Report on a Public Meeting to Discuss

The Environmental & Social Impact Assessment

for the Proposed Photovoltaic (PV)

Energy Facility at

Harrow Plantation,

St. Philip

07 December 2022

Prepared by

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1 WELCOME AND OPENING REMARKS

A public meeting was convened to discuss and obtain feedback on the Environmental & Social Impact Assessment (ESIA) for the proposed construction of a Solar Photovoltaic Energy Facility at Harrow Plantation, St. Philip. The meeting was held at the Princess Margaret Secondary School, St. Philip, on Wednesday, December 07th, 2022.

The Planning and Development Act requires that such meetings be convened, and a report must be submitted as part of the application process for the development. The ESIA was made available to the public from November 08th, 2022 at the following locations:

- Renewstable® Barbados' website at https://renewstable-barbados.com/planning
- The Planning and Development Department, Warrens. Office Complex, St. Michael.
- The Bridgetown Public Library, Fairchild St., Bridgetown.
- The Six Roads Public Library, Six Roads, St. Philip.

The meeting commenced at 6:05 p.m. with opening remarks from Ms. Joy-Ann Haigh, CEO of Haigh Communications. She welcomed the representatives from Rubis Caribbean, Stantec Barbados, members of the press, attendees online, and those physically present. Ms. Haigh invited members of the audience to listen to the findings of the ESIA Assessment that would be shared through presentations from a highly qualified team in various areas of expertise.

Ms. Haigh's remarks were followed by the introduction of the presentation panel by Mr. Ziggy Marshall, Moderator and Consultant with Haigh Communications. The panellists were as follows:

Mr. Thibault Menage	VP Caribbean, Hydrogène de France
Mr. Justin Jennings-Wray	Civil and Environmental Engineer, Stantec Consulting
Dr. Janice Cumberbatch	Sociologist
Mr. Andy Gill	Planning Agent, Richard Gill Associates
Mr. William Bain	Town Planning Consultant, Bain Planning & Development
Mr. Gregory Crooks (Online)	Air Emissions Specialist, Stantec Canada

Mr. Marshall invited the audience to view a short video presentation addressing the concept of the transition to renewable electricity in Barbados by 2030. It highlighted that Photovoltaic plants (PV) and Wind power plants are recognised as intermittent sources of energy. Which means that if there is a challenge with sunlight or wind variations during a large-scale event, particularly on a small island, this could lead to instability and could result in a blackout. Conversely, the

proposed power plant is designed to store energy and deliver electricity during the night, allowing for a 24/7 supply and satisfying end-of-day peak demand for approximately 25 years. This project, themed Renewstable® Barbados, and conceptualised by HDF Energy, is a combination of a Photovoltaic Plant and large-scale Energy Storage, based on clean hydrogen technology, that would produce and store energy during the day and supply it at night. This project is designed to cater to local energy needs by providing 8% of Barbados's electricity. It is a a non-intermittent, clean, renewable, and stable power supply for Barbados.

A presentation from Mr. Thibault Menage, Vice President, Caribbean for HDF Energy, followed the video presentation.

2 OVERVIEW BY MR. THIBAULT MENAGE

Mr. Menage told the audience that a local subsidiary of HDF Energy, HDF Caribbean, was implemented one year ago, with local employees in Barbados. The company intends to develop this projects and also projects of a similar nature within the Caribbean, through this subsidiary. He noted that the RSB project, presented in the video, is different and a bit more complex than a standard solar plant, therefore he wanted to provide some background to the project.

The project ownership is shared between HDF Energy (49%) and Rubis Caribbean Holdings (51%). However, the plan is for HDF Energy to sell some of its shares to local investors at construction stage. Specifically, discussions are ongoing with the Credit Union movement, centred around a share arrangement of 30% with the Credit Unions, 19% with HDF Energy and the remaining 51% with Rubis.

Renewstable® Barbados (RSB) is a 50 MWp solar capacity plant with a storage capacity of 90 MWh in the form of hydrogen (2 days), and 30 MWh battery (3 hours). RSB solar capacity is approximately five times as large as the plant at Trents in St. Lucy. It will have the capacity of a continuous power supply of 13 MW during the day, 13 MW for 2 hours at night, and 3 MW for the rest of the night. This represents a large-scale power storage, with a combination of hydrogen as long-term storage (3/4) and batteries as short-term storage (1/4) storage capacity. It is a good combination to deliver a continuous power supply and is a major financial investment for the country in the sum BDS $300 million, to be financed by international investors.

Mr. Menage presented a facility diagram to demonstrate how electricity would be stored. (See Figure 1 below). He explained that hydrogen would be used for long-term storage until needed and will produce electricity via a hydrogen fuel cell.

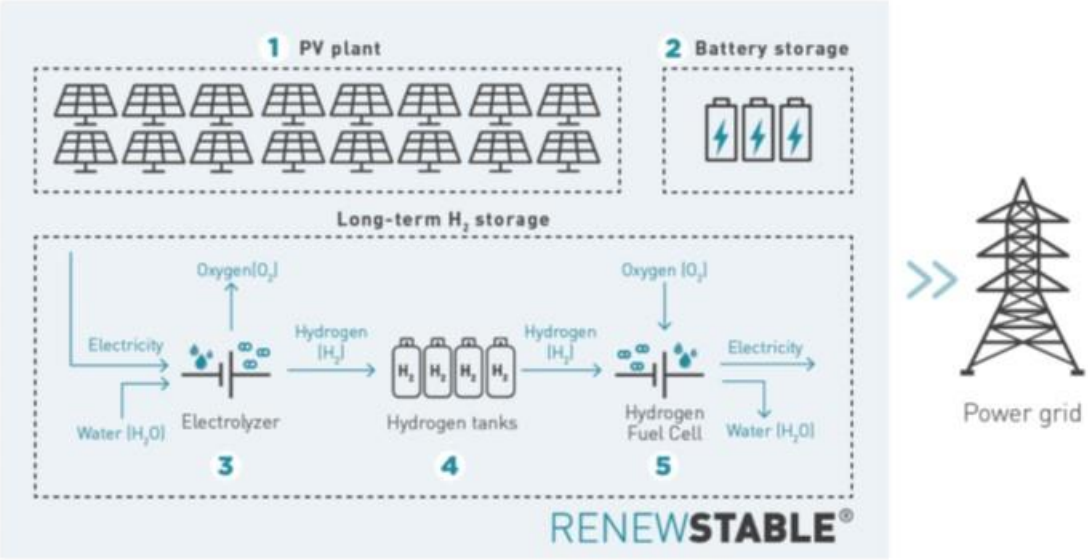

Figure 1: Electricity Production Process

He explained that the grid requires power during the end-of-the-day peak and at night when solar is unavailable. Therefore, RSB can deliver power at the most critical times in a stable and continuous form.

The plant's location is at Harrow in St. Philip, as represented in Figure 2 below. It is located north of Six Roads and Southwest of Bushy Park.

Figure 2: Location of the plant at Harrow

The complex is large, with the storage facility in the middle comprising the fuel cells, hydrogen tanks, batteries, storage, and electrical equipment, and it will be monitored continuously.

The facility will occupy 183 acres of land at Harrow Plantation. A portion of the lands will remain in agriculture, in dual use, consistent with the food security policy guidelines from the Ministry of Agriculture. The project will also host the largest black belly sheep farm on the island, comprising a maximum of 1,830 head and is a model that will boost the production of the black belly sheep in Barbados. The aim is to have a sustainable farm for 25 years, which will also be a revenue stream for high-end products like meat and milk. The sheep will maintain the site through grazing, and there will be a dedicated buffer grazing area where grass will be harvested and stored.

Several benefits of the project were outlined, namely:

- Allowing for the decommissioning of some old power plants, including an old 13MW gas turbine by the BL&P.
- Stabilisation of the grid.
- Stabilising the price of electricity.
- Avoiding some further new investments in fossil fuel power plants.
- Savings in foreign exchange since the BL&P would have to purchase less fuel.
- Doubling the solar capacity that is currently available on the island.
- Creating jobs in this sector.

It would be the first hydrogen project in Barbados. It would be an impetus for other projects to be developed in hydrogen power and mobility in Barbados, with more associated jobs.

Another significant benefit of the project would be the creation of jobs, and there are currently five (5) specialised persons working locally, through the Developer and consultants working on the project, with th support of international expertise. The project will generate 120 construction jobs over two years. Once the project has been built, further job opportunities will exist in the full-time operation phase. There will be at least ten permanent jobs over the (25 years+), with potential to increase as the farm ramps up. These jobs will be shared between the power plant, security monitoring and the black belly sheep farm.

Creating direct and indirect jobs will benefit the local communities at Six Roads and Padmore Village. In addition, the old train line on the northern side of the site will become a cycling track (development by a third party).

Mr. Menage concluded his overview and encouraged persons to reach out to the team via three mediums:

- The website: https://www.renewstable-barbados.com.
- Instagram: @renewstablebb
- Tel/WhatsApp: 836-4629

Following the project overview, Mr. Marshall introduced Mr. Justin Jennings-Wray, who presented the results of the ESIA.

3 PRESENTATION OF THE ESIA

Mr. Jennings-Wray stated that the ESIA report had been presented to the Planning and Development Department in August 2021 under application no. 1735/10/2021D. On review, permission was given by the department for the ESIA to be shared with the public. He listed the contributors to the ESIA as follows:

STANTEC:

- Noise Assessment – Mr. Brian Bylhouwer, Acoustic Specialist
- Quantitative Risk Assessment – Mr. Gregory Crooks, Air Emissions Specialist
- Drainage Assessment – Justin Jennings-Wray, Environmental Engineer
- Report Generation – Katherine Fleet, Elizabeth Wey, & Amber Fox, Environmental Scientists

SUB-CONSULTANTS:

- Social Impact Assessment – Dr. Janice Cumberbatch, Sociologist
- Agricultural Impact Assessment – Mr. William Bain, Town Planning Consultant

Mr. Jennings-Wray explained that the EIA provides information on a proposed development and its likely positive and negative environmental impacts and recommends measures to reduce/eliminate negative impacts. He also pointed out that the SIA examines the positive and negative social consequences of planned projects and identifies measures to eliminate or minimise impacts. Regulators consider those measures during the project assessment and in defining the environmental protection measures that must be done if permission is granted for the development. He stated that the ESIA also provides guidance to architects and engineers towards producing environmentally friendly designs.

Discussions with the Planning Department finalised what should be contained in the ESIA, and this was defined as:

- Relevant Legislation and Administrative Framework
- Description of the Project
- Energy Production and Benefits of the Project
- Description of the Environment
- Environmental Impact Assessment and Mitigation
- Social Impact Assessment and Mitigation
- Cumulative Impact Assessment
- Monitoring and Management Plans

The following studies supported the ESIA:

- Social Impact Assessment
- Drainage Assessment
- Acoustic Modelling Study
- Glint & Glare Study
- Agriculture Impact Assessment
- Quantitative Risk Assessment Study

3.1 Project Description

The detailed description of the project, as provided, showed that it is proposed to produce a constant carbon-free renewable electrical power supply capable of powering 16,000 homes. That supply will be purchased by the Barbados Light & Power and is expected to operate for approximately 30 years. It will occupy 180.9 acres/73.2 hectares at Harrow Plantation. The PV panels and grazing land for sheep will occupy 146 acres/59.1 hectares. The farming activities would produce sheep skins and manure as revenue earners. The other allocations were noted as:

- 4 ac / 1.6 ha – Energy storage + management systems
- 5.7 ac / 2.3 ha – Buildings + facilities
- 25.5 ac / 10.3 ha – Green space (additional grazing + fodder pasture).

The elevation is +56m to +43m above sea level and higher in the north.

The PV energy capacity is 56,000 MWh/year, and hydrogen and batteries will enable 13MW of electricity during the day, with 3MW being enabled at night. A portion of the solar energy is to be used to split water into hydrogen for energy storage, and there will be mixed land use since the site will also house a blackbelly sheep farm with a total count of approximately 1,830 heads.

The site will require 65m^3 (≈ 3 super-tankers) of water per day from the public mains to produce hydrogen and for tending the sheep, and an additional 300 m^3 in potable water storage. Access to the site will be via Highway M and Harrow Road.

Figure 3 shows the site in relation to the surrounding neighbourhoods.

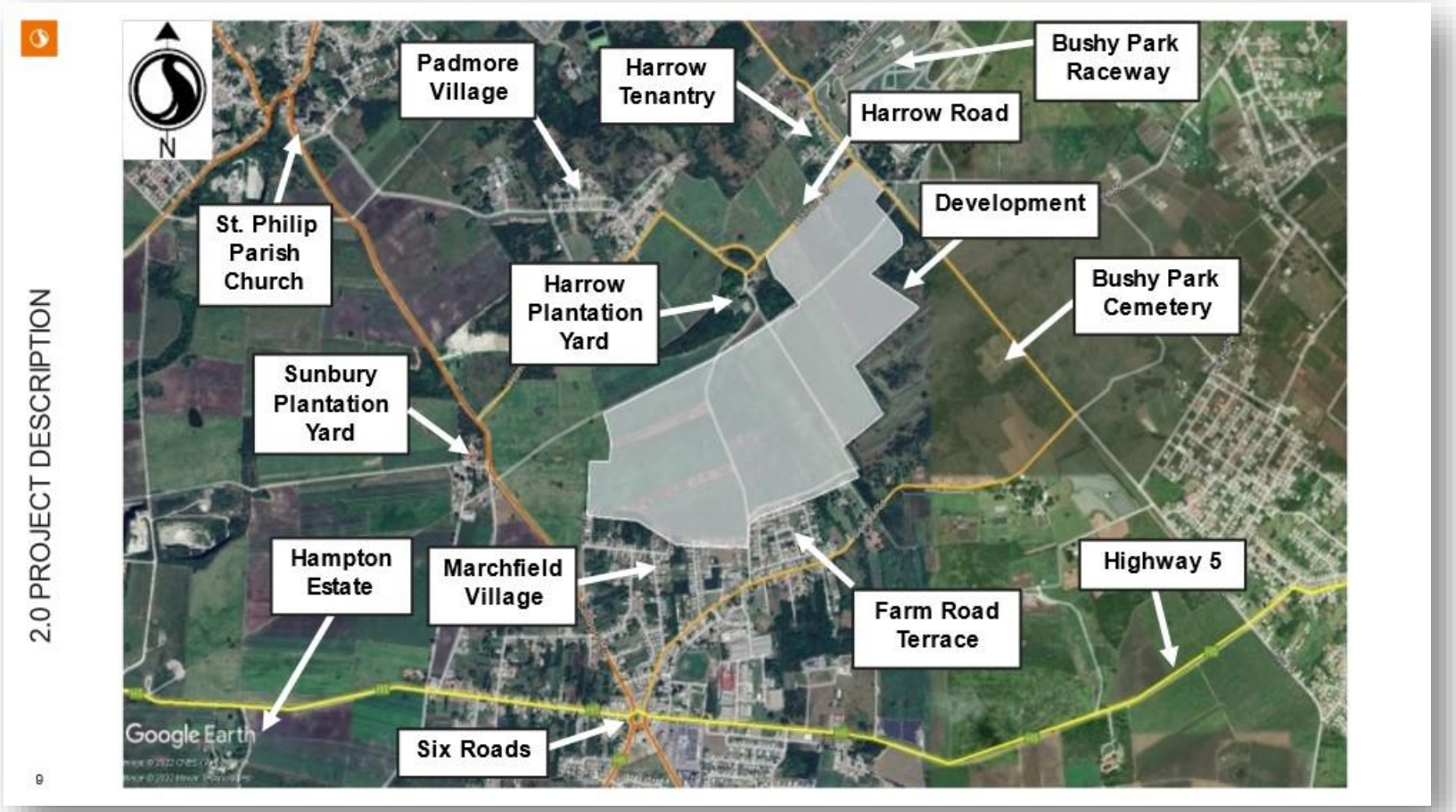

Figure 3: Site Plan

Mr. Jennings-Wray also shared several images which represented the following:

- Hydrogen Power Centre area
- Fodder Pasture Areas and Sheep Pens
- Example of the containerised battery enclosure
- Energy facility components of the project

Figure 4: Hydrogen Power Centre

Figure 5: Fodder Pasture Area and Sheep Pens

Figure 6: Containerized Battery Enclosure

The battery enclosure will be used for the short-term storage of electricity. He also explained the energy production and storage processes.

3.2 Potential Impacts

The ESIA report outlined the potential impacts, and the presentation addressed each of these areas:

1. Construction
2. Air and noise environment
3. Drainage and groundwater
4. Flora and fauna (plants and animals)
5. Visual environment
6. Agriculture
7. Accidents, malfunctions, emergencies, and disasters
8. Climate change
9. Social impacts
10. Waste Disposal
11. Project Decommissioning

3.2.1 Construction-related impacts

The ESIA identified the following potential impacts and recommended mitigation measures during the construction phase.

Potential Impacts:

- Negative impacts from the use of vehicles and equipment, and ground-disturbing activities.

- Potential for leaks/spills of stored fuels, chemicals, or waste.

Mitigation Measures:

- Minimising noise from vehicles, heavy equipment, and machinery.
- Construction work is to be carried out between 7:00-17:00 on weekdays; 8:00-14:00 on Saturdays, with no work on Sundays.
- Noise barriers should be erected near loud sources.
- Tree screens/enclosures around site boundaries, road watering, speed limits on site and the paving/revegetation of cleared areas to control dust.
- Maintenance of existing drainage systems.
- Silt screens/hay bales/boulder barriers are to be used to prevent erosion.
- Proper handling, storage and disposal of hazardous chemicals and fuels.
- Sediment dust control and noise management strategies are to be introduced to reduce impacts to nearby land users.

All of these measures are usually captured in an Environmental Management Plan which is to be followed by all of the contractors.

3.2.2 Atmospheric 4And Acoustic Environment

A main concern was potential noise and air emissions, and a study of the atmospheric and acoustic environment was carried out. The following were the findings:

- The baseline noise in the existing environment was lower than the World Health Organisational standards at most sites (5 out of 7)
- The main source of post-development noises would be transmitted by transformers, electrolysers, and battery packs.
- Acoustic modelling was done, and while daytime noises would not exceed the WHO standards, there would be some slight exceedances during the night-time.

As it relates to air emissions, the following information was obtained from the study:

- Pure oxygen would be generated from the electrolysis process.
- Hydrogen gas would be purged in a controlled manner during the operation and maintenance of the electrolysers and fuel cells.
- Air containing low oxygen will be released during the operation of fuel cells.
- Water vapour will be released during the operation of the fuel cells.

It was also noted that gaseous emissions were deemed to be non-polluting.

In the operations phase, the potential impacts and recommended mitigation measures for the air and acoustic environment were identified as follows:

Potential Impacts During the Operation Stage:

- Noise from the use of vehicles and equipment for farm and facility maintenance, emissions from sheep, and noise from electrical components.
- Positive impact from energy generation from non-polluting and carbon free source.

Recommended Mitigation:

- Minimising noise from vehicles through speed limits and routine maintenance of all equipment /vehicles.
- Consideration of enclosure for battery storage facility or physical barriers for transformers/inverters.
- Selection of plant equipment with noise reduction capabilities.

3.2.3 Surface Water and Groundwater

As is relates to surface water, in the existing environment, the runoff drains from a north watershed to the site and then from the site to the Six Roads area and Marchfield. There is an existing flooding problem in the Six Roads area when there is intense or prolonged rainfall. There are 23 suck wells on the property to help reduce flooding on the site and downstream at Six Roads. Relative to the groundwater, it exists as "stream water" beneath the site and is estimated to be flowing in a southerly direction.

In mapping out the drainage design, the team considered the following, as depicted in Figure 7 below. The panels are not expected to contribute to runoff once the area is fully grassed. In addition, the existing suck wells will be kept, and drainage for new hard surfaces would be done onsite so that they do not contribute to additional drainage off-site. The PV panels will be placed around the suck wells and not on them. Infiltration swale along southern site boundary along with new suck wells are only anticipated to reduce downstream stormflows by 1.7% due to a 1 in 50-year storm event. This will be studied in more detail toward the final design.

Figure 7: Drainage Design

In the Operations Phase, the potential impacts and recommended mitigation measures were identified as follows:

Potential Impacts During Operations Stage:

- The addition of impermeable surfaces, and potential for bare patches beneath PV panels could result in flooding on-site and downstream.
- There could also be potential leaks/spills of stored chemicals or waste.

Recommended Mitigation:

- Maintenance of existing drainage systems.
- Planting and maintenance of grassed surfaces beneath the PV panels.
- Appropriate drainage design within the project site to drain additional flows on-site.

The recommended mitigation measure for groundwater would involve regular inspection of septic tanks and soakaways as well as proper handling, storage and disposal of hazardous chemicals and fuels.

3.2.4 Flora and Fauna

An ecology study was conducted with the three main habitat types identified as cleared agricultural land, grassy areas, and sugarcane fields. There were no flora or fauna species recorded on the property that were considered rare or endangered.

In the operations phase, the potential impacts and recommended mitigations were noted as:

Potential Impacts during Operations Stage:

- Negative impacts on habitat/health from the presence of project components, dust emissions, collisions with vehicles/equipment and sensory disturbance.

Recommended Mitigation:

- Revegetation of cleared areas.
- Use of vegetation screens to reduce disturbance to fauna.
- Limited use of artificial lighting.
- Use of native plants for landscaping.
- Removal and proper disposal of waste.

3.2.5 Visual Environment

The development site was stated as being currently used for agriculture and to be surrounded by lands used mainly for agriculture and residential purposes. As part of a visual impact assessment, six locations were identified with potential to experience visual impact from the development – Harrow Tenantry, Harrow Plantation Yard, Sunbury Plantation, Marchfield Village, Farm Road Terrace, and Bushy Park Raceway. It was stated that there are clear views across the site to the surrounding areas.

The visual impact assessment also investigated potential impacts of glint and glare on the nearby communities. The presenter defined glint as a quick flash of light from a reflective surface and glare as direct or reflected sunlight from a surface for an extended period. It was noted that some existing vegetation can serve the purpose of screens, but they do not extend to the entire boundary.

The study estimated glare at 11 points and 4 public roadways under 5 types of panel configurations. The results showed that the potential glare impacts at 9 out of 11 points and 4 roadways. The glare was classified as green, a low hazard, or yellow, representing a moderate hazard. The glare was projected to be present in the early morning after sunrise west of the site and early evening before sunset to the east of the site.

Mr. Jennings-Wray explained that the panels are designed to absorb as much light/solar energy as possible and not reflect solar energy. The glare from the panels was generally minimal when compared to other reflective surfaces such as water and steel (e.g., water in the sea, pond, and metal sheeted roofs)

In the visual environment, the potential impacts and recommended mitigation measures identified in the operations phase were:

Potential Impacts in the Operations Phase:

- The visual impact of development.
- Use of artificial lighting.
- Potential glint and glare impact.

Recommended Mitigation:

The four recommendations made in this phase were:

- Planting of thick vegetation/tree screens in high-impact areas.
- Limited use of artificial lighting.
- Choosing solar panel types that minimise reflection.
- Remove the offending panels or replace them with panels with a lower glare potential.

3.2.6 Agriculture and other Land Uses

The findings from the agriculture study were presented by Mr. William Bain who first outlined that the purpose of the Agricultural Impact Assessment was to:

- Describe the proposed development and contextual factors.
- Determine the potential adverse impacts on food and agricultural lands and active agricultural operations on-site and adjacent to the site in the surrounding areas.
- Recommend measures to buffer, mitigate, and minimise potential land use conflicts.

The 304-acre Harrow Plantation has traditionally had most of its productive lands in sugar cane. It is managed by the Barbados Agricultural Management Company (BAMC) from the Mount Pleasant Plantation. Arable production occupies 252.5 acres, and the application site will utilise 184 acres.

The plantation falls within the Agro-ecological Group C, which is defined by soil type, land capability, i.e. slope, fertility, drainage and effective rainfall-annual total and distribution within the growing season that meets the need for a specific crop during its growth cycle. The information provided by the BAMC states that Group C is defined as a less productive zone because of the above factors, with effective rainfall ranked highest as the most binding constraint to crop development within the area.

The application site is located within an area traditionally rural in character. The dominant land use has been agriculture, mainly sugar cane cultivation within the application site and surrounding agricultural lands. Any residential development would have been located within the existing tenantries. The main changes within the immediate environs have related to the planned expansion of the Six Roads Regional Centre to the south and the development of the Bushy Park racetrack facility to the northeast.

Given that total rainfall in some years fell below the maximum amount required (56 inches) for optimum sugar cane output, the plantation would not have met its optimum growth during production.

Agricultural Proposal

It is proposed that the facility would occupy an overall lease area of 182 acres south and east of the plantation yard and will incorporate a sheep farm with a total of 1,830 Black Belly sheep. Hence the proposal is for the dual agriculture and renewable energy use of the site. The agriculture component will comprise the following:

- Fodder pasture – 25.45 acres located to the northeast of the solar farm.
- Agricultural, office and storage facility – 5.63 acres located to the south of the fodder pasture and occupied by 4 sheep pens, a hay storage building, a staff building and an office/storage building.
- A solar grazing area of 141.73 acres would take up the bulk of the application site and providing covered (under solar panels) and uncovered grazing area. It should be noted that there will be no sheep grazing/access to the 3.92 acres HyPCe facility containing equipment and system for energy storage.
- Sheep grazing currently takes place at other solar facilities on the island, most notably the Barbados Light and Power's photovoltaic farm at Trents, St. Lucy.

The agricultural use at Harrow Plantation is identified in the table below:

Agri-Use	Agricultural Production (Acres) 2021	Post Development Acres
Sugar Cane	193.75	104.50 (2022 estimate)
Sugar Cane (prepared-not planted)	41.25	
Cotton	17.50	
Sheep Grazing Combined with Solar		141.73
Fodder Pasture		25.45
Sheep Pens		5.63
Total Acres	**252.50**	**277.77**

The figures in the above table demonstrate the shift from solely arable production to arable combined with sheep farming and renewable energy. The reduction in sugar cane production alone is estimated to be 89.25 acres.

Impacts on Lands of Harrow Plantation

Mr. Bain also outlined the impacts on the lands of Harrow in the operations phase and these were listed as:

- The total number of sheep that will graze throughout the facility will range between 1830 with land also being allocated as a fodder pasture. Four sheep pens are also proposed.
- Sheep will graze within the solar farm thereby controlling the growth of grass and weeds.
- The income derived from selling electricity to the grid will help to support the various forms of agriculture at the plantation.
- It is important to recognise that renewables can be integrated with other agricultural uses thereby increasing the productivity of the landscape.
- Positive impacts from mixed land use with sheep livestock farming would include locally harvested meat to boost local meat supplies, and the by-products such as leather and manure. Remaining lands would be reserved for intensive agriculture.
- The proposed solar photovoltaic energy generation and storage facility will not adversely impact continued agricultural activity (mainly sugar cane production) on the remaining plantation lands.
- A local professional consultancy has been engaged to assist in sheep farm design and management.
- There will be no fragmentation or alienation of any of the remaining plantation lands due to the simple manner in which the overall plantation is being divided to accommodate the proposed facility.

The potential impacts and recommended mitigation for sheep farming were also noted:

Potential impacts -Sheep Farming:

- Over grazing
- Pollution resulting from manure

Recommended Mitigation:

- With regards to over grazing, high nutrient grasses will be selected.
- A rotational grazing plan will be developed.
- Develop grazing as a service, with a live mowing service being offered to others. This however needs to be clarified.
- With regards to manure management, the majority of the organic load will be generated in confinement.
- Pens will be raised to facilitate the collection of manure, which will be scraped by a mechanical scraper, collected in manure pits and moved to adequate storage facilities for bagging.
- Installation of a manure bagging plant on site.
- Fertiliser marketing – local / regional.

- A tree screen should be planted along the western and southern boundaries of the site to act as a buffer to adjoining agricultural lands. The details of this screen can be submitted under condition of any permission granted.
- The plantation should limit the spraying of herbicides on adjoining fields to days that are not windy in order to prevent any dispersion onto the operational renewable energy facility and sheep farm as well as nearby receptors.

3.2.7 Accidents, malfunctions, emergencies, and disasters

Mr. Jennings-Wray continued the presentation and addressed the areas of accidents, malfunctions, emergencies, and disasters and how they would impact the environment in the operations phase of the development. The potential impacts and recommended mitigation measures are outlined below:

Potential Impacts in Operations Stage:

Energy Storage Systems – incidents resulting in rupture or leak from batteries, hydrogen fuel cells, hydrogen storage cylinders, electrolysers and associated piping could result in release of flammable vapours and potentially cause fire.

A Quantitative Risk Assessment (QRA) was done to investigate potentially hazardous events related to ruptures, leaks, and the potential impact these could have on the development and adjacent land uses. The findings were assessed towards recommending the following mitigation measures.

Recommended Mitigation:

- Set back of energy storage system centre more than 200m from property boundary.
- Design of Battery and Hydrogen Energy Storage Systems to international standards such as US National Fire Protection Association (NFPA) 855 and NFPA2

Batteries

- Battery units are to be sealed and separated to prevent fire propagation. Battery enclosures should have a 2-hr fire rating and be capable of withstanding temperatures of 50° C.
- An automated management control system will be used to shut down batteries in unsafe working conditions.
- A ventilation system must be in place to enable safe evacuation of gases and flames.
- Fire detection systems are to be capable of detecting thermal or gas emissions.

Hydrogen Energy Systems

- Electrolysers and hydrogen fuel cells are to be housed in containerised enclosures and enclosures are to be ventilated to vent any vapours.
- Enclosures to have hydrogen gas detectors with provision to adjust ventilation.

Other

- Preparation of an Emergency and Disaster Management Plan and training of staff/operators
- Training/workshops with the Barbados Fire Service on fighting fires in the energy storage area.

3.2.8 Climate Change

The presenter also examined the impact of climate change with the following findings.

Potential Impacts:

- Potential negative impacts associated with climate-related and other natural hazards – tropical storms/hurricanes.

Recommended Mitigation:

- Ground mounted solar PV systems to withstand hurricane wind forces including use of dual post piers for racking structure foundation.
- Safety features in energy storage systems to help to maintain safe operation of the facility in event of climate related or natural disaster.
- Water reuse & rainwater harvesting to reduce the impact of future drought potentials.

3.2.9 Social Impacts

Dr. Cumberbatch delivered the next presentation on the Social Impacts of the development during its construction and operations phase. The following represents the potential impacts and the recommended mitigation measures.

Potential Positive Impacts:

- One of the primary potential impacts would be job creation that would generate 150 construction-related jobs over two years.
- Capacity building and skills development for local workers. The project intends to target persons first within the local community.
- Support for local suppliers and businesses, including food vendors, car rental companies etc.

Potential Negative Impacts:

- Disturbance from noise, dust, and visual impairment to residents of nearby communities and land users.
- Health and safety of on-site workers and the safety of general public
- Social dynamics by the influx of temporary workers

To ensure that the positive benefits accrue, the following mitigation measures were recommended.

Mitigation Measures:

- Public awareness campaign to address concerns: The developers had already commenced with a good public relations strategy and Haigh Communications was already engaged within the community.
- This would extend to communicating to the residents with respect to the availability of jobs.
- Putting Occupational Health and Safety measures in place with regular monitoring.
- Compliance with legal and labour requirements.
- Measures to reduce noise, dust, vibration, wastes and traffic.
- Security at the site.

3.2.10 Waste Disposal

The waste disposal component dealt with agricultural waste and hazardous waste and the mitigation measures were also addressed.

Agricultural Waste:

- The site would generate 1200 metric tons of sheep manure per year.
- There would be no butchering on site; any dead animals would be removed and disposed at approved facilities.

Mitigation Measure:

- Manure waste would be collected from pens and stored in watertight containers and disposed of offsite.

Hazardous Wastes:

- Lithium- Ion batteries
- Potassium hydroxide solution – replaced every 10 years.
- Oil in electrical transformers
- None of these wastes are process outputs but will ultimately have to be disposed.

Mitigation Measures:

- Export batteries overseas for recycling.
- When replacing or disposing of potassium hydroxide, implement safe removal, handling, and transportation for recycling overseas would be in accordance with waste shipping protocols.
- Arrange collection of transformer oil by an approved specialist waste disposal contractor.

3.2.11 Decommissioning

The presenter noted that the facility was to be designed, built, and maintained for 25 years and acknowledged that the process of decommissioning could take around 12 months and would involve:

- Dismantling and removal of the power plant.
- Transferring wastes to disposal, recycling, and treatment facilities (possibly overseas).
- Re-grading lands and revegetation with natural re-growth or non-invasive plant species.

The potential impacts would be emissions, discharges and wastes similar to what is experienced during the construction stage, and these impacts were expected to be short-term. The Hydrogen Energy Storage system should be 100% recyclable.

3.2.12 Next Steps

Mr. Jennings-Wray concluded with a summation of what had already been done and the next steps in the process. He explained that the implementation of design mitigation and environmental protection measures identified in the ESIA had been formalised in an action plan called an Environmental and Social Management Plan – ESMP. The intent would be for the developer to implement this plan if given a permit to proceed with the development. This plan would ensure that the developer constructs and operates the project in keeping with best practices that protect the environment and public health and safety.

The next steps in the process would be to hear from the attendees at the meeting and record any queries and concerns. A report of the meeting proceedings would be prepared for submission to the Planning Development Department (PDD) - for their consideration as part of their assessment of the application. There will be the opportunity for attendees to raise queries or concerns with the PDD. After the PDD has reviewed the meeting minutes and any further concerns, there will be further assessment on their part towards determining the application.

Mr. Jennings-Wray thanked the audience for attending the public meeting and reminded them that their feedback and comments were important and these could be e-mailed to justin.jennings-wray@stantec.com

4 QUESTION & ANSWER SESSION

This session was moderated by Dr. Cumberbatch, who fielded questions both from the online and on-site audience.

1) The first question from an ***online participant*** queried if there were any alternative feed sources for the sheep in the event of a drought.

   Mr. Andy Gill responded to this and stated that the sheep farm was designed with plenty of grazing areas in and around the panels, as well as a pasture that will be harvested and bailed for the storage of hay bales in the event of a drought. If there were an extended drought, then bales would be sourced from another location, or feed would be purchased from an external company, such as Roberts Manufacturing Ltd.

   Mr. Menage also responded and said that consultations with the Barbados Water Authority showed that this area had a good water supply, and had plans to increase the supply in the area.

2) ***Ms. Gillian Rowe***, a resident of Farm Road Terrace, stated that when she purchased the property, she did not envisage being surrounded by a PV Farm. However, from the slide presentation, it appeared that her neighbourhood at Farm Road was in the centre of the development.

   Mr. Jennings-Wray clarified this and pointed out that Farm Road and Marchfield were beyond the south boundary, and there was buffer land between the site boundary and the panels. There was also the intention to plant tree screens as part of the recommended mitigation measures so that there should be no visual impacts from the site.

3) ***Ms. Rowe*** also queried the distance from the panels to the boundary line of the community.

   Mr. Gill explained that they were to be positioned 50 to 60 feet from the boundary and the maximum height would typically be approximately 6 feet tall, which is a rather low construction comparable to a typical human height.

4) ***Ms. Rowe*** said she had done some research to find out about the problems created by such installations and if they had presented any issues over time, particularly those that had a battery component. Her assessment was that information presented on proposed developments in Barbados is usually good, but problems arise over time, and there is little recourse. She stated that there was no intention for members of her community to relocate in 25 years, and they need to be given as much accurate information on the ongoing works promptly to make informed decisions for themselves and their grandchildren. She envisages that there will be some level of discomfort over the next two years. She also asked what would be done with the batteries when they have to be removed, and while she has taken note of the mitigating measures, who will be responsible for effecting those measures? What will happen to the infrastructure at the end of the project?

Dr. Cumberbatch thanked Ms Rowe for her valid questions and concerns, and responded that: as efforts are being made to increase renewable energy in Barbados to achieve the national target in 2030, such solar installations are likely to be developed across the island. However, when the projects are approved, and the developer commences works, they will be required to implement the mitigation measures recommended in the ESIA. Then regulatory agencies such as the Environmental Protection Department, the Ministry of Health or the Ministry of Energy, will be required to review the report and monitor the implementation of the measures, as well as how they are operating. The engineer in charge of this process has the power to stop the work and require the developer implement the measures before proceeding.

Dr. Cumberbatch stated that there would also be a stakeholder engagement process, and there was a recommendation for a community liaison who would interact and communicate with the community. This individual would relay and address any issues with the operations team. This approach has been implemented in other projects in Barbados. Persons also had the option to use other mechanisms, such as call-in programmes and social media, to voice their concerns. She also encouraged persons to review the stakeholder sections of the document, which was available online and use the e-mail address that Mr. Jennings-Wray has provided to raise any immediate concerns. She stressed that stakeholder concerns from this meeting would be reviewed by the Planning Department which would address these issues with the developers.

Dr. Cumberbatch also agreed that while there will be screens to act as a visual buffer, the psychological impact of the development will be more significant for some persons than others. In any case, it is stated that a mechanism will be in place in order for the community members to be able to raise their concerns to the project developer, its laison or the regulatory agencies, such as the EPD, and to make sure that concerns are considered and dealt with.

Ms. Joy -Ann Haigh sought clarity on the distance from the nearby communities in terms of the proximity to the actual plant, in “bajan terms”.

Mr. Gill stated that the central facility where the storage would occur was about 300 – 400 metres from the edge of the houses. The facility is in the centre of the panels, and there is no noise from the panels, with a slightly harder visual than vegetation. The main mitigation for this type of infrastructure is typically to put a screening hedge between the houses and the plant, as well as a little distance between the houses and the panels. He also stated that the site at Trents in St. Lucy was a good example, with a tree screen, and one could drive around the edge of the boundary to get an idea of how the entire site was laid out.

On the decommissioning, ***Mr. Jennings-Wray*** advised that the intent is that at the end of the useful life of the facility everything is removed, and then the land is revegetated. Nevertheless, at the end of its useful life, in approximately 25 years, an extension could be afforded to the existing developer

or there could be a new developer. Yet, he confirmed that if no extension is granted, the developer, as per its permit, shall remove everything and returnthe land to its original state.

Dr. Cumberbatch sought for details on the disposal process.

Mr. Jennings-Wray stated that since the panels are a waste which cannot be processed in Barbados, they would be stored on-site to achieve sufficient mass, typically one shipping container, and shipped overseas to specialized facilities for recycling. This same process would also apply to batteries, or any kind of special waste.

5. The moderator, ***Dr. Cumberbatch,*** introduced several questions from ***online attendees*** that were all themed around agriculture. They were as follows:
    i) What vector control measures would be in place to address any issues with livestock?
    ii) How would the emissions from sheep be handled?
    iii) Overgrazing by the sheep could result in the possibility of flooding. If this occurred, how would it be addressed?
    iv) Manure bagging: would this be powered by solar farm-produced electricity or fossil fuel?

Ms. Jacqueline Beckles, Project Manager, responded to these queries as follows.

    i) The Planning and Development Department was particularly interested in vector control, and the exact procedures for managing this would be detailed in the design process. The agricultural consultants were currently addressing this. The issue of water accumulation around the farm would also be monitored.
    ii) Sheep emissions are normally around one-tenth of what cows produce on a cattle farm. This farm at Harrow is considered quite small from a global perspective, and the emissions from the farm would not be that high annually. As an added benefit, when the sheep are bred locally, imports of lamb over air and sea passages is avoided, effectively reducing greenhouse gases from shipping.
    iii) Regarding the potential of overgrazing, the same consultants are studying this aspect. The intent is to farm the sheep in sustainable manner, specifically, rotational grazing should limit the possibility of overgrazing.
    iv) The manure bagging plant and the sheep farm would be similarly powered by the grid since by Barbados regulations power must first be sold to the grid. Therefore the farm cannot generate its own power. The grid would become greener with every solution that is added to it.

6. Another ***online attendee*** queried how much grid work upgrade would be necessary.

Ms. Beckles highlighted that currently the grid is under strain due to the amount of intermittent power which is fed into it without a storage solution. She noted that exact answer to the question

cannot be given, as it for Barbados Light & Power to determine how much upgrade is needed. The developers are in close contact with the BL&P to ensure that all requirements will be met.

7. Another ***online attendee*** asked if local persons would be trained for these potential jobs, to minimize recruitment from an external source.

   Ms. Beckles stated they were already training persons to work on the project, and indicated that two were present at the meeting. In addition, a large portion of the site works can be carried out by local contractors, such as civil works, and HDF would be responsible for some of it. The role of Renewstable® Barbados was to set the rules by which the EPC contractor would operate to maintain local content.

8. ***Mr. Ryan Gittens*** raised the question of water and the daily usage of 65 cubic meters. He was concerned about whether the water mains could satisfy the project, if there would be a cost for new the infrastructure or adaptations to supply the project, and what the contingencies would be in the event of a water shortage.

   In response to his query on how many persons could use 65 cubic meters daily, ***Ms. Beckles*** suggested that it would be the usage of a medium size hotel with a capacity of approximately 350 persons.

   Ms. Joy-Ann Haigh noted that the water is being paid for, like any other business, and would assist in producing renewable energy as Barbados was moving toward a 2035 timeline to reduce carbon emissions. Water was also required for use on the sheep farm. It was only when water was misused that problems occurred. Therefore, it was important to look at the balance and the benefits of the project, rather than just at water consumption.

9. ***Mr. Gittens*** noted that while there was provision for five days of storage, there were no contingencies for dams etc. He also had some other related queries:
   - Were there any plans for the community to be engaged in water harvesting and was any investment being put in place to address this? He had not seen any reference in the document to deal with it.
   - In addition, a project of this magnitude is a significant financial investment. He asked if there was any provision for the community to invest in and gain a return on the investment.

   Mr. Menage shared that the developers were in constant discussions with the BWA, and the plant would utilise the BWA supply intermittently. Regarding any possibility of investment, he again referred to the involvement of the Credit Union Movement through the Barbados Sustainable Energy Cooperative, where there were ongoing discussions.

   Ms. Joy- Ann Haigh also provided a further update on the water and mentioned that the 65 cubic meters requirement would satisfy some 70 households using 250 gallons per day. If this were another type of development, e.g., a hotel, the concept would still be the same with a requirement

for the water service, although the amount used would be different. She also explained that the water was being purchased to supply energy, and it would be stored. She added that the plant was designed to put things in place to address these issues of climate change.

In response to the query on water harvesting, Mr. Gill stated that the mitigation measure was to put more suck wells around the site, adding to the groundwater reserves. There would also be trickle feeding from the tanks during the night to minimize effects to the community. They would also capture the rainwater from the roofs of the buildings such as the sheep pens, etc.

Ms. Beckles further explained that the process takes 65 cubic metres daily, with 60 cubic metres going toward hydrogen production and the remainder going to the farm. Half of the 60 cubic metres that goes toward hydrogen production is directed to the holding ponds for use elsewhere on the site. Generating hydrogen requires pure water; whatever comes into the system is treated before it goes to the electrolysers. Once the treatment process is completed, half of it is discharged, placed in a holding pond and tested to determine the mineral content. When they are confident that it can be reused based on the test results, it can then be used for irrigation, cleaning panels, and cleaning the farm and maintaining the site in a general way.

Ms. Beckles also mentioned that they were studying rainfall harvesting. Alan Armstrong, a local contractor, was now engaged in this study and was examining the drainage, which is an issue, particularly in Six Roads. She told attendees they could review the Drainage Study in the ESIA document, and there was already work being generated for local contractors like Alan Armstrong.

10. ***Mr. Gittens*** also stated that since this was the first hydrogen project, what is the benchmark and where was the origin of the standard/model being used and from what country?

    Mr. Menage responded that it was based on the Trinidad model. The plant was a small one with a capacity of 600 tonnes per year, and the Trinidad plant annually produces two million tonnes. There was also a similar project in French Guiana at the moment. He further explained that the standard used on this project was the US standard. They had commenced with the British standards but, at Stantec's recommendation, had switched to US standards. The moderator also suggested that the audience could view these standards on the project website.

11. ***Dr. Cumberbatch*** stated that there were other questions posed online related to the following:
    - The length of time of the glint and glare occurrences.
    - The potential impact on the visibility of drivers on nearby roads.
    - The impact on residents, particularly in the southernmost community

    Mr. Jennings-Wray noted that the software does not account for natural boundaries and assumes no barrier between the panel and the receptors. In addition, the software models the sun's movement over 365 days and predicts glare to occur early in the morning or later in the evening.

As a result, the recommendation is for a partial vegetated screen to be placed around the site so that the potential impact of the glare is minimized.

12. ***Mr. Andrew Hutchinson***: On the site plan which showed the boundaries, he pointed out the Trailway and asked the extent to which the project might compromise this.

    Ms. Beckles assured that they were in touch with Mr. Barney Gibbs, that there was the potential to assist with the development of that project, and there was no intention to compromise or affect the trailway in any way.

    Mr. Hutchinson suggested that on the water issue, the project should address the net water demand and how much would be recovered. Mr. Menage indicated that some of the water is lost as steam, and some is recirculated back into the system. Ms. Beckles indicated that the part of the water that is recycled is recirculated into the fuel cell process, and advised that she could research it and provide more information *(refer to **Annex 1 – RSB Public Consultation Q&A Update**).*

    Mr. Hutchinson also noted that in the 1980s, an unusual rainfall event caused a major flood across the 1400-acre watershed which crosses the site. This was a rare 1:50-year event, but since this project is a significant monetary investment, this type of event should be considered. He outlined what happened then since it could reoccur. This should be a consideration within the project scope and mitigated as far as possible for the interest of the project and the downstream community.

13. ***Mr. Hallam Edwards*** sought clarification on the plant's capacity and said that it could not be a 13 MW baseload plant in power generation terms since the facility is proposed to produce 3MW at night. Mr. Menage stated that the storage capacity was 50 MW of solar and 120 MWh of storage, outlining the process. He indicated that after a capacity factor is applied to the plant's output, only about 22% of the maximum power is actually produced and this is why in order to make it a baseload plant, capacity is over-installed.

    When Mr. Edwards asked about the capacity supplied during the night, Mr. Menage noted that this would be 3 MW throughout the night and 2 hrs at 13 MW that can be called at the end-of-the-day peak when it is most needed.

14. ***Ms. Rowe*** asked whether all information from the meeting would be relayed to the public.

    Dr. Cumberbatch assured the audience that all updates would be available on the website. She advised that the ESIA was already on the website, and the meeting report would also be added.

15. ***Ms. Rowe*** also expressed concern about the deterioration of the roads due to the heavy equipment and construction vehicles.

    Dr. Cumberbatch responded that for developments of this nature, there is a requirement for the contractor to return the roads to an improved and acceptable level of repair.

16. ***Ms. Rowe*** also noted that while the project will generate jobs, how will they help others in the community?

    Mr. Menage stated they wanted to ascertain the community's needs, and a consultant was engaged to assist in this process. Water supply, the availability of jobs and road works were three concerns that had already been mentioned. A survey was conducted, and the team will devise a plan to determine what can be done based on the feedback from those surveys. They had also commenced discussions on the issue of water harvesting.

    Ms. Joy-Ann Haigh said that some persons had not completed the questionnaire, and she encouraged persons to do so over the next seven days. Approximately 100 persons participated from the 300 homes surveyed, and some responses addressed areas such as access to Wi-Fi, facilities for children, job creation, etc.

Dr. Cumberbatch thanked the on-site members and the online audience for their participation. She reminded persons that comments could still be sent to justin.jennings-wray@stantec.com as well as to rsbarbados@hdf-energy.com.

There being no further comments, the meeting concluded at 8:52 p.m.

5 LIST OF PARTICIPANTS

In addition to those on-site, as listed in the table below, 32 persons attended online.

William Bain (ESIA Consultant)	Seth Edwards
Janice Cumberbatch (ESIA Consultant)	Richard Bynoe
Justin Jennings-Wray (ESIA Consultant)	Anthony Gittens
Jacqueline Beckles (Project Manager)	Kevin Whittaker
Norma Hinkson (Rapporteur)	Ryan Gittens
Thibault Ménage (Developer)	Martina Walrond
Andy Gill (ESIA Consultant)	Shanice Hoyte
Joy-Ann Haigh (PR Consultants)	Wayne Walrond
Ziggy Marshall (PR Consultants)	Sandra King
Ceiliah Bain	Marcia Murrell
Léo Theron	Glenroy Greenidge
Baïdy Diallo	Jonathan Benn
Philip Williams	Julia Gittens
Janice Payne	Geoffrey Squires
Jesse Payne	Jason Balliet
Trevor Browne	Donnah Russell
Aidan Rogers	Andrew Hutchinson
Stewart Gill	John Sealy
Julian Rowe	Andrea Drayton
Colleen Lynch	Hallam Edwards
Mauricio Nicholls	Allan Haynes
Kimberley Dewhirst	Carl Griffith
Alejandro Perez	

Technical Team: ***Oversight Corp.***

1. Ricky Redman
2. Selwyn Browne
3. Dennis Phillips
4. Christopher Blenman
5. Zavier Browne
6. Ria Redman

6 ANNEXES

A. RSB Public Consultation Q&A Update (*Responses to questions asked online that were not answered during the public meeting, as well as updates to live responses that required further research to facilitate a complete and accurate response).*

#	Questioner	Question / Comment	Response
1	jgibson375	Any alternative feed sources in case of severe drought?	Both the process & farming perspectives answered live
2	Myrico Morris Esq	How are the waste materials from the components being disposed of when maintenance is required?	Answered live
3	Myrico Morris Esq	Are local persons being trained before and during the establishment of the site for the potential jobs, to avoid "no qualified persons can be found locally, hence persons are being recruited overseas"	Answered live
4	Jheuel Carter-Guy	So is it that it is yet to be determined how the water from the new impermeable surfaces is to be drained onsite?	Answered live *(during the water reuse discussion w/ Ryan Gittens)* **Update:** The preliminary Drainage Study is currently in progress and will make recommendations on drainage methodologies for impermeable surfaces such as the administrative area, car park and Hydrogen Power Centre (HyPCe); as described in the presentation the intent is that the runoff from all new impermeable surfaces on site be captured and drained on-site. The detailed design process will then produce a final design based on these recommendations. It would be important to note that the new impermeable surfaces being created are a minor part of the development; the majority of the development area will be used for the photovoltaic power plant.
5	Myrico Morris Esq	Has the possibility overgrazing by the sheep and removing the mentioned grasses surfaces and contributing to increased flooding and runoff been studied?	Answered live
6	jgibson375	Has there been any thought given to the cumulative impacts of the proposed project?	Yes! The ESIA presented by Stantec Caribbean presents a review of the project's cumulative impacts in the Main Report. A copy can be downloaded for review from the Renewstable® Barbados website at https://www.renewstable-barbados.com/planning

#	Questioner	Question / Comment	Response
7	Myrico Morris Esq	How long is the glare expected to last during the identified times?	Answered live **Update:** Glint & Glare modelling scenarios for various types of panels at 15 receptor points were performed, i.e. smooth to deeply textured, with or without anti-reflective coating. Results noted entirely green or yellow-level glare to be most prevalent at varying times of the year between 5.45 am and 7.15 am, and between 4.15 pm and 6.30 pm. RSB will be incorporating tree screens along certain occupied boundaries to mitigate these effects. Detailed results are available in the Glint & Glare Study (Appendix H of the Technical Appendices to the ESIA) on the Renewstable® Barbados website at https://www.renewstable-barbados.com/planning.
8	Jheuel Carter-Guy	Will the glint and glare recorded impair visibility of drivers on nearby roads, or is it negligible/acceptable?	Answered live
9	Kwame Bradshaw	Will the manure bagging plant be powered by fossil fuels or electricity produce from the Solar Farm?	Answered live
10	Myrico Morris Esq	Lithium-ion batteries and water do not mix well. Water causes them to go into thermal runaway. Further research is necessary.	The process water and the batteries are located at two distinct areas of the Hydrogen Power Centre with no interfaces, specifically to minimize the potential for contact. Rainwater however is a standard parameter already considered in BESS design. In addition, fire-fighting methodology would be designed as per supplier recommendations with the objective to limit the impacts of an already existing fire.
11	Myrico Morris Esq	Are they any mitigation factors for the possible decline in property values in the immediate area?	RSB's understanding of current planning conditions give us cause to believe that the inclusion of the RSB plant on today's electricity grid is in line with infrastructural development plans for the Six Roads area and the wider parish of St. Philip. The improvements in the electricity network that will flow from this project will be a timely addition in support of future projects.

#	Questioner	Question / Comment	Response
12	Kwame Bradshaw	Has any investigation been done on the effect of glint and glare to those residents in nearby developments, especially with the erection of the PVs at 6ft tall approx. 60ft from the southern community?	Answered live
13	jevon Yearwood	Any consideration for other natural hazards for example how an earthquake may affect the hydrogen storage or any of the other facilities on site?	Local climate conditions as well as natural hazards are considered in the design of the facility, including hydrogen storage. Specifically regarding earthquakes, local historical records and design values are well documented. Local design values are typically used as input data, for structural and mechanical engineering, which shall be performed in accordance with internationally recognized methodologies such as ASCE (American Society of Civil Engineers). The same process would be applied for hurricanes.
14		Vector control / management	Answered live
15	Peter Beckles	What about methanogenic emissions from sheep?	Answered live
16	Peter Beckles	Are there any economies in storage and reuse of the oxygen derived by electrolysis?	The possibility has been considered but is unlikely at this time as the oxygen would be generated in limited marketable quantities. It is always possible however to consider collection and storage of the oxygen as an independent market expansion project at a later date.
17	Andrew Hutchinson	Would it not be better to speak about the net water demand? How much (water) is recovered from the cycle? Can the water be reused?	The fuel cells will produce between 1.5-1.7 tons/hour of water, though it is important to note that this water is produced mostly in the gaseous phase which makes recovery difficult. The water that can be recovered as liquid will be recycled both to humidify the fuel cell air inlet and to resupply the electrolyzer. The volume of recyclable water is dependent on ambient operating parameters and represents less than 30% of the total water production.