Seminar: Unconventional Water Resources

Project Plan -
Algae Water Treatment in South Africa

University for Sustainable Development Eberswalde
2 April 2022

Munich Re Foundation
From Knowledge to Action

1. Task

Munich Re Foundation
From Knowledge to Action

Algae Water Treatment in South Africa

Delivery Date 02. April 2022

Project Developers | Government Officials | Local Civil Society | On-Site Staff | Other

Town with existing waste water ponds should get algae treatment inspired by Motetema and Brandwacht project - serves around 1 560 households

2. Project Goal

Munich Re Foundation
From Knowledge to Action

Supplying a local population with recycled water from their town to potentially use in their domestic, industrial and agricultural endeavours and becoming more independent from fluctuations from freshwater supply.

Our vision for this project:

reusing water that is already in the system (our location)
building longlasting infrastructure
improve existent waste water treatment system (local infrastructure)
sustainable and efficient technique
enable participation of local community
leading the way in waste water treatment solutions

3. Defining Success

all risks are mitigated, project is running and accepted by local population

Munich Re Foundation
From Knowledge to Action

Phases

Basic research 1st Year	Pilot plant 2nd-3th Year	Prototype 4th-5th Year	Pre demo 5th-6th Year	Dem 6th--8th Year
Phase 0: Planning	Phase 1: Exploring	Phase 2: Adjustment	Phase 3: Expantion I	Phase 4: Expantion II

Strategic approaches

including local stakeholders

letting locals participate so that acceptance for treated water will be higher

make area-specific unconventional water resource(s) a priority in local political agendas, policies, and management of water resources in water-scarce countries and river basins, and enable their use through supportive action plans;

support increased scientific funding to understand and tap the potential unconventional water resources

Encourage private sector investment in projects utilizing unconventional water resources;

3. Defining Success

Munich Re Foundation
From Knowledge to Action

From Goals to Milestones

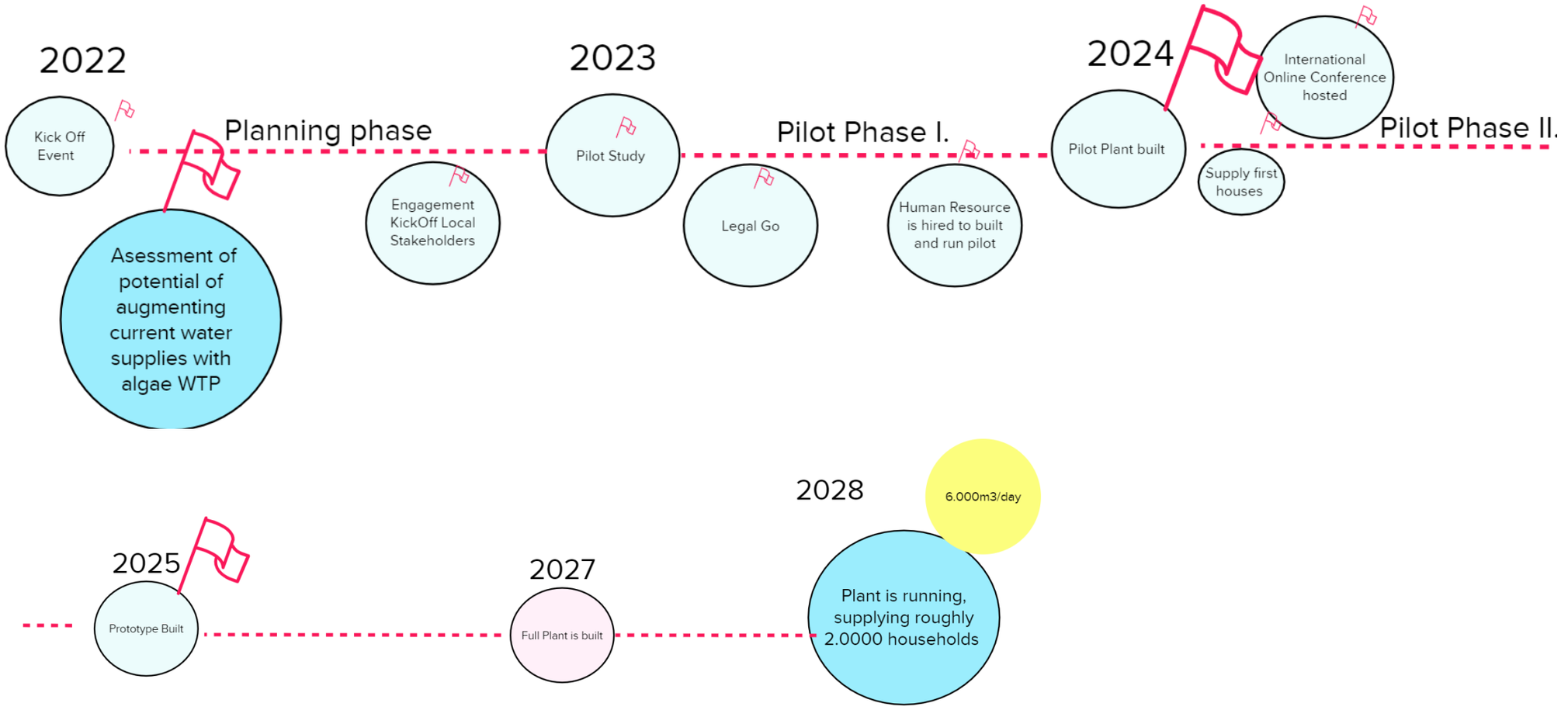
Understand and analyze the economics of action and inaction to overcome the perception of high costs or impossibilty by undertaking comprehensive analyses --> release report

build capacity of skilled human resources to run the single phases of the project

S.M.A.R.T. goals are much more achievable, ultimately leading to success.

4. Project Timeline – Milestones

Munich Re Foundation
From Knowledge to Action

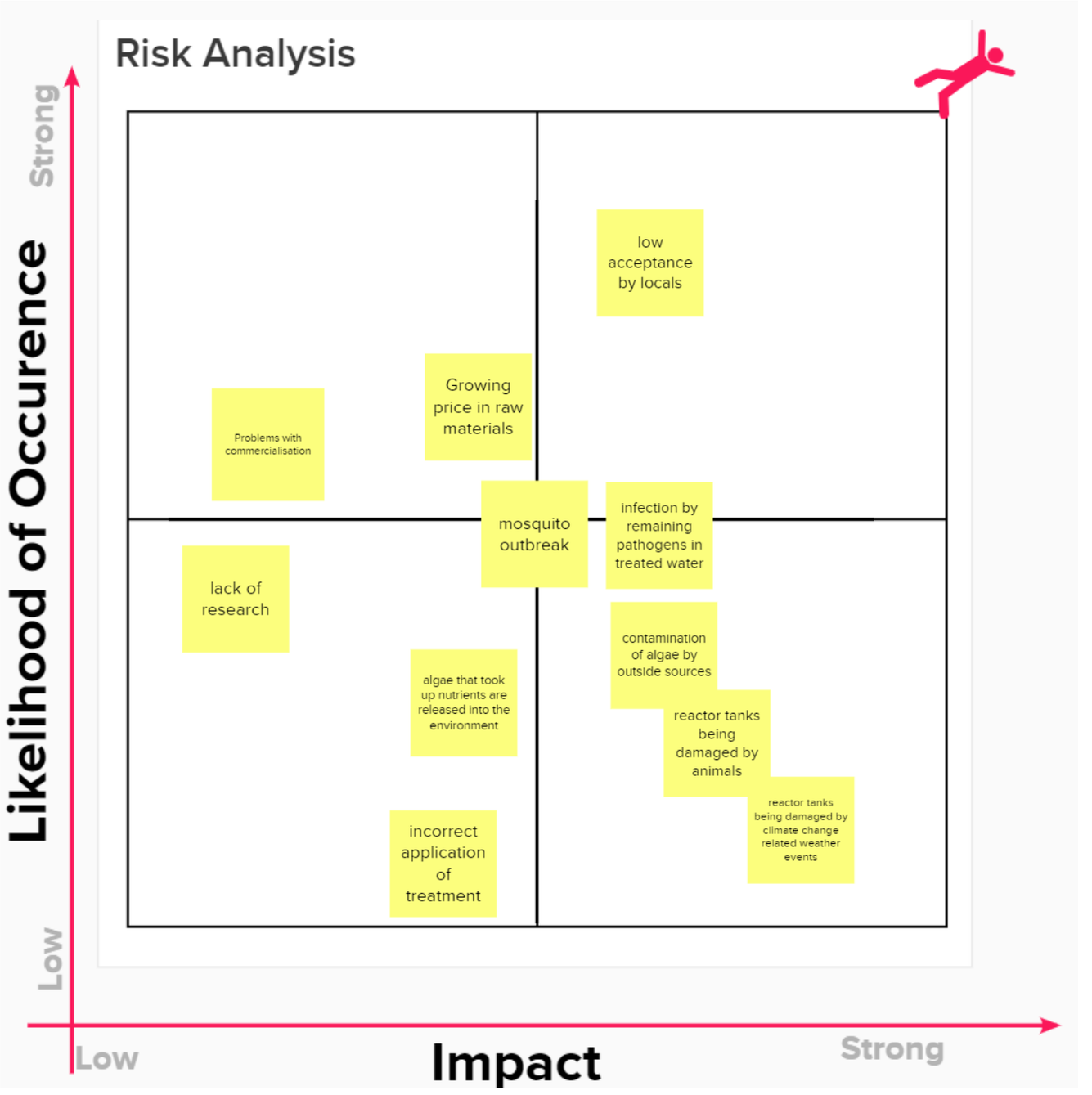


5. Advantages / Disadvantages (Consequences)

Munich Re Foundation
From Knowledge to Action

social	• can contribute to water justice • can contribute to SDGs like "clean water for all" • water infrastructure can trigger development in the area and improve quality of life in the area	• low acceptance rate of treated waste water can trigger conflict • if scaled up, land is needed
economic	• low electricity consumption --> low costs • establishment. of work places	• low acceptance rate of treated waste water can trigger conflict • algae is more innovative kind of water treatment, and therefore research might be costly
ecological	• environmentally friendly: - zero land fill - also other positive side effects, such as • energy recovery as biomethane; • microalgeae als biofertiliser	• potential spillover

6. Risk Analysis



Munich Re Foundation
From Knowledge to Action

7. Mitigation Of Known Risks

Munich Re Foundation
From Knowledge to Action

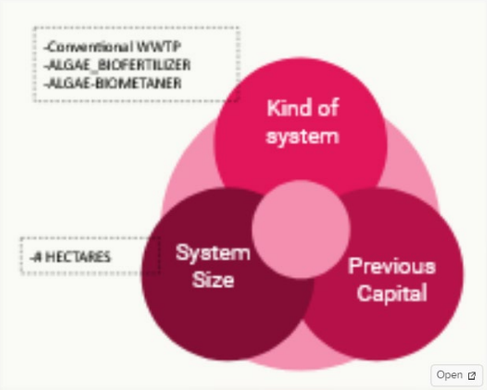
low acceptance by locals	big interactive knowledge and capacity building campaign, especially around the mechanism of the cleaning process, starting in school
incorrect application of treatment	make the maintenence of the facility integrated task of importance (via education), stay in contact with other communities having done that case study
mosquito outbreak	having ponds with a depth of more than 1 meter and steep/vertical walls, regularly check for larvae
algae that took up nutrients are released into the environment	monitoring algae concentration, using durable materials
tanks being damaged by animals	using resilient materials
reactor tanks being damaged by climate change related weather events	
lack of research	Initiating an international network / annual conference for algae based water reuse systems
infection by remaining pathogens in treated water	removing bottom sludge before wetting; water should be designated to non direct contact with people
contamination of algae by outside sources	shielding algae in reactor tanks from outside influences; costant monitoring

8. What Will This Costs?

Munich Re Foundation
From Knowledge to Action

Allocated: 10.000.000 €		
1. System		
Implementation COSTs / CAPEX	**€ (850 h.e.)**	**€ (30.000 h.e.)**
		(Differents tech: It's Biometaner)
Civil works and auxiliary installations	93.500,00 €	
Mechanical and electrical installations	65.000,00 €	
Pre-treatment	23.000,00 €	
Algae lagoons	15.000,00 €	
Algae harvesting	45.500,00 €	
Sub Total	**242.000**	**4.650.000**
Operation COST (OPEX)	(medium flow)	0 (- 1.450.000)
Fixed cost: Laubor, maintenance, electrical power	5.200	
Variable costs: Electricity, regents, Algal biomass disposal, CO2 addition etc.	1.800	
Subtotal	**7.000**	**0**
Land costs (rent/buy)	*Dependent on method*	
2. Education and Communication		
Lecturers, Talkers, Materials, certification	100.000	100.000
Communication Strategies	50.000	50.000
Sub Total	**150.000**	**150.000**
3. Project Adminsitration		
Labour, documentation, and another system operation	80.000	80.000
Savings for unpredictables.	200.000	200.000
Sub Total	**280.000**	**280.000**
Total per year	**680.000**	**5.080.000.00**

6.000m3/day



9. Action Items

Munich Re Foundation
From Knowledge to Action

What are our next steps?
Who is responsible for doing them?