SUSTAINABILITY AND ETHICAL PRACTICES IN THE ESWATINI SUGAR INDUSTRY

Introduction

The Eswatini sugar industry (ESI) has a long tradition of excellence. As the global business landscape evolves, the industry's commitment to responsible business practices remains a top priority. This includes strengthening existing efforts and aligning operations with ***human rights and environmental standards***. The compliance involves a proactive approach that helps us identify and address potential social and environmental concerns throughout our supply chain. This translates to:

- ***Empowering People***: Ensuring fair treatment and working conditions for all involved in sugar production, from farmworkers to factory employees.
- ***Protecting Our Environment***: Implementing practices that minimize our impact on the land, water, and air.
- ***Building Strong Relationships***: Collaborating with suppliers and communities to ensure shared goals and sustainable practices.
- ***Transparency and Accountability***: Regularly reporting on our progress and demonstrating our commitment to continuous improvement.

Why is this important?

The sugar industry operates in a globalized world. Consumers and businesses alike are increasingly prioritizing ethical and sustainable products. By embracing this we can continue to:

- ***Maintain Market Access***: Leading sugar importers are demanding ethical sourcing practices. Demonstrating compliance ensures continued access to these valuable markets.
- ***Strengthen Our Reputation***: Consumers are attracted to responsible brands. Continued compliance strengthens Eswatini sugar's image as a product produced with care for people and the environment.
- ***Manage Risks***: Proactive compliance helps mitigate potential legal issues, reputational damage, and disruptions in the supply chain.
- ***Build a Sustainable Future***: Operating ethically and sustainably fosters long-term success for the industry, its workers, and the environment.

How Are We Implementing this?

The ESI is already taking significant steps towards human rights and environmental due diligence. Our existing policies on human rights and environmental protection provide a strong foundation. Here's how we're moving forward:

- ***Mapping Our Supply Chain***: We're actively identifying all stakeholders involved in sugar production, from farm to customer.
- ***Risk Assessments***: We're conducting ongoing assessments to identify potential social and environmental risks within our supply chain.
- ***Developing Action Plans***: We're working on strategies to address identified risks and promote sustainable practices throughout the supply chain.
- ***Monitoring and Reporting***: We're establishing systems to regularly monitor our efforts and report progress to stakeholders.

Looking Ahead: Standards and Collaboration

Sustainability standards such as Fairtrade, Bonsucro and Farm Sustainability Assessment (FSA) are strong advocates for human rights and environmental due diligence. Collaboration with these and other stakeholders will be crucial for achieving our shared goals.

A Commitment to a Brighter Future

By building on our existing strengths and embracing these principles, the ESI can secure a sustainable and prosperous future. We remain committed to responsible business practices that benefit our people, our environment, and the global community.

Stay Informed!

Future newsletters will delve deeper into specific Human Rights and Environmental Due Diligence topics and provide practical guidance for our members. Together, let's continue to build a brighter future for the Eswatini sugar industry.

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(Sustainability Programme Coordinator)

ESWATINI SUGAR ASSOCIATION TECHNICAL SERVICES

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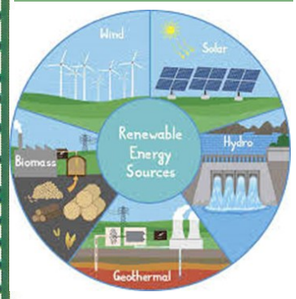
CONSIDERATIONS FOR SOLAR POWERED IRRIGATION SYSTEMS

Introduction

In the past, all the electric power used for running irrigation systems in the Eswatini sugar industry came from Eswatini Electricity Company (EEC). In recent years, Solar Powered Irrigation (SPI) systems are becoming more attractive in the industry as the cost of energy such as fuel and standard grid electricity continue to rise, whereas the establishment cost for solar-powered systems continued to decrease. Also, most parts of Eswatini receive enough solar radiation to make solar powered irrigation feasible. Investing in SPI gives growers the ability to generate their own energy instead of relying entirely on EEC. This article therefore provides a guide for growers considering installing SPI systems.



Solar powered irrigation systems

Over the last few years, SPI systems are becoming more attractive in the industry

Soil salinity

Soil salinity is a growing threat in the sugar industry particularly in the South

Sustainability & ethical practices

As the global business landscape evolves, our commitment to responsible business practices remains a top priority

Where to begin when designing SPI systems?

The first consideration for SPI system is the energy demand, also known as hydraulic power (Ph) of your irrigation system. The amount of pumping power demand depends upon the (i) flow rate (Q_{pump}) of water being pumped, (ii) pump head (H_{pump}), and (iii) pumping equipment efficiency (ή). The second consideration is the type of irrigation system to be used. Systems that operate with low pressure such as drip, micro sprinkler and centre pivots require less energy than impact sprinkler system. Finally, the direction of slope, elevation, latitude and shading will also affect the amount of radiation received and consequently the amount of solar energy generated .

Storage batteries are also important SPI components adopted in many countries. The main disadvantage of batteries is their frequent failure, high maintenance costs and loss of storage capacity over time. However, where net metering is practiced, battery storage requirements is eliminated.

How to select the right components for an SPI system?

Solar panels are the most important component of an SPI system. They are durable and usually last between 25 and 30 years. Solar panels also differ in their power generation efficiency and

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Considerations for Solar Powered Irrigation Systems... *continues*

lose about 1% in efficiency per year. Though they cost more, top tier panels offer the highest efficiency ratings and best power output than other types. Panels can be configured either as rigid or sun tracking arrangement. Rigid solar panels are more suited for permanent installations while the sun tracking system is good for maximum power generation, but also require frequent maintenance.

Another important SPI component is the power invertor whose key function is to convert the generated DC power to usable AC power for electric motors. Inverters also differ in their capacity, efficiency, and cost. Be sure to compare cost, expected life, and quality of invertors when evaluating SPI installation and maintenance costs.

Should the SPI be off grid or grid tied system?

Linking the SPI to the grid allows growers to always have access to power even in times when solar power generation is not enough to meet power requirements, and also make additional income by exporting excess generated power to the grid through net metering. However, the disadvantage with grid tied is that if the utility (EEC) power goes off, your on-grid system will also stop working. Off-grid system, on the other hand, is not affected by grid power outage, but can pose a huge risk because the SPI system may not be able to meet crop water demand during peak period.

What are the regulatory and permit requirements?

There are regulatory and permit requirements for establishing solar-powered systems. For more information, growers wishing to install a grid-tied solar PV system in their premises, should refer to Newsletter No. 94 for details or contact Technical Services.

What will it cost and what are the returns?

The cost of establishing SPI system is difficult to estimate because situations are different. However, many of the existing SPI in the sugar industry costed between E14 000 and E18 000 per kW. Presently, it is recommended that the battery storage systems be avoided because they are expensive and can significantly increase operation and maintenance costs. It is important for growers to ask for a full breakdown of return on investment from the contractor prior to installation.

Which pitfalls should growers look out for?

Firstly, the system design and quality of implementation is a key consideration. Before installation, grower must secure an independent professional Engineer to design the system according to the required energy demand.

Secondly, growers must consider only top tier equipment (tier 1) because of the long-term nature of the investment, and the equipment (panels and inverters) carry long-term warranties.

Thirdly, growers must select a trusted contractor for the system installation who is suitably qualified and meets regulatory compliance and accreditation. Currently in Eswatini, the installer accreditation program is still being developed by the Regulator.

Finally, growers must consider taking a service level agreement with installer not more than two years, and be provided with training on the operation and maintenance of the solar system.

Nkululeko Dlamini
(Irrigation Engineer)

Soil salinity, a growing threat in the industry

Introduction

Soil salinity refers to the concentration of soluble salts in the soil, and it has adverse effects on crop growth. Signs of soil salinity have been observed during farm visits, particularly in small-scale grower fields in the South. While these conditions were observed on certain parts of the fields, it should be noted that the accumulation of salts can drastically affect the overall yield performance of the field. Saline soils are characterized by high levels of dissolved salts in the root zone. The excessive accumulation of salt levels disrupts the osmotic balance within the plant, leading to reduced water uptake and nutrient absorption. This can impede the overall growth and development of sugarcane plants, ultimately affecting their potential yield.

Figure 1: Visible salt crystals in the soil surface in a sugarcane field in the South

Causes of soil salinization

There are two forms of soil salinisation namely, (1) primary or natural salinisation and (2) secondary or human caused salinisation. Natural salinization occurs due to weathering of basic rocks like basalt and climatic factors such as low rainfall and high temperature. Secondary salinization occurs as a result of human activities such as soil compaction, irrigating with poor quality water, over irrigation, inadequate drainage system which increases water table and discharge of salts near soil surface.

Signs and effects of soil salinity in a sugarcane field

Soil salinity may present itself in different forms. Visible signs of soil salinity in the field include pronounced whitening and salt crystals on the soil surface caused by salt build-up as water evaporates **(Figure 1)**. Salinity induces water stress, scorching of the leaves, restricted growth and, in severe cases, death of the plant. Additionally, an increase in growth of salt-tolerant plants in the field may be observed.

Diagnosing soil salinity

To evaluate the extent of salt contamination, a salinity analysis is recommended. Soil samples should be collected from the salt-affected areas using a soil auger. The ideal time to take the sample is during the summer when the salinity level in the soil is at peak. The samples should then be submitted for testing at the laboratory. Moreover, growers are advised to test their irrigation water to determine if the salinity problem is not as a result of poor-quality irrigation water.

Prevention and Reclamation of Soil Salinization

Salt accumulation can be avoided by ensuring adequate soil drainage, proper irrigation practices, irrigating with water that has low concentration of soluble salts. The leaching of salts from the root zone by excessive irrigation in affected fields is an effective corrective measure. In such cases, the draining capacity of the soil must be adequate to flush-out the salts from the field.

Conclusion

Soil salinity is a growing threat in the sugar industry particularly in the South. Growers are therefore encouraged to address soil salinity issues in sugarcane fields to maximize yields and ensure sustainability of their businesses in the long-term. For more information and assistance, growers can contact the Eswatini Sugar Association Technical Services (ESATS).

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