About Solena Fuels, LLC.

Solena Fuels, LLC. ("Solena") is building a sustainable jet and marine fuels platform to directly provide industrial end users - such as airlines and shipping companies – price competitive alternatives to fossil fuel sourced energy. We use our proprietary technology to convert any type of biomass, including municipal solid waste, into a renewable synthetic gas ("BioSynGas") which is subsequently upgraded into a synthetic, certified drop-in liquid fuel that replaces fossil fuel-based energy. Solena's biomass-to-liquids ("BTL") facilities are all standardized to allow for scaled economics, low costs and feedstock flexibility.

Introduction

Having reviewed the "Integrated Waste Management Facilities Environmental Impact Assessment Report" documentation, which is currently undergoing the Public Consultation Phase, and associated documents as listed below, Solena is pleased to submit the present document with its comments for the consideration of the Director of Environmental Protection of the EIA Ordinance and other officials.

List of Documentation Reviewed:

- Engineering Investigation and Environmental Studies for Integrated Waste Management Facilities Phase 1 – Feasibility Study. Environmental Impact Assessment Report
- Legislative Council Brief - Development of the Integrated Waste Management Facilities
- ACE-EIA Paper 6/2011 and associated Annexes
- Confirmed Minutes of the 166th Meeting of the Advisory Council on the Environment held on 14 December 2009 at 2:30 pm
- Paper WMSC 01/10. Integrated Waste Management Facilities Sorting and Recycling Plant

The listed documents show that the major problems challenging the City of Hong Kong are the limited amount of land that can be used to safely landfill MSW and the projected large increases in MSW production. At present, these wastes are currently being generated at a rate of 19,000 tonnes per day.

Solena believes that the mass burn incineration technology preliminarily chosen to solve the waste and landfill space problems (i) is not efficient in recovering energy and therefore increases the costs of waste disposal, (ii) is an open loop system which causes the production of toxic air emissions which must be scrubbed at high costs and which cannot be completely eliminated, and (iii) it produces large amount toxic bottom and fly ash, which requires special costly landfilling after they have been rendered inert by a costly post-incineration inertization process. Therefore, Solena is of the opinion that the proposed IWMF is employing an obsolete combustion technology, which is very damaging to the environment, may worsen climate change and does not entirely solve the problems posed by the lack of landfilling space and increased production of MSW.

Solena Fuels Proposal

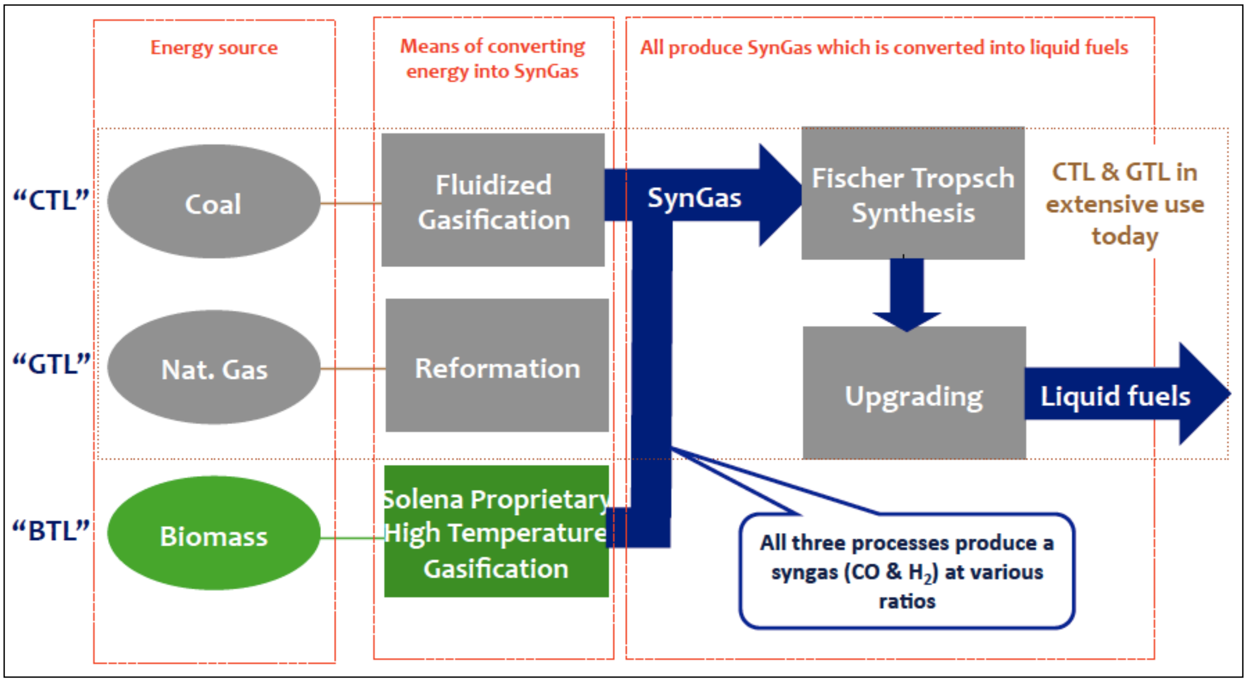
To solve the problems of increasing volumes of waste and lack of enough landfill space in Hong Kong, Solena proposes an innovative and well-vetted solution such as its waste Biomass-To-Liquids ("BTL") facility, which is based on the Fischer-Tropsch synthetic fuels industrial platform enhanced with Solena's patented high temperature gasification technology and process.

Solena's Biomass-To-Liquids solution can process 3,000 tonnes per day of raw Municipal Solid Waste ("MSW") and produces over 30 million gallons of biofuels per year and 22 MW net of renewable baseload electricity (plus 55 MW of its own parasitic load that is auto-consumed) while producing no toxic SVOC emissions or solid waste effluents that need to be landfilled. As such, the Solena BTL facility is highly efficient in energy recovery by converting both the chemical hydrocarbon energy as well as the sensitive heat energy in the MSW into a high demand sustainable transport liquid fuels and clean electricity, respectively.

By producing the carbon neutral sustainable aviation fuels ("Bio Synthetic Paraffinic Kerosene") and partnering with Hong Kong largest local airline as long term fuel purchaser, Solena will be able to privately finance the facilities while offering substantial reductions in waste disposal costs to the City of Hong Kong. Specifically, since Solena's BTL plants are privately funded and obtain revenues from the sale of its advanced biofuels and renewable power, the cost of operation and capital costs are offset, which can translate into significant savings to the city-state of Hong Kong both in capital investment and in waste disposal fees, as the BTL facility can offer savings of up to 50% in tipping fees.

Solena's solution is based on the historically and successfully proven Fischer-Tropsch synthetic fuels platform, currently in use today to produce advanced biofuels from coal or natural gas, enhanced with Solena's proprietary high temperature plasma gasification technology to enable the conversion of waste biomass into sustainable biofuels. Figure [1] below illustrates the different routes currently being used to produce synthetic fuels from different sources.

Figure [1]
Certified Synthetic Fuel Production Platform



Solena's facility would require approximately 8 Hectares of land and will not produce any toxic ash or solid waste effluents. The BTL plant's power production system will produce an exhaust composed mainly of nitrogen, oxygen and moisture. In addition, the exhaust is virtually free of SO_X and particulate matter, has low NO_X levels, no mercury or volatile metals. The facility will produce small quantities of vitrified slag, which can be used in making concrete, road fill, bricks and other manufacturing uses. The US EPA considers it an inert and safe material. In addition, the plant can be designed to fit into the existing space on one of the proposed sites or alternatively at one of the existing landfills without high buildings and it will be free of odor.

Equally important, Solena's BTL facility is a zero-landfill solution, i.e., the facility does not produce any solid waste. Thus there will not be a requirement to take any material to a landfill. All waste destined to the landfill, which would normally decompose into a more potent GHG such as methane, would be avoided when disposed in the BTL facility. Additionally, since the majority of the CO and H_2 (synthesis gas) are converted into FT fuels (BioJetFuel, Renewable Diesel or BioNaphtha), the plant drastically reduces the emissions of green house gases by at least 50% less than the incinerator currently being proposed. Moreover, the CO_2 in the gas turbine exhaust is considered to be carbon neutral. In summary, Solena offers a system and process that (i) is pollution free both from toxic air emissions and GHGs, (ii) does not require any landfills, and (iii) will produce large amounts of high value advanced biofuels and renewable baseload power.

Current Developments

Solena's utilizes a team of highly reputable world-leading companies such as General Electric, Honeywell, UOP, and Fluor to bring its bioenergy platform to market worldwide. The first of such BTL plants is scheduled to begin construction in London, England by Q1 of 2013. The London project, in partnership with British Airways as project partner and fuel off-taker, will be built in East London and will start production of BioJetFuel in 2015. Two of London's largest waste management companies will be providing the MSW/RDF feedstocks.

In addition, Solena was selected by the City of Rome Waste company AMA to build a similar sized BTL facility for BioJetFuel production for Alitalia, the plant will be built within a refinery located in front of the Malagrotta Rome landfill; a Solena BTL facility in Sydney for Qantas Airlines with one of Australia's largest waste providers; one BTL facility at the Arlanda Airport in Stockholm, Sweden for SAS Airline; and in San Francisco, CA, US with a consortium of North American airlines led by American Airlines, United Continental Airlines, FedEx, JetBlue, Lufthansa, Air Canada, with waste supply by the Recology group. All of these projects will be of the same standard size and capacity as that of London and will be built and operating by 2015, 2016, and 2017.

In Hong Kong, Solena is in discussions with the largest local airline company to develop its BTL facility with the same throughput and fuel production capacity as described above. In order to meet the 2018 timeframe indicated in the IWMF EIA Report, Solena would need to begin construction no later than 2016. This provides ample time for Solena to develop the necessary partnerships with local entities, finalize the engineering works and obtain the necessary environmental and construction permits. This will allow Solena to offer a solution to Hong Kong's challenging problems in the same time frame, if not earlier, than the proposed IWMF. It should be noted as well that by 2016 Solena will have 4 to 5 Industrial BTL plants in operation (London, Rome, Sydney) or under construction (Stockholm and San Francisco), thus providing industrial construction and commercial operational track record and mitigating risks to the project partners in Hong Kong.

Benefits of Solena's Waste-Biomass-to-Advanced-Biofuels Plant

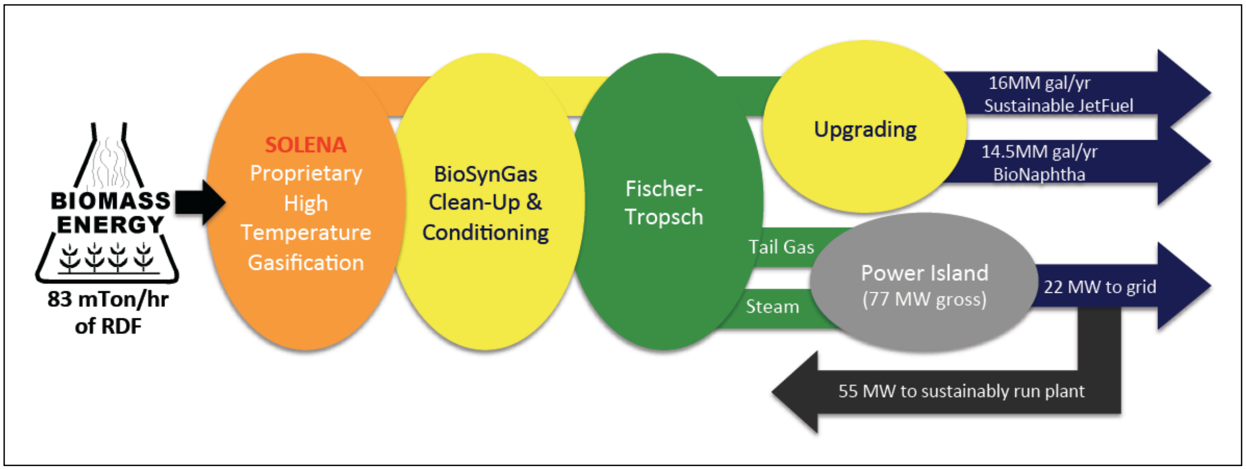
Solena's proposed waste-biomass-to-advanced-biofuels facility represents the following benefits to the local community, the environment, as well as to the city-state of Hong Kong:

- Zero-landfill solution for waste disposal challenges – no need for post-processing and disposal of toxic fly and bottom ash.
- Use of innovative and well-vetted technology platform currently in use today.
- Highly efficient and non-polluting conversion of waste biomass into highly demanded products.
- Privately funded facility – revenues from sale of advanced sustainable fuels offset capital and operation costs.
- Substantial reduction of up to 50% in waste disposal costs to the city-state of Hong Kong.
- Same waste processing capacity as the proposed IWMF.
- Faster timeframe for commencing of operations and smaller footprint than the proposed IWMF.

BTL Plant description

Solena's BTL facility consists of five integrated processing "islands": (i) MSW Reception and Processing Island; (ii) Solena's proprietary high-temperature gasification; (iii) BioSynGas conditioning; (iv) Fischer-Tropsch ("FT") processing & upgrading; and (v) power production. The facilities are designed to produce (i) 16 million gallons of sustainable aviation fuel; (ii) 14.5 million gallons of sustainable naphtha; and (iii) 77 MW of sustainable electricity (of which 55 is consumed by the facility and 22 is exported/sold to the grid). Each of the processing islands are illustrated in Figure [2] below and described hereunder.

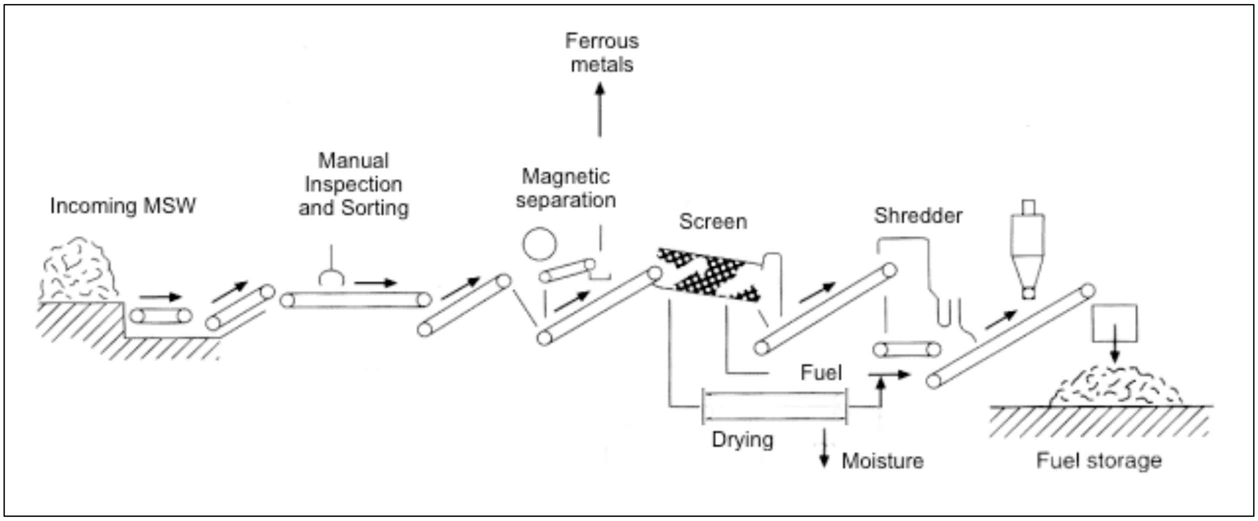
Figure [2]
Integrated Processing Blocks of Solena BTL Solution



Mixed MSW Reception and Processing Island

Solena's BTL plant receiving mixed MSW will incorporate a reception and MSW processing island. The purpose of this pre-treatment area is two fold: (i) to optimize the overall efficiency of the BTL facility by removing most of the inert materials (mainly metals and glass) and (ii) to control, sample and analyze the quality of the feedstock sent to the gasification process. To achieve these goals, the incoming mixed MSW will be first sorted using both manual separation, which also serves as a first recycling process for glass containers or bottles and other bulky items, and then using mechanical industrial methods such as magnetic separators and trommel screens, which are commonly used in MSW processing plants due to their high degree of effectiveness and efficiency. Following the separation stages, the waste streams will be sized (5 cm. to 10 cm.) and dried (to approximately 20% moisture content), thereby producing a refuse-derived fuel, which is ideally suited for the gasification process (calorific content of 16 MJ/kg). Figure [3] below illustrates the RDF production process. As a result of the inert materials and moisture being removed from the mixed MSW, it is estimated that the incoming 3,000 tonnes per day of mixed MSW will be reduced to approximately 2,000 tonnes per day of RDF, which are then fed to the four gasification reactors, each rated at 500 tonnes per day.

Figure [3]
Schematic of the MSW to RDF production process

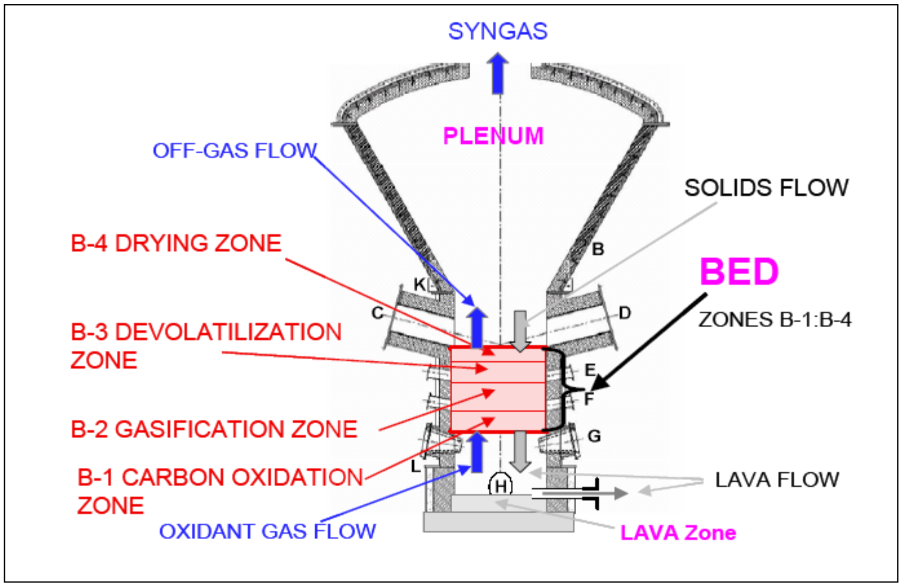


Solena Proprietary High Temperature Gasification Island

The second processing block in Solena's BTL solution is its proprietary high temperature gasification system. This processing block receives the waste biomass via screw feeders, which deliver the feedstock to one of four Solena Plasma Gasification Vessels ("SPGV"). Each SPGV is rated at 20 tonnes of RDF or a waste biomass feedstock per hour and hosts three independent plasma heating systems each. The plasma jet generates an extremely high temperature that heats a catalytic bed, which forms the base of Solena's counter-current, fixed bed gasification process. The resulting even distribution of high temperature heat across the cross section of the SPGV dissociates organic hydrocarbon materials into basic elemental gases while at the same time all the inorganic inert materials are melted into an inert and non-leachable "slag". This process of thermal de-polymerization of organic materials and melting of inorganic materials by means of high temperature plasma energy is Solena's patented gasification system.

The SPGV is illustrated in the schematic in Figure [4] below with details of the gasification zones.

Figure [4]
Schematic Section of Solena's Plasma Gasification Vessel



The SPGV efficiency and functionality is based on its capacity to deliver reliable and instant high temperature heat through the plasma arc torch heating system. Plasma is a very high temperature ionized gas. It is considered to be the fourth state of matter and it exists in nature, for example, in stars and lightning. In the plasma gasification process, the plasma field is produced in a controlled environment via a plasma torch. Historically, man-made plasma has been produced in a controlled environment that is capable of generating temperatures in excess of 5,000º C through plasma arc torches, in both a transferred and non-transferred arc mode.

Solena's technical team has been continuously extending its know-how and intellectual property through extensive research and development and two pilot facilities. The patents are based on the knowledge developed during tests campaigns at these facilities.

BioSynGas Conditioning Island

Upon exiting the gasification island, the BioSynGas produced in the Gasification Island is sent to the BioSynGas conditioning island through a BioSynGas duct that is the interface between the two Islands. The BioSynGas is free of tar, soot, or medium to long chain hydrocarbons. BioSynGas composition is continuously monitored at the BioSynGas duct level. Entering the BioSynGas Conditioning Island, the BioSynGas is rapidly cooled and filtered to ensure that any remaining volatile metals, and/or particulate matter are removed. Moreover, any acidic gases such as hydrogen chloride (HCl) and hydrogen sulfide (H_2S) are removed to meet FT process' technical specifications and ensure that the BioSynGas does not damage the Fischer-Tropsch catalyst. Once the BioSynGas is cooled, it is passed through a scrubbing system for acid gas removal. The BioSynGas treatment process train removes acid gases and ensures that the BioSynGas meets or exceeds the fuel gas specifications required by the FT provider. This process typically involves a hydrogen chloride absorption system, a compressor and a sulfur removal system to remove hydrogen sulfide and traces of carbonyl sulfides. Once the

BioSynGas has been cleaned, it is passed through a series of filters and moisture separators to condition it before it is delivered to a hydrogen separation and purification unit to provide the FT process and the LFTL/wax upgrading unit with pure hydrogen. At that point, the conditioned BioSynGas is sent into the FT processing island.

FT Processing Island

Upon exiting the BioSynGas conditioning island, the BioSynGas is fed into the FT processing island. The FT processing island consists of processing the cleaned BioSynGas through a slurry bed reactor whereby the BioSynGas is converted – via a chemical synthesis reaction that is exothermic – into various hydrocarbons such as soft wax, hard wax, and a light Fischer-Tropsch liquid (once cooled). All FT systems must utilize a catalyst that is appropriate for the type of synthetic gas being processed. Solena's BioSynGas is ideally suited for iron-based catalysts since these are more efficient when used with a synthetic gas with a H_2 to CO ratio of 1. In addition, these iron-based catalysts are less expensive than a majority of FT systems in use today, which utilize cobalt-based catalyst. The waxes and liquids produced within the FT processing island are subsequently upgraded into liquid fuels (jet or marine and naphtha) via the FT wax upgrading process.

Used extensively in the refining industry today, the FT wax upgrading process combines hydrocracking and hydrotreating to convert the FT waxes into various liquid fuels. After filtering, the FT products are heated in a wax pre-heater, mixed with the recycled stream from the FT reactor unit and flashed in the heavy wax flash drum to remove residual light ends, such as carbon monoxide, carbon dioxide and nitrogen. The processed streams are subsequently separated into the jet or marine fuel and naphtha. The residual flashed gas free of impurities is routed to the power production block.

Power Production Block

The FT processing island produces a tail gas that is a combustible fuel suitable for driving gas turbines in combined cycle. As such, the FT tail gas is used within the BTL facility for power generation. After the FT tail gas has been combusted with excess air in the gas turbine generator, the temperature of the combustion products (i.e. the exhaust gas) is high because of the combustion process. The large flow of hot exhaust gases is passed through a heat recovery steam generator (HRSG) where the heat energy in the exhaust gases is used to generate steam. The steam generated by the HRSG is then used to drive a steam turbine in combined cycle for generating additional electrical energy. In addition to the steam produced in the combined cycle, there are other instances in the plant where steam is produced (hot BioSynGas heat recovery and FT process exothermic reaction). This steam is also sent to the combined cycle's steam turbine to maximize power production and energy efficiency of the plant.

Feedstock Versatility

Independently with Dr. S. Camacho, a former NASA scientist, in the renowned PTC Research Triangle of North Carolina, USA and in conjunction with Dr. S. Dighe at Westinghouse Plasma center in Pittsburgh, Solena has tested, treated and analyzed hundreds of biomass and waste streams at industrial capacity to establish its database and to develop the SPGV process for BioSynGas manufacturing. These tests and/or treatment periods were performed on behalf of clients and in conjunction with Solena's research and development efforts. The feedstock streams successfully treated and gasified by the plasma systems include all of those listed below in Table [1].

Table [1]
Feedstocks Successfully Processed by Solena Group

Biomass	Municipal Type Waste	Industrial Waste
Agricultural / Grain Biomass	Municipal Solid Waste	Asbestos Fibers
Wood and Forestry Biomass	Automobile Tires	Contaminted Materials
Treated Wood	Car Fluff	Contaminated Fines, Soils & Landfill
Mixed Source Biomass & Waste	Sludge & Harbor Sediment	Liquid PCBs
Pathological Biomass	Hospital/Medical Biomass/Waste	Paints & Solvents

It should be noted that due to the robustness and fuel flexibility of Solena's process, the proposed BTL facility will, as described above, be able to accept raw, mixed MSW into the plant. However, although the high temperature gasification process is perfectly capable of gasifying raw MSW, Solena has determined that the efficiency gained by processing refuse-derived fuel instead of unsorted municipal solid waste warrants incorporating a mechanical sorting process prior to the gasification process. Therefore, in order to increase the efficiency of the process and thus the profitability of the plant, Solena would incorporate a sorting facility into its standard BTL Plant design that will to sort out the recyclable and inert materials in the incoming MSW.

Well-Vetted High Temperature Gasification Solution

More than 10 years of developing, testing and refining the SPGV technology and solutions has allowed Solena Fuels' team to collect, compile and analyze a significant amount of material data. The Company has used this data to design and develop its patents and proprietary steady state gasification computer model in order to simulate system performance and design control systems to regulate and monitor each BioEnergy Plant.

Solena's proprietary data includes information such as:

- the SER (Specific Energy Requirement) for each biomass and waste stream, i.e. the amount of energy required within the plasma system to completely gasify and vitrify a ton of the specific biomass stream;
- the cost of operation per ton of a specific biomass or waste stream;
- the behavior of each biomass and waste stream within a plasma reactor;
- the optimum capacity of the plant for each biomass or waste stream;
- the heat and material balance for each biomass stream;
- the characteristics and composition of the BioSynGas generated by the biomass stream under plasma SPGV conditions;

- the energy content of the fuel gas and the energy recovered from the gas either in the form of electricity or liquid fuel, etc.;
- the characteristics and safety of the vitrified slag (e.g., TCLP limits, etc.);
- the environmental impact of the Solena BTL Solution;
- the air pollution control/gas scrubbing system required for each biomass stream; and
- the optimum biomass and waste condition/composition to generate the maximum energy within the BioSynGas recovery.

Based on experience and process testing, the Solena technical team was able to refine the SPGV process in order to maximize its technical efficiency and cost-effectiveness. Prior to Solena's developments, plasma technology pyrolysis required over 1,000 kWh of electricity to handle one ton of feedstock. Through extensive research and modification of the design of the reactor and refining the process control system, Solena has made the SPGV process nearly ten times more efficient than traditional plasma pyrolysis technology (with SPGV requiring only 150-200 kWh per ton of biomass). A single modular reactor can handle from 145 tonnes per day for a small system to 500 tonnes per day for a large system and reactors can be strung together in various configurations such as the four reactors we use for the BTL solution.

The extensive experience of the Solena team and the aforementioned critical data will help minimize technology risk and help establish Solena as an industry leader in sustainable, synthetic fuel production.

Specific Comments to the Executive Summary of the above mentioned IWMF EIA Report

Page 1: Introduction:

Under section 1.1, it is indicated that the Incineration Facility is intended to be constructed and operated under a design-build-operate model. The Solena facility briefly described above would also be under a contract for design-build-operate of the Biomass Fuels Facility (BFF).

The Solena plant will use only a gasification process that initially will process the 3,000 tonnes per day of the MSW with recyclables removed (1.1.1.2). A recycling facility would be built on the front-end of the plant to remove inorganic material that the City wants recycled. If there is no market for recyclables, the Solena plant would size and process all the MSW. Most importantly, Solena's biomass-to-liquid fuels and power facility will not produce any dioxins, furans, or their precursors and not produce any flue gas. The high operating temperature of the gasification process ensures all organic molecules are depolymerized and the resulting off-gases reform into the BioSynGas. As such, and because the system is a closed loop in which the syngas is then converted to advanced biofuels, (as opposed to an incineration open loop, which vents the flue gas to the atmosphere), Solena's BTL plant enhances public health and safety and protection of air and water around the facility.

In 1.1.1.3, it is noted that Hong Kong now depends on three landfills, which will reach capacity in 2014, 2016, and 2018. Solena can build the described BTL facility at each landfill processing more 3,000 tonnes per day of MSW and producing 30 million gallons of advanced sustainable biofuels and 22 MW of renewable baseload electricity. Using this approach the landfills would not fill as quickly and therefore have an extended life. The plants can process new incoming waste or previously landfilled waste (mining the landfill to extract waste) thereby reducing the overall volume of the landfills and eliminate the need for additional extension of the landfills. This approach would not succeed with an incinerator since the incinerator would produce a significant amount of ash, which still requires post-processing and landfilling. In addition, the incinerator can only produce small amounts of power since it only takes advantage of the sensible heat energy of the waste whereas a Solena gasification plant would produce power much more efficiently because the BTL process uses both the sensible heat energy as well as the chemical energy in the waste by converting it into a syngas fuel.

In 1.1.1.5, it is stated that Hong Kong must move quickly to solve its waste management problems. With the Solena system construction can be completed over 24 months from the time it is permitted and financial closing achieved, hiring over 1000 construction workers during that period and over 200 full time employees. In other words, Solena can expedite and move quickly on plant construction once the site is permitted. Moreover, Solena brings with it a major local airline as a project partner and fuel off-taker, who would be committed to purchasing the sustainable biofuels produced at the BTL plant.

In 1.1.1.6, there is a listing of benefits, which the City appears to be satisfied with.

In relation to the bulk reduction of waste volume, it should be noted that although incineration reduces the volume of waste processed, it does so at the expense of producing toxic fly and bottom ash. Incinerators typically produce ash in large quantities – approximately 20% of the incoming dry matter comes out in the form of ash, which requires costly post-processing and landfilling. Therefore, the incineration facility does not solve the problem of decreasing landfill space. In contrast, Solena's BTL process converts all the incoming waste into advanced biofuels and slag. As noted above, slag is an inert material with commercial applications in the construction industry and does not require landfilling.

With regards to energy recovery, as noted above, the IWMF incineration process is an open loop process which relies solely on the sensible heat energy of the incoming materials by burning them and therefore wastes most of the energy contained in the waste by releasing its carbon content into the atmosphere in the form of CO_2. In contrast, Solena's closed loop high temperature gasification system, converts the heat energy content of the waste into BioSynGas, thus keeping all the carbon within the process in the form of CO for the subsequent production of advanced biofuels through the Fischer-Tropsch system. As such, the Fischer-Tropsch facility enhanced with high temperature gasification technology is vastly superior in energy recovery efficiency.

With regards to the greenhouse gas reduction, it should be noted that, like the IWMF, the Solena BTL facility will also use the available MSW thus obtaining the same benefits in reduction of green house gases on the input side. However, since the BTL plant is a closed loop system that keeps all the carbon within the system (instead of emitting large amounts of CO_2 to the atmosphere like the IWMF would do), it reduces GHG emissions further by up to 50%.

produces liquid biofuels instead of

2.2.1.3: The Solena gasification system will process 3,000 tonnes per day of MSW using 4 gasification reactors rated at 500 tonnes per day of refuse-derived fuel ("RDF", refuse-derived fuel will be produced on-site from the 3,000 tonnes per day of MSW at a sorting facility which will convert the MSW into 2,000 tonnes per day of RDF).

The BTL plant can meet the emission limit of NO_X for the State of California of 57 mg/m^3, which is stricter than the 100mg/m^3 that is proposed for the incineration plant. Indeed, the U.S. Federal standard of 100mg/m^3 is much better than the referenced 200mg/m^3 EU standard, but the California standard is stricter to all other NO_X standards in the world. It is also important to note that the Solena plant will produce advanced biofuels in addition to renewable power, which an incinerator cannot do.

2.2.1.6 The table shows the air emission limits for the IWMF that the incinerator is required to meet. It is important to note that a Solena gasification plant not emit any of the pollutants listed, except lower volumes of NO_X.

2.2.2.1 As stated at the TTAL site, the incineration unit will require 11 hectares, of which 1.2 hectares are a pond habitat for Litter Grebe. A comparable Solena BTL plant requires 8 hectares and therefore it would not require to 'decommission' the 1.2 Ha of pond habitat. Instead of building a plant at the Island and disrupting the habitat and attempting to build an artificial island that again will have adverse impacts on the habitat and the surrounding water, Solena suggests that instead the Hong Kong government should consider building plants at the three landfills as noted above. This would be a less expensive approach since all the work on the Island TTAL site and creating an artificial island SKC will be very expensive and will have adverse impacts on the environment whereas land around the current landfills is zoned as industrial, has an existing infrastructure of roads, power lines, etc. and the addition of three plants would not be intrusive and have a considerably smaller environmental impact.

In section 2.2.3.3 the IWMF clearly state that "the bottom ash, fly ash and air pollution control residues produced from the incineration process will be collected for treatment and disposed of at the WENT landfill or its extension *if they have met the disposal requirements.*" If the landfill has not met the requirements to dispose of the toxic materials produced by the IWMF in large quantities (approximately 20% of the dry matter will become bottom and fly ash, i.e., 390 tonnes per day), the IWMF will have no place to dispose of these toxic solid waste effluent, thus forcing the facility to stop production. Even if the WENT landfill met the requirements, the IWMF would still require costly post treatment of the bottom and fly ash and disposal at landfill. Therefore the IMWF has higher waste processing costs (need to pay for toxic bottom and fly ahs inertization processes and disposal costs) and clearly does not solve the challenging problems that the City of Hong Kong is facing. In contrast, the BTL plant proposed by Solena does not produce any solid waste effluent and the cost of MSW disposal is substantially reduced.

In section 2.3.1.1 it is noted that the IWMF would be ready for commissioning by 2018 - 2019. As noted above the Solena BTL facility could meet or exceed this timeframe and start operations earlier. In order to do so, Solena would need to begin construction no later than 2016, which allows ample time for the project development activities to take place. Therefore, a Solena BTL facility could start accepting Hong Kong's MSW earlier than the proposed IWMF and offer lower disposal costs.

3.1.3 Evaluation of shortlisted Sites: The site selection criteria are exacting, but based on preconceived idea that a plant would be industrial and ugly. I would like to refer you to Solena Fuels' website (www.solenafuels.com), where a video shows a rendering of a proposed plant near Prague, CZ Republic. This plant is modern, fits into the local area and is not an eye-sore like most industrial facilities. Because the plant is exceptionally clean in all respects, such a facility in the Hong Kong area should be very acceptable and could open other sites that were passed by because of concerns about plant design and not being able to fit into the architecture of the surrounding community, which is probably true for an incinerator, but not for Solena's proposed BTL facilities.

3.1.3.11 S5-Tsang Tsui Ash Lagoons. This site would also be ideal for the construction of Solena's BTL plant as described above.

3.1.3.13 S6-Tuen Mun Area 38 would be suitable for a Solena BTL plant, especially since it is so close to the WENT landfill. Solena's plants would easily meet air quality requirements. This plant would not require water front space since all the waste would be easily hauled by truck to the plant from the nearby WENT landfill.

3.2.1.2 and 3.2.1.3 (In the technology selection) In general, the incineration technologies discussed are not innovative and utilize limited and inefficient XIX century designs. The discussion about gasification is uniformed, e.g., a plant for General Motors was commissioned in 1987 in Defiance, Ohio, with the capability of processing 50 to 100 tonnes per hour in one reactor. As indicated above, Solena will be able to accept and process the 3,000 tonnes per day of mixed MSW and convert it into sustainable biofuels and baseload renewable power. Solena's BTL plant will incorporate four reactors rated at 500 tonnes of RDF per day each (2,000 tonnes per day of RDF would be produced on site from the incoming 3,000 tonnes of mixed MSW). As described above, the high operating temperatures (up to 4,000 degrees Celsius) insure that all inorganics melt and organics are dissociated into basic gases, i.e., hydrogen and carbon monoxide, forming a BioSynGas, which is then used as feedstock for a Fischer Tropsch unit to produce 30 million gallons per year of advanced biofuels and 22 MW net of renewable power. This is Solena's basic design for over 15 BTL plants currently being implemented around the world.

3.2.2.2 While environmental, engineering, and cost considerations are important; it is a fatal flaw to exclude visual impacts, employment opportunities, public health, and public acceptance because some options are thermal treatment technologies. In almost all cases the public opposes incineration because of health impacts, damage to the environment, and potential climate change risk. In addition, design of incinerators is limited and does not have the flexibility of design found in gasification plants, which can easily blend into the architecture of the surrounding community as referenced above for the plant in Prague, CZ.

3.2.3.1 In Table ES5, Summary of Option Evaluation for Thermal Treatment Technologies is flawed and shows little or no understanding of gasification technology and how it functions. For example, under flexibility, gasification is given a least favorable mark because of "the ability to tolerate a fluctuation of the MSW characteristics." On the contrary, Solena's gasification technology and process is very robust and fuel flexible since it can easily treat a broad range of organic material derived from MSW. With regards to the land requirements and system complexity criteria, again this shows lack of understanding of gasification technology. A gasification plant would have almost the same requirement as a moving grate incineration unit and probably have a lower capital and operating costs. A typical Solena gasification unit combined with a FT unit to produce biofuel and renewable power would have income streams from the biofuels and the power, as well as the vitrified slag. This would enable the facility to recover its capital costs quickly and operating costs are also low.

Therefore, Solena disagrees with the results of Table ES5 – Summary of Option Evaluation for Thermal Treatment Technologies, which are most likely due to the lack of knowledge of Solena's technology and process. In turn, Solena presents the following Table [1] for your consideration:

Table [1]
Revised Table of Option Evaluation for Waste Disposal Processes

CRITERIA	MOVING GRATE INCINERATION	FLUIDIZED BED INCINERATION	GASIFICATION	SOLENA BIOMASS TO LIQUIDS
Air Emissions	High	High	Low	Low
Flexibility	Medium	Low	High	High
Power Production Efficiency	Low	Low	High	High
Reliability (Unit Capacity)	10-920 TPD	10-80 TPD	100 – 500 TPD	100-500 TPD
Reliability (Plant Capacity)	20-4,300 TPD	10-200 TPD	100 – 3,000 TPD	3,000 TPD
Reliability (Suppliers)	Many	Limited	Medium	High
Land Requirements & System Complexity	Medium	High	Low	Medium
Op. Experience w/ Mixed MSW treatment	High	Medium	Medium	Medium
Capital Costs	High	High	Medium(1)	Medium(1)
Operating Costs	High	High	Medium(1)	Medium(1)
Waste Disposal Costs	High	High	Low	Low
Overall	Less Favorable	Least Favorable	More Favorable	Most favorable

3.2.3.2 It is asserted that moving grate incineration is more favorable, even though it is extremely inefficient and not cost effective, than gasification because the latter technologies are of much smaller scale. This clearly is not true given the example above of the GM plant that has been processing up to 2,500 tonnes per day since it became operational in 1987. In addition, Solena gasification will not have scale up risks since the required plant size has been operational over 20 years. One cannot justify a technology such as moving grate on the basis it has been in operation for over 100 years, because it has never been cost effective, efficient, and is a heavy polluter causing possible climate change, damage to the environment with heavy pollution of toxic chemicals, and causing major health problems to surrounding communities and harming wildlife.

The statement that a moving grate is more tolerant of fluctuation of MSW characteristics is clearly not true. Anyone with experience with moving grate incineration should acknowledge that high moisture content and large quantities of plastics can cause a shutdown, which is clearly not the case with Solena gasification technology.

The statement that moving grates incineration needs less land than gasification on the basis that the latter needs more land for treatment units. Just as a single example of how false this statement is, the Solena biofuels plant in London requires less than 10 hectares and no additional landfilling. One must take into account the area needed by the incineration facility to landfill the ash it produces.

The justification about the number of gasification vendors is also false. Clearly old and inefficient technologies go out of business, but new and better technologies are entering the market. In any case, the decision is not going to be made on the basis of the number of vendors in the market, since Solena alone can handle Hong Kong's MSW problems with a superior gasification system producing power and biofuels. The problems with other gasification technologies cannot be related back to Solena's gasification technology or process, as they are fundamentally different in design and operation philosophy.

The statement about capital and operational costs of a moving grate Vs. gasification system shows a lack of knowledge about new gasification plants producing biofuels and renewable power, both of which a moving grate system would find almost impossible to produce comparable power levels and of course could not produce biofuels.

3.2.3.3 This statement again shows little understanding of gasification. A Solena gasification plant produces no flue gas. Of course moving grate incineration systems can attempt to capture toxic gases, mercury, bottom and fly ashes, but at a huge expense and without guarantees on efficiency of dioxins removal. Without producing flue gas and no pollution, Solena's gasification system has lower capital and operating costs, which enable it to function without creating pollution or toxic ash, which an incinerator needs to send to a landfill, thus increasing operating costs and therefore, costs of waste disposal.

3.2.3.6 For the Advisory Council meeting on the ACE held on 14 Dec. 2009, one can only assume that the Council had no objections to moving grate incineration technology because it was not given a full and complete presentation on the cost effectiveness, efficiency, and benefits associated with Solena's gasification process and production of biofuels and renewable power as described herein.

3.2.4.1 MBT technology has flaws, which were identified. However, it would be a waste of money to build even a small-scale unit. Clearly what is needed, which has been adopted in

Europe and the U.S., is an efficient technology process to separate recyclables from MSW and creating a valuable refuse derived fuel (RDF), which has a broad range of use and easily fits feedstock needs for a gasification plant.

3.2.4.3 Instead of worrying about how to separate recyclables and where such a process can be built, the City should let the private sector come up with a RDF solution. Waste haulers in the UK and Europe have done this very successfully. Such a facility would not then need to be included in the IWMF land requirement.

4.2.1.3 With a Solena gasification system there is no need for a SCR because NO_X levels will be low and meet the emission standard for NO_X without the need for post-combustion cleaning. If necessary, with an SCR, Solena's system could lower NO_X levels to 51 mg/m^3.

4.2.4.2 With a Solena gasification system, no toxic bottom ash, toxic fly ash, or air pollution control residues would be produced. Therefore, there would be no landfill requirement for toxic ash.

4.2.4.3 Of course, there will be no land contamination with Solena's gasification system.

4.2.5.1 With Solena's gasification, a biofuels plant could be built on a smaller tract of land, i.e., 8 hectares instead of 11 hectares, which means less impact on the environment.

4.2.7 Health Impact: There is no discussion of the health impacts of fugitive emissions of dioxins, furans, and their precursors, as well as volatile metals including mercury. Many of these are considered to be carcinogenic.

4.2.10 Landfill Gas Hazard. For Solena landfill gas is not a hazard. The gas could be captured and used. Of course, since Solena's gasification plant would help alleviate the need for landfilling and there would be less methane gas being generated by the landfill.

4.3.1.2 With Solena's gasification plant there would be no pollution created, no odor released, and the overall green plant would be very clean and beneficial to the workers and local community.

4.4.1.3 With Solena's gasification plant an advanced air pollution system would not be required and a SCR most likely would not be necessary saving on capital and operational costs. In addition, no dioxins, furans, or their precursors would be created.

4.3.4.1 Time and money could be saved by building smaller plants at the three existing landfills or at abandoned landfills instead of trying to build islands. Also small volumes of inorganic waste captured in the separation process could be processed in the gasification unit and melted into an inert vitrified slag, which has many industrial uses.

4.3.5 Ecology: waters around the islands and the area near SKC are too important in terms of habitat for the Finless Porpoise and other species to expose them to an incineration plant, which will be producing toxic ash and emissions not healthy to human or animal life. These toxic materials will escape into the ecosystem as has happened elsewhere, which is why the construction of incineration plants is such a rare event in other countries. As an example, Denmark has recently rejected a proposed modern incineration plant on the basis of its CO_2 emissions[1], which were deemed to high and damaging to the environment. Instead, the Danish government will focus its efforts in other recycling activities while looking for other alternatives. The 198 coral colonies would be of special concern.

4.3.6.1 Fisheries This is another example of why it is so risky to try to build such a plant on the proposed sites. The City would be better served if smaller plants were built at three existing and operating landfills or abandoned landfills.

5.1.1.1 The EIA is quite comprehensive. However, because it is so uninformed about Solena's plasma gasification process and production of biofuels and renewable power, the evaluation process may no be providing the City with all the information it needs to make a decision.

Specific comments on Paper WMSC 01/10: Integrated Waste management Facilities Sorting and Recycling Plant

Paragraph 2: Since almost all countries in the world have great concerns about incineration of wastes it is not clear why Hong Kong would want such a primitive method of treating wastes, which is very expensive to build and operate with very low cost effectiveness and efficiency. Moreover, incinerators of this type are notorious for creating vast volumes of contaminated and toxic ash, which must be landfilled using special and expensive methods. In addition, such incinerators also bellow large volumes of contaminated emissions containing dioxin, furans, volatile metals, mercury, and cadmium just to name a few besides equally huge volumes of carbon dioxide that is not carbon neutral, and other gases that only help to worsen climate change. Of course, this array of toxic emissions and pollutants not only harms the immediate environment, but surrounding areas of land and water causing immense damage to the environment and adversely impact human, animal, and fish health. Since a gasification system such as used by Solena Fuels can easily avoid all these problems and produce useful alternative biofuels and renewable power, it is not clear why such an inferior burner technology was selected for the IWMF. Hong Kong should aspire to greater things and be the showplace for the world and attract more tourists to an even cleaner and safer environment.

It is not clear why 3,000 tonnes per day was selected for one plant. This will only concentrate all the problems mentioned above. Why not have three Solena gasification plants producing biofuels and treating 3,000 tonnes per day each and producing 30 million gallons of advanced sustainable aviation fuel annually, as well as 22 MW net of renewable power each. These could be built easily at the three active landfills or at abandoned landfills, all of which are located on stable land, zoned industrial, and easily used to treat the wastes and produce biofuels and power without further harm to the environment and lessen the increase of climate change.

[1] http://www.architizer.com/en_us/blog/dyn/35348/big-ski-slope-denied/

Re sorting and recycling, most countries turn this over to private companies who have determined how to produce a harmless refuse derived fuel that meets the caloric and moisture content needs of a gasification plant producing biofuels and renewable power. If this is not acceptable, Solena has a design for a sorting and compacting plant, briefly described above, that can easily be built on the front end of a gasification unit. Incidentally if there is no market for the recyclable, then Solena's system is so robust, it can process all the organic and inorganic waste.

Regarding paragraph 8, a gasification plant using RDF would solve these problems and eliminate the need for MBT.

Regarding paragraph 9, I addressed this sorting and recycling issue above. Without such recycling, the incinerator problem would have an availability of less than 50% since it would have a hard time processing the inorganics, plastics, etc. On page 4, number (iii), it is important not to compare incineration to a recycling and sorting plant. This is not a meaningful comparison. Solena's front-end system mentioned above would be much smaller. In fact, it would probably be smaller than one hectare. And cost about $5 million and very low sorting/operation costs because it would be partially automated and use employees to sort. Of course, Solena's design eliminates odor and dust. Re (iv), the easy solution is to gasify all the waste.