Barbados WtE Project

Confidential Information Memorandum

March 2015

Confidentiality Notice and Disclaimer

Cahill Energy Limited (hereinafter referred to as "Cahill") has hired Jacob Securities Inc. (hereinafter referred to as "JSI") to handle the sale of its subsidiary: Cahill Energy Barbados Limited (hereinafter referred to as "CEB"). CEB, situated in San Thomas Parish, Barbados, is based on a waste-to-energy (hereinafter referred to as "WtE") project using plasma gasification technology (hereinafter referred to as "the project").

According to the regulations of Cahill, this confidential information memorandum will be sent by JSI on behalf of Cahill to a limited number of parties which have the intention for the acquisition of CEB (hereinafter referred to as "acquisition"). The sole purpose of this memorandum is to assist potential acquirers in making their own assessment and then deciding whether to submit a formal letter of intention. Unless otherwise stated, all the sums in this memorandum are in U.S. dollars.

By accepting this memorandum, the recipient agrees to keep confidential the information in this memorandum and the information acquired through further investigation of the acquisition. Without prior approval by Cahill, the recipient shall not contact the management, employees, clients and suppliers of Cahill and CEB and representatives and consultants of the government of Barbados under any circumstances.

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This memorandum includes statements, assessments and predictions by Cahill's management about the future performance of the project. The statements reflect various assumptions related to the project's anticipated future performance. These assumptions might prove to be erroneous. Assessments and predictions merely reflect the projections made by Cahill's management about the future performance of the project on the basis of some current conditions and facts as well as predictions about future economic and other outcomes (which may or may not prove to be correct). Statements, assessments and predictions may not reflect present value or future performance. Future performance may be obviously better or worse than predicted in this memorandum.

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Please submit all message, questions and requests related to this memorandum to the following contacts.

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1. Transaction Review

1.1. Background

The vision of Cahill Energy Limited (hereinafter referred to as "Cahill" or "our company") is to develop a series of clean energy projects in tightly regulated places so as to tackle the challenges in waste management, reduce the reliance on fossil fuels, reduce carbon emissions, and create exceptional values for shareholders and countries.

The first Cahill project – a waste-to-energy (WtE) factory using plasma gasification technology located in a small town called Vaucluse in San Thomas Diocese, Barbados (hereinafter referred to as "the project") – is in an advanced stage of its development. Our company has received whole-hearted support and cooperation from the government of Barbados (hereinafter referred to as GoB) in the development, investment and construction of the project. Our company can flexibly manage the project, being able both to own and operate the project for a very long period of time and to sell the shares in the holding company of the project: Cahill Energy Barbados Limited (hereinafter referred to as "CEB") at any time.

Because the project is now in an advanced stage of development, the potential risks for project development have disappeared. The key factors driving future development will be construction and operation efficiency. Therefore, Cahill has chosen to sell CEB and use the funds generated by the sale to improve its project development business.

According to the agreement between CEB and GoB, a plasma gasification (PG) factory will be built. Though the agreement itself has not set any specific environmental standards, it is known that the goals of the GoB include 1) reducing fossil fuel electricity generation so as to reduce the costs of fuel imports, 2) effectively solving the problem of flammable waste being sent to landfills and 3) striving for sustainable development by encouraging the development of renewable energy. Knowing that there exist many technologies in the WtE industry and that some potential buyers might want to use their own technology, Cahill has been in talks with the GoB to explore the possibility of expanding the scope of the agreement to include systems other than the PG system. Although the results of the talks are yet unknown, the revised scope is highly likely to include any technology that meets the following requirements: 1) meeting international emission standards and 2) not generating solid residue that needs to be sent to landfills. In this regard, it is expected that the buyer of the project will integrate its own WtE technologies into the project. However, in deciding which system to use, it has to be considered that the GoB will not accept any solution that produces solid residue destined for landfills.

In light of this, the confidential information memorandum provides the following information: 1) a review of local market factors, including the economy of Barbados and the electricity and the waste market of Barbados (section 3); 2) a review of important development information of WtE factories on the island (section 4); 3) the reasoning and research work done by Cahill in advancing the PG project (section 5); 4) financing projections made by Cahill for the PG project (section 6).

1.2. Process of the Transaction

As Cahill's financial consulting firm, Jacobs Securities Inc. (JSI) is secretly contacting possible buyers for their views on buying CEB (hereinafter referred to as "the transaction")

The transaction has two stages:

The first stage: expressing intention

In the first stage, potential bidders (hereinafter referred to as "bidders") that have signed the confidentiality agreement will get this memorandum and access to the first-stage database. Furthermore, a letter detailing the progress in the first stage will be sent to the bidders (hereinafter referred to as "first-stage progress letter"). Along with other information, the first-stage progress letter will provide detailed information about the important dates of the first stage, items requiring to be transferred, and how to prepare the transfers.

Bidders do have questions should directly contact JSI. Without prior approval from Cahill, the management, staff, clients and suppliers of Cahill and CEB and any representatives or consultants of GoB are not to be contacted under any circumstances.

Then, all bidders are required to submit a written, non-binding letter of acquisition intention (hereinafter referred to as "initial bid") according to the principles of the first-stage progress letter.

The submission of initial bids means the end of the first stage of the transaction.

The second stage: due diligence and binding letter of tender

On the basis of the situation of the initial bids, Cahill and JSI hope to choose a limited number of bidders to conduct further due diligence. In the second stage of the transaction, the bidders will be given access to the complete database and invited to attend the management report meetings and visit the sites.

The participants of the second stage will receive a second-stage progress letter, which includes the table for submitting the letter of tender (LOT) with a binding quotation.

The participants of the second stage must confirm in the LOT that they are ready to negotiate and finally sign a binding agreement to acquire CEB or the project with the same terms as laid out in the quotation. The quotation shall not be subject to any further substantive due diligence (confirmatory due diligence excluded), shall not be bound by financing terms, and shall have the approval of all necessary firms. Cahill will decide, on the basis of the assessment of the quotations, whether to proceed with the final negotiations.

Timetable

The bidders will receive, quite early on, a notice of the deadline for the first stage of bidding. The deadline of the initial bidding is expected to be around [•]. JSI and Cahill hopes that this memorandum and the first-stage database contain enough information to allow bidders to express their initial non-binding intentions before the said date. Shortly after receiving the notice on the participation of the second round, the participants will receive a document detailing the information about the submission of quotations, including the deadline.

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2. Investment Highlights

Important work has already been done

All important agreements and preliminary studies about project site, raw material and product sales have already been done, inspiring strong confidence that the project's financial performance will follow the projections. With high internal rate of return (IRR), strong grass-root political support and attractive prospects for getting multilateral and development financing, this transaction allows the buyer to dramatically enhance the project's value through improving construction and operation efficiency.

30 years of stable return

By dint of the long-term contract signed with the GoB, the operating profits of the project are guaranteed:

- 30-year-long waste supply agreement enables the project to use all of the increasing waste on the island.
- 30-year-long fixed power purchase agreement (PPA) allows electricity price to increase along with the rise in project costs.
- Exempt from all kinds of taxes on corporate earnings, share dividends, deductions, capital incomes and from all tariff.

It is estimated that the projected deleveraged IRR is 21% higher than acquisition costs.

Full support from the government

The Caribbean and Barbados are confronted with the very difficult issues of energy and waste management. The GoB imports $850 million of heavy fuel oil[1] annually. Currently, besides the recycled waste, all the rest of municipal solid waste (MSW) is sent to landfills. Due to the pressure from the tourism industry and the scarcity of land, the GoB urgently needs to implement a more sustainable waste management strategy. Cahill estimates that the project will save 30 million Barbados dollars (BDs) for the GoB (not including the intangible benefits to the environment and the local economy). The Implementation Agreement, which has already been signed, (hereinafter referred to as "IA") has shown the degree of financial support the GoB has given to the project:

- The project site is provided by the Barbados government free of charge

- The costs of construction and test runs for the integration of the project into the grid and the public water supply system are covered by the GoB.

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[1] Caribbean News Now – Sustainable Energy a High Priority for Barbados and SIDS – August 28, 2014

[2] http://www.viaspacegreenenergy.com/giant-king-grass.php

Proven innovative technologies

The WtE technologies and module setup of the project are very elegant and proven to be commercially viable. Gasification technologies have been applied in more than 270 factories around the world, including the many projects in China, India and Japan that use the most advanced technology of its kind so far – PG technology. Currently, a firm called "Air Products" is operating, on a trial basis, a PG WtE factory with a capacity of 1000 tons per day (TPD) in Tees Valley, UK. Besides, the chosen engineering, procurement and construction (EPC) contractors usually provide a series of contracts underwritten by the banks for the design and performance of a project, including the main technical plans and auxiliary facilities for subcomponents in factories.

3. Market Overview

3.1. An Overview of Barbados

Population:	around 289,680 (as of July, 2014)
Land area:	432 square kilometers
Major industries:	tourism, international finance, light manufacturing, agriculture
Sovereign credit rating:	B (S&P)/B3 (Moody's)
Exchange rate:	pegged to the dollar at $ 0.5: BD 1

Government

Barbados is a parliamentary democracy with strong and durable democratic tradition. There are two main parties: Democratic Labor Party (DLP), which has been in power since October 2010; and Barbados Labor Party (BLP), which is in opposition now. The next election will he held in 2018. The law in Barbados is based on English Common Law.

Electricity price has long been a political issue. Therefore, both parties agree to take measures to reduce the costs of power generation and to replace fossil fuels with renewable sources. In the "Implementation Agreement" that the GoB signed with CEB, the clauses supported by the ruling DLP are in line with the policy platform of the opposition BLP, which includes measures such as tax credits for renewable energy, supporting renewable energy schemes and promoting renewable energy mix excluding solar power.

Preferential policies for project development

Barbados has big current account deficit, mainly attributable to the fact that it needs to import most of its goods. According to the U.S. Energy Information Administration (EIA), Barbados' net import of oil in 2013 reached 7,200 b/d, half of which is used in electricity generation. The large deficit is also a main factor constraining Barbados' credit rating, as its economy is vulnerable to external fluctuations. Furthermore, large current account deficit exerts pressure on the country's foreign exchange reserves, creating further uncertainties.

Once in operation, the project will have a major impact on Barbados' spending on fuel import. The following exhibit 3.1 compares the annual fuel expenses and fuel import of the Barbados Light & Power Co. Ltd (BLPC) from 2003 to 2013 and calculates the potential savings in fuel import if the project were in operation then. The calculation shows that the project has the potential to cut the annual fuel import of Barbados by 15% - 20%.

Exhibit 3.1 – The amount of fuel imported and calculated potential savings

Year	Fuel Import	BLPC Fuel Cost (1000 Barbados Dollar)	Percentage BLPC Fuel Import	Fuel Import Reduction through Project (1000 Barbados Dollar)	Percentage Import Reduction
2003	260,808	124,964	48%	49,123	18.8%
2004	342,356	149,010	44%	56,786	16.6%
2005	374,899	176,669	47%	63,263	16.9%
2006	371,420	195,447	53%	68,538	18.5%
2007	415,283	225,299	54%	75,866	18.3%
2008	728,047	297,612	41%	99,877	13.7%
2009	467,024	236,552	51%	78,702	16.9%
2010	604,059	306,803	51%	101,150	16.7%
2011	804,411	409,822	51%	139,110	17.3%
2012	844,633	397,529	47%	137,172	16.2%
2013	698,718	399,234	57%	138,681	19.8%
Average			**49%**		**17.2%**

Reducing fuel import will also boost the economic growth prospects of Barbados. The Central Bank of Barbados estimated in the economic research report published in February 2015 that, in the current situation, achieving energy self-sufficiency will equivalent to having an additional 4% GDP growth per annum. The project is also a potential revenue source for the GoB, because in the future, it can sell the sales right of electricity generated by the project to BLPC or any other approved supplier.

Higher GDP growth and the government revenue generated by selling electricity will improve the financial standing of the government.

As part of its effort to increase renewables' share in power generation and reducing oil import, the GoB is working together with the Inter-American Development Bank (IDB) to set up a new sustainable energy framework of Barbados (SEFB). The goals of the SEFB are: 1) reducing the country's reliance on oil import, 2) enhancing security and stability of energy supply, and 3) improving the sustainability of the overall environment. To develop and promote the framework, IDB has provided more than $100 million of loans to Barbados, aiming to influence new policies and encourage the application of energy conservation technologies.

3.2. Barbados Waste Market

The Sanitation Service Authority (SSA) of the Ministry of Environment and Drainage is in charge of the collection, processing and disposal of waste in Barbados. SSA owns and operates all three landfills on the island.

The main landfills for municipal waste are situated in Mangrove Pond, abutting project sites and Sustainable Barbados Recycling Centre (SBRC). Besides the Mangrove Pond facility, SSA also runs the Edgecomb Quarry and the Lonesome Mountain Landfill. The Edgecomb landfill is dedicated to commercial and industrial waste and Lonesome Mountain Landfill is dedicated to the disposal of hazardous liquid waste (blood and fat). For hazardous waste that can't be disposed of, it is mainly exported to Canada under the Basel Agreement.

Besides the waste disposal conducted by SSA and SBRC, there are also some small, independent recyclers, the largest being "B's Recycling", that recycle glass, plastic bottles and cardboard. Some other organizations (e.g. ports, airports and hospitals) burn their waste on site.

SBRC, which has signed an agreement with the GoB, takes in and processes waste. It has the equipment for processing different types of waste, including the equipment to separate inert material from municipal solid waste and size-reducing mills. At present, SBRC recycles soil and some green waste as cover material, but most of the waste is sent back to SSA and disposed of in the Mangrove Pond landfill.

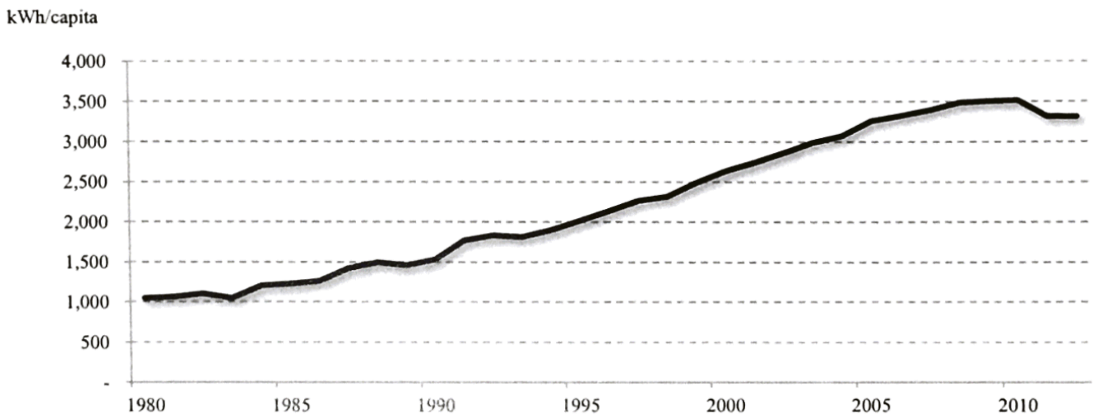
3.3. Barbados Electricity Market

BLPC operates three power plants using fossil fuels – Spring Garden, Garrison and Seawell, and maintains the distribution network on the island.

The total generation capacity of Barbados is 239.1 MW, the total electricity sold in 2013 was 912 million kWh (equivalent to the amount of electricity produced by a 104 MW power plant running non-stop for a full year). The island relies completely on oil to meet its electricity demand, with more than half of its generation capacity from bunker C fuel oil and the rest from diesel and aviation fuel.

Over the past 30 years, the per capita electricity consumption in Barbados has risen by almost twofold, as shown in graph 3.1.

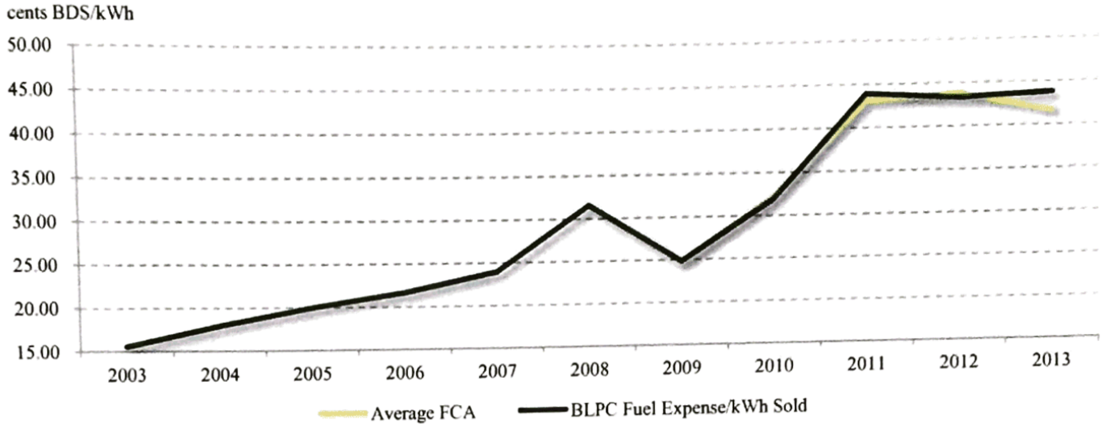
Graph 3.1. Per capita electricity consumption in Barbados
Source: EIA, WB, and JSI



The electricity prices for corporate and residential consumers are mainly determined by the following charges: 1) basic electricity prices, which, depending on the monthly electricity consumption plan, can increase from 0.184 BD/kWh to 0.290 BD/kWh (corporate consumers); 2) the additional fuel charge for each kWh, which will differ depending on the estimation by BLPC of the fuel expense for the next month. The two charges combined once raised the electricity price for corporate consumer with high electricity consumption to over 0.76 BD/kWh ($0.38/kWh).

The BLPC is subject to supervision by the Free Trade Commission (FTC), which sets the standards for electricity prices and service for the BLPC. The FTC has approved a Fuel Clause Adjustment (FCA) Mechanism, which allows BLPC to adjust fuel charge each month to recover the fuel expense from customers. The FCA is the single largest item in consumers' electricity bills. Graph 3.2 shows that annual average FCA between 2009 and 2013 and the average fuel expense per kWh of electricity sold by BLPC between 2003 and 2013.

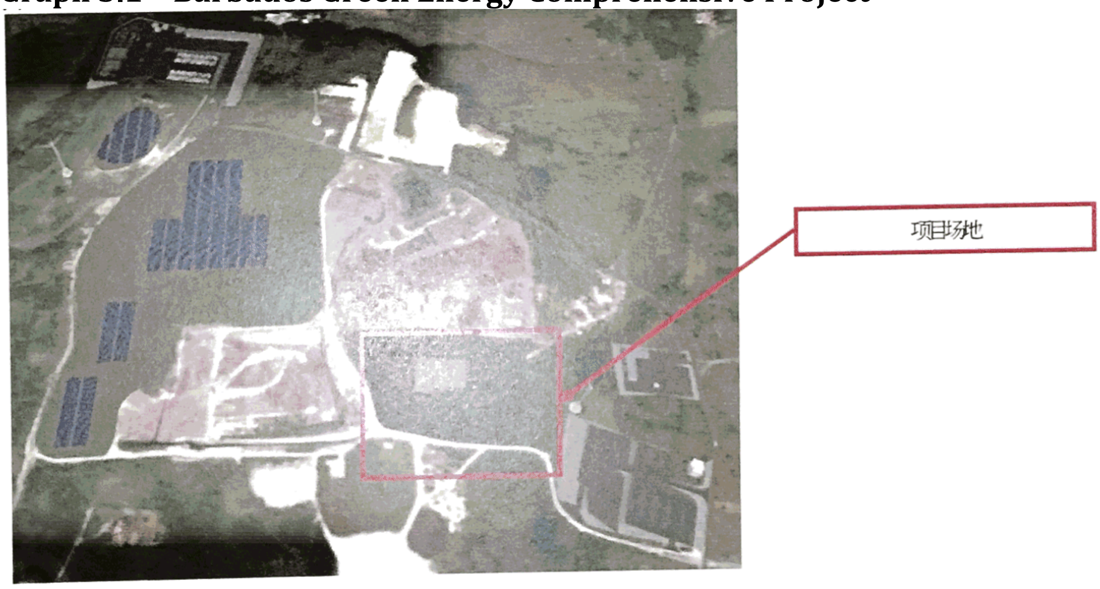
Graph 3.2 - Average fuel expense per kWh of electricity in Barbados
Source: BLPC annual report, calculation by JSI



Graph 3.2 shows that the price for fossil fuel power generation has increased steadily over the past decade. Through capping the price for the large amount of electricity consumed annually in Barbados, the project can partially alleviate the problem. Moreover, the waste being shipped to landfills will also be drastically reduced. Given all that, it's easy to understand why the project is so politically popular.

To show its commitment to increasing the production of clean energy, the GoB has approved and promoted the Barbados Green Energy Comprehensive (BGEC) Project. BGEC covers several renewable energy power generation projects (including this project) and the renovation of the Mangrove Pond landfill, the administration buildings and vehicle maintenance buildings of SSA. It was approved by the Barbados government in April 2012 and is currently in an initial stage of construction.

Graph 3.1 – Barbados Green Energy Comprehensive Project



3.4. Waste-to-Energy Industry

Usually WtE refers to the process of driving steam turbine through burning waste. This type of power generation, usually called "incineration", raises a lot of environmental concerns about the emissions of carbon dioxide, sulfate oxides, furans and dioxins. In recent years, many technologies have been developed that could mitigate the environmental impact of the waste-to-energy process. One example is the technology called "gasification". These two WtE technologies will be introduced in the following sections:

Incineration

Incineration involves the direct combustion of organic matters contained in waste. This process eventually transforms organic matters into heat, dust and exhaust gas. Incineration is a commonly adopted process in waste management industry and is also widely used for power generation. Among all W2E technologies, incineration is most prone to opposition from environmental groups. They are worried about the production of harmful substances such as furans and dioxins and their impact on the environment and human life. However, in countries where land is scare, such as Japan, Denmark, Sweden, Germany and France, incineration is still widely adopted for waste management.

During the past few decades, the design of incineration plants has been greatly improved. As modern plants are widely equipped with cleaning systems, their emissions are now as low as those of gasification plants. Therefore, the difference between modern incineration plants and gasification plants mainly lies in energy transfer efficiency, input requirements and cost. However, it should be noted that, many modern incineration plants integrate cleaning systems into their design and can be as capital-intensive as those using new alternative technologies.

Gasification

Gasification involves the incomplete burning of low calorific value carbohydrates with insufficient oxygen. The oxygen required in gasification is merely 20% - 30% of the what's needed in theory for the raw material to burn completely. In such an environment with insufficient oxygen, the raw material was not burnt, but disintegrates into elements (H) and simple compounds (CO and H2O). The resultant mix is called synthesis gas. Vaporized water was sprayed at the synthesis gas at the top of the gasification chamber to reduce the temperature of the gas, which then passes through other systems in the factory.

Compared to the older incineration technology, gasification has many advantages, including:

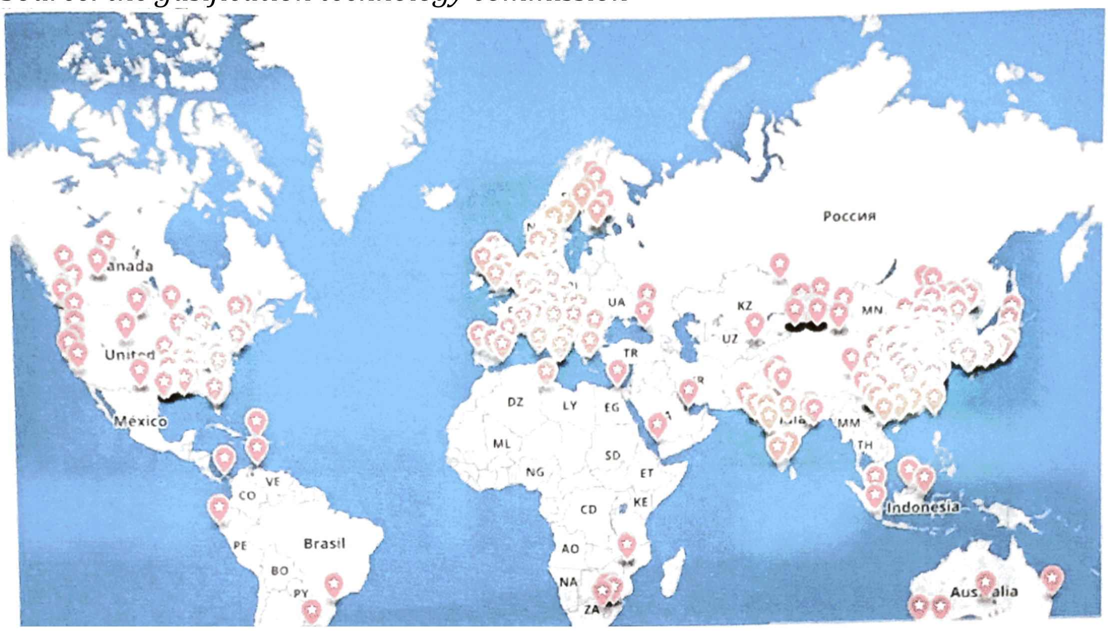
i) The raw material is burnt in high temperature and therefore the process is more efficient.

ii) Clean gas is produced through filtering out the corrosive ash-forming elements (e.g. K and Cl), thus reducing the emissions of green house gases in the process of burning.

iii) The toxic gases produced by burning high calorific value plastics are much reduced due to the high temperature in the gasification chamber. Even zero-emission is can be achieved.

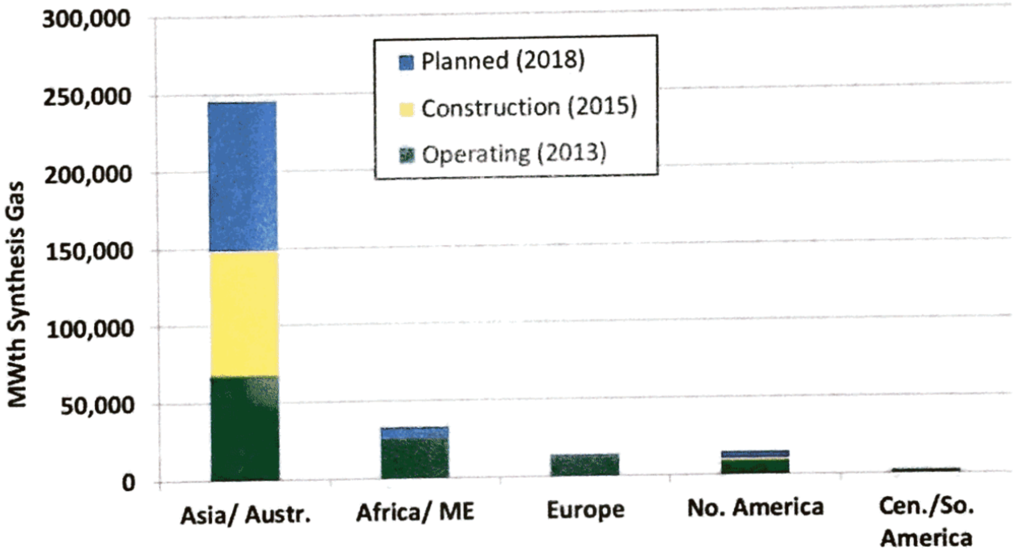
The gasification technology commission has pointed out that now, there are more than 270 operating gasification plants around the world, with more than 680 sets of gasification equipment installed.

Graph 3.2. – Global distribution of gasification plants
Source: the gasification technology commission



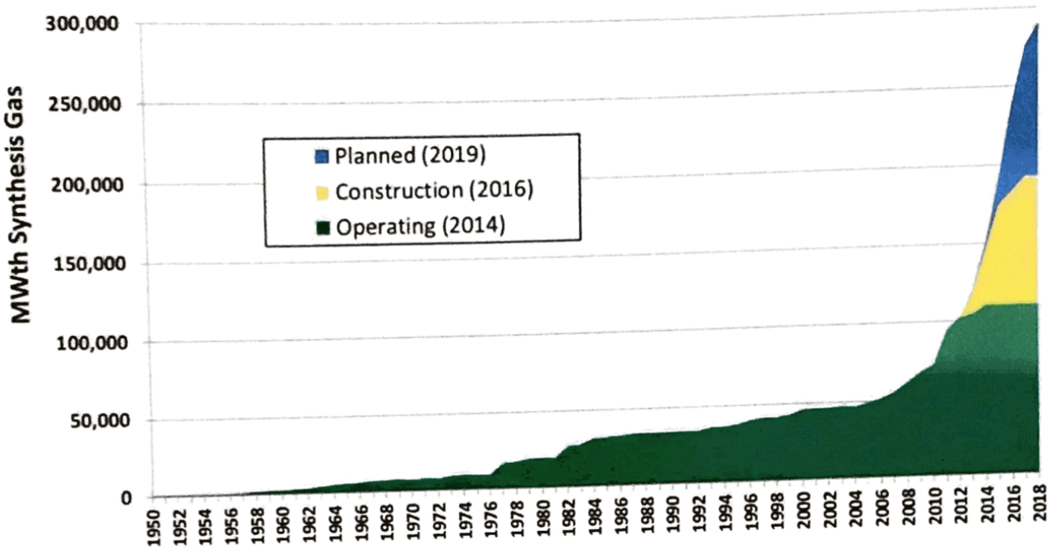
Most gasification plants are in Asia. Their total capacity is larger that that of the rest of the world combined. Over the past 4 years, the development of chemicals, fertilizer, coal-to-liquid and other industries have facilitated this significant shift.

Graph 3.3 – Capacity of gasification plants (by regions)
Source: the gasification technology commission



Gasification technologies are most often used in the production of chemicals, which will continue to account for the lion's share of the use of these technologies. However, in places where natural gas is dear, gasification technologies, which produce an alternative for natural gas, will grow more and more popular. Therefore, in the future, it's projected that the increase in the total capacity of gasification plants will accelerate.

Graph 3.4 – Total capacity of gasification plants in the world
Source: the gasification technology commission



3.5. Cost-Benefit Analysis

Cahill commissioned a study to analyze and quantify the costs and returns that the project will bring to Barbados. The study investigated the factors affecting the cost of power generation and the economic returns of the project. The study has also investigated the economic returns that will accrue from paying CEB to process waste instead of continuously expanding the capacity of landfills. The conclusion of the study is that in the operation period of 30 years, the project will save $455.3 million for Barbados and create many intangible benefits. Exhibits 3.2 and 3.3 have summarized the conclusions of the study.

Exhibit 3.2 – Project Cost and Income for Barbados Summery

Cost (Mio dollar)	Plan "Status Quo"	Adopt CEB Project	Difference
Time length	**30 Years**	**30 Years**	**30 Years**
Power Generation	$2,289.0	$2,139.0	($150.0)
Processing Fee	$0.0	$165.0	$165.0
Cost of Great King Grass	$0.0	($90.0)	($90.0)
Capital Cost of Landfill	$39.0	$0.0	($39.0)
Cost of Leachate Plant	$48.0	$0.0	($48.0)
CEB Project Construction	$0.0	($110.0)	($110.0)
CEB Project Operation	$0.0	($183.3)	($183.3)
Total	$2,376.0	$1920.7	($455.3)

Exhibit 3.3 - Immeasurable Benefits

Type	Summary
Landfill	This project will eliminate the need for developing extra landfill. It will also cut down the operational cost of existing landfill.
Jobs	The construction, operation and maintenance of the project as well as the production of great king grass will create several hundreds of jobs.
Foreign Exchange	Will increase the trade balance figure by 140 million dollars per year
"Green Barbados"	The target of using 29% of total energy as renewables will be achieved 10 years earlier
Tourism	Mitigate the smell of mangroves ponds for tourist attractions as much as possible. Increase Barbados's attractiveness as tourist destination.
Tire Fire	Decrease the accumulation of tires and reduce fire hazard.

4. Project Overview

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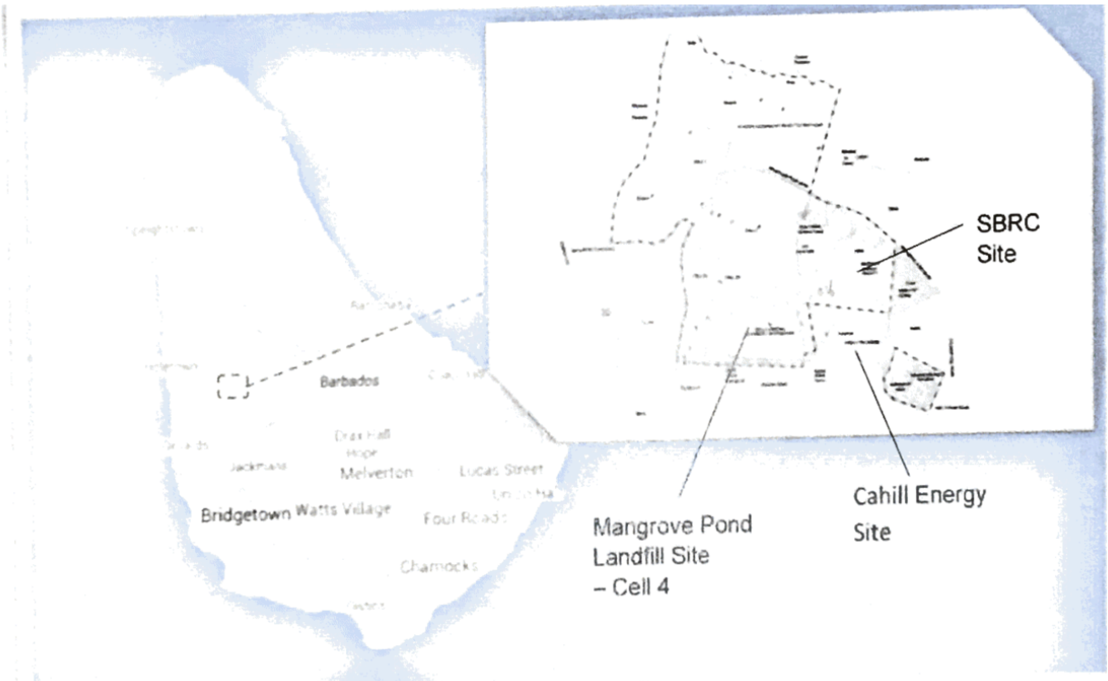
4.1. Highlights

The project promises unique and attractive investment opportunities. The highlights include:

- The revenue of the project is not affected by the fluctuation of commodity prices. The 30-year contract with the government of Barbados (GoB) has ensured the profitability of the project. There are guarantees about processing costs and electricity price Power Purchase Agreement s, including the possibility of raising electricity prices along with the rise in operation and maintenance costs (O&M).
- Through the "*Implementation Agreement*", the project enjoys the support of the GoB. In the agreement, the GoB promises various forms of support in the construction and operation of the project as well as the transmission of electricity generated. The key clauses of support are included in section 4.3 of this confidential information memorandum.
- There are attractive financing opportunities, including the potential to use multilateral development financing and financing from export credit agencies.
- All the technical elements (including the technology to transform raw material into fuel) have already been used in WtE reference factories around the world.

Graph 4.1 shows the location of the project (Vaucluse, San Thomas Diocese, Barbados)

Graph. 4.1- The location of the project



4.2. Clauses of the Agreement with the GoB

CEB signed two agreements with the GoB, namely, i) Implementation Agreement, ii) Power Purchase Agreement.

Implementation Agreement

The *Implementation Agreement* has two parts. The first part lists the payment that shall be made by the GoB to CEB for the development, construction and operation of the project. The second part is the arrangement for the supply of waste material for the project. The main clauses of the implementation agreement include:

- **Duration:** the agreement will terminate at the 30th year after the test operation of the project (hereinafter referred to as "Commercial Operation Date, or COD"). Delays in construction timetable will not affect the return period, provided that the COD is within 66 months after the submission to CED of a report detailing the content, source and quantity of the waste material (Adjustments may be made if the delays are caused by the government or force majeure).

- **Tax benefits:** the GoB has agreed to waive taxes and tariffs for the following items of the project: commodities imported for the project, commodities to be exported after the termination of the project, waste tires and other supply materials imported for the project; profits, returns and incomes generated by the project, interests and dividends paid by CEB; transfer of CED shares and the purchase, use and disposal of project land.

- **Processing fees:** the processing fee per ton charged by CEB is subject to the type of waste material:

  i) For contract waste material consisting of municipal solid waste or commercial or industrial waste, the fee is \$30/ton.
  ii) For any kind of contract waste material consisting of tires, the fee is \$50/ton.
  iii) For contract material consisting of hazardous waste, the fee is \$250/ton.

If the average calorific value of the waste material is below the target value (12-14MJ/kg), the processing fees will increase by 5% to 14%.

The processing fees will be raised every three years to reflect the increase in CED's operation and maintenance costs. The first fee increase will reflect the difference between actual operation and maintenance costs and the original estimation.

- **Reserve account for waste processing:** Similar to debt payment reserve account, the GoB should set up a reserve account for waste processing. The account should have a reserve equivalent to 6 month of processing fees (the highest monthly fee should be used in the calculation). Three payments should be made to meet the reserve requirement, the first being made before the financing day and the last being made on COD.

- **Grid connection and testing:** the GoB alone will cover the costs related to connecting the project to the grid and testing and the costs related to providing accounting measurements to measure the costs of electricity output of the project. The GoB must ensure that BLPC provides electricity for the construction, testing, and test runs of the project and for emergency situations at a price common for industrial sites.

- **Exclusivity:** During the period when the agreement is effective, CEB enjoys exclusive processing right for the increments of waste in Barbados, and Cahill enjoys the exclusive right to develop WtE factories in Barbados.

- **The Usability of Waste Material:** The GoB has promised to provide appropriate waste material and biomass daily for the project. See the quantity of the material in Section 4.6 – "material". The GoB has agreed to provide \$35,000 of research fund to test this.

- **The supply of waste material:** the GoB has agreed to provide for the project no less than 550 tons per day of contract waste material and no less than 900 tons per day of waste and biomass. It has also agreed to provide for the project no less than 450 tons per day of contract biomass and no less than 1000 tons per day of waste and biomass.

The waste material provided must meet the requirements laid out in the contract. The GoB should try its best to supply waste material frequently instead of supplying it infrequently and in large quantity each time. The GoB is responsible for collecting, transporting, sorting the waste, getting rid of waste that doesn't meet the requirements and breaking or pulverizing it before supplying it to the project. In addition, the GoB is responsible for purchasing and paying for cultivating, harvesting, storing, drying, pulverizing, collecting, transporting and supplying biomass material to the project.

The GoB should prioritize the supply of biomass waste so that, when necessary, it can supply only biomass waste to the project in order to meet the above mentioned minimum average calorific value of 12 -14 Mj. The waste material must be sorted into different categories and CEB can refuse to accept waste and biomass that don't meet the requirements.

CEB should build and maintain a reserve of no less than 4550 tons of waste and 1400 tons of biomass. When the reserve is 95% full, it can require the GoB to completely or partially stop the supply of waste and biomass. If the GoB is unable to supple waste and biomass in accordance to the contract, it has to compensate CEB for its losses, including losses in revenue as per the "*Power Purchase Agreement*".

- **Supplied land:** The GoB has agreed to compulsively purchase land and donate it to CEB to develop the project. All the costs related to purchasing the land and transferring it to CEB will be covered by the GoB. According to the "*Implementation Agreement*", if, 25 months after the submission of the waste analysis report, the project cannot get financing, CEB should return the land back to the GoB.

- **CEB put option:** If any clause in the "*Implementation Agreement*" is not fulfilled by the GoB, and CEB chooses to terminate the "*Implementation Agreement*", then CEB has the right (but not the obligation) to require the GoB to buy out the project. The price of such a buyout will be the sum of the total equity investment made in the project, the total unamortized debt, compensation for the loss of potential investment returns caused by the premature termination of the contract and other losses incurred.

- **Environmental impact assessment:** The GoB is responsible for submitting an environmental impact assessment (hereinafter referred to as "EIA"), ensuring the suitability of the land for the project and that no other remedial measures have to be taken before developing the land. Any existing pollution of the land is the responsibility of the GoB. In addition, the GoB should compensate CEB for any additional costs and delays caused by existing pollution of the land.

- **<u>Supply of water:</u>** CEB has the right to drill wells and create a rainwater lagoon. The GoB has agreed to help CEB get necessary land, using compulsory purchase if needed. Any land compulsorily purchased will be donated to CEB free of charge. CEB has the right to extract water free of any charge or tax. The GoB has agreed to provide water processed from leachate from nearby factories to CEB if needed. It has also agreed to provide water to CEB (not water extracted by CEB) under reasonable business terms, to secure any necessary approval for CEB, to independently purchase the design, construction and operation of hydraulic infrastructure and to connect the project site to the public water supply system.

Power Purchase Agreement

CEB has signed "*Power Purchase Agreement*" with the GoB covering all electricity generated by the project. The main clauses of the agreement include:

- **<u>Signing Parties</u>**: The GoB, not BLPC is responsible for the sales of electricity generated by the project. The GoB has the right to designate another company wholly owned by it to sell the electricity too. Any such company has to continue to be owned by the government, which has to ensure that the company fulfills its obligations.
- **<u>Duration:</u>** the duration of the "*Power Purchase Agreement*" is also 30 years after the COD. If, for a certain period, CED cannot produce electricity because of force majeure, the breach of the agreement by the electricity seller or the suspension of the supply of waste and biomass by the GoB, the duration should be extended by the said period.

- **<u>Revenue:</u>** Revenue derived from electricity generation has two parts:

  i) Capacity payment: the electricity seller promises to pay according to the generation capacity regardless of whether the generated electricity is used.

  ii) Fixed electricity price: the project sells electricity to the grid at a fixed price of $0.225/unit.

The capacity payment part is to ensure that the project has a continuing revenue stream. This part of the revenue is based on the net generation capacity of the project. This part is smaller than the revenue created on the basis of the actual supply of electricity or that created by selling electricity at a fixed price. When the project fails to produce electricity due to CEB's problems, force majeure or the suspension of the supply of waste and biomass by the GoB, the revenue from capacity payment will decrease. However, if the decrease results from the suspension of the supply of waste and biomass by the GoB, the government will compensate CEB as per the "*Implementation Agreement*".

The price will be raised every three years to reflect the increase in CED's operation and maintenance costs. The first price increase will reflect the difference between actual operation and maintenance costs and the original estimation.

- **Right for priority dispatch:** The GoB has agreed that the electricity generated by this project will enjoy priority dispatch over electricity from other sources (excluding intermittent and renewable ones).

- **No lower limit for electricity supply:** the seller has to buy electricity from the project, but the CEB doesn't have any obligation to generate a minimum level of electricity, nor will it compensate the seller for not producing electricity.

- **Suspension of operation:** CEB will suspend operation for a maximum of 35 days a year for maintenance. If the suspension period is shorter than 35 days, due to the fact that the seller is obliged to buy electricity from the project, extra revenue will be generated. When operation is to be suspended, the CEB must coordinate with BLPC, but CEB doesn't have to obligation to provide alternative electricity during suspension. The CEB may also suspend operation due to other emergency maintenance needs.

- **Reserve account for electricity revenue:** Like the reserve account for waste processing, the electricity seller should set up a reserve account for electricity revenue. The account should have a reserve equivalent to 6 month of revenue from electricity sales (the highest monthly income should be used in the calculation). Three payments should be made to meet the reserve requirement, the first being made before the financing day and the last being made on COD.

4.3. Raw Material

The key to the electricity generation of this project is the calorific value of the waste material. The calorific value and consistency of the waste material will affect the efficiency of WtE factories. Sorted and pulverized waste material will improve efficiency.

Plastics and tires have the highest calorific values: between 20 and 35 MJ/kg. Raw materials that have low calorific values are those green waste with high water content. For those materials, their calorific values are usually between 6 and 8 MJ/kg.

So far, assuming that the raw material provided by the GoB doesn't change, an analysis of the generational potential of the project is based on the following three sources: 1) annual SAA data collection, 2) A report entitled "A study on the properties of solid waste" presented to the GoB by LH Consulting Inc. 3) An analysis on the generational potential of the project made by a widely recognized engineering consultancy in 2014 on the basis of the information in 1) and 2). A preliminary analysis has estimated that the average calorific value of available material is 13.6MJ/kg and the overall hourly generation capacity is about 61.7MW. With the work on analyzing the waste material almost done, the facts confirm the estimation.

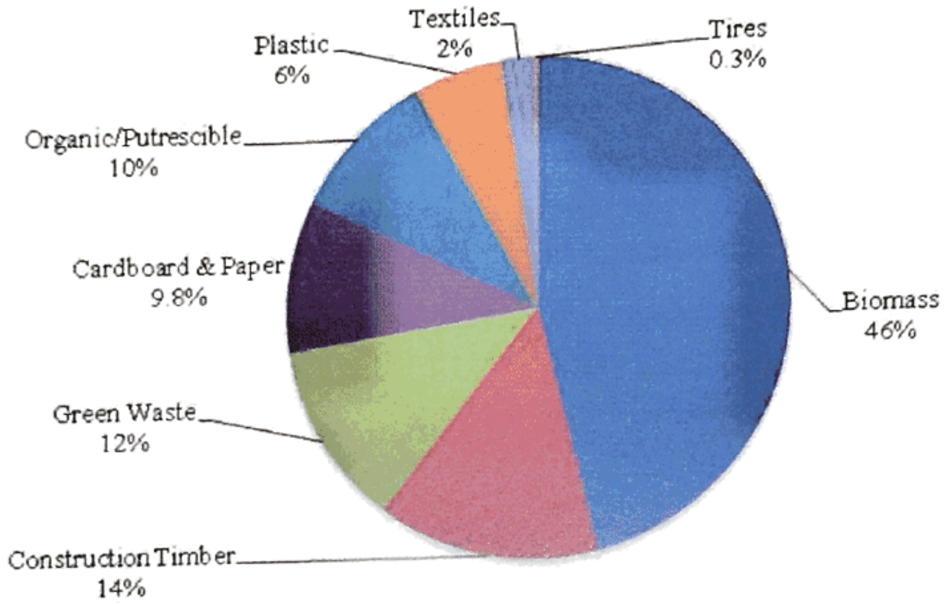
The following Exhibit 4.1 and Graph 4.1 have summarized the sources and types of the raw materials. The data on waste material supply is generated by calculating the averages of the SSA record of waste materials received by SBRC in the past five years. The statements made by organizations providing waste materials and the Department of Agriculture that provides Great king grass have further confirmed the data.

Exhibit 4.1 – Raw material break down

Raw Material Source	Type	Comments	Ton/day
Through SBRC	MSW	Organic/paper/plastic/textiles etc. (including 2.5 tons tires per day)	277.5
	CIW	Building timber /pallet	130.7
	Green	Native timer (decorations), coconut shell	72.2
Public Spaces	Harbor	Pallet/Cardboard/General wastes	27.0
	Airport	General wastes/ Paper	9.5
	Hospital	Limited to general wastes (no medical wastes)	5.0
Other Green Wastes	Bagasse	From sugarcane industry	28.4
Biomass	Giant king grass	Based on contract with Barbados government	450.0
Total			**1000.0**

Diagram 4.1 – Types of raw materials

图表 4.1 - 原料类型



Waste

Municipal solid waste collected by self-run or contracted SSA vehicles will be sent directly to SBRC. There is no waste transfer station on the island. After processing and removing incombustible components, rest of the wastes will be transported to project site (instead of the existing waste landfill).

As mentioned above, the on-going waste validation study is carried out to identify the calorific value of each waste source on the island. The waste validation study is almost finished, and the result of validation study confirms the initial estimation of preliminary analysis. Despite all this, under the *"Implementation Agreement"*, Barbados government guarantees the supply of raw materials with calorific values between 12-14 MJ/kg, which is enough to ensure sufficient power generation as planned.

Graph 4.2 – Project validation study

In the future when the amount of waste increases, it is possible to decrease the amount of biomass used and increase the amount of waste in order to process the excessive waste. This project also grants enough flexibility to respond to normal variations of raw material ingredients, and can also fully utilize high-calorific value raw materials – e.g. the piling tires in Barbados and nearby islands.

Giant King Grass

Giant king grass will be used as extra raw material for this project to supplement the supply of MSW and other wastes (pre-dried and shredded giant king grass will be sent directly to project site as biomass fuel).

Giant king grass is a fast-growing, high-yield hybrid plant. It is not genetically modified, therefore not invasive to local environment. It can grow under different soil conditions, and can be harvested several times per year. Giant king grass grows best in tropical and subtropical zone with more than 100 sunny days per year and 32 inches of rain. It has low demand for fertilizers and no demand for pesticides.[2]

Barbados has the most suitable weather for giant king grass; there is enough sunlight every day even during the rainy season (June to December). The average annual rainfall is around 40-90 inches.

Giant king grass's crop yield is about 152 ton/acre, with 70% water content (41 ton/acre in extreme dry conditions). The Barbados Department of Agriculture provides 3000 acres for giant king grass planting, which means the total yield would reach 456 kiloton (12.3 kiloton in extreme dry conditions). The first batch of giant

[2] http://www.viaspacegreenenergy.com/giant-king-grass.php

king grass planting has already taken place in Barbados, and lab experiments on produced hay is initiated.

The typical caloric value of dried giant king grass is 18.4 MJ/kg, roughly 7900 BTU/lb. In comparison, the average caloric value of power coal produced United States in 2012 is about 10050 BTU/lb.[3] As project raw material, great king grass will be dried with a water content up to 20%. Under this circumstance, the average caloric value is estimated to be 14 MJ/kg.

Currently, great king grass is used in many biomass power plants around the world. Exhibit 4.2 lists power plants that adopts great king grass as raw material:

Exhibit 4.2 – Location of power plants with great king grass as raw material

Location	Company	Type of Plant
Negros Occidental, Philippines	Sagay Central Inc.	Biomass power plant
Imperial City, California	Mesquite Lake Water and Power LLC	18MW Biomass plant 16mw gasifier
Korat City, Thailand	DP Tech	Biomass boiler
Viking Island, USA	Tibbar Energy	7MW Anaerobic digestion biogas power plant

4.4. Project Design Considerations

Based on *"Implementation Agreement"*, 550t of waste should be provided per day with an extra 450t of great king grass biomass per day. Cahill and Barbados government has already made progress regarding building PG power plant described in section 5 and section 6, however, the WtE technologies and power plant designs provided in the market are very extensive. Exhibit 4.3 compares different WtE system designs in various programs around the world.

Exhibit 4.3 - WtE system design comparison

[3] US Energy Information Administration: http://www.eia.gov/tools/faqs/faq.cfm?id=72&t=2

Technology	Plasma Gasification	Slagging Gasifier with Pre-Combustion AQCS	Gasification with Ash Vitrification and Advanced AQCS	Advanced Pyrolysis or Low Temperature Gasification (<900°C)	Moving Grate Combustion (Conventional Incineration)
Core Vendors	• Alter NRG • InEnTech • CHO Power	• BGL • JFE/Thermoselect	• Ebara Twin REC TIFG • CLEERgas / Chinook + ash vitirification	• CLEERgas • Chinook	• Martin GmbH • Inova (Von Roll)
World Bank WTE Air Standards	Advanced	Advanced	Advanced	Medium – Advanced	Medium – Advanced
Solid Residuals (EU Directive 1999/31/EC)	Vitrified Slag - Inert Fill	Vitrified Slag - Inert Fill	Vitrified Slag - Inert Fill	Bottom Ash -Non-hazardous, safe to landfill	Bottom Ash -Non-hazardous.safe to landfill
Efficiency (Est. MWh/t)	1.0 - 0.8	1.0 - 0.5	1.0 - 0.5	1.0 - 0.8	0.8 - 0.6
Feedstock Flexibility	Very Good -Size reduction to <6" - Full range of feed properties	Good - Uniform feed size required - May require feedstock with a net calorific value > 7 MJ/kg	Good - Uniform feed size required - May require feedstock with a net calorific value > 7 MJ/kg	Good - Uniform feed size required - Requires feedstock with a net calorific value > 7 MJ/kg	Good - Large range of feed sizes - Requires feedstock with a net calorific value > 7 MJ/kg
Level of Commercialization	Designed / Under Construction	Designed	Demonstrated	Designed	Mature

Beneficial Property
Neutral/Mixed Property
Detracting Property

AQCS: Air Quality Control System
WTE: Waste to Energy

Cahill believes that PG technology is the best solution for this project because of the following reasons: i) The efficiency and raw material flexibility of PG technology; ii) It fits the goal of Barbados government of providing clean energy without producing landfill ash; iii) The project adopting PG system demonstrates attractive economic benefits.

Understanding that different kinds of technology exists in WtE industry, and some potential buyers might want its own technology to be adopted, Cahill is currently discussing with Barbados government about extending its agreement range to include systems beyond PG. Although the result of such discussions is uncertain, it is certain that Barbados government needs this project to solve some of its specific targets, including decrease import fuel cost, increase renewable clean energy supply and significantly extend the service life of the existing landfill.

The agreement between CEB and Barbados government does not specify any environmental standards or requirements, including emission standards or reference for any possible solid waste incurred. However, the project emission will comply with Barbados' architecture and environmental standards, and a solution plan will be provided to any solid waste produced. Cahill is seeking the possibility of adopting replacement technologies. Although it is uncertain whether an agreement will be reached with Barbados government regarding replacement technology, considering Barbados government's target of decreasing the future landfill space requirement, it is certain that Barbados government will not accept a technical solution plan which creates solid wastes, and needs landfill treatment on the island.

4.5. Financing

Project Financing

This project owns a power purchase agreement with 30 years of fix income, guaranteed waste supply and processing fee; therefore, it is an ideal project for financing. The characteristics of "*Implementation Agreement*" further support the financing ability of the project, including right for priority dispatch, fixed electricity price and advanced payment for installed capacity, exclusiveness of waste supply, waste supply and biomass caloric value guarantee, and underwriters reserve account. Similar project financing has done with some of the WtE equipment. Insurance covering construction, operation, maintenance, as well as performance risk helps to gain supports from private sector financing, and bank guaranty provided by multilateral development bank helps to cope with political risks and Barbados government credit risk.

Availability Of Development Bank Financing

This project is eligible for support from International Finance Corporation (hereinafter referred to as "IFC"), Caribbean Development Bank (hereinafter referred to as "CDB"), Inter-American Development Bank (hereinafter referred to as "IDB") and other multilateral or supranational financing institutions.

IFC provides a series of products, including loans (separate or combined loans), equity, risk management and trade financing products. In the Caribbean region, IFC supports private sectors' participation in infrastructure development. In fiscal year 2012, IFC provided a record-breaking amount of 4.8 billion dollars for 129 programs in Latin America and Caribbean region. The priority of IFC is to support small-scale economies; therefore it has invested 1 billion dollars in Central America and Caribbean regions in the fiscal year 2013.

CDB has already appointed 120 million dollars for Barbados in the four-year period (from 2015 to 2018). A lot of established goals under the national strategy of Barbados could be accomplished through this project, including enhance financial sustainability and support organizations. It also foresees the opportunities for Barbados in maximizing its development potential in renewable energy related sectors. [4] CDB recently announced that it has been taking measures to encourage public and private sectors to invest in renewable resources, for which it would expand the range of its capital and technical support projects.

Regarding the national strategy of Barbados, IDB emphasizes on the following 4 targets: i) increase the ability of coping with costal risks, natural disasters and

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[4] Caribbean Development Bank Country Strategy Paper 2015-2018 (p.1) http://caribank.org/uploads/2015/01/BD91_14-Bdos-CSP_FINAL.pdf

climate change; ii) more efficient water supply and resource management; iii) decrease oil import cost, promote clean energy and energy efficiency; iv) improve the quality of education and its relevance. Evidently, this project could directly achieve the third target of IDB. In the past five years, IDB invested 142 million dollars for Barbados energy plan, including two loans totaling 105 million dollars, which aims at supporting Barbados' sustainable energy framework.

Through its structured corporate finance department (hereinafter referred to as "SCF") providing mid-long term direct and combined loans, loan guarantee and technical cooperation, IDB extends its cooperation with private sectors and investment funds in large-scaled infrastructure projects. SCF could provide loans for enterprises or project financing, with maximum loan term of 30 years, credit amount ranging from 10 million dollars to 200 million dollars (up to 400 million dollars loan under special circumstances). In addition SCF could provide up to 400 million dollars of partial credit guarantee and political risk guarantee to improve the financial condition.

Export Development Financing

As almost 100% of the project equipment and technical expertise relies on import, this project has a huge opportunity for export financing utilization. Generally speaking, suppliers arrange this kind of project financing from their country of origins. For instance, Export-Import Bank (hereinafter referred to as "ExIm") could provide up to 18 years fixed interested direct loan for renewable energy projects, free from limitations on transaction scales. ExIm will cover up to 85% of American supply contract or 100% of American products, plus 30% of the local cost. Exhibit 4.4 summarizes potential suppliers and lending guidelines for relevant export financing organizations.

Exhibit 4.4 – Potential project supplier and available export financing

Country	Potential Supplier	Relevant Organizations	Lending Guidelines (1)
USA	GE, Solar Turbines (Caterpillar), Air Products, Merichem, MEGTEC (Babcock % Wilcox Power)	Export-Import Bank	For renewable energy projects, US provides 85% contract + 30% local cost, time limit: 18 years
Canada	Alter NRG (Westinghouse gasifier), Hatch, SNC Lavalin	The Export Development Bank of Canada	Provide long term project financing
UK	Chinook Sciences, APP, Johnson Matthey, Foster Wheeler	UK Department of Export Financing	150-250 million pounds, time limit: 10 years or more
France	Air Liquide, Technip	COFACE	Provide guarantee, but not as direct lender
Germany	MAN Turbomachinery, Linde, Trema, ThyssenKrupp-Mannex	KfW-IPEX	Maximum 85 million Euro or its Dollar equivalents, need to be backed by German Federal Government, minimum of 4 years

(1) Only suitable for Barbados (if applicable)

4.6. Project Timeline and Important Items

Graph 4.3 briefly summarizes the rest development requirements before the operation date for this project. Appendix D provides an overall project timetable, including finished important matters and the rest to be finished before the operation date.

Graph 4.3 – Project Development Timeline

Exhibit 4.5 lists important matters of finished part of the project, and the important items to be accomplished to get the project ready for financing and construction.

Exhibit 4.5 – Project Important Items

Types	Finished Important Items	Important Items to Be Finished Before Entering Financing Stage
Technology	▪ Technip finished initial field study ▪ Barbados government executed BGEC EIC ▪ Technip finished initial supply study	▪ Water study ▪ Geographical, soil, geological exploration ▪ Final supply study/soon to be ready ▪ EPC contractor bid technology/business evaluation
Contract suite	▪ Already signed "*Implementation Agreement"* with Barbados government (including land allocation commitment and wastes supply agreement ▪ Already signed "*Power Purchase Agreement*" with Barbados Government	▪ Operation and maintenance bidding with EPC, and choose primary operation and maintenance provider with EPC ▪ Operation and maintenance agreement negotiation with EPC ▪ Finish the site right transfer
Financials	▪ Detailed project operation financial model based on initial supply study ▪ Tax income and accounting consulting and cash flow model ▪ Brief project cash flow model	▪ Develop project financing mode ▪ Project financing bidding process, choose primary lender and credit agreement negotiation

5. Cahill Plasma Gasification Project

5.

5.1. Overview

Right now, Cahill choose to study the progress of PG WtE factory. Exhibit 5.1 lists the main parameters of PG factories studied and developed by Cahill:

Exhibit 5.1 – Main project parameters summary

Main Parameters	Comments
Location	15 Acers, located in Vaucluse town, St. Thomas Diocese, Barbados.
Property Rights	Barbados government donated the land to CEB to build this project; CEB does not need to cover the cost.
Grid Connection and Measurements	Barbados government is responsible for the cost related to grid construction and connection adjustment. Barbados government will provide accounting measurement, and is responsible for the cost incurred.
Net Capacity	Est. 40 MW.
Plant Availability	Efficiency availability: 90% by deducting 35 days of annual routine maintenance per year.
Annual Net Power Generation	Est. 316,800 MWh.
Raw Material Requirements	Barbados government needs to provide pre-shredded contract waste—a mixture of municipal solid waste, green waste, construction and demolition waste, and public place waste, with average caloric value (CV) of 12-14 MJ/kg. Barbados government also needs to provide biomass fuel - great king grass with water content <20%.
Raw Material Capacity	900-1000 tons per day.
EPC	Potential EPC contractors (e.g. Technip) have already expressed interests to this project. The following contractors have already proven their experiences in design, engineering, construction, adjustment and initiation of global WtE projects.
	Expected EPC Bidder: Technip Foster Wheeler ThyssenKrupp Hatch SNC Lavalin
	Choosing primary EPC contractor and executing the last stage of supply study could be progressed simultaneously. This could speed up the project development, ensure competitive pricing for the project, as it allows EPC bidder to work together with supply provider.
Operation and Maintenance	The selection of operation and maintenance contractor will be based on its global experience on operation and maintenance WtE projects, and the selection process will be as strict as which of EPC contractor.

5.2. PG Technology Assessment

PG technology is reviewed and evaluated by independent professionals in engineering and energy technology sectors. Appendix C introduces the development history of PG technology. This technology is positively recognized for its technological stability, economic feasibility and environmental sustainability - Exhibit 5.2 briefly lists 7 evaluation comments from renowned professionals.

Exhibit 5.2 – Third party accreditation summary

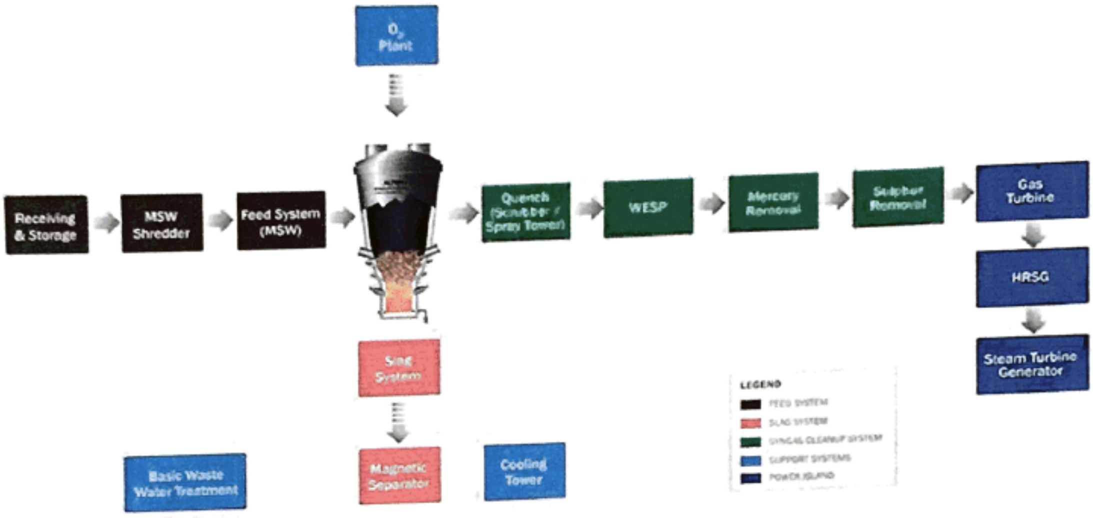
Third-Party Accrediting Agency	Credentials	Review Summary
R·W·BECK	R.W.Beck is consisted of a group of technology-based business consultants, providing services for global public and private infrastructure organizations.	Reviewed Westinghouse PG technology used for power plant reconstruction and municipal solid waste utilization. Did not find any significant technological challenge. Comments: "*Plasma Gas Technology seems like a very reasonable technology to gasify organic raw materials and produce fuel gas compatible with combustion boilers.*"
FICHTNER	Fichtner is one of the world-leading independent engineering consulting firms. This group consists of more than 2000 employees providing professional engineering consulting services.	Comments: " *For many years, developers seek to transfer waste into gas that could be used in combustion engines for power and heat generation. The advanced plasma energy technology has overcome the main obstacles in WtE technologies to provide fuel for gas engines.*"
ENSR | AECOM	AECOM is a Fortune 500 service provider in professional technology and management. As the subsidiary of AECOM, ENSR is a service provider in global environment and energy development field.	Finished a project inspection to test and verify that the emission level for one of the PG factories with daily capacity of 750 tons MSW is lower than North American emission standard. The report verified that the emission level of PG technology is much less than that of incineration.

amec	AMEC provides science, environment, engineering and project management support in over 30 countries.	Already finished basic design memorandum for three different types of equipment settings—combined cycle, steam cycle and synthesis gas cycle, which includes complete process flow diagram and capital expenditure forecast
Golder Associates	Golder Associates is a global civil/geotechnical and environmental consulting service provider.	Inspected emission data in PG factories in Utashinai and Mihama-Mikita, Japan. Confirmed the operations of these factories are far inferior to the emission standards in Japan and North America
SHIMADZU	Shimadzu Techno Research is an analytic research service provider in health, environmental products and material testing market.	Inspected the slag emitted from Mihama-Mikita PG factory in Japan. The result shows that the vitrified slag is inactive and does not cause soil or drinking water contamination.
Juniper	Juniper Consultancy is a public-recognized, world-leading independent analyst on emerging technologies in waste management sector.	Thoroughly inspected Westinghouse PG factories in Japan. Confirmed that this technology passed inspection, and regarded Westinghouse as a world-leading supplier in design and supply of plasma gasifier system.

5.3. Project Flow Overview

A typical PG factory flow includes 6 parts: i) raw material receiving and storage; ii) gasification; iii) slag system; iv) gas purification; v) power generation; and vi) supporting system. Diagram 5.1 shows a typical process flow diagram, Appendix E provides a more detailed process flow chart.

Diagram 5.1 – Plasma gasification power plant process flow overview
Source: AlterNRG



Note: WESP = Wet electro-static precipitator, HRSG = Heat recover steam generator

Raw material receiving and storage

Equipment will be built to store 4550 tons of waste and 1400 tons of biomass. Different raw materials will be mixed into a homogenized raw material flow, and transferred into gasifier through a closed delivery hopper that allows minimum air inflow.

Compare to normal gasification, one of the benefits of the PG process that this project considers is that the working temperature is very high to ensure the complete destroy of the raw material. This will allow all kinds of waste which couldn't be processed through traditional gasifier to be thoroughly processed, including materials with high water content raw materials, and with high inactive content (e.g. glass, metal, electronic waste, industrial waste, petro waste and medical wastes). It will ensure this project with enough flexibility to cope with changes in waste mixtures or new waste flow during the entire operating life.

Due to large amount of potential suppliers and low technical differentiation, the competition in the raw material preparation equipment market related to this project is very intense.

Plasma gasifier system

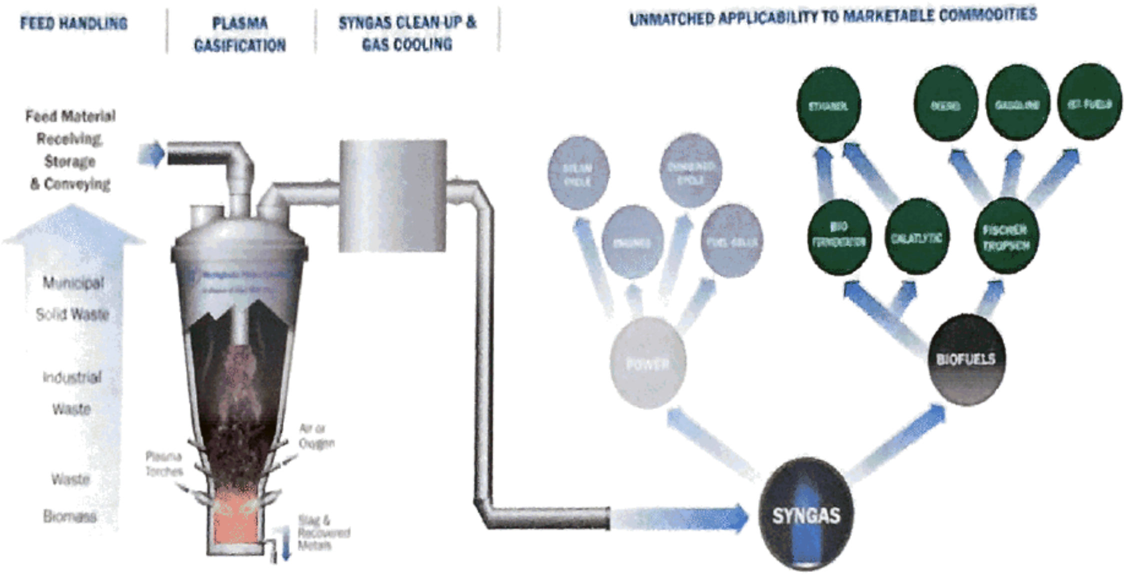
In plasma gasifier, the organic matters are resolved by plasma torch with working temperature around 5000°C. The Plasma gasifier is operated under oxygen deficient environment, which means that the raw materials are burned, but be broken down into different elements (e.g. hydrogen) and simple compounds (e.g.

carbon oxide and water). The gases formed are called "synthesis gas". Comparing to gasification under lower temperature, the extremely high working temperature could maximize the dissociation of molecules, which means more extensive sources of potential waste with enough caloric value could be used, and less emission problem related to the usage would incur. On top of the gasifier, atomized water is used to quench some of the synthesis gas, and decrease the temperature to about 850°C.

The major differentiation from non-PG is the operating temperature: the high temperature in plasma gasifier could break down tar entirely. Non plasma gasifier usually operates between 800°C and 900°C, which means the synthesis gas produced in non plasma gasifier has limited usages – it can be burned immediately, but cannot be used for combustion engines, reciprocating engine or transferred into liquid fuel.

Westinghouse is the leading provider of PG technology; its systems are successfully adopted in various commercial equipment e.g. Mihama Mikata, Japan and Poona, India. Except the plants in operation, other factories are also under construction and/or debugging phase, including two factories from Air Products Ltd. currently under construction in Durham Tees valley, England with comparatively large capacity, and the first factory is under debugging phase. Other plasma gasifier providers include Advanced Plasma Power (hereinafter referred to as "APP") and Chinook Sciences (hereinafter referred to as "CS"), as well as a series of unique technologies developed by other participators. APP sells its unique PG technology under Gasplasma®. APP's technology has already passed the inspections and verifications from Fichtner Consulting (a leading technical consulting firm). CS sells its RODEC® technology, a modularized and expandable system that has been proven since 2000.

Diagram 5.2 – Plasma gasifier products
Source: AlterNRG



Slag System

MSW contains lots of inorganic wastes, including glass, metals, stones and soil; they cannot be gasified, but melt as liquid slag. The melted slag flow out through the slag hole on bottom of the gasifier, quenched and forms into granulates.

The vitrified granulates produced here are totally inactive material, could be used as high quality construction material. Before being sent to clients as construction materials for the entire islands, these granulates could be transported and stored in trucks.

Gas purification

The synthesis gas produced in the gasifier includes ashes (particles) and other disfavored elements (e.g. Mercury). Synthesis gas needs to be purified in order to convert to other sources of energies, including electricity, heat and liquid fuel. Every projects synthesis gas purification process needs to be individually customized.

For projects like CEB which uses MSW as main raw material, purification process including particle removal, desulphurization, and mercury/ heavy metal removal, to be used as synthesis gas suitable for combustion engines.

Synthesis gas is cooled through quenching scrubber, and then into Wet electro-static precipitator (hereinafter referred to as "WESP"). Quenching and WESP's main function is to remove the particles in synthesis gas. And then, the cooled particle-free synthesis gas goes through a series purification process, to remove chlorine, sulfate, lead, cadmium, zinc and mercury. The intermediate compressing and cooling steps are used to remove water in the gas.

Exhibit 5.3 – Gas purification technology provider

Technology Provider	Process	Technology
Merichem	Desulphurization	Lo-Cat®
Johnson-Matthey	Desulphurization/ removal of mercury	PURASPEC$_{JM}$
Trema	Quenching system /scrubbing/WESP	Multiple technologies
Megtec	Quenching system /scrubbing/WESP	Multiple technologies
Andritz	Scrubbing/WESP	Multiple technologies

Power Generation

The last phase of WtE process is to use combined circulation system, combustion engine and steam engine to transform synthesis gas into power.

Steam engine is very common, however, the design of synthesis gas engine is different from natural gas engine, which is why they could use synthetic gas with low caloric (herein after referred as "CV") and high hydrogen content.

Exhibit 5.4 – Thermoelectric cogeneration plant provider

Technical provider	Process	Technology
GE	Gas and steam turbine	Lots of series suitable for different power generation and low caloric value gas
Solar Turbines	Gas and steam turbine	Lots of series suitable for different power generation and low caloric value gas
Man Turbomachinery	Gas and steam turbine	Different technologies

Supporting system

Power plant needs some supporting and public infrastructure systems, including cooling, water processing, power dispatching etc.

Technically speaking, the most important supporting infrastructure is air separation equipment. Air separation equipment provides oxygen for gasifier. Right now, this project primarily adopts vacuum pressure swing adsorption (hereinafter referred as "VSA"), although cryogenic technology is also good.

Exhibit 5.5 – Oxygen equipment supplier

Technology Supplier	Process	Technology
Air Products	BSA and low temperature equipment	VSA technology under brand PRISM®
Air Liquide	BSA and low temperature equipment	VSA technology under brand FLOXAL®
Linde	BSA and low temperature equipment	VSA technology under brand ECOVAR®

5.4. Major Process Technical Risks

The exhibit below summarizes major process technical risks and how to reduce those risks:

Exhibit 5.6- major process technical risks

Process Elements	Risk Disclosure	Risk Reduction
Variability of Raw Materials	Affects project design and/or operational raw material variation risks.	Finished validation study. The design basis of supply study will include enough flexibility to cope with the changes of raw materials ingredients and future changes of raw material mixture.
Performance Assurance	Project might not achieve target performance, e.g. power output/usability.	Choose EPC contractors with experiences in gasification/ synthesis gas process. EPC contractor will be fully responsible for performance assurance.
Plan	Cannot keep up with planned schedule or operation date.	Started initial constructability study on project site. Important dates outlined by Technip. The selected EPC contractor will be fully responsible for performance assurance.
Safety	Synthesis gas produced is poisonous and flammable.	The design and construction of this project will adopt international standards. Design will be strictly inspected (e.g. HAZOP, region classification) Safety equipment will be listed into the design (e.g. shutdown system, torch).

Environmental Standards	Might exceed the air and water pollution emission limit.	The project will satisfy all the suitable environmental standards. Will specify all the equipments, redundant systems, containers needed to satisfy these standards during supply study phase.
Site Conditions	Unforeseeable site conditions.	Will finish thorough inspection, any unfavorable condition will be resolved by GoB and the supply contractor. Based on "*Implementation Agreement*", if the current site is unacceptable, GoB is responsible for providing external site for CEB.
Engagements between Technology Provider and EPC Contractor	Gasification technology and equipment for the factory set-up will be purchased from different companies. Possible risks of discrepancies or disputes in between.	EPC contractor will adjust design and equipment provided by technology provider within the limit of contract, and will be responsible for system integration.
Risks Occurred between Engagements with Public Infrastructure Provider and EPC Contractor	GoB provides public infrastructure (e.g. water, grid connection). The public infrastructure supplied might not satisfy supply/EPC contractors' requirements	Public infrastructure requirements will be specified during supply study period. The risk could be eliminated through close supervision of EPC contractor and engagements with GoB.

6. Financial Analysis of PG Project

6.

6.1. Project Economic Benefit Summary

Technology

This project is modeled based on the supply design of Westinghouse 1,000 TPD PG system and matching plant set-up.

Operational Income

The plant is estimated to process about 550 tons of MSW and 450 tons of great king grass per day with daily total raw material input of 900 – 1000 tons. Based on that, the total annual power output is estimated to be around 350 MWh. Fixed electricity price and waste processing fee raise according ton the increase of operation and maintenance cost.

Operational and maintenance cost related to the project include consumables (e.g. dried grass, metallurgical coke, caustic soda, fluxing agent, and water) and fix cost (e.g. labor, daily cost and insurance). Although oxygen is a required consumable, it is produced on-site, therefore the production cost is reflected on the parasitic loading, but not accounted into purchases. It is estimated that the cost will increase 2.5% annually, same as the US dollar inflation rate. Section 6.4 lists detailed operational income estimation.

General Administrative Cost

This project is planned to be managed by Barbados local office. The cost of this office is reflected in the general administrative cost. The general administrative cost in the model also includes the cost of responsible person and construction team during construction phase.

Recurring general administrative cost includes the cost of project manager, financing and accounting, legal and administrative cost.

Tax

Based on "*Implementation Agreement*" with GoB, this project is lifted from all tax related to profit, interest and distribution. Therefore, no modeling was done for the tax incurred throughout project lifetime.

Development Cost

In 2015, the initial cost for project development is 5.6 million dollars. This amount does not include any administrative or legal fee; acquiring firms might be introduced to realize such project development. Exhibit 6.1 lists the cost estimation for pushing the project to bankable phase.

Exhibit 6.1- Estimated development cost

Supply Study (1.88 mio Euro)	2mio USD
Owner's Engineer Fee	1 mio USD
Gasify PDP	0.9 mio USD
Environment Study	0.5 mio USD
Total	4.4 mio USD
Technology Licensing Fee	1.2 mio USD
Total	5.6 mio USD

Estimated Financial Results

Exhibit 6.2 lists the estimated operational outcome for first 5 years of project. Section 6.4 provided the operational income model for the total of 30 years.

Exhibit 6.2 – Estimated result: First 5 years

Inflation rate 2.5%

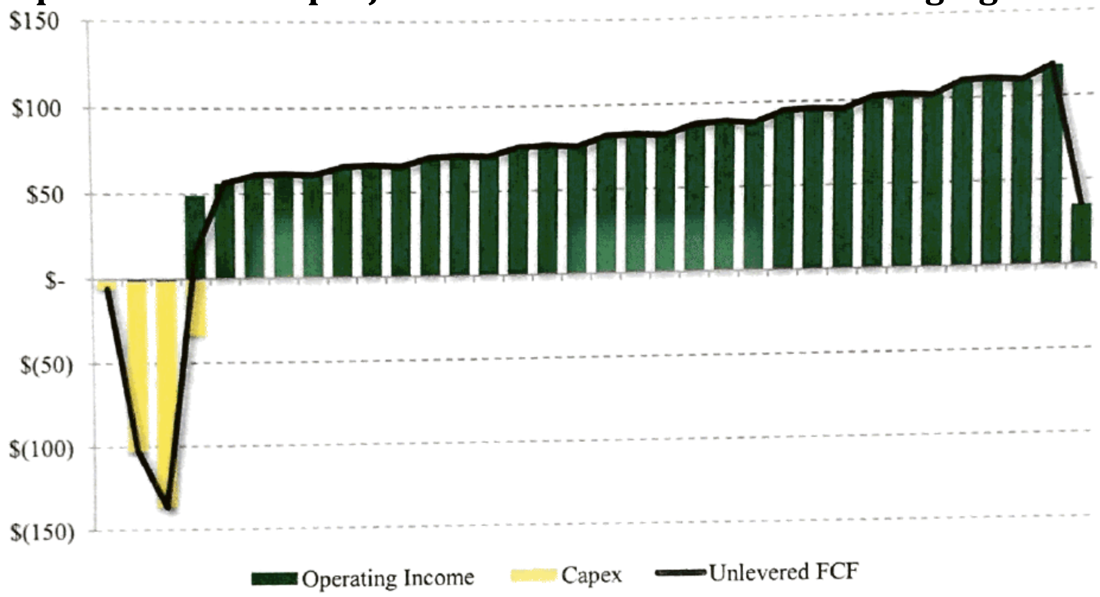
Million dollar, unless specified

Year	**2018**	**2019**	**2020**	**2021**	**2022**
Operational Days	275	330	331	330	330
Power Output (GWh)	264.0	316.8	317.8	316.8	316.8
PPA Rate (USD/MWh)	236.4	236.4	250.9	254.6	254.6
Power Income	62.4	74.9	79.7	80.6	80.6
Waste Processed (kt)	151.3	181.5	182.1	181.5	181.5
Process Fee (USD/T)	31.5	31.5	33.5	33.9	33.9
Waste Income	4.8	5.7	6.1	6.2	6.2
Byproduct Income	0.0	0.0	0.0	0.0	0.0
Total Income	67.2	80.6	85.8	86.8	86.8
Raw Material Cost	(5.3)	(6.6)	(6.7)	(6.9)	(7.1)
Consumables Cost	(4.0)	(4.9)	(5.1)	(5.2)	(5.3)
Other Operational Cost	(7.8)	(12.0)	(12.3)	(12.6)	(12.9)
G&A Cost	(0.9)	(0.9)	(0.9)	(0.9)	(1.0)
Total Cost	(18.0)	(24.4)	(25.0)	(25.6)	(26.2)
Operational Income	49.1	53.3	60.8	61.2	60.6

6.2. Estimated Financial Return

Based on the estimations above, this project is modeled within the 30-year period of *"Implementation Agreement" and "Power Purchase Agreement".* On the basis of deleveraging, the first 5 years of operation will create around 60 million USD of free cash flow per year; the capital expenditure from 2015 to 2018 is 269.66 million USD.

Graph 6.1 – Annual project free cash flow after deleveraging



On the basis of deleveraging, the internal rate of return is estimated to be 21.0%.

6.3. Detailed Financial Model

Operation

Exhibit 6.3 – Operating Assumptions

Business Operation Date	April 1st, 2018
Annual Maintenance Days	35
Raw Material Capacity	1000 tons per day
Total Power Output	58 MW
Parasitic Loading	18 MW
Net Power Output	40 MW

The estimated business operational date is April 1st, 2018. This date reflects 8 months of developing work, including final supply study, process flow design and EPC bidding, as well as 27 months of construction and debugging.

The project is estimated to operation 24 hours per day, excluding 35 days of downtime per year for routine maintenance and refractory lining replacement of plasma gasifier. There will always be a refractory lining on-site as back up.

Gasifier will process 1000 tons of waste per day. The initial raw material study shows that 61,7 MW of total power output and about 43 MW of net power output could be realized, however, the number is decreased to 58MW total/40MW net based on Westinghouse standard. About 18MW of parasitic loading will be used to support the plasma torch, air separation equipment of gasifier and other mechanical process (including hopper and supply system).

Income

Exhibit 6.4 – Income assumptions

Processed MSW	550 tons per day
Biomass Process	450 tons per day
Basic Processing Fee	30.00 USD per ton
Basic Fixed Electricity Price	225 USD/MWh
Price Increase	From May 15th, 2014 - the start of "*Power Purchase Agreement",* price will increase every 3 years to reflect the increasing cost

Income is based on operating assumptions above, and use fixed electricity price specified in "*Power Purchase Agreement*" and the waste-processing fee specified in "*Implementation Agreement*". The 550 tons of waste per day is calculated based on initial waste study, which shows that, on the basis of 330 days per year of operation, 550 tons of waste with sufficient caloric value can be supplied every day for processing.

Fixed electricity price and waste processing fee are raised every three years on the anniversary of the effective date of "*Power Purchase Agreement"* and "*Implementation Agreement"* to match with inflation.

The income incurred due to the sale of recyclable residuals or metal is not calculated, as the model assumed that raw material only contains waste with high caloric values, and little metal/none gasifiables.

Operational Cost

Operational cost includes raw material supplement (transfer into processed waste), consumables and fixed plant operation and maintenance cost. All cost are increased based on an estimated 2.5% annual inflation rate.

Viable Cost

Exhibit 6.5 – Viable cost assumptions

Great King Grass Usage	450 tons per day
Basic Great King Grass Price	40.00 USD per ton
Metallurgical Coke Usage	26.3 tons per day
Basic Metallurgical Coke Price	300.00 USD per ton
Fluxing Agent Usage	50.3 tons per day
Basic Fluxing Agent Price	15.00 USD per ton
Caustic Soda Usage	9.4 tons per day
Basic Caustic Soda Price	500.00 USD per ton
Water Usage	345 Sqm per day
Basic Water Price	0.53 USD per Sqm

The initial cost of 450 tons per day of great king grass material is estimated to be 40.00 USD per ton. This price assumption is based on the indicative price given by GoB of the great king grass to be planted on the island. Everyday, 26.3 tons of metallurgical coke with initial cost of 300.00 USD per ton (loan project site) will be used in the process flow.

Other consumables (including caustic soda (alkaline liquor), fluxing agent and water) are calculated based on daily usage multiplied by operation days. The current market price causes extra transportation cost increase. Water price is calculated based on local water price. Oxygen is not calculated into cost, as based on capital expenditure and parasitical loading, air separation equipment is assumed as a part of the plant.

Fixed Cost

Exhibit 6.6 – Fix cost assumptions

Labor	2.81 million USD per year
Daily Expenses	30% of the labor cost
Operation and Maintenance	1.0% of capital expenditure
Insurance	1.0% of capital expenditure
Other Fixed Cost	0.82 million USD per year
Exchange Refractory Lining	Once a year
Basic Refractory Lining Cost	1 million USD

Project labor cost is based on 68 operational workers. It further estimated that daily expenses (including plant management) as 30% of labor cost. Operation and maintenance cost as well as insurance are modeled based on 1% of total capital expenditure of 269.7 million dollars. The additional 8.2 million dollars fix cost is used as the reparation fee for connecting parts between gasifier installments and other facilitating power plant installments.

Considering that plasma gasifier are operated in extreme high temperature, refractory lining needs to be exchanged annually. Replacement refractory lining will be prepared before hand on site, to make sure a speedily exchange. Based on indicative price obtained from AlterNRG, the price of refractory lining is calculated with a basic price of 1 million dollars.

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6.4. 30 Year Operational Model

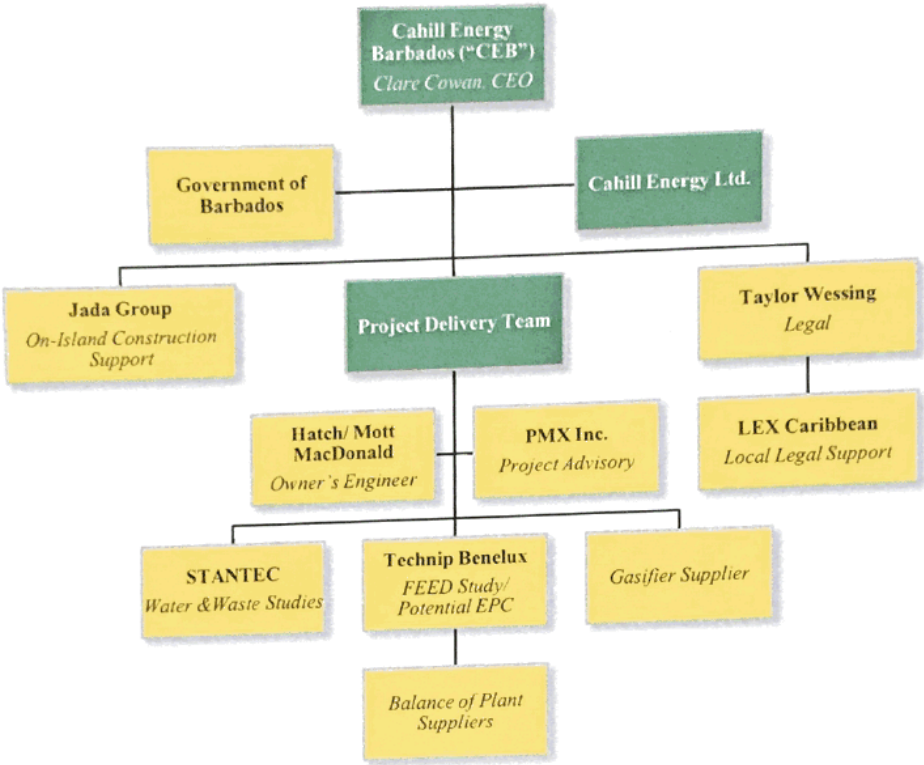
Calendar									
BoP		1-Jan-15	1-Jan-16	1-Jan-17	1-Jan-18	1-Jan-19	1-Jan-20	1-Jan-21	1-Jan-22
EoP		31-Dec-15	31-Dec-16	31-Dec-17	31-Dec-18	31-Dec-19	31-Dec-20	31-Dec-21	31-Dec-22
Period Days		365	366	365	365	365	366	365	365
Project Year		-2	-1	0	1	2	3	4	5
Price Escalation Year		0	0	1	0	0	1	0	0
Inflation Index (Base = 2015)		1.00	1.03	1.05	1.08	1.10	1.13	1.16	1.19
Tariff Index		1.00	1.00	1.05	1.05	1.05	1.13	1.13	1.13
Fraction of Year Before Tariff Increase		-	-	0.20	-	-	0.20	-	-
Project Operations									
Operational Days		-	-	-	275	330	331	330	330
Waste Processed	*'000 t*	-	-	-	151.3	181.5	182.1	181.5	181.5
King Grass Processed	*'000 t*	-	-	-	123.8	148.5	149.0	148.5	148.5
Total Feedstock Processed	*'000 t*	-	-	-	275.0	330.0	331.0	330.0	330.0
Power Generated	***GWh***	-	-	-	**264.0**	**316.8**	**317.8**	**316.8**	**316.8**
Revenues									
Feed-In Rate	*USD/MWh*	$ 225.00	$ 225.00	$ 234.11	$ 236.39	$ 236.39	$ 250.89	$ 254.57	$ 254.57
Power Revenue	*MM USD*	$ -	$ -	$ -	$ 62.4	$ 74.9	$ 79.7	$ 80.6	$ 80.6
Waste Tipping Fee	*USD/t*	$ 30.00	$ 30.00	$ 31.22	$ 31.52	$ 31.52	$ 33.45	$ 33.94	$ 33.94
Waste Revenue	*MM USD*	$ -	$ -	$ -	$ 4.8	$ 5.7	$ 6.1	$ 6.2	$ 6.2
Recovered Metals Revenue	*MM USD*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Slag Revenue	*MM USD*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Revenue		**$ -**	**$ -**	**$ -**	**$ 67.2**	**$ 80.6**	**$ 85.8**	**$ 86.8**	**$ 86.8**
Operating Expense									
Operating Expense - Variable									
King Grass Price	*USD/t*	$ 40.00	$ 41.00	$ 42.03	$ 43.08	$ 44.15	$ 45.26	$ 46.39	$ 47.55
King Grass Cost	*MM USD*	$ -	$ -	$ -	$ (5.33)	$ (6.56)	$ (6.74)	$ (6.89)	$ (7.06)
Coke	*MM USD*	$ -	$ -	$ -	$ (2.33)	$ (2.87)	$ (2.95)	$ (3.02)	$ (3.09)
Flux	*MM USD*	$ -	$ -	$ -	$ (0.22)	$ (0.27)	$ (0.28)	$ (0.29)	$ (0.30)
Caustic Soda	*MM USD*	$ -	$ -	$ -	$ (1.39)	$ (1.72)	$ (1.76)	$ (1.80)	$ (1.85)
Water	*MM USD*	$ -	$ -	$ -	$ (0.05)	$ (0.07)	$ (0.07)	$ (0.07)	$ (0.07)
Total Variable Expenses	*MM USD*	$ -	$ -	$ -	$ (9.34)	$ (11.49)	$ (11.81)	$ (12.07)	$ (12.37)
Operating Expense - Fixed									
Labor	*MM USD*	$ -	$ -	$ -	$ (2.28)	$ (3.10)	$ (3.18)	$ (3.26)	$ (3.34)
Operations & Maintenance	*MM USD*	$ -	$ -	$ -	$ (2.19)	$ (2.98)	$ (3.05)	$ (3.13)	$ (3.21)
Site Overhead	*MM USD*	$ -	$ -	$ -	$ (0.52)	$ (0.93)	$ (0.95)	$ (0.98)	$ (1.00)
Insurance	*MM USD*	$ -	$ -	$ -	$ (2.19)	$ (2.98)	$ (3.05)	$ (3.13)	$ (3.21)
Other Fixed Costs	*MM USD*	$ -	$ -	$ -	$ (0.67)	$ (0.91)	$ (0.93)	$ (0.95)	$ (0.97)
New Refractory Lining	*MM USD*	$ -	$ -	$ -	$ -	$ (1.10)	$ (1.13)	$ (1.16)	$ (1.19)
Total Fixed Expenses		$ -	$ -	$ -	$ (7.84)	$ (11.99)	$ (12.29)	$ (12.60)	$ (12.92)
General & Administrative	*MM USD*	$ -	$ (1.31)	$ (1.31)	$ (0.86)	$ (0.88)	$ (0.90)	$ (0.93)	$ (0.95)
Total Expenses	***MM USD***	**$ -**	**$ (1.31)**	**$ (1.31)**	**$ (18.03)**	**$ (24.36)**	**$ (25.01)**	**$ (25.59)**	**$ (26.23)**
Operating Income	***MM USD***	**$ -**	**$ (1.31)**	**$ (1.31)**	**$ 49.14**	**$ 56.25**	**$ 60.81**	**$ 61.21**	**$ 60.57**
Optg. Margin	*%*	*0.0%*	*0.0%*	*0.0%*	*73.2%*	*69.8%*	*70.9%*	*70.5%*	*69.8%*

Calendar										
BoP		1-Jan-31	1-Jan-32	1-Jan-33	1-Jan-34	1-Jan-35	1-Jan-36	1-Jan-37	1-Jan-38	1-Jan-39
EoP		31-Dec-31	31-Dec-32	31-Dec-33	31-Dec-34	31-Dec-35	31-Dec-36	31-Dec-37	31-Dec-38	31-Dec-39
Period Days		365	366	365	365	365	366	365	365	365
Project Year		14	15	16	17	18	19	20	21	22
Price Escalation Year		0	1	0	0	1	0	0	1	0
Inflation Index (Base = 2015)		1.48	1.52	1.56	1.60	1.64	1.68	1.72	1.76	1.81
Tariff Index		1.41	1.52	1.52	1.52	1.64	1.64	1.64	1.76	1.76
Fraction of Year Before Tariff Increase		-	0.20	-	-	0.20	-	-	0.20	-
Project Operations										
Operational Days		330	331	330	330	330	331	330	330	330
Waste Processed	*'000 t*	181.5	182.1	181.5	181.5	181.5	182.1	181.5	181.5	181.5
King Grass Processed	*'000 t*	148.5	149.0	148.5	148.5	148.5	149.0	148.5	148.5	148.5
Total Feedstock Processed	*'000 t*	330.0	331.0	330.0	330.0	330.0	331.0	330.0	330.0	330.0
Power Generated	*GWh*	**316.8**	**317.8**	**316.8**	**316.8**	**316.8**	**317.8**	**316.8**	**316.8**	**316.8**
Revenues										
Feed-In Rate	*USD/MWh*	$ 317.92	$ 337.42	$ 342.36	$ 342.36	$ 363.42	$ 368.69	$ 368.69	$ 391.37	$ 397.04
Power Revenue	*MM USD*	$ 100.7	$ 107.2	$ 108.5	$ 108.5	$ 115.1	$ 117.2	$ 116.8	$ 124.0	$ 125.8
Waste Tipping Fee	*USD/t*	$ 42.39	$ 44.99	$ 45.65	$ 45.65	$ 48.46	$ 49.16	$ 49.16	$ 52.18	$ 52.94
Waste Revenue	*MM USD*	$ 7.7	$ 8.2	$ 8.3	$ 8.3	$ 8.8	$ 8.9	$ 8.9	$ 9.5	$ 9.6
Recovered Metals Revenue	*MM USD*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Slag Revenue	*MM USD*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Revenue		**$ 108.4**	**$ 115.4**	**$ 116.7**	**$ 116.7**	**$ 123.9**	**$ 126.1**	**$ 125.7**	**$ 133.5**	**$ 135.4**
Operating Expense										
Operating Expense - Variable										
King Grass Price	*USD/t*	$ 59.38	$ 60.86	$ 62.39	$ 63.95	$ 65.54	$ 67.18	$ 68.86	$ 70.58	$ 72.35
King Grass Cost	*MM USD*	$ (8.82)	$ (9.07)	$ (9.26)	$ (9.50)	$ (9.73)	$ (10.01)	$ (10.23)	$ (10.48)	$ (10.74)
Coke	*MM USD*	$ (3.86)	$ (3.97)	$ (4.06)	$ (4.16)	$ (4.26)	$ (4.38)	$ (4.48)	$ (4.59)	$ (4.71)
Flux	*MM USD*	$ (0.37)	$ (0.38)	$ (0.39)	$ (0.40)	$ (0.41)	$ (0.42)	$ (0.43)	$ (0.44)	$ (0.45)
Caustic Soda	*MM USD*	$ (2.31)	$ (2.37)	$ (2.42)	$ (2.48)	$ (2.55)	$ (2.62)	$ (2.68)	$ (2.74)	$ (2.81)
Water	*MM USD*	$ (0.09)	$ (0.09)	$ (0.09)	$ (0.10)	$ (0.10)	$ (0.10)	$ (0.10)	$ (0.11)	$ (0.11)
Total Variable Expenses	*MM USD*	$ (15.45)	$ (15.88)	$ (16.23)	$ (16.63)	$ (17.05)	$ (17.53)	$ (17.91)	$ (18.36)	$ (18.82)
Operating Expense - Fixed										
Labor	*MM USD*	$ (4.17)	$ (4.28)	$ (4.38)	$ (4.49)	$ (4.60)	$ (4.72)	$ (4.84)	$ (4.96)	$ (5.08)
Operations & Maintenance	*MM USD*	$ (4.00)	$ (4.10)	$ (4.21)	$ (4.31)	$ (4.42)	$ (4.53)	$ (4.64)	$ (4.76)	$ (4.88)
Site Overhead	*MM USD*	$ (1.25)	$ (1.28)	$ (1.31)	$ (1.35)	$ (1.38)	$ (1.42)	$ (1.45)	$ (1.49)	$ (1.52)
Insurance	*MM USD*	$ (4.00)	$ (4.10)	$ (4.21)	$ (4.31)	$ (4.42)	$ (4.53)	$ (4.64)	$ (4.76)	$ (4.88)
Other Fixed Costs	*MM USD*	$ (1.22)	$ (1.25)	$ (1.28)	$ (1.31)	$ (1.34)	$ (1.38)	$ (1.41)	$ (1.45)	$ (1.48)
New Refractory Lining	*MM USD*	$ (1.48)	$ (1.52)	$ (1.56)	$ (1.60)	$ (1.64)	$ (1.68)	$ (1.72)	$ (1.76)	$ (1.81)
Total Fixed Expenses		$ (16.13)	$ (16.53)	$ (16.95)	$ (17.37)	$ (17.81)	$ (18.25)	$ (18.71)	$ (19.17)	$ (19.65)
General & Administrative	*MM USD*	$ (1.19)	$ (1.22)	$ (1.25)	$ (1.28)	$ (1.31)	$ (1.34)	$ (1.38)	$ (1.41)	$ (1.44)
Total Expenses	*MM USD*	$ (32.76)	$ (33.65)	$ (34.42)	**$ (35.28)**	**$ (36.16)**	**$ (37.12)**	**$ (38.00)**	**$ (38.95)**	**$ (39.92)**
Operating Income	*MM USD*	$ 75.65	$ 81.78	$ 82.32	**$ 81.46**	**$ 87.76**	**$ 88.98**	**$ 87.73**	**$ 94.51**	**$ 95.47**
Optg. Margin	*%*	*69.8%*	*70.9%*	*70.5%*	*69.8%*	*70.8%*	*70.6%*	*69.8%*	*70.8%*	*70.5%*

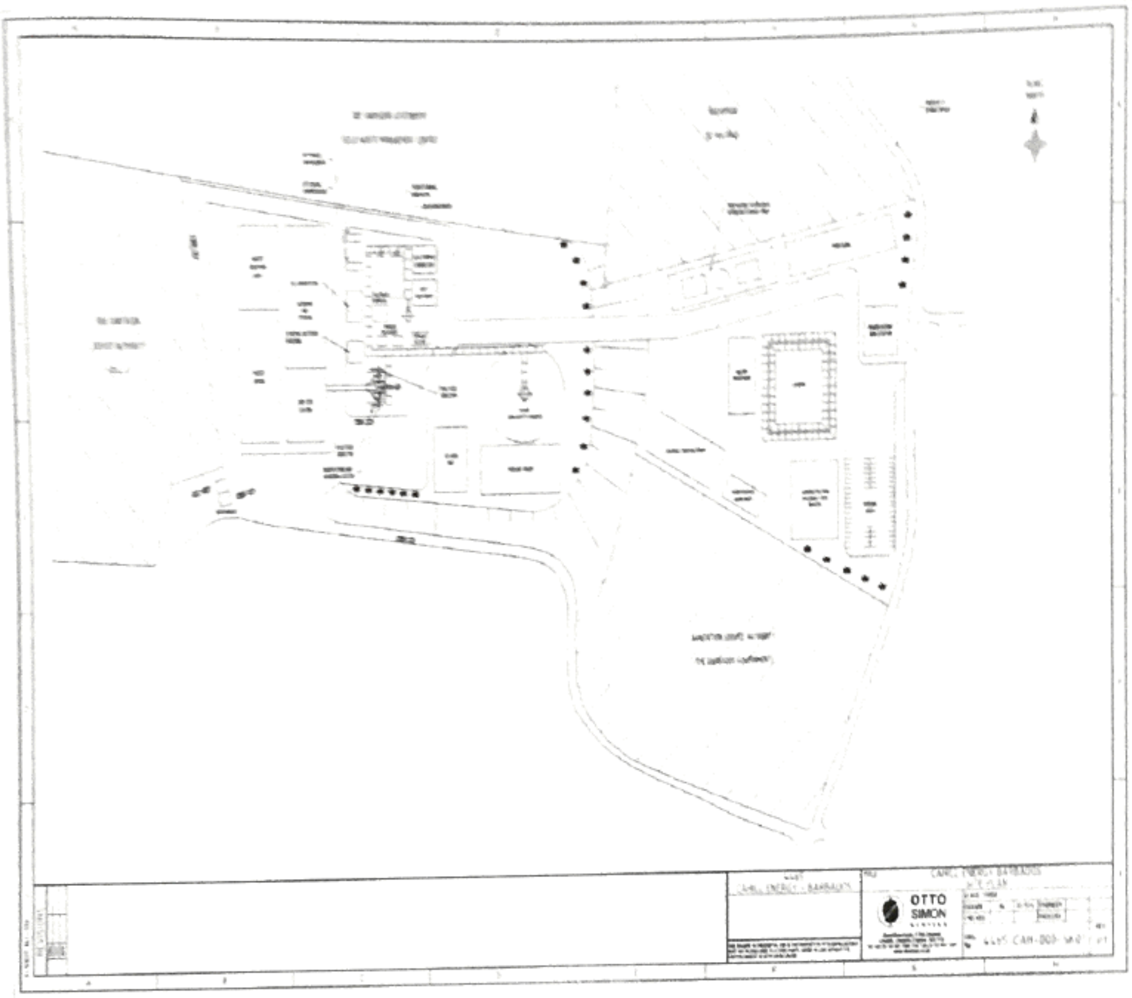
	Unit									
Calendar										
BoP		1-Jan-40	1-Jan-41	1-Jan-42	1-Jan-43	1-Jan-44	1-Jan-45	1-Jan-46	1-Jan-47	1-Jan-48
EoP		31-Dec-40	31-Dec-41	31-Dec-42	31-Dec-43	31-Dec-44	31-Dec-45	31-Dec-46	31-Dec-47	31-Dec-48
Period Days		366	365	365	365	366	365	365	365	366
Project Year		23	24	25	26	27	28	29	30	31
Price Escalation Year		0	1	0	0	1	0	0	1	0
Inflation Index (Base = 2015)		1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.26
Tariff Index		1.76	1.90	1.90	1.90	2.05	2.05	2.05	2.20	2.20
Fraction of Year Before Tariff Increase		-	0.20	-	-	0.20	-	-	0.20	-
Project Operations										
Operational Days		331	330	330	330	331	330	330	330	91
Waste Processed	'000 t	182.1	181.5	181.5	181.5	182.1	181.5	181.5	181.5	50.1
King Grass Processed	'000 t	149.0	148.5	148.5	148.5	149.0	148.5	148.5	148.5	41.0
Total Feedstock Processed	'000 t	331.0	330.0	330.0	330.0	331.0	330.0	330.0	330.0	91.0
Power Generated	GWh	**317.8**	**316.8**	**316.8**	**316.8**	**317.8**	**316.8**	**316.8**	**316.8**	**87.4**
Revenues										
Feed-In Rate	USD/MWh	397.04	421.46	427.57	427.57	453.79	460.44	460.44	488.76	495.85
Power Revenue	MM USD	126.2	133.5	135.5	135.5	144.2	145.9	145.9	154.8	43.3
Waste Tipping Fee	USD/t	52.94	56.19	57.01	57.01	60.51	61.39	61.39	65.17	66.11
Waste Revenue	MM USD	9.6	10.2	10.3	10.3	11.0	11.1	11.1	11.8	3.3
Recovered Metals Revenue	MM USD	-	-	-	-	-	-	-	-	-
Slag Revenue	MM USD	-	-	-	-	-	-	-	-	-
Total Revenue		**135.8**	**143.7**	**145.8**	**145.8**	**155.2**	**157.0**	**157.0**	**166.7**	**46.6**
Operating Expense										
Operating Expense - Variable										
King Grass Price	USD/t	74.16	76.01	77.91	79.86	81.86	83.90	86.00	88.15	90.35
King Grass Cost	MM USD	(11.05)	(11.29)	(11.57)	(11.86)	(12.19)	(12.46)	(12.77)	(13.09)	(3.70)
Coke	MM USD	(4.84)	(4.94)	(5.07)	(5.19)	(5.34)	(5.46)	(5.59)	(5.73)	(1.62)
Flux	MM USD	(0.46)	(0.47)	(0.48)	(0.50)	(0.51)	(0.52)	(0.53)	(0.55)	(0.15)
Caustic Soda	MM USD	(2.89)	(2.95)	(3.03)	(3.10)	(3.19)	(3.26)	(3.34)	(3.43)	(0.97)
Water	MM USD	(0.11)	(0.11)	(0.12)	(0.12)	(0.12)	(0.13)	(0.13)	(0.13)	(0.04)
Total Variable Expenses	MM USD	(19.35)	(19.77)	(20.27)	(20.77)	(21.36)	(21.83)	(22.37)	(22.93)	(6.48)
Operating Expense - Fixed										
Labor	MM USD	(5.21)	(5.34)	(5.47)	(5.61)	(5.75)	(5.89)	(6.04)	(6.19)	(1.58)
Operations & Maintenance	MM USD	(5.00)	(5.12)	(5.25)	(5.38)	(5.52)	(5.66)	(5.80)	(5.94)	(1.51)
Site Overhead	MM USD	(1.56)	(1.60)	(1.64)	(1.68)	(1.73)	(1.77)	(1.81)	(1.86)	(0.12)
Insurance	MM USD	(5.00)	(5.12)	(5.25)	(5.38)	(5.52)	(5.66)	(5.80)	(5.94)	(1.51)
Other Fixed Costs	MM USD	(1.52)	(1.56)	(1.60)	(1.64)	(1.68)	(1.72)	(1.76)	(1.81)	(0.46)
New Refractory Lining	MM USD	(1.85)	(1.90)	(1.95)	(2.00)	(2.05)	(2.10)	(2.15)	(2.20)	-
Total Fixed Expenses		(20.15)	(20.65)	(21.17)	(21.69)	(22.24)	(22.79)	(23.36)	(23.95)	(5.19)
General & Administrative	MM USD	(1.48)	(1.52)	(1.56)	(1.59)	(1.63)	(1.68)	(1.72)	(1.76)	-
Total Expenses	**MM USD**	**(40.98)**	**(41.94)**	**(42.59)**	**(44.06)**	**(45.23)**	**(46.29)**	**(47.45)**	**(48.64)**	**(11.67)**
Operating Income	**MM USD**	**94.82**	**101.78**	**102.81**	**101.74**	**109.98**	**110.72**	**109.56**	**118.03**	**34.96**
Optg Margin	*%*	*69.8%*	*70.8%*	*70.5%*	*69.8%*	*70.9%*	*70.5%*	*69.8%*	*70.8%*	*75.0%*

Appendix

Appendix A – CEB Organizational Chart



Appendix B – Site Floor Plan



Appendix C – History of Plasma Gasification