

MACAO INTERNATIONAL ENVIRONMENTAL CO-OPERATION FORUM & EXHIBITION

CIRCULAR WATER AND WASTE AVOIDANCE SOLUTIONS FOR REGENERATING ECONOMIES

Re-setting our relationship with water



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Water Challenges..... To be solved!

Water, water everywhere, but not a drop to drink

"The Rime of the Ancient Mariner", Coleridge



TOO LITTLE
Poverty & conflict



TOO MUCH
Destroys crops & businesses



TOO DIRTY
Source to sea
Persistent pollutants



TOO SALTY
Expensive to desalinate



IN THE WRONG PLACE

WATER MANAGEMENT & POLLUTION CONTROL



TOO COSTLY



HIGH CARBON FOOTPRINT

Water - the “Cinderella” of the environmental arena



UN 2023 Water Conference
22 – 24 Mar 2023, New York



2023 – first UN global water conference in 47 years!

“if climate is a shark, water is its the teeth”

(James P Bruce)



**Even WEF now sees it as
“on trend”**

Largest water users

- Agriculture (70+%)
 - irrigation
- Thermo-electric power
- Industrial
 - cooling & boiler feed



DATA CENTRES & AI Growth

Clashes with communities & other demands

- Direct: cooling
- Indirect: power generation

Consume **0.1 ~ 2.0 Litres / kWh (WUE)**

50 MW centre consumes 10 – 20 MLd

- 50,000 - 100,000 people equivalent

AI rapid growth has huge consequences

Traditional Government approach

More infrastructure - inefficient & expensive

Desalination plants - damaging to ocean

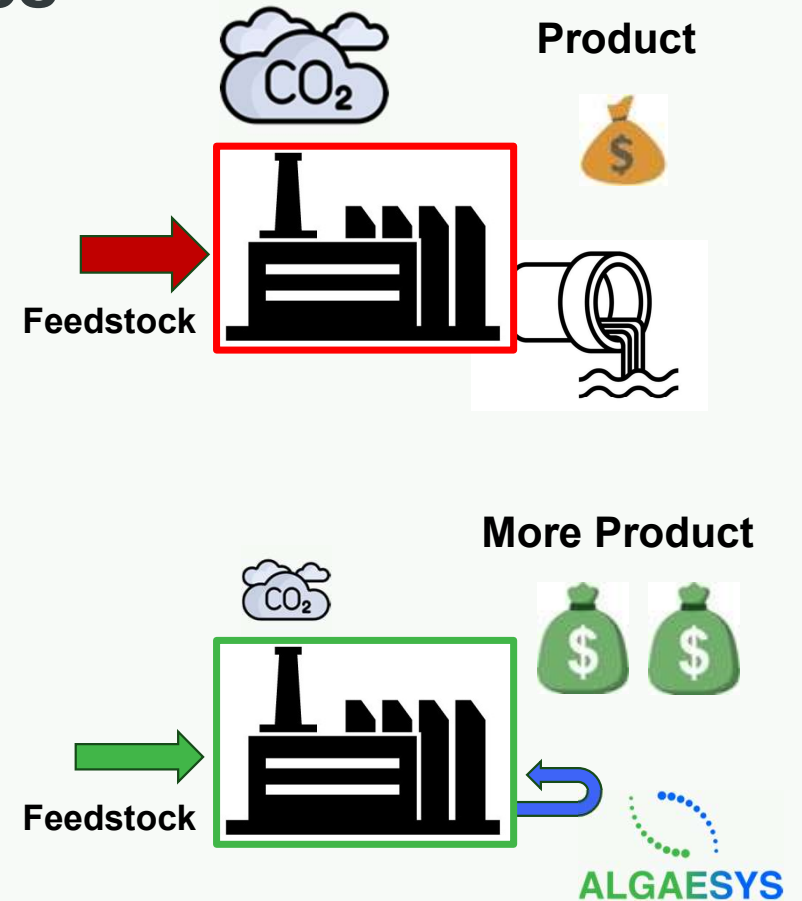


Municipalities & industrial parks

- limited budgets & tariff income
- inappropriate technology
- high O&M burden

Implement point of use efficiencies

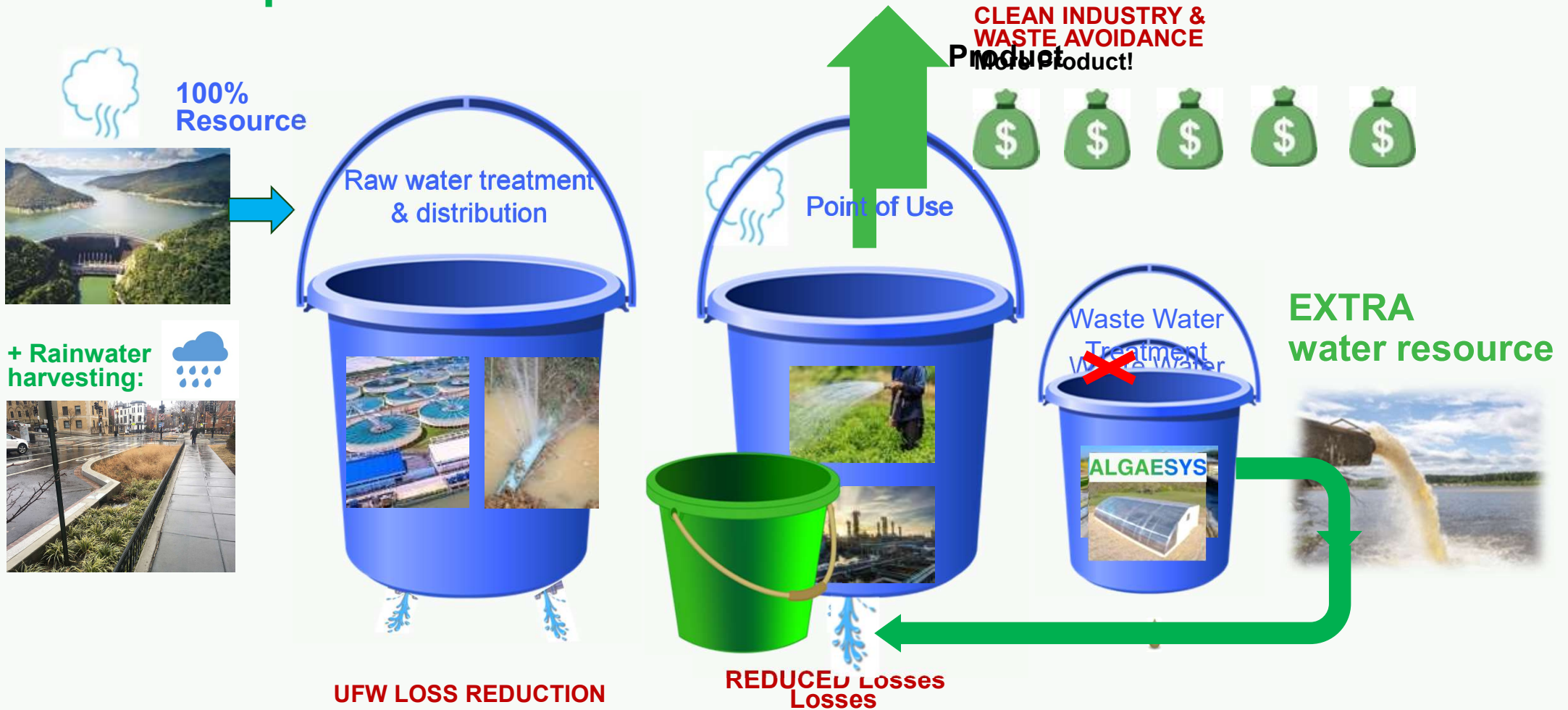
- Philosophy
 - **Water & Resource Use Efficiencies**
 - **Reduce end of pipe** volumes & pollution loads
- Hierarchy of interventions
 - Clean production technology
 - Improved practices & asset management
 - Recover & recirculation
- **Decentralisation** opportunities



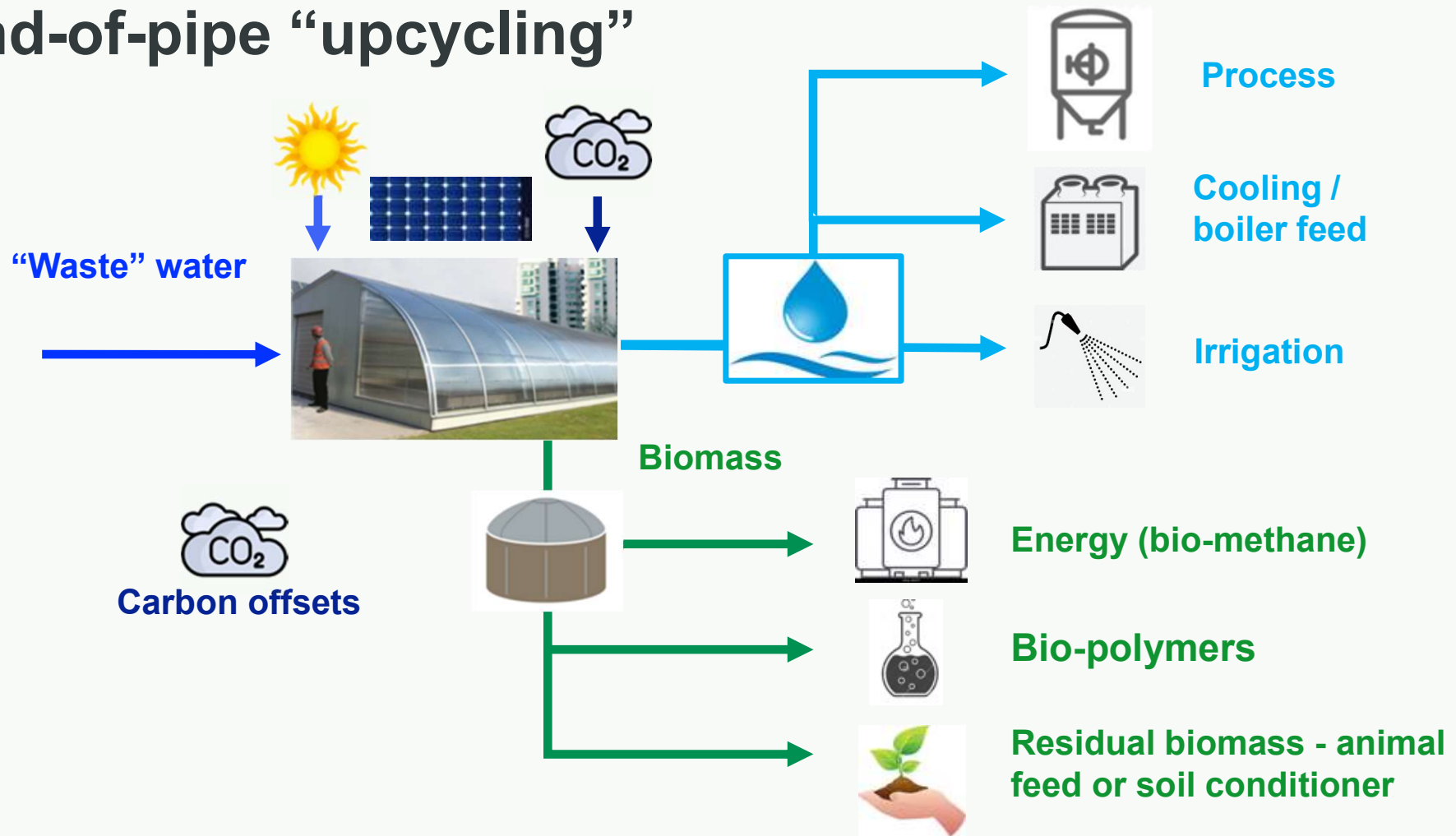
Conventional Water Cycle



..... + Implement user efficiencies



End-of-pipe “upcycling”



Affordable solutions are available!

Harnessing 3.5 billion year old tech

.....natural Algae & the power of the sun

- Algae robust to toxins & shocks - reliability
- Intensive process – highly oxidative environment
- Destroys persistent organic chemicals & pathogens
- Captures micro-particulates & metals
- Carbon negative: C sequestered to biomass



ZERO POLLUTION
Persistent organics,
microplastics



WATER SECURITY
To the highest global standards



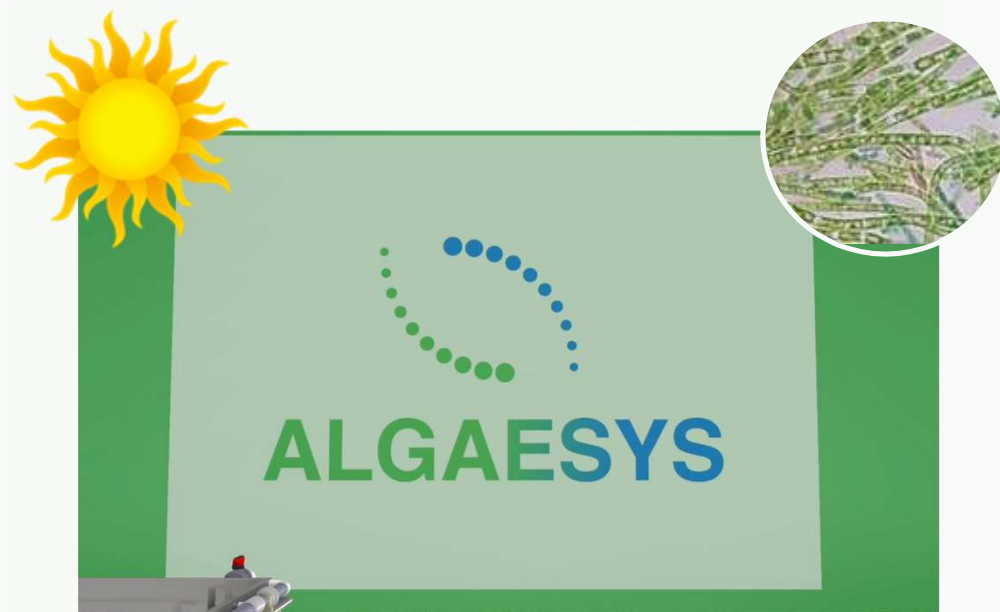
ENERGY EFFICIENCY
Up to 90% saving, 100% with
renewables



**UNIVERSAL
AFFORDABILITY**
50 - 80% less lifecycle cost



CARBON NEGATIVE



New approach

Avoids human – v – nature's conflict

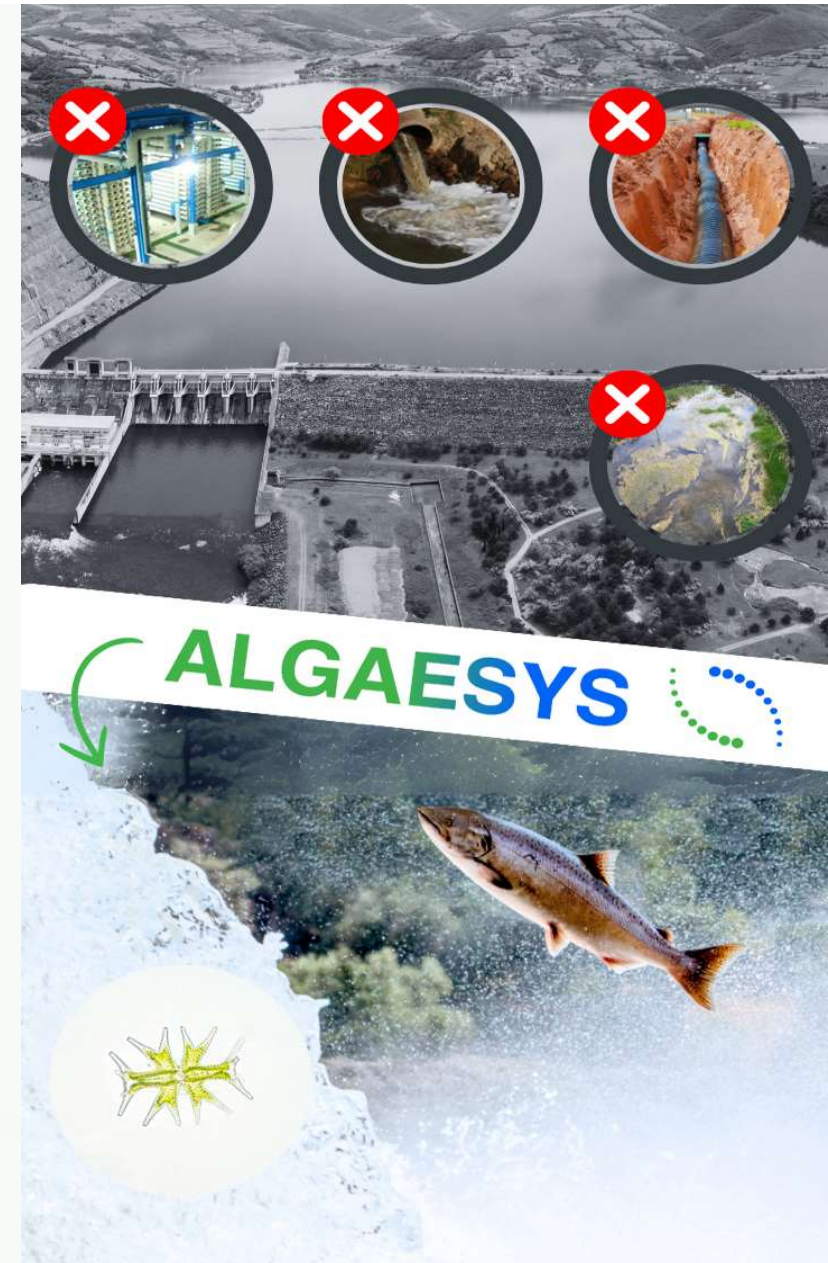
- REGENERATIVE resource management / growth

Alternative to large disruptive infrastructure projects

- Avoid transfer - Restoring both source & receiving catchments
- Decentralisation – faster implementation, lower costs & tailored to local needs – greater community engagement

Eliminates pollution & hypoxia in rivers & ocean

- Re-establish plankton
 - food chain
 - absorbs CO2
 - create natural aerosols form clouds
 - omega 3 oil films, reducing evaporation



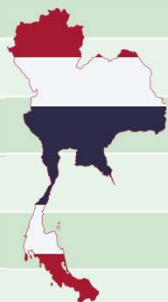
Unblocking economic growth

What revenue does that extra (regenerated) cubic metre of water create?

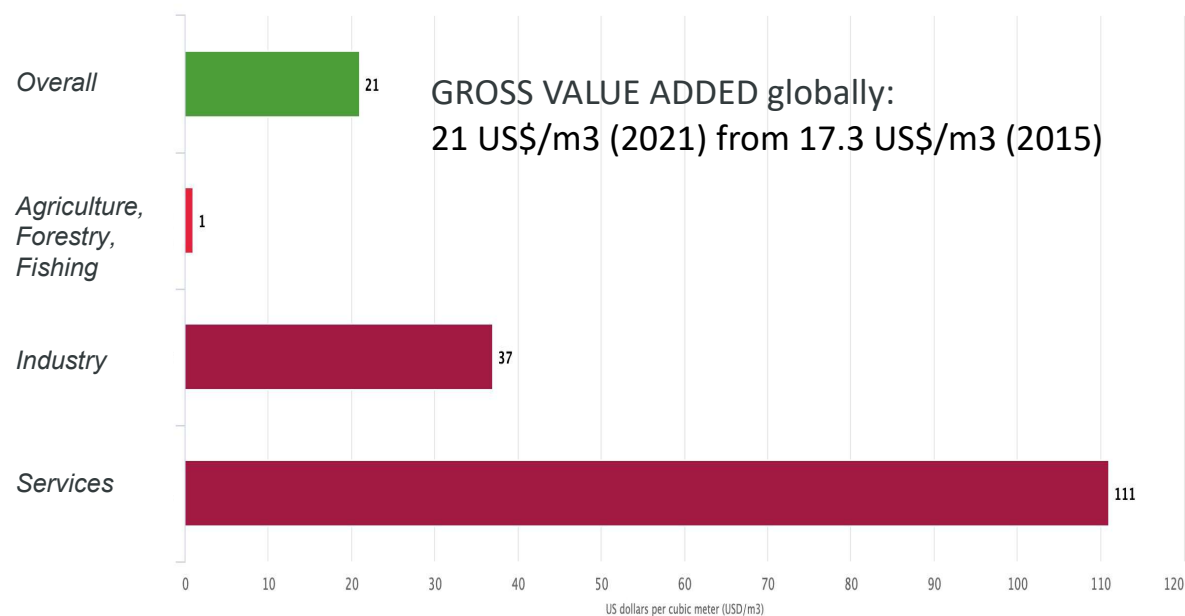
ECONOMIC VALUE OF WATER

- Raise value of "waste" water from ZERO / -ve
- Raise GDP / water consumed

Thailand example	Direct GDP US\$ / m ³ usage
Oil & gas	16,000
Petrochemicals	950
Breweries	1,160
Metal fabrication	130
Concrete & cement	40
Iron & steel	13
Economic value of water (2022): US\$ 7.4 / m ³	



SDG 6.4.1 Change in Water-use Efficiency



“海納百川 - all rivers lead to the sea”

Regenerate economies & ecosystems with **affordable water security**

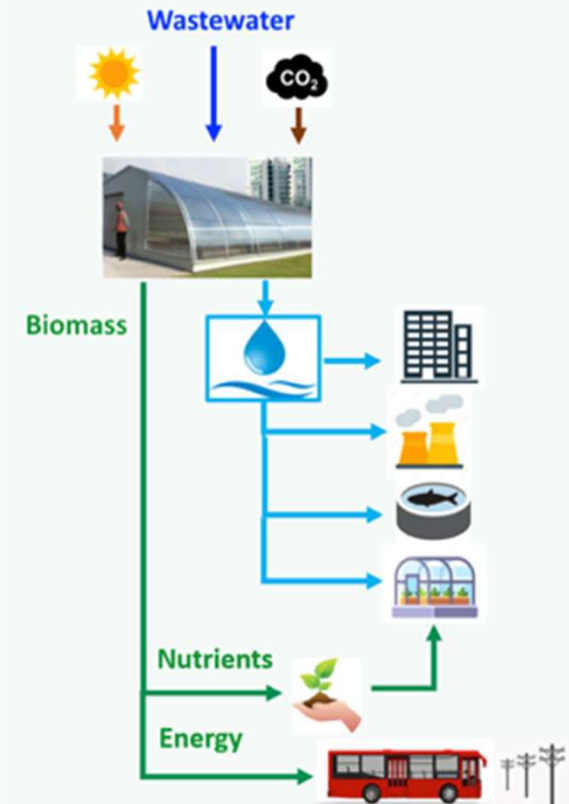


Mine raw sewage & industrial effluents → high quality water

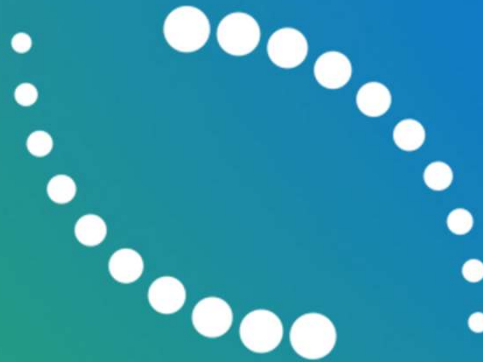
- Fast-tracked affordable, reliable water supply to industry
- Avoids / Replaces inadequate public sewage treatment assets
- Shift from tax-payer **liability** to water supply **income & ROI**
- Decarbonising water management

Food, energy & digital security

It's time to re-set our relationship with water



uplink | Top Innovator



DECARBONISING RESOURCE RECOVERY EMPOWERING ECONOMIES AROUND THE WORLD

www.algaesys.earth