EQUILIBRE BIOENERGY PRODUCTION LTD

Arundo Donax for BioPower Production



CONFIDENTIAL



ABOUT EQUILIBRE



Introduction and Vision Statement



- Equilibre's vision is to become a **leader in the mass production of biomass for the production of clean energy** based on the intensive agro-cultivation of fuel crops, such as our specially developed Arundo Donax hybrid plant.
- Equilibre has developed a **comprehensive**, **integrated solution** for the production of clean energy that starts with the cultivation of fuel crops through to the implementation of fuel pellet, bio-fuel and **100% biomass electricity generation** plants.
- Equilibre has invested in scientific research in Mauritius in conjunction with the University of Mauritius and the Government's agricultural research unit (FAREI) over a 6 year period. We believe this has produced one of the world's leading knowledge repositories for Arundo Donax. Equilibre is proud to have been a pioneer in the first successful combustion trial of Arundo Donax, whereby electricity was successfully exported to the Mauritius national grid in April 2016 for a 10 hour period. This has resulted in a proven combustion model that demonstrates the effectiveness of Arundo Donax as a coal replacement.
- Equilibre realises that one of the greatest challenges for developing countries is the **high cost of importing fuel** as well as the **creation of jobs**. Our model addresses both issues and can become a **driver of significant socio-economic growth**.
- In addition, **our fuel crop is a net zero producer of greenhouse gasses** while the residual ash is organic in nature and does not require specialised disposal. Our pellet plants are able to produce a conditioned and compressed Arundo product that can be exported, thereby generating foreign currency.
- Equilibre has assembled a **world-class management team** with expertise in agronomy, engineering and project management. In addition, it has proven ability to develop successful enterprises across multiple emerging markets.

WHO WE ARE AND WHAT WE DO



1

The Arundo Donax Bioenergy Crop Experts in Mauritius

- Since 2012, Equilibre has initiated the development of Arundo Donax as a commercial bioenergy crop in Mauritius in collaboration with FAREI, MCIA and UOM
- Based on test performed in different regions across Mauritius and 28 months of growing, Equilibre has acquired know-how on Arundo's plantation methods, cultivation and harvesting practices and protective protocol in Mauritius
- Equilibre has an international technical partnership with BIOTHEK (Spain), a company with over 10 years experience offering comprehensive consultancy on biomass projects having specifically researched the K-12 Arundo Donax bioenergy crop

2 Pioneer in Production of Electricity from 100% Locally Produced Biomass

- Equilibre is the promoter of an electricity and biofuel production model specifically designed for biomass
- Equilibre partners with the local farming community to grow Arundo
- By including the biomass in the power production supply chain, Equilibre can guarantee revenue generation and a continuous supply
- Biomass is a source of green energy thus contributing to safeguard the environment.

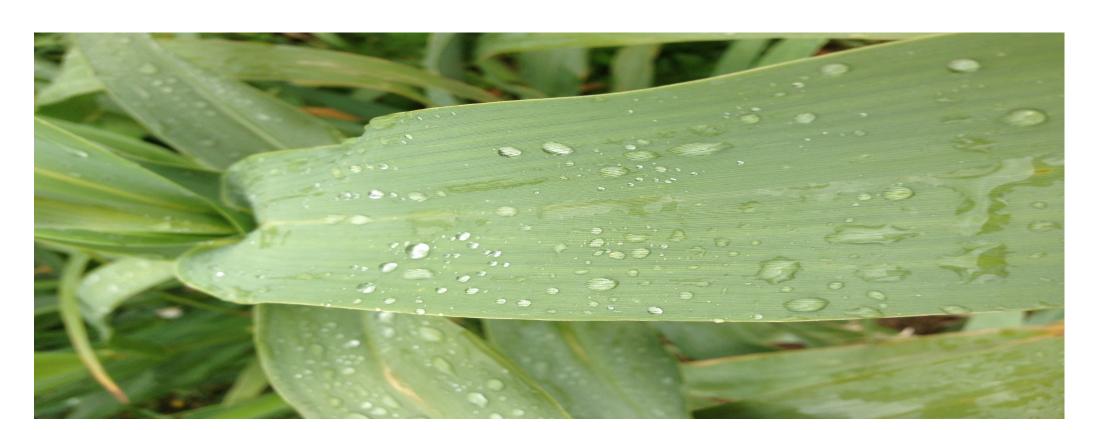
3 Position Mauritius as the "showroom" for Africa

We believe the model Equilibre is pioneering in Mauritius can be quickly and efficiently rolled out into the rest of Africa





PROJECT INTRODUCTION



BENEFITS FOR THE COUNTRY

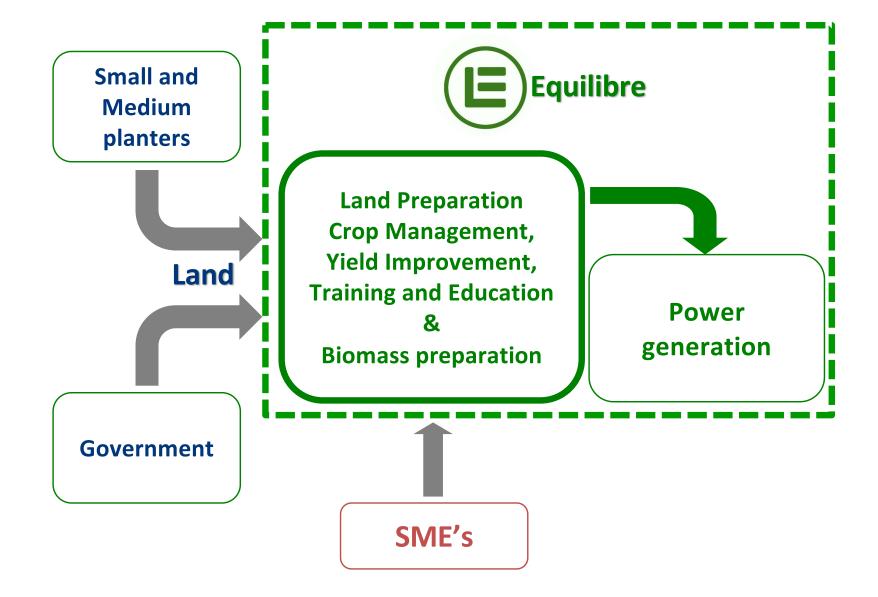




- Higher income for the Government and an englarged fiscal base
- The Country will be less subject to international price fluctuation of imported fuels lower hedging requirements
- The Country will save foreign currency with more trading conducted in local currency
- A greener economy the energy produced using biomass will avoid further carbon emission and even reduce it through **carbon sequestration**
- The Country will enable the valorization of marginal or non utilized agricultural land sustainable revenue on land that is currently not contributing to the economy
- ARUNDO biomass production provides a Sustainable Business Model for the Development of a "Green Economy" Sector
- This Green Project addresses the Climate Change Agenda and the COP 21 Paris Accord 2030 target

OUR MODEL





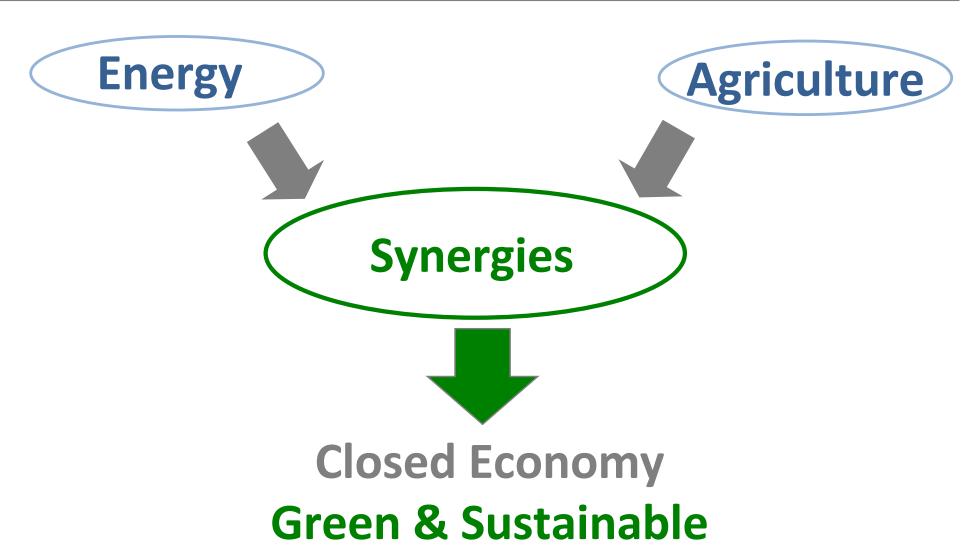


CONTEXT



THE CHALLENGE





THE ENERGY INDUSTRY



A "secured" source of revenue for feedstock supplier **Need base load Source of pollution** electricity production **Energy** Industry Need to create Need to be cost direct value add effective **Support to** economic growth

THE AGRICULTURE INDUSTRY



Increasing agricultural land not utilized

Decreasing revenue

Increasing cost of production

Agriculture Industry

A source of employment for unskilled labor

Provides a "secured" and local source of biomass

Need to allocate land for food crop



OUR PROJECT



THE ARUNDO DONAX NURSERY





- So far 58,000 Arundo Donax ecotype variety K-12 plantlets have been imported from Honduras
- These plantlets were transferred into trays for hardening
- Plant development protocol supplied by Galliltec were followed and the plants responded very well in the controlled environment
- Plants were ready for field transfer within 45 days of hardening







ARUNDO BIOMASS FOR BIO-POWER PRODUCTION





= GREEN COAL







1





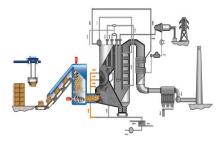
= BIOFUEL



= BIO-POWER

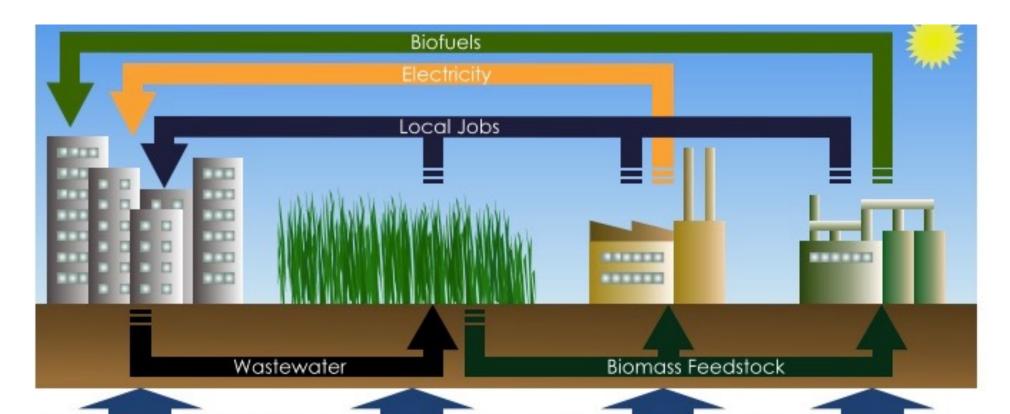






ARUNDO DONAX RENEWABLE ENERGY MODEL





Population Centers

Population centers benefit from the increase in local jobs and renewable energy resources.

Arundo Donax Plantations

Arundo donax produces significant yields even when grown on marginal land and watered with wastewater.

Power Plants

Biomass power plants are fueled with renewable biomass feedstock.

Biorefineries

Biorefineries process biomass feedstock into biofuels that can power cars and mass transit.

ARUNDO DONAX BIOMASS FOR PELLET PRODUCTION



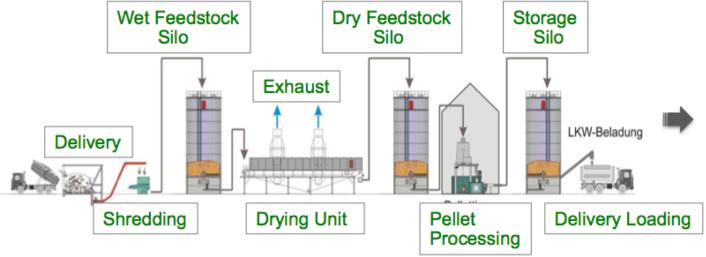


Pellet Plant Site (120,000 Tons/Year)





Pellet Storage Silos





Pellets

Pelletizing Plant Schematics



THE PROCESS



THE RENEWABLE ENERGY SOLUTION MODEL





Plant Establishment Nursery



New Plant



Plant Acclimatization



Field Planting



Field Establishment



New Field After 2 Months



Field After 3 Months



Field After 6 Months



Plant Characteristics

THE RENEWABLE ENERGY SOLUTION MODEL









Field Drying





Round Baling



Freshly Cut Plant Material



Dry Plant Material Collection





Field Baling & Densification



Bale Densification



Automatic Bale Collection



Loaded Bale Trailer

THE RENEWABLE ENERGY SOLUTION MODEL









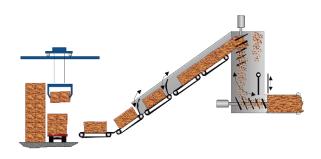




Power Plant Site

Bale Unloading

Bale Storage



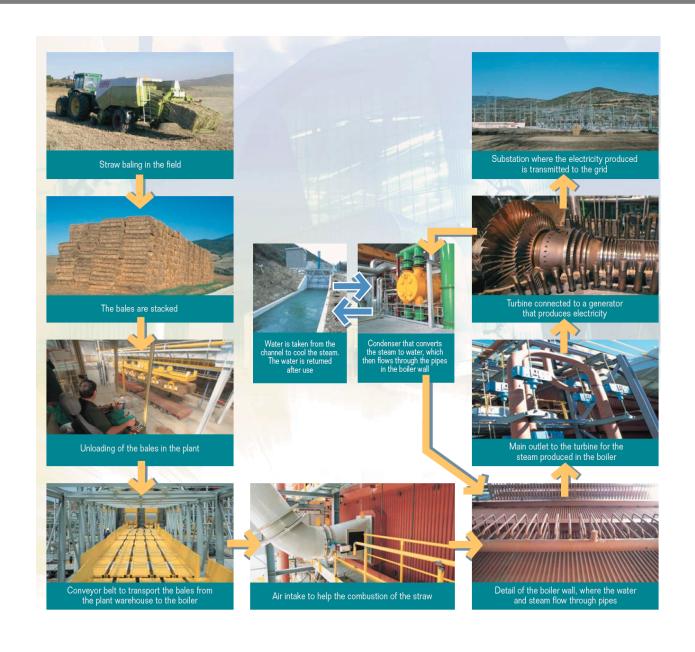






BIO-POWER PRODUCTION







ABOUT THE FEEDSTOCK



ARUNDO DONAX: HIGH YIELD & LOW COST







- The worlds top energy crop; high yield, low maintenance
- Grown in Mauritius; perfectly adapted as it has been found growing naturally
- High calorific value; equal to sugar cane bagasse
- Low requirement crop; low fertiliser and water (50% of Sugar cane's requirements)
- Non seasonal; harvesting 12/12 months
- Wide adaptability; resistant to drought, flood and cyclone
- A sustainable solution for the small planters



CONCLUSION



THE PROBLEM STATEMENT



Annual Decline in Sugarcane Prices and Production (6% per annum) with Rising Industry Costs

■ 17,000 ha productive land unutilized resulting in economic losses and social impact creating rising unemployment

Burning Coal to Generate Electricity Severely Increases the Environmental Impact

- Ash disposal hazardous and difficult to contain safely and appropriately causing leaching into the water system and ocean
- Main contribution of CO2, NOX & SOX harmful emissions released into the atmosphere

The Country 's Energy Supply is mostly Dependent on Imports of Fossil Fuels

Coal and transport fuels form a significant total of goods Imported and severely impact on the cost of Foreign Exchange

Post COP 21 Paris Accord the Country's Climate Change Agenda needs to be addressed

To achieve a 30% target for sustainable energy by 2025 without damaging the economy, innovative strategies are required to be implemented by the Government

ARUNDO DONAX: THE SUSTAINABLE MODEL



Reduce the Environmental Impact of Coal

- Disposal of ash problems can be alleviated
- Leakage of coal contaminants can be reduced to avoid excessive pollution of waterways and destruction of the ocean's coral reef

Achieve COP 21 Targets

- Arundo will assist the Government to reduce CO2 emissions
- Arundo energy is carbon neutral when combusted and 50% CO2 is sequestrated in the ground during its 10 year cultivation cycle

Arundo Donax Ready Biomass Solution Non invasive (FAREI Research Report)

- Advanced hybridised variety K12
- Grows on marginal land
- Low water and fertiliser requirements
- High yield (135 tons /ha)
- FAREI and UOM researched (4 years)

Mauritius Benefits

- Become leader in sustainable clean energy
- Social and economic benefit new employment
- Enlarge the fiscal base higher income for the Government
- Develop a strong sustainable "Green Economy" sector activity
- Reduce Imported energy dependency and FOREX costs
- Environmental Protection

Save Foreign Currency

- Currently Mauritius imports 800,000 MT of coal per annum
- Equilibre plans to reduce current coal imports by 20% or 160,000 MT per annum in its first phase
- FOREX savings on USD 12 million import cost (Coal Price = USD 75 / MT)



Drives SMEs and Land Usage

- 17,000 ha of agro land not planted
- Equilibre plans to produce 2,000 ha of arundo initially and increase to 5,000 ha equivalent to two 60MW powerplants

Diversifying from Sugar

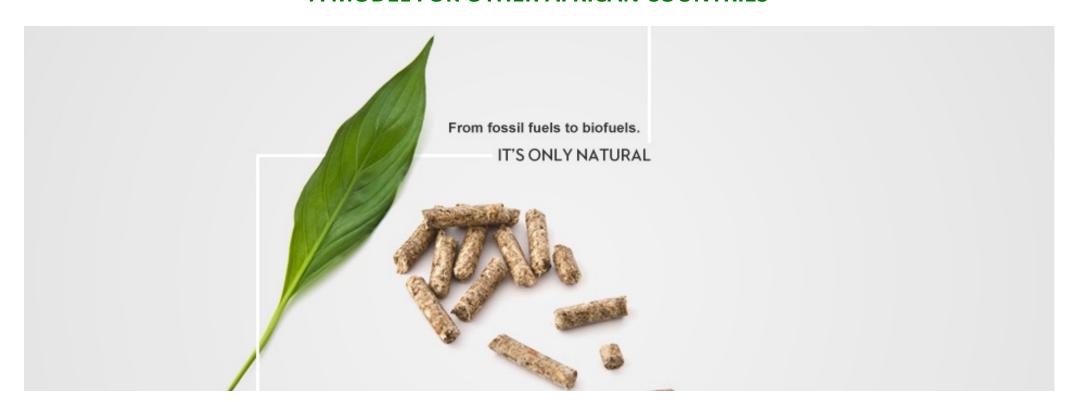
- Sugar in worldwide decline
- Growing biomass energy is an excellent way to use marginal land
- Equilibre will not impact food production or convert viable land from sugarcane agriculture



THANK YOU

INITIATED IN MAURITIUS

A MODEL FOR OTHER AFRICAN COUNTRIES



CONTACT DETAILS





Laurent de Morelos

Founder and Director – Equilibre Group

Email: Imorelos@equilibregroup.com

Mobile: +230 5 477 4000

Website: www.equilibregroup.com