reports that include financial statements showing the financial operation of the companies, their use of grant funds, and their progress in the four impact areas required by the program seen in Table 3.

Metric	Unit Measured
Jobs Created	Number of People/Year
Avoided Emissions	Ton/Year
Renewable Energy Generated from Product Sales	kWh/Year
Electricity Saved by Product Sales	kWh/Year

Table 3. Four Program Impact Metrics Used to Assess Awarded Grantee Fund Use

One year after receiving a grant, grantees will submit a more comprehensive report detailing their annual inputs, outputs, and outcomes based on economic and environmental metrics. Tracking and monitoring these four metrics will be the standard to best achieve program success.

Internal Program Evaluation

Tracking and measuring grantee performance serves as the initial aspect of program evaluation. Further aspects of this evaluation include the grading of the IEETP team, and analysis of the program's achievement of its own progress benchmarks. This internal evaluation will increase the likelihood of program success by identifying any existing problems, providing feedback and assistance to grantees, and adjusting the following year's expectations accordingly. *Table 4* illustrates the nine main criteria, which are divided into Program Administration and Program Impacts that will be used.

Year 1	Unit	Year 1 Goals
Program Administration		
Budget Expense	Dollars/Year	1.26mm
Applications Submitted	Number of Applications/Year	≥ 8
Grants Approved	Number of Grants/Year	4
Grants Released	Dollars/Year	200,000
Grantees' Compliance to Expected Program Goals	Number of Grantees Fully Reaching Program Goals	4
Program Impacts		
Job Creation	Number of People/Year	N/A
Renewable Energy Generation	kWh/Year	[7200, 8000]
Net Electricity Saved	kWh/Year	[51300, 57000]
CO2 Emissions Saved	Tons/Year	[19.2, 22]

Table 4. Internal Program Evaluation for IEETP

After comparing achieved outcomes to annual program goals, the IEETP team will examine the whole lifecycle of the grants to identify problems and provide feedback. The feedback should reflect program changes needed regarding staffing, budgeting, and reallocation of resources within the team and amongst grantees. This feedback then becomes a critical input into ongoing program development and budget creation.

The outputs of performance management will be generated annually based on the requirement of grantee self-reporting and the annual program report sent to the Governor's Office. At the end of the operating year, the Program Manager must submit a report to all program partners, including NYSEERDA, DEC, and the NY State Legislature.

Essentially, these outputs should allow IEETP staff to answer the following questions:

1. Did the IEETP invest in the right businesses?
2. Are grantees achieving the program's targeted outcomes?
3. How can the IEETP most efficiently improve in the following year?

Summary

IEETP performance management – evaluation of grantee applications, tracking and measuring grantee awards, and internal evaluation of the program – reflects the main components of the budget seen in Section VII and the goals of the program. All aspects of performance management have been put into place in order to continually adapt to changes in legislation, technology, and needs of applicants. Applications are assessed on four main criteria: technological solution, business model, market assessment of the technology, and alignment of the business and technology with the goals of the IEETP. These assessment components are given a weight of 20%, 20%, 30%, and 30%, respectively, to capture their relative importance to the overall consideration of the application.

Success of the program itself is judged on nine main criteria:

- ❖ **Program Administration**
 - Budget Expenses, Applications Submitted, Grants Approved, Grants Disbursed, Compliance with Expected Program Goals
- ❖ **Program Impacts**
 - Job Creation, New Renewable Generation, Net Electricity Saved, CO₂ Emissions Reduction

IX. Program Timeline

Overview

- ❖ The implementation of the IEETP is divided into two main phases:
 1. Program development, taking place in the first year the program is created, and
 2. Program operation, occurring in post-development years in which the program is fully functioned.
- ❖ Once the IEETP achieves full functionality, the program will operate on a yearly cycle based upon the solicitation and receipt of grant applications, distribution of grants, grantee monitoring, and program evaluation.

Program Development and Operation

The IEETP steering committee comprises of members of the ESDC, NYSERDA, and the DEC. This steering committee is tasked with hiring the Program Manager who will hire the remaining program staff and lead the development of the program throughout this year.

The tasks undertaken throughout 2013 are displayed in *Figure 9* and are summarized as follows:

- Q1:** Formation of the IEETP steering committee. This committee will hire a Program Manager who will be in charge of hiring the remaining staff for the program.
- Q2:** Hire and train new staff members and interview potential candidates for unfilled positions. The Program Manager will also implement a search for a candidate for the Performance Analyst position to be hired later in the year.
- Q3:** Develop the quantitative goals with which to measure the overall success of the IEETP. The Applicant Liaison will also begin composing profiles of potential grantee businesses. The applicant scorecard will be developed and confirmed in this period.
- Q4:** At this point in the year, all remaining open staff positions will be filled. Program goals and the application scorecard will be finalized and confirmed. The Applicant Liaison will begin outreach to the business community to solicit program applications for the following year.

The tasks that will occur in following years after IEETP is developed and in operation:

- Q1:** Applicant Liaison interviews potential applicants and assists potential grantees with the application process.
- Q2:** Continued provision of program outreach and any application support necessary in order for applicants to meet the June 1st application deadline. Begin overall program evaluation.
- Q3:** Approve final list of grantees from June 1st deadline. Begin solicitation of applications for November 1st application deadline. Provide grantee support regarding application of funds and evaluate grantee progress towards program goals. Submit overall program evaluation report to the Governor's Office. Begin analysis of application criteria for potential revision. Submit request for program budget revision, if appropriate.
- Q4:** Approve final list of grantees from November 1st deadline. Continue to provide grantee support for all grantees and monitor progress towards program goals. Revise application criteria for the following year, if necessary. Begin outreach to potential applicants for the following year.

Figure 8. Calendar of activities for IEETP 2013 implementation

Function	Activity	Staff	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Program Development	These 6 people meet to form SC	Mgmt team	█											
Program Development	SC conducts interviews and hires PM	SC		█	█									
Program Development	Develop quantitative goals based off of research	RC/ JS								█	█	█		
Program Development	Support other team members as needed	JS								█	█	█		
Program Development	Develop Profiles of promising projects/opportunities	AL								█	█	█		
Management	Pick 2 employees from each org to represent IEETP's SC	Legislation	█											
Management	SC sends out internal/external feelers to gain best candidates in the field for position	SC		█	█									
Management	Vets and hires Research Team	SC		█	█	█								
Management	Hire initial program staff	SC/PM			█	█	█	█						
Management	Interview potential candidates	SC/PM				█	█	█						
Management/ Administration	Train initial program staff	PM				█	█	█						
Management	Hire Performance Analyst to be added in Q4 of this year	PM						█	█	█	█			
Management	Review goals and compare to legislative intent	PM								█	█	█		
Management, Program Development, Performance Analysis	Develop program benchmarks/ goals	PM, RC, BA, PA								█	█	█		
Management	Approve application/ weighted scorecard for distribution	PM								█	█	█		
Management, Program Development, Performance Analysis	Based on above research, develop program benchmarks/ goals	PM, RC, BA, PA								█	█	█		
Management	Laise with Research Team to oversee criteria/scorecard creation	RC										█	█	█
Administration	Go through hiring process/ paperwork	PM				█	█	█						
Administration	Compile/ streamline market research	RC/RT								█	█	█		
Administration	Create physical application	AL/ JS									█	█	█	
Administration	Type up score card and criteria	AL										█	█	
Customer Service	Reach out to applicants to create awareness of grants/ program and encourage application	JS/AL					█	█	█	█	█	█	█	█
Customer Service	Answer questions about application process	AL					█	█	█	█	█	█	█	█
Promotion	Outreach to state research universities to create program awareness	JS					█	█	█	█	█	█	█	█
Promotion	Outreach to other state agencies (SBA, NYC OLTPS) to create awareness	JS					█	█	█	█	█	█	█	█
Promotion	Create target lists of applicants	JS					█	█	█	█	█	█	█	█
Research	Begin market research (to be conducted on a continuous basis)	RC, RT				█	█	█	█	█	█	█		
Research	Identify gaps in NY's environmental/energy industry	RC, RT								█	█	█	█	
Research	Liase with research consultants to understand programmatic implications of research	RC								█	█	█		
Research	Liase with research consultants to understand programmatic implications of research	RC								█	█	█		
Research	Develop possible application criteria and scorecards -	RT										█	█	

ESD
Outside Party
Grantee
ESD+ Liasons from DEC/NYSERDA

X. Case Study

This case study provides an example of how the Innovative Energy and Environmental Technology Program will operate once it has been fully implemented.

Program Outreach

The program begins with the **Applicant Liaisons** reaching out to companies in the business community that they think would be successful applicants and other connections that might assist in identifying potential applicants (e.g., faculty at research universities). For this example, we will focus on a hypothetical company, SunTrek Solar, which has developed a new, easily removable and transportable solar panel system. After initiating contact, the Applicant Liaison will assist SunTrek Solar in completing the application for the IEETP.

Scoring of Application

After the Applicant Liaison assists SunTrek Solar with completing the application, it is sent to the Business Analyst for evaluation.

The **Business Analyst** considers:

- ❖ The potential that SunTrek's solar panels will function as planned
- ❖ An analysis of SunTrek's panels relative to similar technology
- ❖ The financial investment taken on by SunTrek's owners and other capital providers
- ❖ SunTrek's overall business model
- ❖ The consumer demand for products similar to SunTrek's panels
- ❖ The job creation potential of an investment in SunTrek
- ❖ The potential amounts of solar energy generated and CO₂ emissions abated by the use of SunTrek's panels

The Business Analyst will work with the Research Coordinator to identify third-party research providers that can assist in these evaluations where necessary. The Business Analyst uses his or her own judgment, together with any third-party research, to recommend approval of a grant (and the amount of the grant), denial of the application, or request further information from the applicant. If the Business Analyst recommends providing the grant, this must be further approved by the Program Manager or, depending on the nature of the investment, by an investment committee formed by the Program Manager.

For purposes of our analysis, we shall assume SunTrek's application is approved and the company will be granted \$100,000.

Grantee Support

The **Research Coordinator** is tasked with ensuring that SunTrek makes the best use of its grant money. He or she works with the third-party Research Team to supply:

- ❖ Consumer analysis
- ❖ Assistance in navigating state/local regulatory processes
- ❖ Product licensing support
- ❖ Access to specialized technical support from 3rd parties
- ❖ Marketing research

The grant helps SunTrek to:

- ❖ Hire two new employees
- ❖ Receive all necessary licenses for their product
- ❖ Increase production of its solar panels
- ❖ Intensify the focus of their marketing campaign

Grantee Evaluation

The **Performance Analyst** ensures that SunTrek makes progress towards achieving the overall goals of the IEETP. Considering the progression made with the help of the Research Coordinator, the Performance Analyst finds that SunTrek has:

- ❖ Created new jobs
- ❖ Increased the amount of solar energy generated via sales of its solar panel system
- ❖ Decreased CO₂ emissions via the switch from fossil fuel-generated energy to solar powered-energy stemming from the use of its solar panels

All of these achievements match the goals of the IEETP.

The Performance Analyst now takes this data from SunTrek and combines it with data from all the other grantees in order to compile the IEETP's annual progress report.

XI. Conclusion

Senate Bill 1120 presents an opportunity to move towards solutions to problems in New York State associated with unemployment, energy demands, and environmental degradation. The Innovative Energy and Environmental Technology Program allows solutions to these three issues to be combined within a single organization. This program leverages the entrepreneurial spirit of small business coupled with technological innovation to help New York State progress towards its goals of achieving greater employment and a cleaner environment.

Using similar programs as precedents, our team developed a program structure and implementation timeline that we believe best fits the legislative spirit of Senate Bill 1120 and the overall goals this program is meant to achieve. Our team has developed metrics with which to evaluate the success of the IEETP, and we believe that these benchmarks will facilitate the proper evaluation and long-term success of the program.

Our team expects the development of the IEETP to be an evolutionary process, with modifications made to the program each year. Based upon feedback from various program stakeholders, the IEETP will be altered to reflect stakeholder needs as well as developments in economic and technological environments. As this program reaches maturity, our team believes it will lead to increases in employment, increases in the generation of energy from renewable energy sources, and a decline in the local production of greenhouse gases. While no single program can act as a panacea to the many issues faced by New York State today, the IEETP represents progress towards an eventual solution.

XII. Appendix

Title:	Reporting Manager:	Primary Responsibilities:	Annual Salary	Introduction to Program	Hiring Status:
Program Manager (ESD)	EVP of Business Development, ESDC	Correspond with liaisons from EDC and NYSERDA Manages all employees of IEETP Reports annual progress of IEETP to Governor's Office	\$60,000 ^{xxiv}	Year 1	New hire
Assistant Manager	Program Manager (ESD)	Assist in day-to-day operations of IEETP	\$40,000 ^{xxv}	Year 1	New Hire
Applicant Liaison	Program Manager (ESD)	Promote grant availability to potential grantees Coordinates with academic and business institutions to promote program Identifies potential applicants and encourages submissions	\$40,000	Year 1	New Hire
Research Coordinator	Program Manager (ESD)	Assists applicants in evaluation of market and technical feasibility of technology Identifies sources for third party research	\$45,000 ^{xxvi}	Year 1	New Hire
Business Analyst	Program Manager (ESD)	Develops criteria for economic feasibility of technology Evaluates market feasibility of technology Communicates with Program Liaisons (EDC and NYSERDA)	\$50,000 ^{xxvii}	Year 1	New Hire
Support Analyst	Program Manager (ESD)	Monitors grantee progress related to measureable outcomes Completes program evaluations Provides ongoing research and support to grantee regarding commercialization of technology	\$45,000 ^{xxviii}	Year 2	New Hire

Table 5. Program Staffing Summary

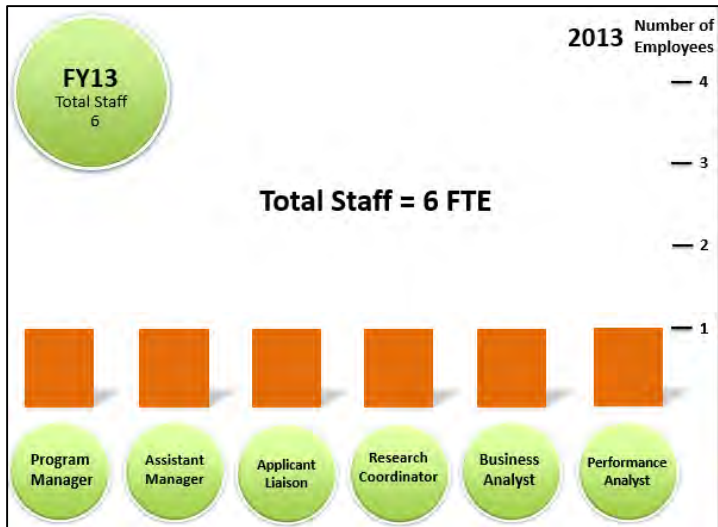


Figure 9. FY2013 IEETP Staff

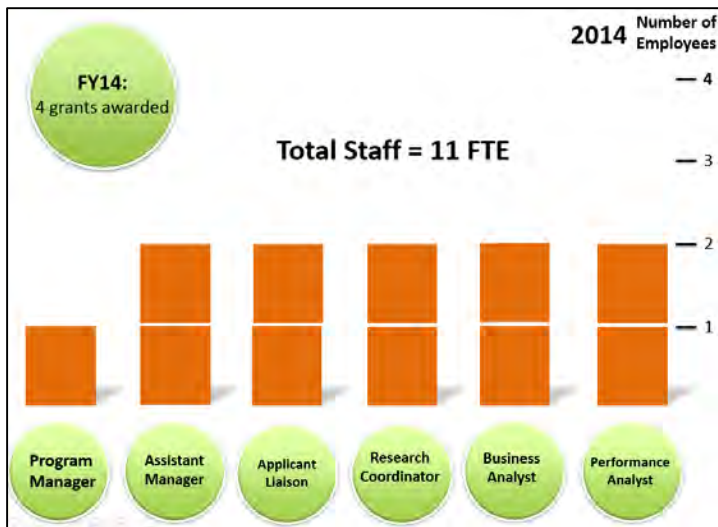


Figure 10. FY2014 IEETP Staff

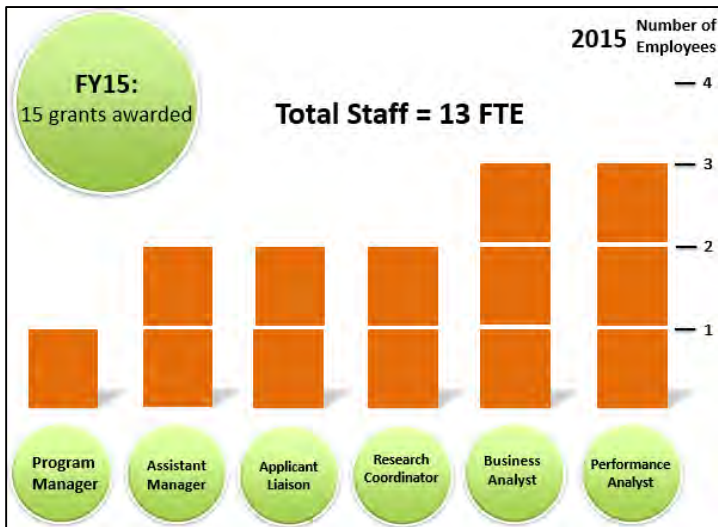


Figure 11. FY 2015 IEETP Staff

Figure 12. Year 1 IEETP Calendar

Function	Activity	Staff Responsible	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Management	Begin interview ing/ hiring next round of added FTEs	Program Manager & Junior Support	ESD	ESD	ESD	ESD	ESD							
	Interview potential candidates	SC/PM	ESD	ESD	ESD	ESD	ESD							
	Oversee research progress and fulfillment of needs	RC						Outside Party	Outside Party	Outside Party				
	Approve final list of aw ardees	JS/PM							ESD					
	Review progress report	PM								ESD				
	Submit to steering committee/ legislation	PM									ESD			
	Approve final list of aw ardees	JS/PM											ESD	ESD
Administration	Go through hiring process/ paperw ork	PM	ESD	ESD	ESD	ESD	ESD							
	Revise application and w eighted criteria to create new app	AL/JS						ESD						
	Calculate scores	AL							ESD					
	Build final list of aw ardees	AL							ESD					
	Create new target lists of applicants based on market research	JS							ESD	ESD	ESD	ESD		
	Receive first batch of 2015 grants: applications due November 1	Junior Support & Applicant Liasons							ESD	ESD	ESD	ESD		
	Provide each grantees individual information and goals for Prog. Report	RC/ AL								ESD				
	Outline grantee info per legislation for Prog. Report	JC								ESD				
	Assess apps and calculate scores based on w eighted scorecard	RC/RT												ESD
	Build final list of aw ardees	AL												ESD
Customer Service & Administration	2014 Applications Due June 1	Applicant Liasons/	ESD	ESD	ESD	ESD	ESD	ESD						
	Assist first-round applicants w ith CFA app	Applicant Liasons	ESD	ESD	ESD	ESD	ESD							
	Assist first-round 2015 applicants w ith CFA app	Applicant Liasons							ESD	ESD	ESD	ESD		
Performance Analysis	Quantify/ project benchmarks for up to 3 years of the aw arded grantee	BA/PA							ESD	ESD				
Program Development	Continue outreach to potential applicants	Junior Support & Applicant Liasons	ESD	ESD	ESD	ESD	ESD							
	Evaluate categories of aw ardees for IEETP Self-Audit/ Progress Report	BA						ESD	ESD					
	Compile program benchmarks/goals set last year for IEETP S.A/ Prog. Report	PA						ESD	ESD					
	Evaluate app criteria based off aw arded grants/ new market research	RC/AL						ESD						
Promotion	Continue to promote program to gain applicants	Junior Support	ESD	ESD	ESD	ESD	ESD							
	Outreach to local research universities/ state agencies to promote	JS							ESD	ESD	ESD	ESD		
Research	Research each grantee's market and technology feasibility	Research Coordinators & Team						Outside Party	Outside Party	Outside Party				
	Research market gaps that w ere not fulfilled by 2014 aw arded grants	RT						Outside Party	Outside Party	Outside Party	Outside Party			
	Analyze candidates based on w eighted score card	RC/RT							ESD					
	Set individual grantees benchmarks/goals based on tech feas. research	RC							ESD	ESD				

ESD
Outside Party
Grantee
ESD+ Liasons from DEC/NYSERDA

IEETP GRANT APPLICATION ^{xxix}

[The Innovative Energy and Environmental Technology Program]

Providing small businesses with grants of up to \$100,000 to commercialize energy and environmental technology innovations in New York State

Please fill in the information required in Sections 1 and 2 of the grant application. Please attach all of the necessary documentations as requested, if any, in Sections 2 and 3. The application period will open on January 1, 2014 and will close on May 24, 2014.

Section 1:

Grantee Information:

Company Name:	
Point of Contact:	
Phone Number:	
Email Address:	

In the sections, “Product Categorization” and “Stage of Development,” please place a “☺” in the subsections that best describe your application.

Product Categorization (select one):

Energy Efficiency	
Utility and Manufacturing Technologies	
Building Efficiency Technologies	
Renewable Energy Technologies	
Automobile/ Vehicular Technologies	
Waste Management Technologies	
Wastewater Management Technologies	
Weatherization Technologies	
Other Energy Technologies	
Other Environmental Management Technologies	

Stage of Development (select one):

Research:	
Prototype:	
Pre-Commercial:	
Commercial:	

Section 2: A Background to Your Company, Product and Market

Part 1: Product Description and Plan. (Max 300 words each)

1. The proposed innovative technology will take the market in a new direction. What is your product? Explain the current market construct for your technology, who else is pursuing this line of innovation and how your product differs.
2. In what stage of development is your technology? To what degree has the success of the technology been evidenced? Please explain your products technical value.
3. Detail a budget description of the amount requested for the product, including how the grant will be used and why it is necessary.

Part 2: Business Model & Economics. (Max 350 words each)

1. Briefly describe your company's goal and mission and how your innovation relates to your overall vision. As a small business in your product's market, what are and have been your challenges? How do expect to mitigate these risks and what are your expected milestones?
2. Explain why your product has had difficulty accessing traditional funding sources. Please attach previous reviews that may detail reasons for rejection or help demonstrate your strong candidacy for this program.
3. Please outline your company's funding history, including previous grant allocations, hard cash investments, investor equities, debt, and current financial standing. Also discuss, if any, other sources of funding your company seeks.
4. Provide models that project your company's finances and detail/elaborate on current or planned strategic investments that will increase profit margins. Please include the amount of funding you expect to accumulate in the next six, twelve and eighteen months.

Part 3: Market Assessment. (Max 300 words each)

1. Who are your current consumers and/or who will they be? Can you evidence that your technology is necessitated by target audiences? Provide a breakdown of the downstream value of your product to partners.
2. Demonstrate a clear understanding and analysis of the market your technology is segmenting. In addition, please discuss the market growth of your product in addition to the pricing of your product.
3. Outline and evidence the size of your market and discuss the available opportunities for investment that make your technology favorable for investors.

Section 3: The Benefits of Innovation

Part 4: Impact on Mission of SB 1120.

1. Please provide a detailed assessment of the level of economic growth and benefits expected from investing in your innovation with special regard to job creation and retention, in addition to local and global economic impact. (Max 300 words)
2. What energy and environmental benefits will be seen as a result of your product? To help estimate the environmental tradeoffs and/or benefits of your product, please fill in the table below and/or provide an assessment of your products ability to impact one or more of these fields:
 1. Waste Minimization,
 2. Pollutant Emission Reduction,
 3. Toxic Emission Reduction,
 4. Water Use and Quality, or
 5. Energy Reduction

Use table below to describe the product innovation you propose and to detail the product your innovation will improve or innovate against. This table is meant to illustrate the benefit in your product's output per total revenue. For instance, if your innovation will improve the efficiency of energy coolant systems, fill in the necessary boxes – i.e. Water Use.

Please estimate and fill in all the boxes to the best of your abilities. Depending on your product, we understand that not all boxes can be filled in – this is OK.

Metric	Unit	Your Product	Product Substitute	% Reduction and/or Increase
Material Use	lb/\$TR			
Energy Intensity	kBtu/\$TR			
Water Use	gal/\$TR			
Toxic Emissions	lb/\$TR			
Pollutant Emissions	lb/\$TR			

** TR = Total Revenue.

Part 5. Timeline of Benefits.

1. Upon receipt of the award, what do you specifically hope to accomplish and in what timeline? If your product was granted an award, what is the expected timeframe for benefits to manifest (i.e. 6 months, 12 months, 3 years)

EVALUATION RUBRIC^{xxx}

		EXPECTATIONS NOT MET (0)	LOW EXPECTATIONS (1)	SATISFIES EXPECTATIONS (2)	EXCEEDS EXPECTATIONS (3)		
20%	TECHNOLOGICAL SOLUTION	PRODUCT DEVELOPMENT RISK	Product in very early, conceptual stage	Substantial product development risk still exists.	Low risks exists. Most production issues resolved.	Very minimal development risks. Product completely engineered.	
		TECHNOLOGY VALIDATION	No technology validation.	Prototype developed, initial validation/testing.	Technology validated with clear plans for completion.	Technology is fully validated and commercially viable.	
		COMPETITIVE ANALYSIS	Does not demonstrate competitive analysis.	Weak analysis. Lack of competitive technological differentiation.	Competitive differentiation. Technology substitutes identified in market.	Strong competitive analysis. All technology substitutes identified & product highly differentiated.	
20%	BUSINESS MODEL	ECONOMIC SCALABILITY	No evidence of scale analysis or presentation of analysis has scaling low potential.	Plan is insufficient or lacks credibility.	Plan is achievable but not concrete.	Highly defensible scaling strategy presented and validated.	
		FINANCIAL STRATEGY & PROJECTIONS	No analysis or strategic assessments provided.	Projections seem overestimated. Strategies appear unrealistic and without empirical analysis.	Projections effectively outline where the company has been and where it is expected to achieve its finances.	Strategy is exceptional and argues for capital and sources with evidence.	
		RISK ASSESSMENT	Risks unidentified.	Risk analysis insufficient. Presentation appears to miss important obstacles.	Satisfactory recognition of risks and challenges. Strategies to overcome were presented.	Risk analysis is superior. Demonstrates knowledge of all barriers and challenges	
30%	MARKET ASSESSMENT	MARKET SEGMENTATION	No analysis of market segmentation.	Market segments are detailed, but in some cases appear unrealistic.	Gaps, opportunities and necessary consumers identified and targeted.	Targeting is exceptional. Knows exactly who target audience is and where opportunities lie.	
		MARKET SIZE & GROWTH ANALYSIS	Market is too small for success. Zero or no market growth forecasted.	Overestimation of sales. Product's market is growing in tandem with economy.	Market growth rate exceeds NYS economy.	Market growth is excellent for startups and innovators. Size analysis is superior.	
		CONSUMER ANALYSIS	No evidence of consumer interest.	Low evidence of customer interest in product	Adequate consumer analysis and engagement with product.	Technology (already) well received by consumers. Consumers well engaged.	
30%	IEETP MISSION	ECONOMY	JOB CREATION	No job creation potential.	Low potential to create jobs. Mainly internship or PT positions available.	Moderate level of jobs created. At minimal, entry-level jobs created.	Extensive job creation and standard salary retaining jobs expected.
			EFFECT ON LOCAL ECONOMY	No effect on local economy expected.	Minimal effect on local economy and revenue.	Tangible and evidenced on local economy.	Outstanding benefits result from product entry.
		ENVIRONMENT	MATERIAL USE	High material use and/or waste produced. No reduction expected. Data N/A.	Reduced (low to moderate) material use or waste generation.	Moderate levels of waste reduction expected.	Zero to little waste generated or high waste reduction achieved.
			TOXIC EMISSIONS	No reductions in toxins expected. Data N/A.	Minimal reductions in the release of toxins into the environment.	Large reductions in toxins released into the environment.	No toxin release expected from product.
			POLLUTANT EMISSIONS	No reductions in pollutants expected. Data N/A.	Pollutant reduction may be minimal to moderate.	Pollutant reduction has large potential for GHG reductions.	No pollutants are released back into the environment or expected from product use.
			WATER USE	Intensive water use expected. No outstanding reductions in water use or consumption.	Water use comparable to product substitute. Minor reductions seen in use.	Moderate reductions in water use achieved.	Little to no water use in for technology.
		ENERGY	ENERGY INTENSITY	Product has high net-fuel energy power requirements	Product is progressive but moderate net-fuel energy	Product has low net-fuel energy requirements	Product has very little to no net-fuel energy demands.
			IMPORT REDUCTIONS	NY energy dependence will not decrease.	NY energy dependence will decrease slightly.	NY energy dependence will decrease.	NY energy dependence will greatly decrease.

GRANT SCORECARD		RAW SCORE	WEIGHTED TOTAL	
20%	PRODUCT DESCRIPTION	PRODUCT DEVELOPMENT RISK		
		TECHNOLOGY VALIDATION		
		COMPETITIVE ANALYSIS		
20%	BUSINESS MODEL	ECONOMIC SCALABILITY		
		FINANCIAL STRATEGY PROJECTIONS		
		RISK ASSESSMENT		
30%	MARKET ASSESSMENT	MARKET SEGMENTATION		
		MARKET SIZE & GROWTH ANALYSIS		
		CONSUMER ANALYSIS		
30%	IEETP MISSION	ECONOMY	JOB CREATION	
			EFFECT ON LOCAL ECONOMY	
		ENVIRONMENT	MATERIAL USE	
			TOXIC EMISSIONS	
			POLLUTANT REDUCTIONS	
			WATER USE	
		ENERGY	ENERGY INTENSITY	
			IMPORT REDUCTIONS	
		TOTAL		

About the authors

Louise Rosen, Faculty Advisor, Columbia University

Louise Rosen is the Deputy Vice President of Alumni Relations at Columbia University. Working closely with the Vice President of Alumni she is responsible for alumni relations, and school based initiatives, regional and affinity programming, marketing and digital media. Prior to joining Alumni Relations, she spent eleven years at Columbia's Earth Institute; most recently as Director of the Office of Academic and Research Programs responsible for incubating new education and research programs wherein she developed and incubated seven new environmental and sustainable development degree programs overseeing all areas of their marketing and communications, including the new major in sustainable development and M.S. in sustainability management. She is still an adjunct faculty member. Louise earned her B.S. in Economic and Political Geography from the London School of Economics, and her M.S. in Journalism from Columbia University's Graduate School of Journalism. She has written for several publications including Newsweek.com, Forbes magazine, Upside Today, Fortune Small Business, Vogue and The New York Times. Currently she is advising the editorial board of Consilience, the Columbia based journal of Sustainable Development and is on a committee to advise on the development of Fresh Kills Park.

Rachel Hamburger, Manager

Rachel Hamburger received a Bachelor of Arts in Organizational Communications and Environmental Studies from Northeastern University in 2013. During her time as an undergraduate student, she completed three 6-month full-time co-op work placements in the digital marketing and sales management fields. During her second co-op position, she relocated to New York City and was a Project Manager for York and Chapel, LLC., where she oversaw the execution of unique digital marketing campaigns in the eco-friendly space. More recently, she was the Interim Director of Sales at UbiCare, an electronic healthcare communications organization in Jamaica Plain, MA, and was one of eight employees in two years to be recognized by the CEO for outstanding performance in sales. Rachel is currently a candidate to receive a Masters of Public Administration in Environmental Science and Policy from Columbia University's School of International and Public Affairs.

Jordan Villars, Deputy Manager

Jordan Villars received his Bachelor of Arts in Environmental Studies and Biology from Bowdoin College in 2012. During his time as an undergraduate, Jordan interned for Clean Markets, a Philadelphia based marketing and strategy consulting firm focused energy efficiency and renewable energy. After graduating college, Jordan worked as a consultant for GreenMax Capital Advisors, a consulting firm focused on financing and development of renewable energy and energy efficiency projects in the developing world, as well as Village Green Ventures, a developer of biogas energy projects. Jordan is currently pursuing his MPA in environmental science and policy at Columbia University's school of international and public affairs and also works as Energy Intern in the NYC Department of Environmental Protection. He intends to pursue a career in energy efficiency and renewable energy development.

Olin Berger

Olin Berger graduated from the University of Washington in 2007 with a degree in the Comparative History of Ideas. He spent nine months travelling around the world before returning to Seattle to work as the Operations Manager for Savor Seattle Food Tours. After leaving Savor Seattle, Olin traveled in Australia and New Zealand and worked as the Program Director for Camp Nor'Wester in the San Juan Islands. He is currently a graduate student at Columbia University working to receive an MPA in Environmental Science and Policy while interning at the NYC Office of Management and Budget. He is also a research intern at Columbia University's Earth Institute, studying sustainability metrics as they relate to economic performance.

Li Chen

Li Chen is from a southwestern city of China – Chongqing. Prior to coming to Columbia University, he studied English and Economics at China Foreign Affairs University, which is accredited as China's "Cradle of Diplomacy". Li had some part time work experience across different sectors. With KPMG, he audited an energy state-owned enterprise. At Siemens, he did treasury work for Siemens energy entities. With the environmental think tank World Resources Institute, Li was involved in projects such as energy efficiency financing, greenhouse gas protocol, and sustainable supply chain. Additionally, Li worked for a think tank housed by China's Ministry of Finance, and a management consultancy The Parthenon Group. Li is interested in the intersection of energy and business, with a special focus on Chinese market.

Corey Davis

Corey Davis graduated from St. John's University in 2012 and is now a member of the 2013 Masters of Public Administration in Environmental Science and Policy (MPA ESP) class at Columbia University. Corey's academic background was in Environmental Science with a special interest in Environmental Justice and political policies that allow communities to empower themselves. In choosing the MPA ESP program he feels that this unique approach to the study of Environmental Science will equip him with the toolkit to effectively engage the issues of environment justice, public policy, and/or community stewardship. After his matriculation from Columbia Corey hopes to work in the environmental justice field. Particularly he wants to empower impoverished and marginalized groups in the environmental movement to promote their growth and health.

Brian Filiatraut

Brian Filiatraut is a graduate student in the Master of Public Administration in Environmental Science and Policy program at Columbia University's School of International and Public Affairs. Prior to enrollment at Columbia, Brian received his Bachelor of Science in Biology from the University of Dayton and taught biology for eight years at Cardinal Hayes High School located in the South Bronx. Currently, Brian is an intern at the NYC Mayor's Office of Long-Term Planning and Sustainability working on the third benchmarking report for Local Law 84 of the Greener, Greater Buildings Plan of PlaNYC. Additionally, Brian is a graduate research assistant for the Research Program in Sustainability Policy and Management at the Earth Institute. Brian is investigating and analyzing current sustainability metrics and indices used in ESG reporting. Upon graduation this coming May, Brian intends to continue working toward more sustainable and energy-efficient practices and policies.

Eda Charmaine Gimenez

Eda Charmaine Gimenez is a graduate student in Columbia University's MPA in Environmental Science and Policy program. Prior to the program, Eda received her Bachelor of Science in Engineering Chemistry and Environmental Studies with minors in Environmental Engineering and Materials Science. Currently, Eda is a graduate researcher for the Advanced Consortium on Cooperation, Conflict, and Complexity, developing theory on Sustainable Human Development; in addition to the Agriculture and Food Security Center, where she helps design fertilizer production processes for developing world countries. In the past, Eda had worked in the fields of energy policy, environmental research, and in engineering design, especially for developing world issues. Upon completion of the program, she intends to work in the fields of sustainable design and management.

Curtis Probst

Curtis Probst was most recently a Managing Director and Head of Corporate Structured Finance in the Investment Banking Division of Goldman Sachs. He has been a leader in structured finance, developing innovative structures to raise over \$50 billion of capital for both corporate and governmental clients. He has been active in developing financing solutions to promote renewable energy and energy efficiency since completing one of the first securitizations of energy efficiency investments in 1995. Prior to joining Goldman Sachs in 1998, Curtis was a Vice President in the Structured and Project Finance Group of Salomon Brothers. He joined Salomon Brothers in 1989 in the Financial Institutions Group, and worked in their New York and Los Angeles offices. Curtis earned a BComm in Accounting from the University of Calgary. He is a Chartered Financial Analyst and a member of the CFA Institute.

Wen Qiu

Wen Qiu earned her BS in Economics and International Trade with a double degree of BA in English from China Foreign Affairs University. During her time in undergraduate study, she spent 4 months drafting report on water rights and administration in rural China on behalf of PlaNet Finance. She also interned at UN World Food Program to help build private-public partnership in China. Wen Qiu is now a graduate student in Columbia University pursuing a Master degree in Environmental Science and Policy while working as a research intern at Columbia University's Earth Institute, studying sustainability metrics and their social impacts. At the same time she is also interning at an impact-investing firm Mission Markets Inc. responsible for preliminary research on opportunities of a new trading portal in environmental credit markets.

Robert Thollander

Robert Thollander is earning a Master of Environmental Science and Policy from Columbia University. He previously worked in inner-city high schools in Chicago where he taught biology and anatomy. Robert became certified through the Chicago Teaching Fellows program and Northwestern University's School of Education and Social Policy. His undergraduate degree is from Florida State University where he got a BSc in Biological Sciences with a focus on plant genetics. Upon completion of his MPA, Robert intends to return to the education sector where he will combine his knowledge of environmental science and policy making with his experience in curriculum design and implementation in the public school system.

Guillermo Zamacona Urquiza

Guillermo Zamacona Urquiza is a graduate student in the MPA in Environmental Science and Policy at SIPA. He received his Bachelor in Political Science from the ITAM in Mexico City. Guillermo has built his professional career in the government, where he was the head of administration of the ISSEMYM, which is the institute responsible for pensions and health of public workers in largest state of the country. He has also serve under two city governments in his natal Huixquilucan, which is a metropolitan city with over 300,000 people; in the first occasion Guillermo served as the spokesman of the mayor and in the second he was appointed as Director of Public Services. Guillermo has also launched some business projects. Upon completion of the program, he intends to continue working in the public sector to improve the living conditions of his country and to preserve and protect the environment.

Endnotes

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- ^{iv} <http://open.nysenate.gov/legislation/bill/A5536-2013>
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- ^{xviii} Regional Innovation Acceleration Network. 2013. Web. 21 Sept. 2013. <http://regionalinnovation.org/content.cfm?article=metrics-that-matter>.
- ^{xix} *Ibid.*
- ^{xx} Payroll taxes estimated at 8% of salaries.
- ^{xxi} Benefits estimated at a specified percentage of salaries: 15% for junior staff; 20% for mid-level staff; 25% for senior staff.
- ^{xxii} Other payroll costs estimated at 20% of personnel cost (salaries, payroll taxes, benefits).
- ^{xxiii} For purposes of our analysis, we have also assumed that costs per employee increase 2% each year to consider the impact of inflation.
- ^{xxiv} There is a similar opening at the ESD for a Program Manager position, please see: http://www.esd.ny.gov/Jobs/082013_ProgramManager_CED.pdf
- ^{xxv} For all Liaisons since there are none of these exact positions at ESD nor other entities of the NYC, we situated them at a range of 40k per year
- ^{xxvi} We look at a range of salaries for research coordinators within the government at > http://www.glassdoor.com/Salaries/research-coordinator-salary-SRCH_K00,20.htm
- ^{xxvii} There is a similar opening at the ESD with this salary, please see: http://www.esd.ny.gov/Jobs/2013_ExecAssist_BusinessMarketing.pdf
- ^{xxviii} There are no similar posts at the ESD, so we look into a range of salaries for analysts at NYC, please see > <http://new-york-employees.findthedata.org>
- ^{xxix} Grant application modeled in part after the Missouri Clean Energy Business Competition 2013: http://www.thecleanenergyexchange.org/media/resource/Challenge_2013_Application_Template_Final.pdf
- ^{xxx} Evaluation rubric modeled after DOE National Clean Energy Business Competition 2013: http://www.thecleanenergyexchange.org/media/resource/Evaluation_Criteria_Final_4.pdf