



# Bestuurscollege van het openbaar lichaam Saba

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Decision of October 12, 2019

No. 225/2019

## THE EXECUTIVE COUNCIL OF PUBLIC ENTITY SABA

TAKING INTO ACCOUNT THAT;

- Saba's long-term vision is to become a 100% sustainable energy island;
- The transition towards sustainable, affordable and reliable energy supply is prioritized in Saba's Social Development Plan 2014-2020;
- Considerable achievements have been realized as part of the 2014 -2020 Energy Sector Strategy

DECIDES TO IMPLEMENT THE FOLLOWING:

## Saba's Energy Sector Strategy

### Vision and pillars

Saba's long-term vision is to become a 100% sustainable energy island. Saba aims at reaching this long-term vision by ensuring that energy does not only come from renewable energy sources, but also that it is affordable for its population. Saba has adopted the following elements as the pillars of its sector strategy:

- Sustainability
- Affordability
- Security and Reliability of Supply

### Period covered and targets

Saba's energy sector strategy covers the period 2020-2025. The sector strategy establishes a target of 60% energy sector sustainability by 2025, which in turn corresponds to the combined effect of the measures referred to as in the action plan of this strategy paper encompassing both supply and demand side activities. The transition towards

sustainable, affordable and reliable energy supply is prioritized in Saba's Social Development Plan 2014-2020.

Saba has proposed an energy transition action plan for achieving its targets.

### **Rationale**

Saba's energy independence is vital to economic stability. The more reliant an energy system is on a single energy source, the more vulnerable the energy system is to serious disruptions. The introduction of renewable energy technologies in the period 2017 – 2019 to the previously only fossil fuel based system has showcased considerable improvements on both energy security, through the enhanced diversity of supply, and affordability, through the avoided costs of imported and expensive fossil fuels.

Saba has favorable natural endowments such as abundance of sunlight, constant warm temperatures, easy access to wind and geothermal potential. Saba's vision is also influenced by the perception that severe weather events are occurring with increased frequency and intensity, which may lead to considerable economic, social, cultural and environmental disruption, and consequently affect any development programme for the island.

To achieve Saba's long-term vision it is very important to further investigate what renewable energy sources can lead the pathway to affordable sustainable energy supply. Commercially mature renewable energy technologies such as wind, photovoltaic systems, solar thermal, geothermal and biomass energy are possible to be exploited on Saba. All these renewable energy technologies have established market availability and technological maturity to a point of being competitive to conventional fossil fuels technologies. They represent an opportunity for Saba's transition to a sustainable and affordable energy supply.

### **Energy efficiency options considered**

Energy efficiency options considered by the sector strategy are:

- **Public lighting:** The public lighting system is expanding and upgraded to Light Emitting Diode (LED) technology. The upgrade of the lighting fixtures offer a reduction of the overall capacity of the public lighting system and as a result energy savings, while in addition allows for an overall better lighting efficiency performance.
- **Private lighting:** Following the example of the public lighting upgrade, a program for a staged upgrade of lighting installations in private properties can be developed and implemented. The programme shall be designed and implemented on the basis of

incentives that would properly address the costs of upgrades and capture of the estimated energy savings based on a monitoring and verification protocol.

- **Solar water heaters:** Installation of solar thermal systems for the purposes of hot water shall be further considered as part of the energy efficiency actions included in the present strategy taking into account the installation costs of solar thermal system including the necessary modifications that are necessary in respect of the internal building hot water installations. Tourism sector facilities should be prioritized in respect of this specific action.

#### Renewable energy options considered

Renewable energy options considered by the sector strategy are:

- **Solar energy:** Construction of solar photovoltaic systems. The island has a large potential to develop solar photovoltaic systems in several locations and of different sizes, from domestic size to decentralized solar farms. According to the Caribbean Renewable Energy Development Programme, Saba receives 6 kWh/m<sup>2</sup>/day of solar irradiation almost constantly along the year.

Solar photovoltaic systems on Saba can be connected to the grid and complemented with energy storage systems.

- **Wind energy:** Wind turbines can be installed either in the harbor or airport areas where previous studies have found that wind speed is favorable. The harbor also offers the advantage of access to boats and small ships which are important for the construction of a wind farm as the logistics on the island and the road transport infrastructure are rather limited.
- **Geothermal energy:** The geothermal potential of Saba is vast and its exploitation could be interesting. Geothermal technologies are economically interesting for medium and large size projects. As Saba's energy demand is actually low, the possibility of geothermal energy is interesting only when associated to large consumption projects, or to energy exports possibilities.

#### Constraints for strategy deployment

The further assessment of renewable energy options requires to take into account several constraints, in addition to coping with the permanent risks of natural disasters. Saba has to deal with:

- Geographic isolation (high cost transport, tenuous supply lines);

- Limited spatial area on the island, especially flat areas;
- Limited availability of government-owned land;
- Lack of capital;
- Lack of private sector involvement;
- Only one other power generation source (low diversity);
- Transfer technology limitations.
- High costs (imported equipment, spares, fuel & oil, external expertise);
- Lack of trained manpower;
- Variable loads (daily, seasonal, growth);
- Variable power quality and reliability.

All these constrains limit the prospect of a positive return on investment in some renewable energy options, and must be taken into account when assessing their feasibility.

However, achieving the goal of 100% renewable Saba is nowadays realistic. It basically requires to start walking the transition steps towards replacing current conventional fossil fuel power generation with renewable energy technologies. This transition must be done gradually to guarantee economic sustainability.

#### **Action plan**

The action plan covers the period 2020-2025. The action plan considers the following activities as necessary to achieve the sector strategy's goals:

- Action 1: Energy efficiency program;
- Action 2: Construction of an additional 1 MW renewable energy infrastructure, focus on wind energy;
- Action 3: Upgrade electricity grid to a "smart grid" which will include energy storage;
- Action 4: Conclude feasibility and testing studies for geothermal energy and the associated electricity interconnections if required.

**Action 1: Energy Efficiency Program**

Subject to an appropriate financing scheme and with due care of the impact of energy efficiency measures on the financial performance of the energy sector in Saba, a structured incentive-based program for energy efficiency in the private sector shall be developed and implemented. The already considered actions of private lighting systems upgrade and installation of solar thermal systems for hot water may be complemented with potential actions of a demonstrative character e.g. Electric Vehicles (EVs)

**Action 2: Construction of additional 1 MW renewable energy infrastructure**

The government of Saba has made in the period 2014-2020 a firm decision to start with the transition towards a sustainable energy supply. In the period 2020-2025 which is covered by this strategy paper, this decision is maintained and reinforced taking into account the lessons learnt from the so far implementation and achievements. The integration of renewable energy sources in the electricity production mix of Saba also aims at increasing security of supply and reduce the cost of electricity production on the island.

An important advantage of the implementation of renewable energy technologies on Saba is that a much higher proportion of the life-cycle costs of these technologies are in the early planning, manufacture and construction phase. Operating costs and decommissioning costs tend to be very low. Therefore, once the earlier phases are supported by donor finance, the self-continuation of supply after life-cycle is finished is very much possible, especially considering that replacement costs of renewable energy technologies have been going down rapidly during the past decade.

The government of Saba has therefore decided to install 1 MW of additional renewable energy infrastructure in the period 2020-2025. In order of priority this additional RES infrastructure should be either in the form of wind power or in the form of solar rooftop installations. Both additions require the appropriately sized energy storage system in order to be optimally integrated into the Saba electricity system.

An update of the feasibility study done by ECN will be required to be performed, with special emphasis on the risks associated to severe weather, including hurricanes category 4.

Solar photovoltaic systems can be developed in small decentralized sizes closer to each demand center. The connection of these smaller systems would produce less problems regarding the capacity of Saba's transmission and distribution grid to handle intermittencies and bi-directional current. However, the level of risk related to both the financial and security of supply damages in the event of a hurricane strike renders

the distributed generation PV option inferior to that of the wind energy converter of appropriate specifications.

**Action 3: Intelligent grid and energy storage**

Solar and wind energy are intermittent. Once their share in the energy mix of the island start to increase, new investments on the electric grid to make it “intelligent” are needed to stabilize or neutralize impacts of their intermittent nature. Those investments may include:

1. Configuration of the power management system in order to extend its control over the additional electricity supply infrastructure;
2. Revision or upgrade of the grid monitoring and control system;
3. Installation of renewable power limiting devices (inverters);
4. Installation of rapid start secondary generation units;
5. Installation of energy storage devices;
6. Enforcement of good monitoring and forecasting practices;
7. Upgrade to advance demand side management systems (smart metering infrastructure).

The specific actions to be implemented will depend on the status of the grid, the type of power management system, and the level of intermittent renewable energies in the energy mix.

**Action 4: Conclude feasibility and testing studies for geothermal energy and electrical interconnections**

Due to the scale of geothermal projects, this type of energy is especially interesting when connected to exporting electricity projects to neighboring islands.

The potential of geothermal energy on Saba is large. Confirmation studies and testing are required previous to any investment decision. These studies include geological studies, exploration and test drilling. These investigations are required to confirm potential and to determine real costs of exploiting geothermal energy on Saba, including as appropriate the electrical interconnection with the nearby islands of St. Eustatius and St. Martin.

**Contribution to sustainable and inclusive growth**

The sector strategy and its action plan contribute to sustainable and inclusive growth by:

- Reducing the greenhouse gas emissions from power generation on the island;
- Identifying the best options of renewable energy technologies for their deployment on the island;
- Contributing to the diversification of the energy mix of Saba;
- Reducing cost of electricity production which will directly benefit the island finances and creating the possibility of more investment in social welfare;
- Creating new business opportunities and employment around the maintenance and operation of renewable energy infrastructure;
- Making the electrical system more reliable which has a direct impact on the productivity of commercial and industrial activities in the island;
- Increasing the energy security of Saba by reducing its dependence on imported fuel oils.
- Protecting and making sustainable use of Saba's natural resources.
- Establishing the foundations for the broader support to energy efficiency and possibly actions related to demand side management together with the development of "intelligent" grids.

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