

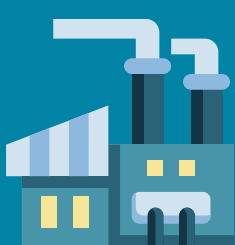
Wastewater treatment in the Crocodile River

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EBP2002

What is wastewater?

42%



11%

untreated household wastewater harms the environment.

of total estimated wastewater is currently repurposed.

limited freshwater resources
→1200 m³/person/year

WWTPs struggle, discharging effluents into surface water.

Subjected to frequent blackouts.



10,500 km²

300 km east of Johannesburg

Lower reaches exhibit poor water quality from runoff, mining, and WWTP effluents.

Why do we need to address this problem?



WATERBORNE DISEASES
E coli



BIODIVERSITY
Marine species
Environment



CLIMATE CHANGE
Emissions of methane
Eutrophication



HEALTH OF HUMANS
Adverse health impacts on communities consuming the crops



FOOD SECURITY
Impact on crop yields



ACCESS TO CLEAN WATER

What do we need to address this problem?

PARTNERSHIPS
Crocodile River Partnership



NEW TECHNOLOGIES
Advanced wastewater treatment technologies



COMPETENT LABOUR
Training personnel on new technologies



SECURITY
Ex: cybersecurity

1.

2.

3.

4.

5.

6.

FUNDING

Grants or private investments

RENEWABLE ENERGY

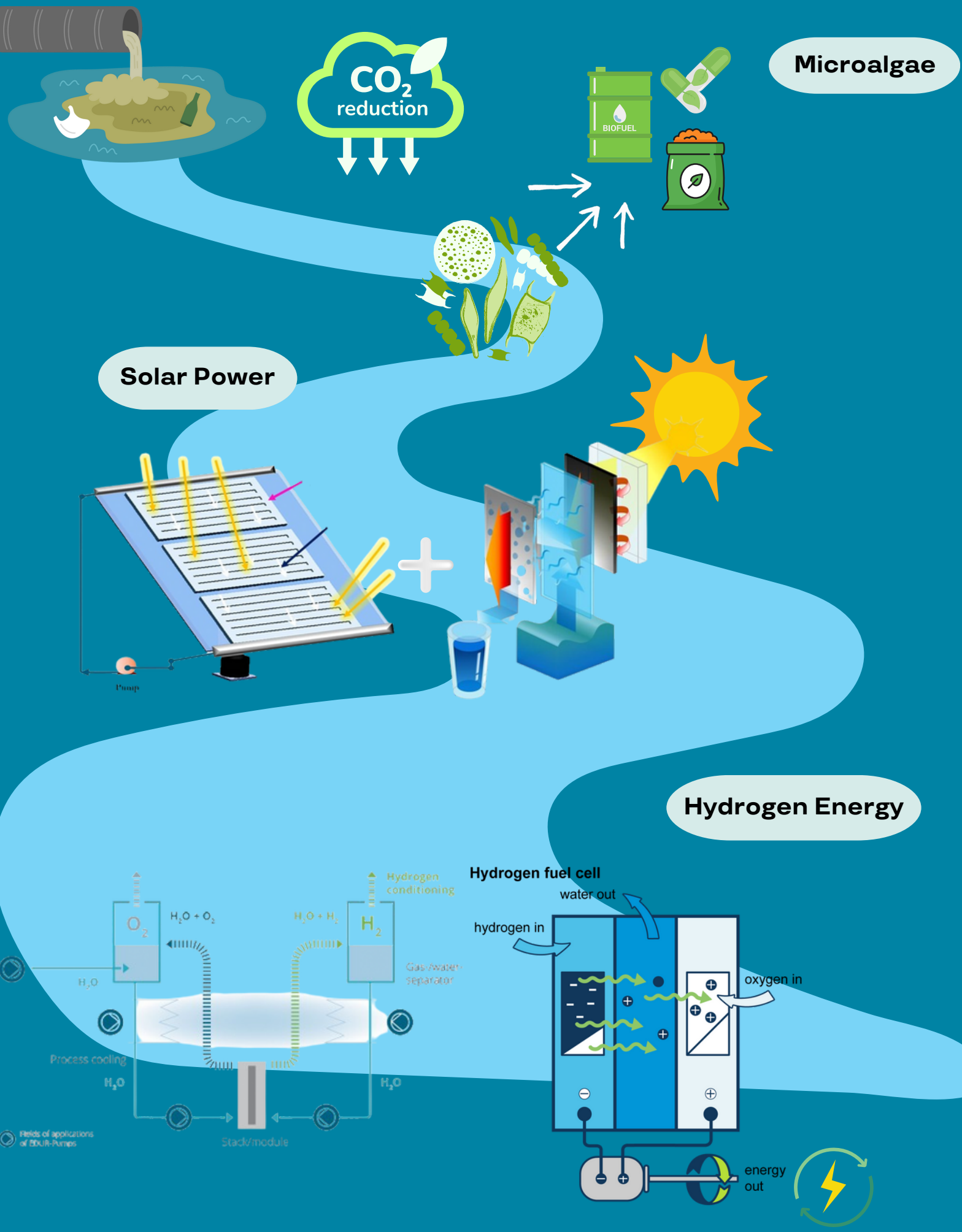
Reduce environmental impact

RQ: How can wastewater treatment facilities along the Crocodile River in Mpumalanga, South Africa, be optimized?

SQ1: What measures can be implemented to improve WWTPs processes?

SQ2: How can WWTPs be made self-reliant in terms of energy consumption?

SQ3: How can WWTPs operate in a cost-efficient manner?



Impact Analysis

Technology	Energy Self-Sufficiency	Water Treatment	Cost-Efficient	Expected Impact
Microalgae	Low	High	Medium	Medium
Solar Power	Medium	High	Low	Medium
Hydrogen Energy	High	Low	Medium	Medium
Microalgae + Solar Power	High	High	Medium	Medium-High
Microalgae + Hydrogen Energy	High	High	Medium	Medium-High
Solar Power + Hydrogen Energy	High	High	Low	Medium
Microalgae+Solar Power +Hydrogen Energy	High	High	Low	Medium