



MILLENNIUM BIO ENERGY

Decentralized Energy from Invasive Water Weed

Can Tho, Vietnam, 30 October 2020



- Food

Water Hyacinth infestation harms fishery. Removing water Hyacinth restores biodiversity and the food production that depends on it

- Energy

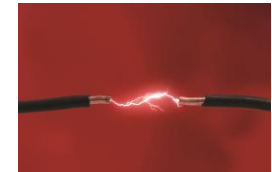
Electrifying rural areas is expensive. Biomass based electricity can be run standalone and sustainably at low cost

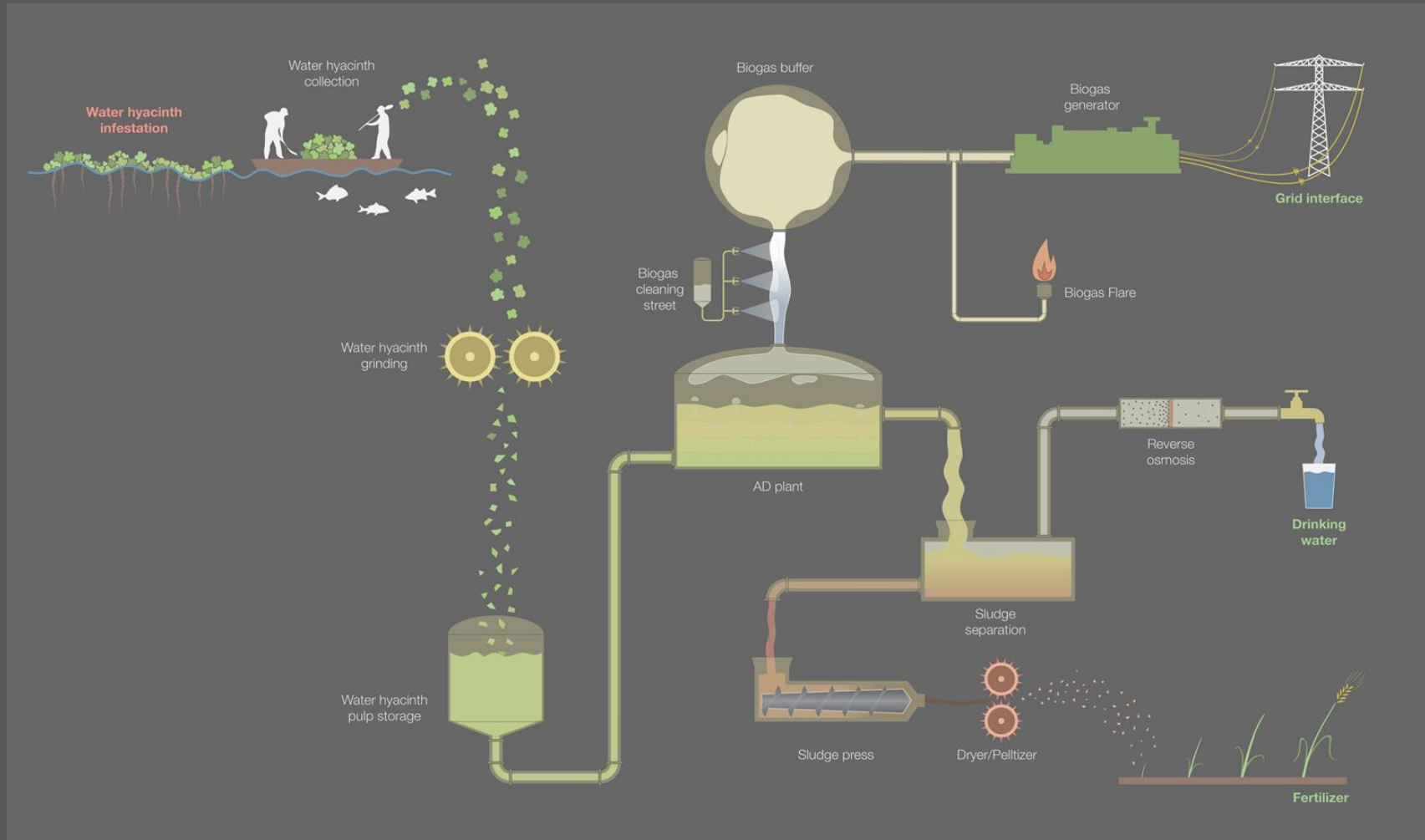
- Water

Water Hyacinth contains 90% water. Recovering the water as drinking water uplifts living conditions

Millennium Goals

We are part of the Local community and participation in local well-being in the form of contribution to millennium objectives





HARVESTING

DIGESTION

ENERGY & FERTILISER



Water Hyacinth

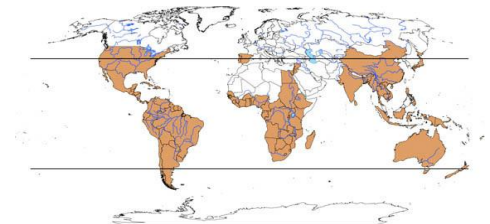
- Most invasive plant in the world
- Major threat to biodiversity
- Reproduces every 5 – 15 days
- Seeds can survive up to 30 years

Water Weed Infestations

- Completely covers water way
- Blocks transportation and traffic
- Blocks sunlight from reaching underwater ecosystem
- Rotting plants cause acidification of water body and kills fish
- Infestations weight 500 ton/ha – slows the flow of water
- Evaporation is up to six times higher than open water

Maintenance Solutions by MBE

- Harvesting → Grows back in 5-15 days
- Chemical → Costly and kills all other life
- Biological → Replacing one pest by another





Reactor Design

- 3-Stage, Plug Flow Design
- Designed to deal with very wet biomass by University of Florida
- Solids Retention Time is 25 days, Hydraulic Retention Time is 11 days
- Modular Design for redundancy, resilience and scalability
- Pre-Selected microbes allow fast starting and reduce downtime
- In principle, generic AD technology, but tuned for water weed

Proven Solution

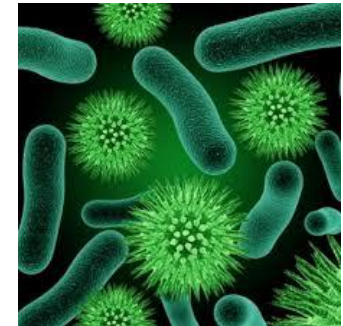
- The technology has been used in a dedicated water hyacinth power installation in India, for more than 14 years, uninterruptedly
- Can be used with any green waste

Water Weed Energy Potential

- Delivers 80 m³ of biogas per ton raw biomass
- 1 MWhe = 6,25 ton raw biomass

Gas Cleaning and Storage

- Gas Storage for homogeneous delivery to generator
- Gas Buffering for electricity demand fluctuations





❑ Decentralized Electricity Production

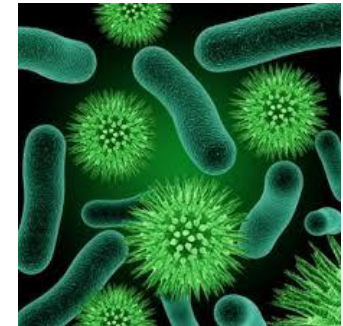
- On – or off-grid
- Optimal production scale is 5 MW
- Economic viability is determined by the cost of electricity and waste management
- Carbon-neutral or Carbon-negative

❑ Digestate is an excellent Fertiliser base

- Low K, high N & P
- Alkaline, so good for pest control

❑ Larger Scale Installation can Produce CO₂

- CO₂ is byproduct of digestion
- Important product for food & beverage, industry and health care
- Green replacement for fossil-fuel based CO₂
- CO₂ refineries, Processing and Storage are industry-standard
- 1 ton raw Water Hyacinth produces 60 kg of CO₂
- 1 MWh of electricity delivers 380 kg of CO₂





Circular Solution

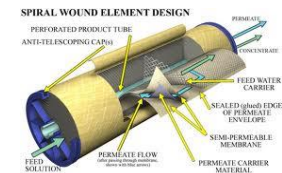
- Water weed is used for waste – to – value conversion
- Value conversion generates money to manage water weeds
- Economic viability is a choice: how much value does waste management carry?

Economic impact

- Water weed management mitigates water weed misery
- Energy availability supports economic growth
- MBE installation creates “green” employment

Ecological impact

- Water weed management protects water availability and - safety
- Water weed management protects biodiversity and food security
- Energy availability supports economic growth
- MBE installation creates “green” employment





 MILLENNIUM BIO-ENERGY

THANK YOU

