BKT | About us




BKT
Innovation
Beyond Waste





After over 20 years of success in industry, BKT now embarks upon a higher level of innovation through synergizing technological advances on the basis of its existing in-house technology portfolio at new headquarters in Daejeon, center of Korea's R&D institutions.

BKT | Innovation Beyond Waste

Company History

2015 Corporate Headquarters moved to Daejeon.

2014 Vietnam Headquarters established.
[BVINA : BKT Vietnam]

2008 US Corporation established.
[BUS : BKT United]

1998 Expansion of environmental services.
[BKO : BKT Korea]

1995 BKT Korea established.

Global Presence

BVINA

Hanoi, Vietnam (Est. 2014)

- Serving developing areas, including China & Southeast Asia
- Manufacturing facilities

BKO

Daejeon, South Korea (Est.1995)

- Corporate Headquarters
- Center for R&D and engineering operations

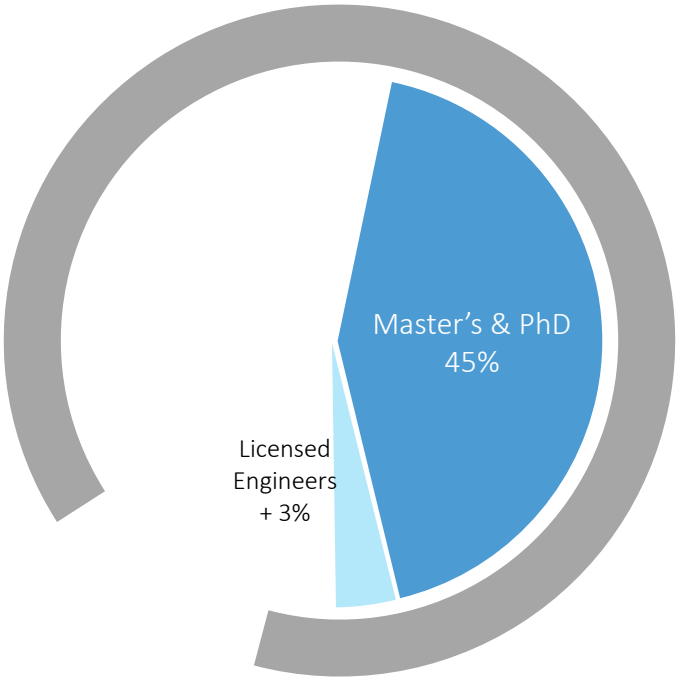
BUS

California, US (Est. 2008)

- Focused on business development in North America & Europe

Team Profile

Environmental Engineers: 81%



Total 110 Members

KEY TEAM MEMBERS

Il Ho Jeong	Seoul National Univ. | Oceanography
Ken Tasaki, PhD	MIT, Tokyo Institute of Tech.| Chemical Engineering
Dae Hwan Rhu, PhD	Korea Univ. | Environmental Engineering
Jang Kyu Kim, PhD	Sungkyunkwan Univ. | Chemical Engineering
Ho Jae Hwang, PhD	Korea Univ. | Environmental Engineering
Yong Joon Yune, PhD	Myungji Univ. | Environmental Science
Kyung Hwan Sung, PhD	Chungnam Univ. | Mechanical Engineering
Wook Sang Yoo, PhD	Aju Univ. | Environmental Engineering
Chulwoo Song, PhD	Kwangwoon Univ. | Environmental Engineering
HongKeun Park, PhD, P.E.	Columbia University | Environmental Engineering
Mihyung Kim, PhD	Seoul National Univ. | Environmental Engineering
Dong Jin Ju, PhD	Busan Univ. | Environmental Engineering
Gi Taek Park, MS	Chungbuk Univ. | Mechanical Engineering
Sun Yong Oh, MS	Univ. of Seoul | Environmental Engineering
James Kim, MBA	University of Michigan, Ann Arbor | MBA
Jong Gu Kim, MS	Kookmin Univ. | Civil and Environmental Engineering
Sang Wook Kim, MS	Korea Univ. | Environmental Engineering
Jungwoo Lee, P.E.	Stanford University | Civil Engineering

Achievements & Recognition

Updated in 2016

- 134 Patents Korea: 89 / Overseas: 45
- 45 Government R&D Projects

  US Dept. of Energy (2013~present)
- 17 Government Acknowledgements

  Top Tech Company, Best Workplace (2014)
- 15 Awards of Recognition

  Excellent Tax Payer by the Korean IRS (2014)

Operations Overview

WATER

Municipal Wastewater	Livestock Wastewater	Industrial Wastewater	Groundwater (US)
			

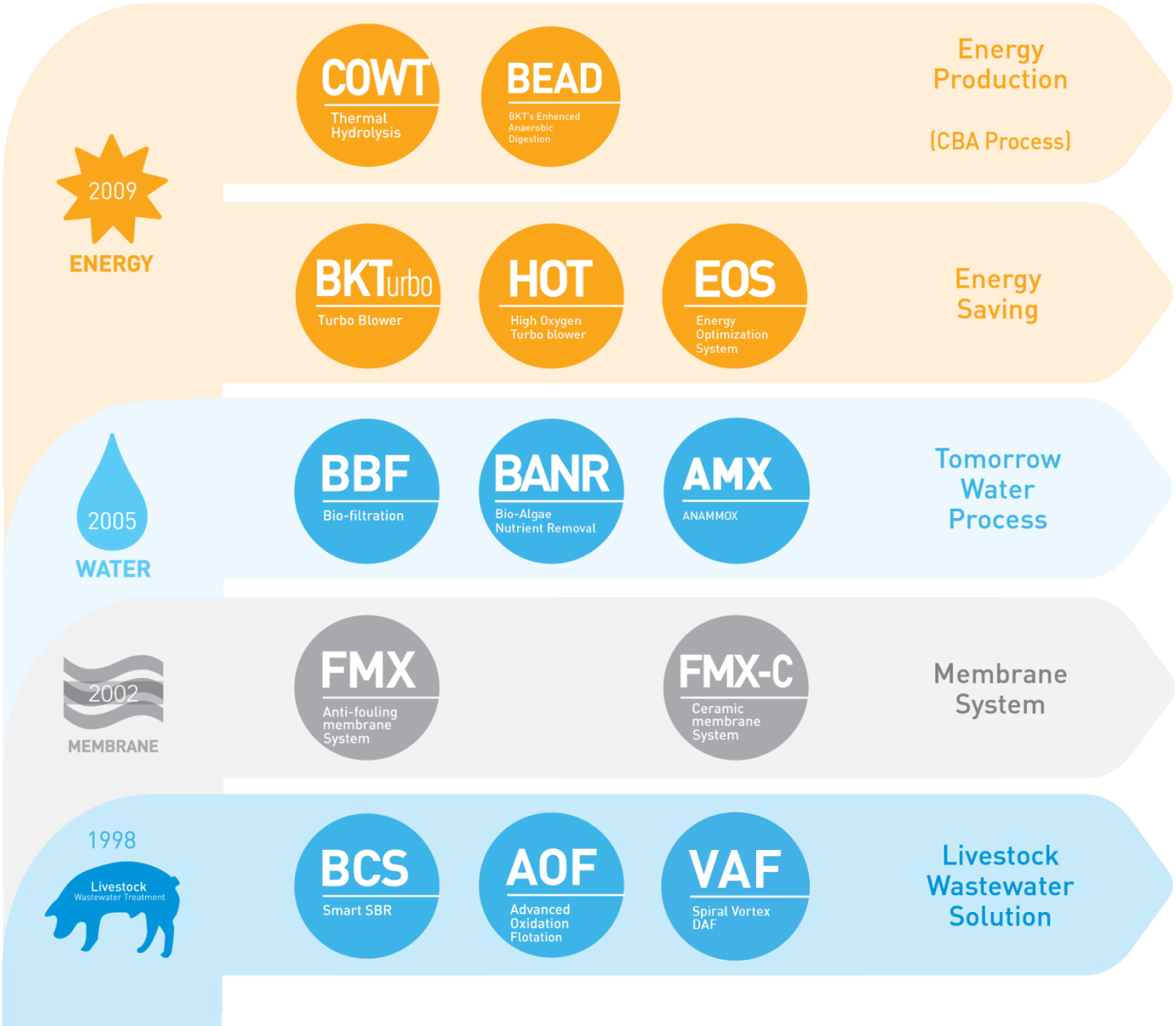
MEMBRANE

Waste Water Management		Manufacturing Processes	
Shale Gas FGD	Food & Beverage	Biotech	Chemical

ENERGY

Production	Recovery	Saving
Biogas Plant	Sludge Treatment & Reuse	Turbo Blower
		

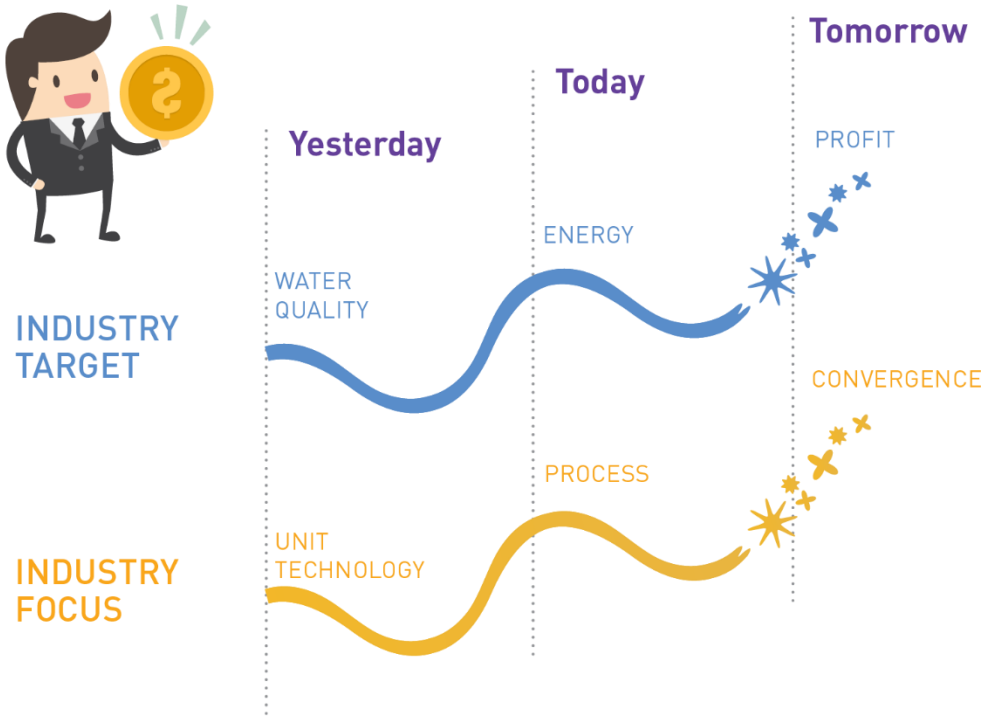
Technology Development



Water Division

BKT Water Business Overview

from Cost Stream to Profit Stream



- In the past, the focus was to improve the performance of each unit technology (i.e. BBF, BCS, COWT) to reach higher water quality targets.
- In the present, the focus is on energy efficiency through processes integrating C diversion.
  - **Upstream:** CBA Process
  - **Downstream:** TWP Stage I (BBF – Algae – Anammox – Flower Farm)
- In the future, the focus will be on convergence of cutting-edge technology in many fields.
  - TWP Stage II: DNA manipulation of Anammox to increase temperature tolerance

BKT Water Business Overview

TODAY'S Wastewater Treatment (NITROGEN) Solution

With over 50 references worldwide, BKT's *BioFiltration (BBF)* system is a proven technology capable of combining both physical filtration and biological treatment in a single reactor.

- MUNICIPAL WASTEWATER
  - Demonstrated compliance with CA Title 22 regulations
  - Recognized by the WERF LIFT Program
  - Ideal for *upgrading and retrofitting* existing WWTP
  - *Nitrogen removal for Wastewater Reuse*
  - *Removal of solids and soluble organics*
  - *Carbon Diversion* and control of *wet weather flow*
- GROUNDWATER REMEDIATION
  - simultaneous reduction of contaminants (i.e. *nitrate, perchlorate, selenium*)
  - generates no concentrated brine stream
- HIGH-STRENGTH INDUSTRIAL WASTEWATER STREAMS
  - i.e. livestock and high-Nitrogen wastewater
  - Robust *DUAL MEDIA functionality for nitrogen removal*

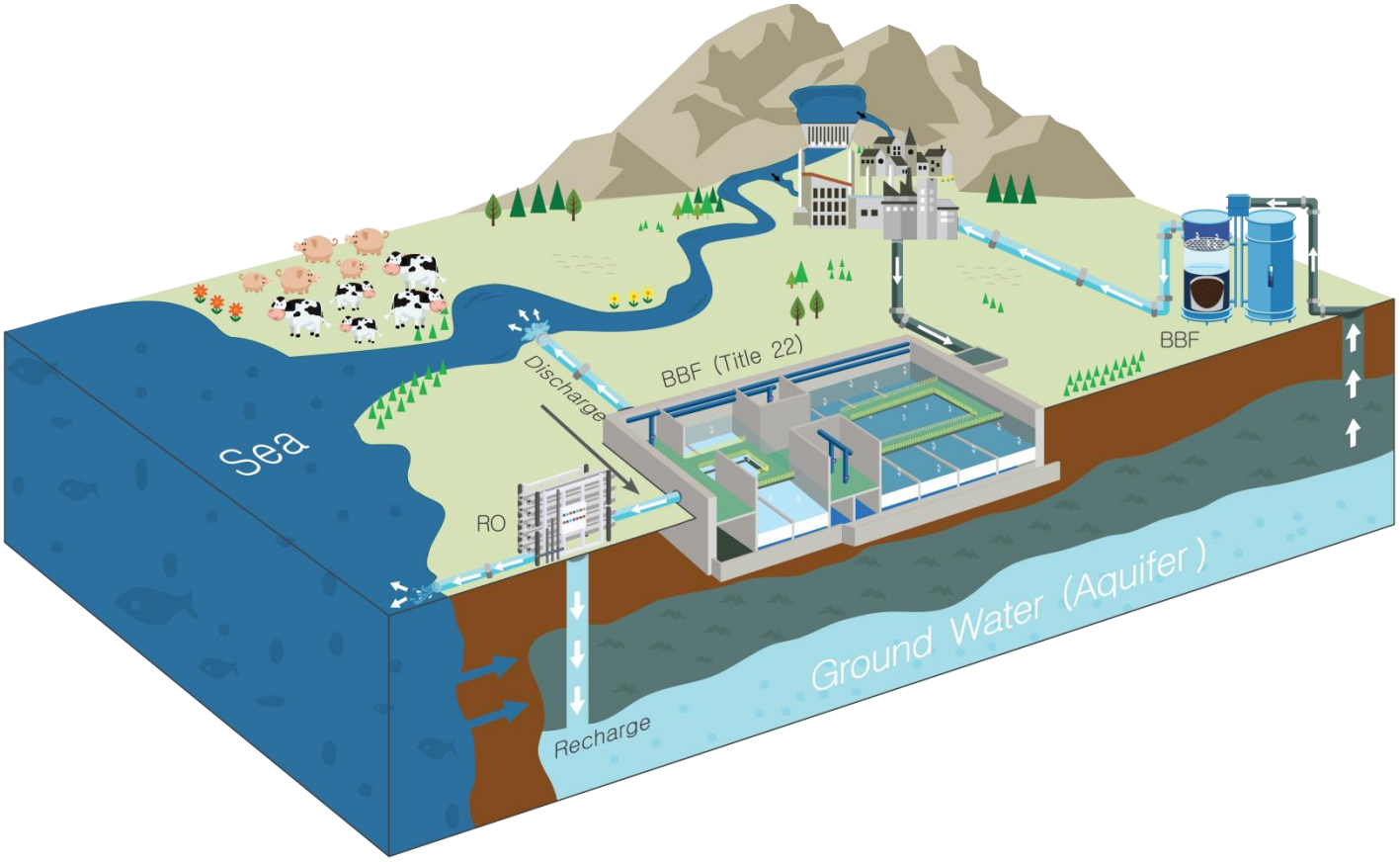
TOMORROW'S Water Resource Recovery Solution

Upgraded over decades of R&D to resolve emerging challenges and address tightening future regulations, BBF now continues to undergo active development in combination with innovations including *Anammox*, *algae*, and *granule* technologies.

In pursuing the ultimate goal of converting wastewater *from cost stream to profit stream*, BKT has extended its innovative research commitment to energy efficiency solutions, such as *Thermal Hydrolysis*, *Turbo Blower*, and *Activated Anaerobic Digestion* technology.

MUNICIPAL WASTEWATER	1 PRIMARY	• Wet weather flow • Carbon diversion LIFT
	2 SECONDARY	• Main Treatment - BOD - SS - Nitrogen
	3 TERTIARY	• Retrofit • Reuse California Water Boards TITLE 22
GROUNDWATER		• Nitrate • Perchlorate • Selenium
INDUSTRIAL WASTEWATER		• Livestock • Mining Wastewater

Today's
Wastewater Treatment Solution



Current Solutions: Municipal Wastewater

BBF | Biofiltration System

Current Solutions: Municipal Wastewater

BBF
Bio-filtration

+

Biological + Physical filtration

Nitrification & Denitrification

TITLE 22 (JWPCP) | LIFT (WERF)

Municipal Wastewater

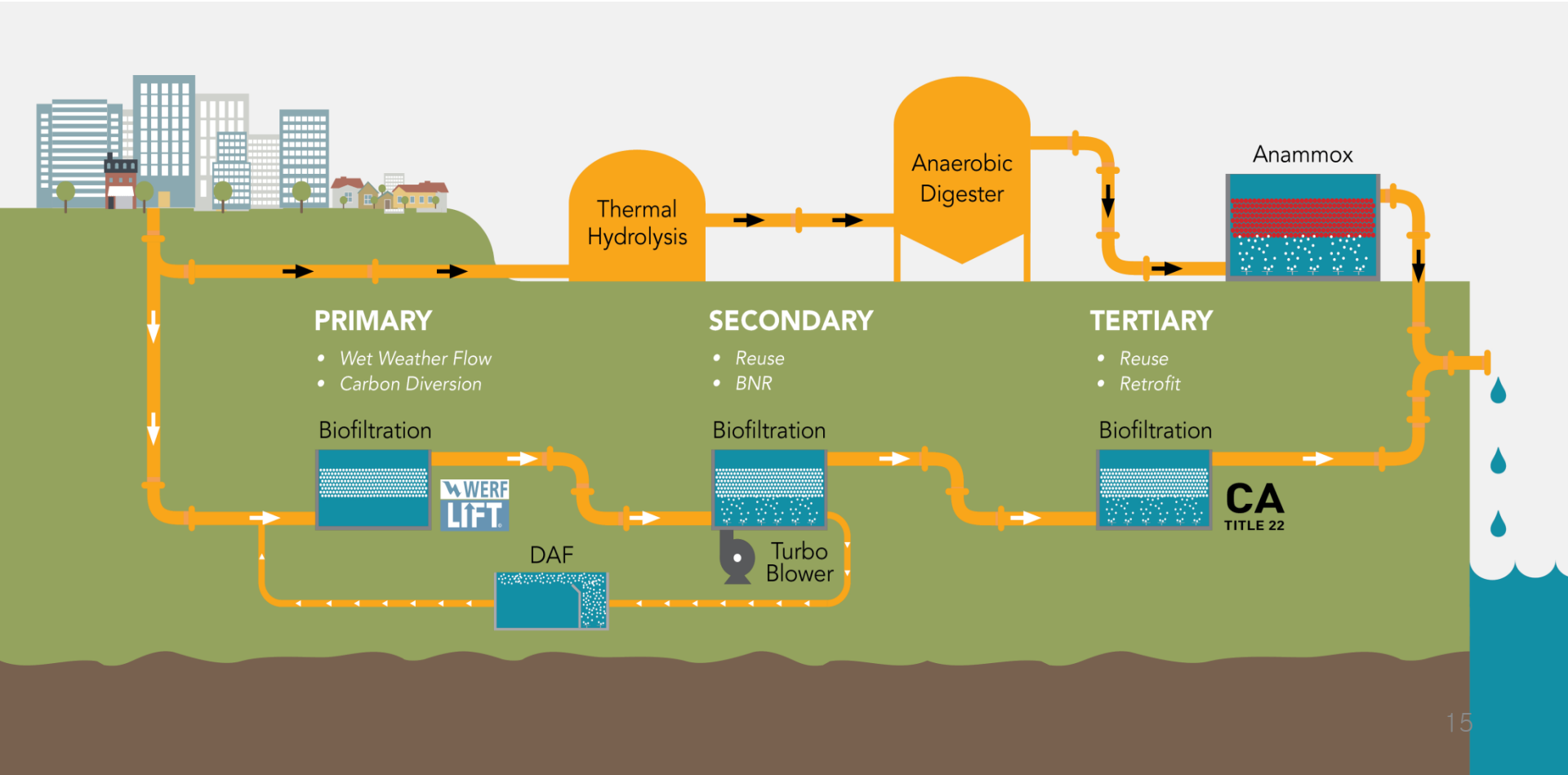
Ground/Drinking water

RO (Pretreatment/Concentrate)





Municipal Wastewater Solution



Today: Municipal Wastewater – Primary Treatment

Carbon Diversion

New Trends

Increasing energy savings and energy recovery is a leading trend in the WWT industry. Carbon, originally used for nutrient removal as an electron donor, is now acknowledged as an important energy source.

Carbon Diversion Challenges

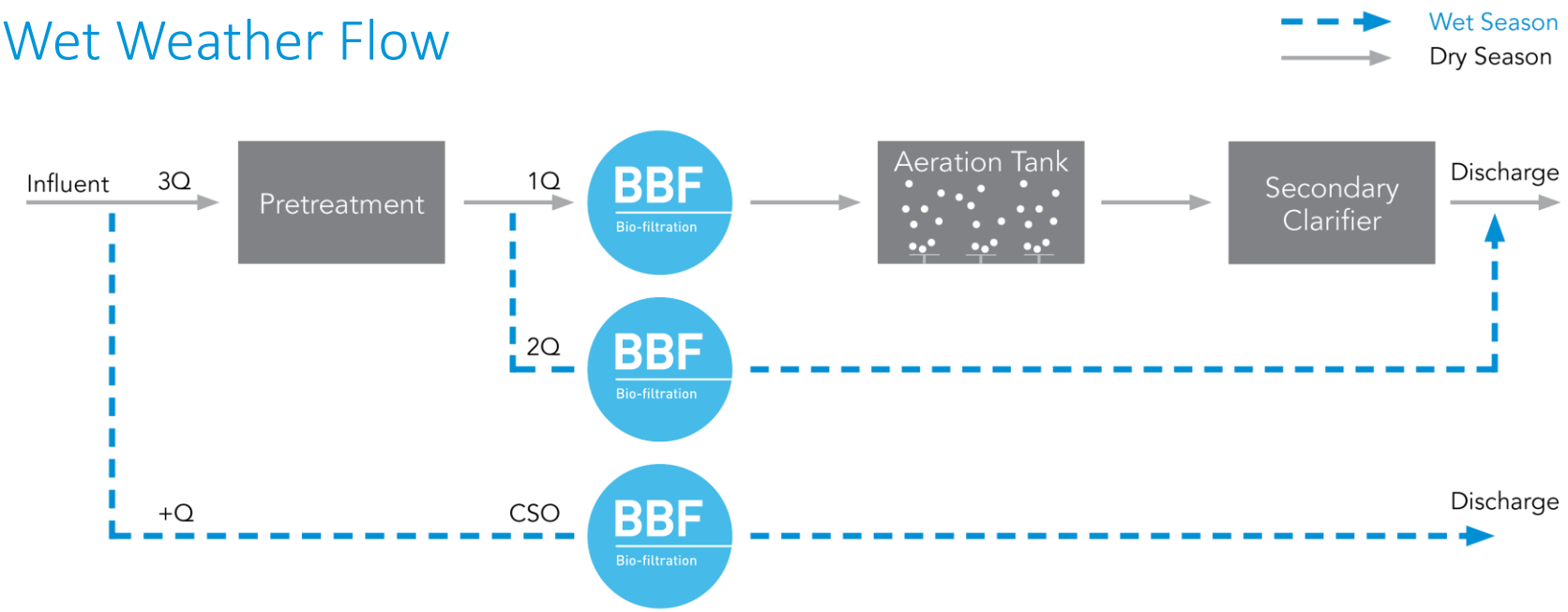
Current primary treatments can effectively remove solid organic but not soluble organic materials. Soluble carbon removal is one of the most critical problems facing advanced biological treatment technologies. Many evolving technologies, such as Anammox, avoid the use of a carbon source in the nutrient removal process.

BBF Solutions

Accepted into the general technology scan of the *LIFT program* based on innovative capacity for carbon diversion, BBF facilitates the effective removal of solids and soluble organics by simultaneously performing biological treatment and physical filtration. This inherent dual functionality enables BBF to be a robust technology platform capable of *combining Anammox* and/or *Algae solutions* with *wet weather flow* treatment.

Today: Municipal Wastewater – Primary Treatment

Wet Weather Flow



BBF Advantages

- A main treatment process during the dry season, BBF can work as a wet weather flow control system in wet seasons.
- Unlike other WWF systems, BBF can deal not only with solid but also with soluble organic materials.

Today: Municipal Wastewater – Retrofit

Municipal Nitrogen Removal | California Title 22 (JWPCP, CA)

CA Title 22 Certification Testing Facility
City of Carson, CA

BBF combines simultaneous Nitrogen Removal & Tertiary Filtration functions in a single reactor.

- Proven Tertiary Treatment Technology for Title 22 Recycled Water
- Ideal for upgrading & retrofitting existing WWTP
- Small footprint
- Energy efficient

Groundwater Treatment Solution

Groundwater Remediation Project

City of Barstow, CA

- Simultaneous removal of Nitrate, Perchlorate, and Dissolved Organics
- Energy-efficient biological filtration
- No brine disposal required

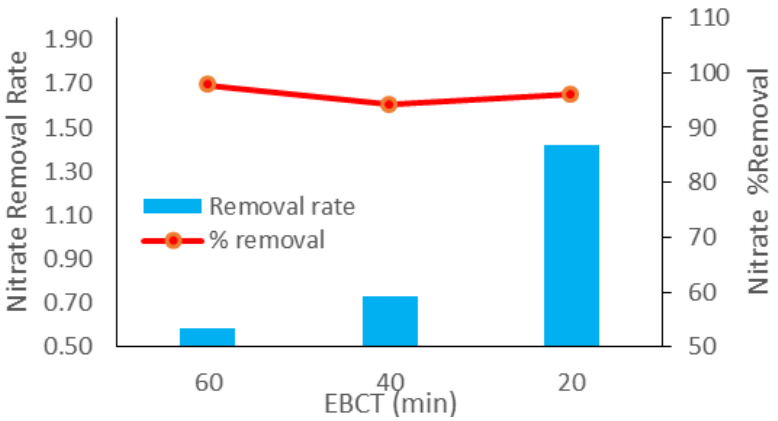
BBF can also be implemented for Selenium removal from Mining Wastewater

Today: Groundwater

Groundwater Treatment Solution

"BKT's BioFiltration (BBF) consistently removes
both Nitrate & Perchlorate *without production of a brine waste stream"*

- Over 175 wells in California are contaminated and have been abandoned due to nitrate and perchlorate pollution. (Department of Water Resources, 2012)
- Awarded groundwater denitrification project by the City of Barstow, California.

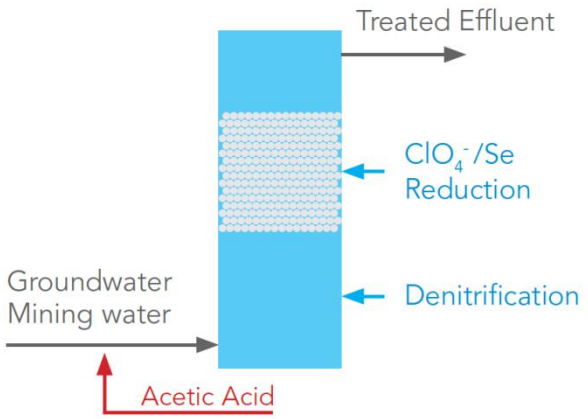


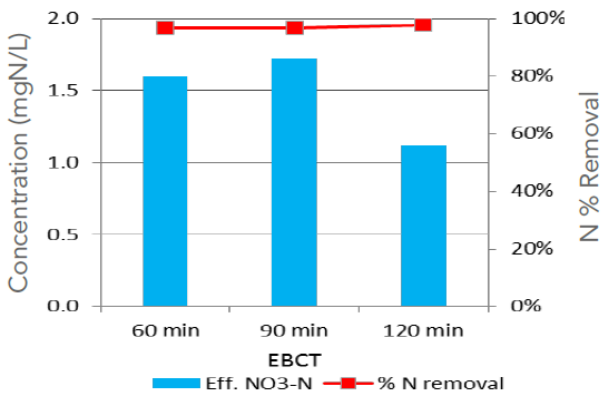
Parameters	Denitrification	Perchlorate Removal
EBCT (min)	60	60
Loading Rate *lb/ft3/d)	34	0.12
Influent Concentration	25.0 mgN/L	85 ppb
Effluent Concentration	0.75 mgN/L	43 ppb
% removal	97	50
Effluent Turbidity (NTU)	5	5

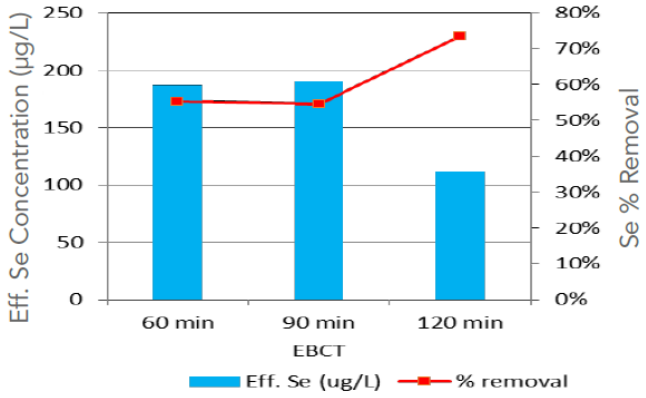
Today: Groundwater

Mining Wastewater Treatment Solution

"BKT's BioFiltration (BBF) consistently removes both Nitrate & Selenium from *mining-impacted water* *without requiring brine disposal*"







Today: Livestock Wastewater

Anaerobic Digester

Option 1

Membrane System
(FMX + RO)

High Value
Fertilizer Production
• *WISCONSIN (BIOSTAR)*

Option 2

Anammox Process
(AMX™)

Low Cost
Nutrient Removal
N P
• *INDIANA (BOS DAIRY FARM)*

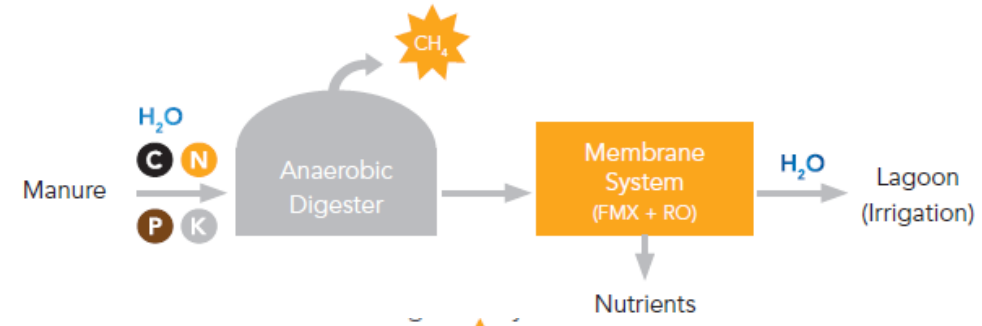
Option 3

DAF
(VAF™)

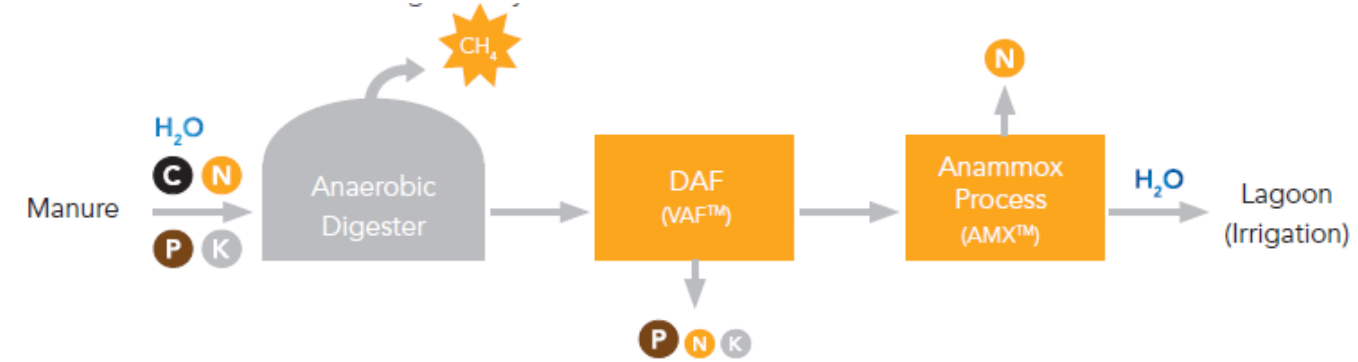
SBR

Ammonia & Methane Emission Reduction
CH_4 NH_3
• *CALIFORNIA*

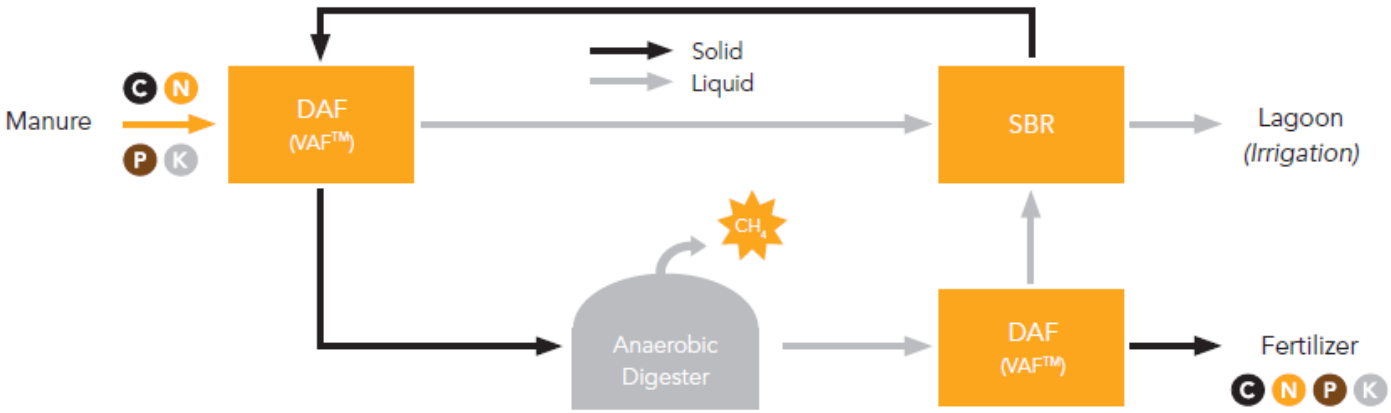
Today: Livestock Wastewater



Nutrient Recovery



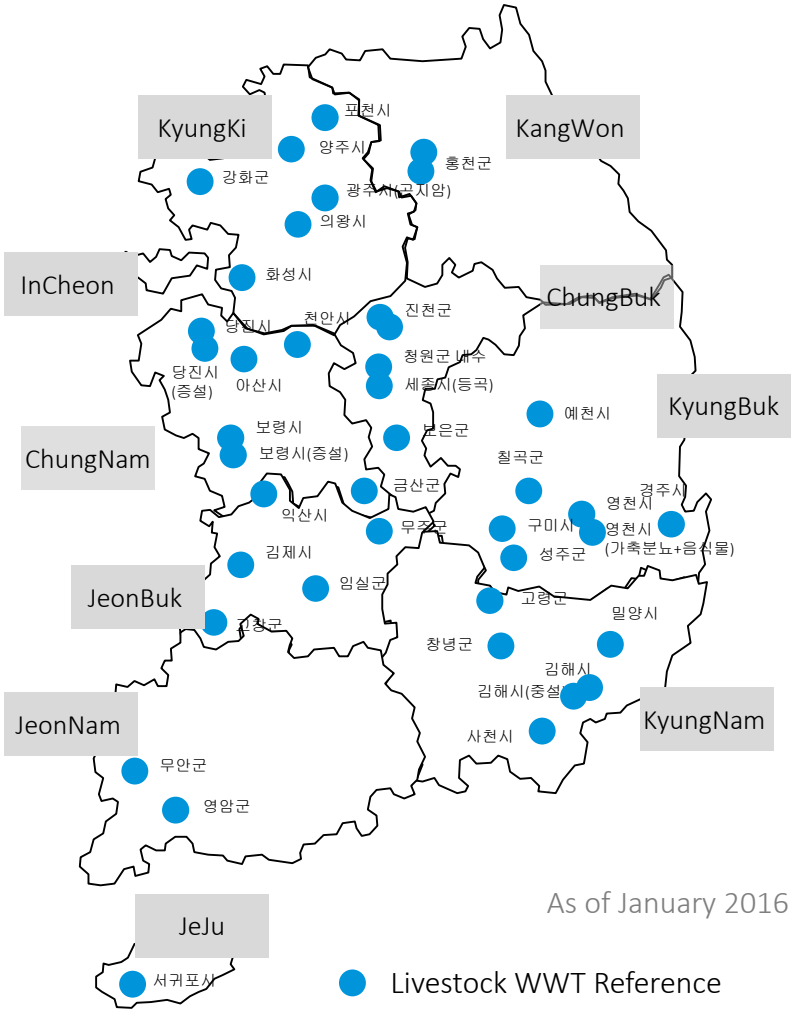
Nutrient Recovery & treatment



Ammonia & Methane gas reduction

Today: Livestock Wastewater

Livestock Wastewater References *in South Korea*

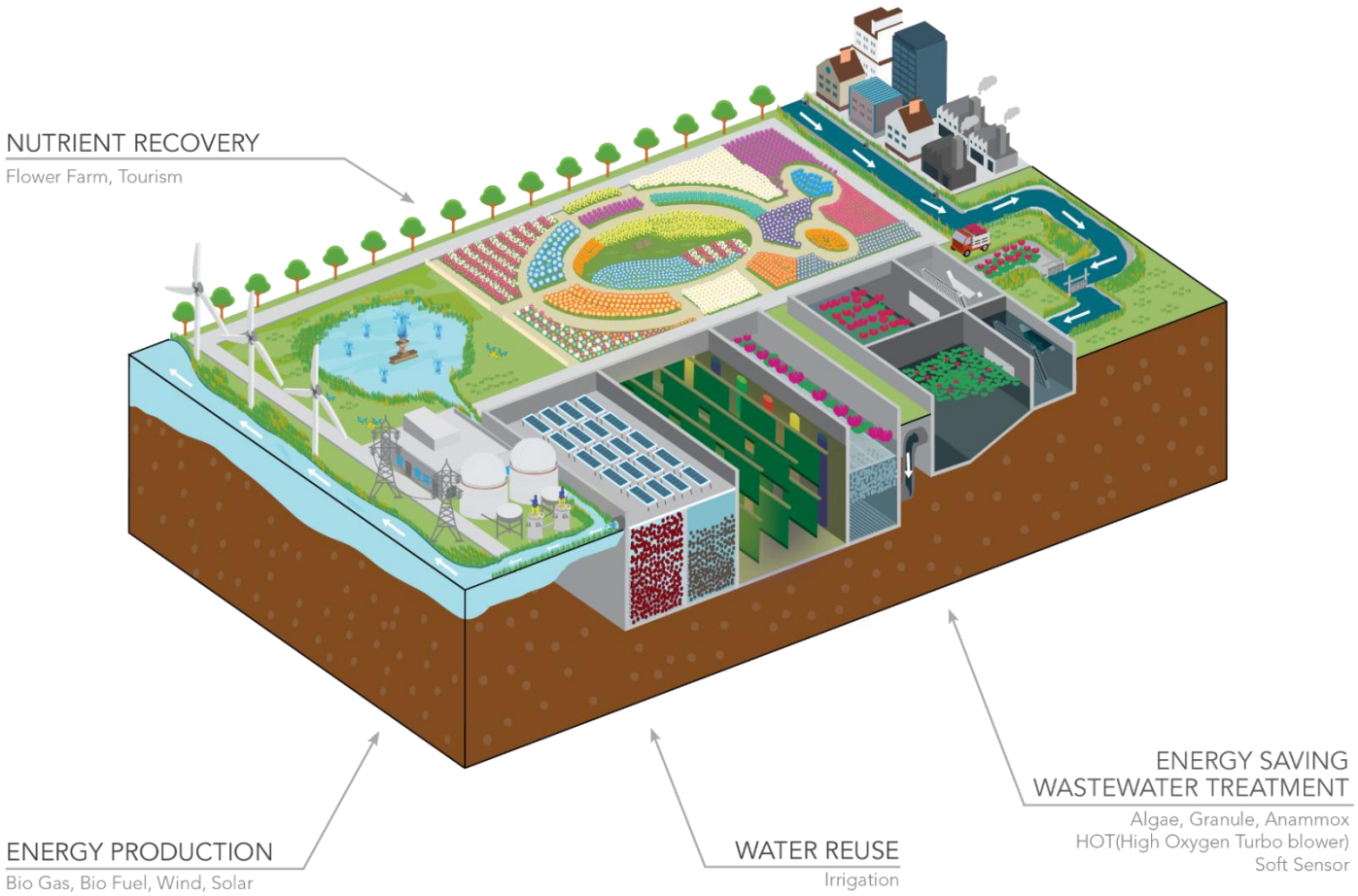


- Customizable solution for specific client needs (discharge, Zero Discharge, or reuse)
- Maintained 62% market share in South Korea over the past 5 years
- 1st Wet Weather Flow application (Seoul, Korea)
- 1st TMDL application (Gwangju, Korea)
- 41 distinct reference sites

BKT WWT technology has been applied in more than 100 facilities worldwide, including Asia's largest WWTP in Seoul.

Tomorrow's Wastewater Solution

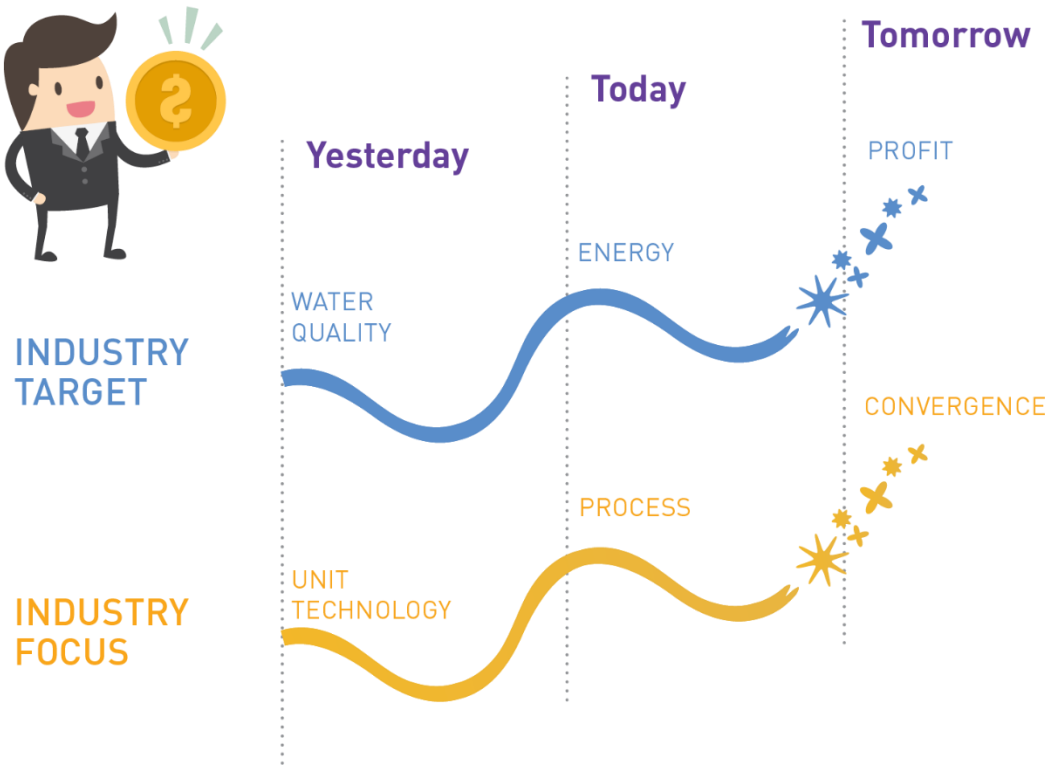
BKT Tomorrow Water Process: Transforming WWTPs from cost stream to profit stream.



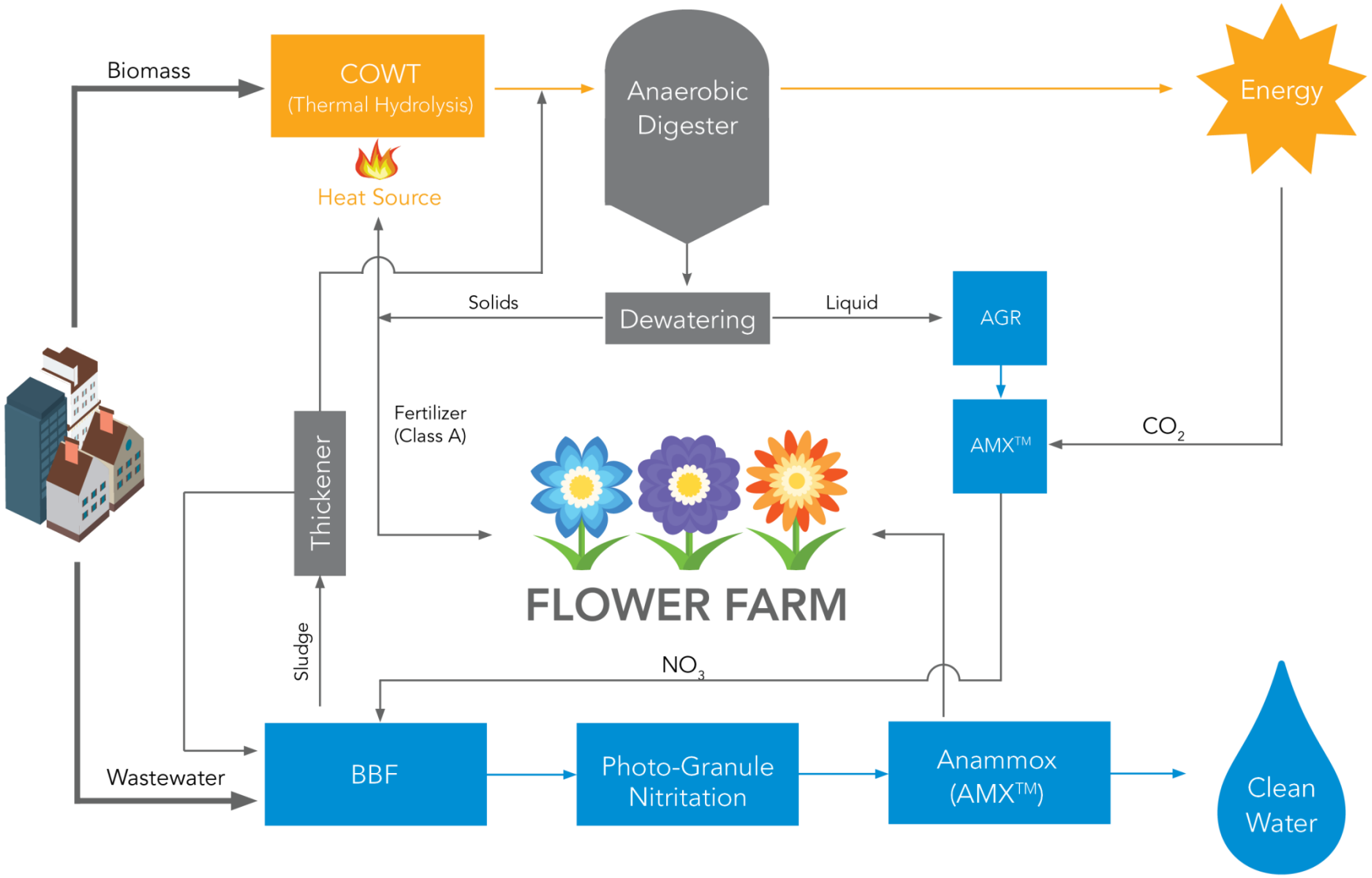
from Cost Stream to Profit Stream

As the industry focus shifts to resource recovery , wastewater itself is no longer waste but a precious resource.

Seeking to lead this new paradigm, BKT has devoted years to technological innovation in an endeavor to transform wastewater from cost stream to profit stream.



Tomorrow Water Process | Resource Recovery



Environmental

Reliable solution for clean water & sanitation

Profitable

New revenue streams and lower ongoing costs

- Revenue streams: tourism, agriculture, biogas/biomass production
- Low operating costs: low-energy, no-chemical, reduced sludge

Beautiful

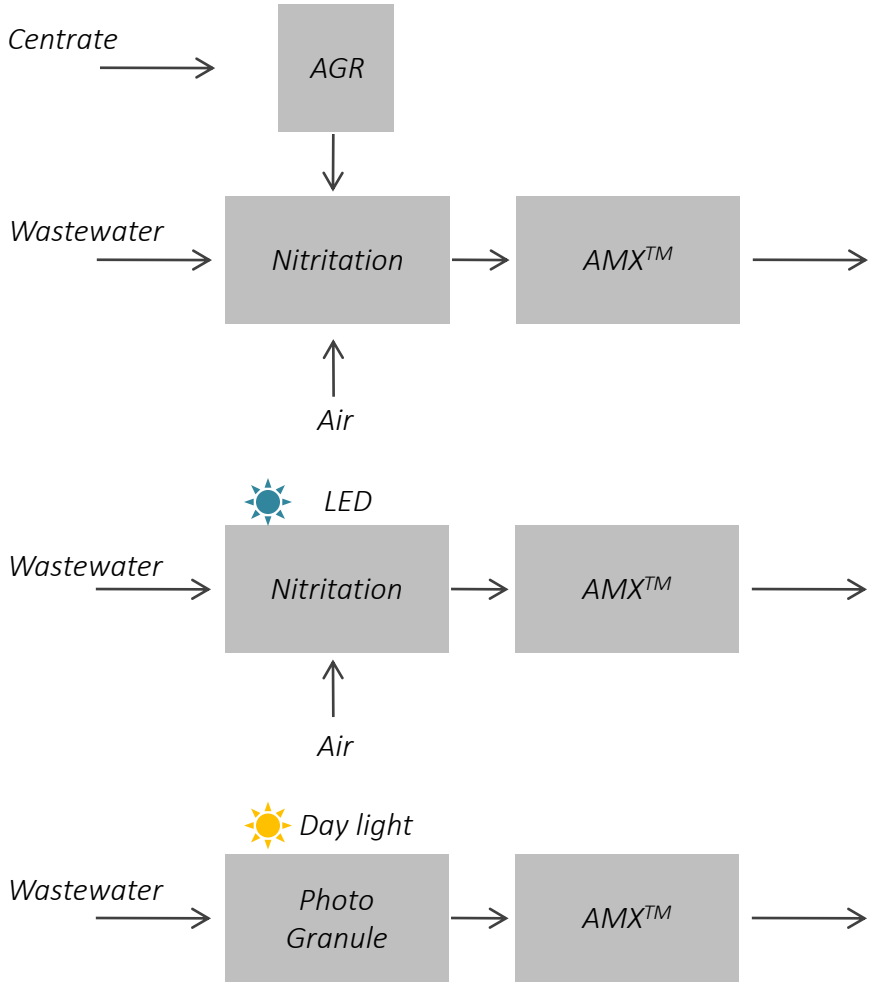
Tourism-friendly flower factory to replace unsightly wastewater treatment factory

BKT's Tomorrow Water Process (TWP) employs characteristics of *warm weather climates* in the design of *environmental, profitable, and beautiful* wastewater treatment plants.

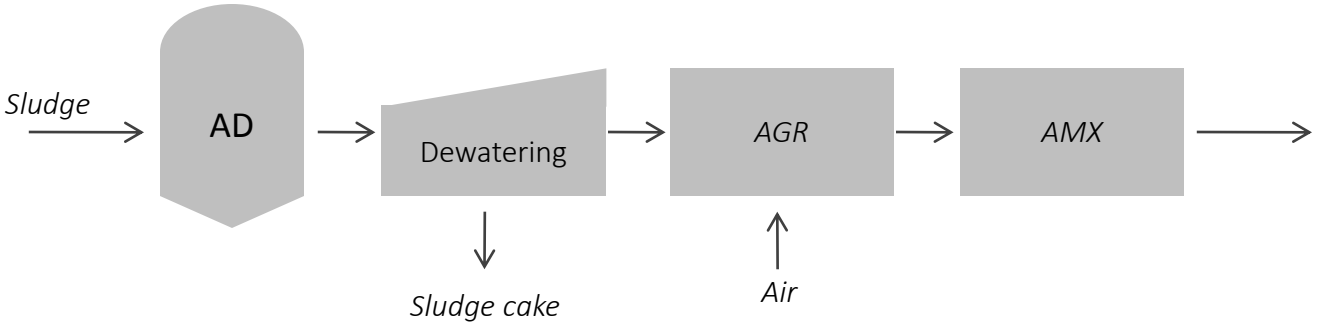
AMX™ (Anammox)

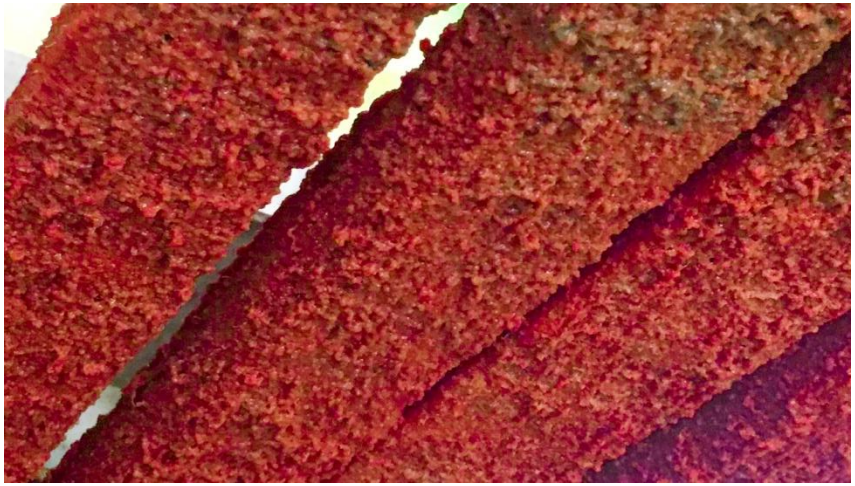
- Compared to other strains of Anammox bacteria, *Candidatus* “Brocadia sinica” JPN1 demonstrates higher growth rate and higher nitrogen removal rate.
- Versatile Applications
  I. SIDE-STREAM (Municipal)
  II. MAIN-STREAM (Municipal)
  III. LIVESTOCK WASTEWATER
- Innovative process options answer common challenges to Anammox application
  I. SINGLE-stage / 2-STAGE configuration
  II. Hybrid process scheme with combined side-stream + main-stream
  III. Suspended & attached growth (*i.e. MBR(PN)+BBF(A)*)

Main-stream AMX™

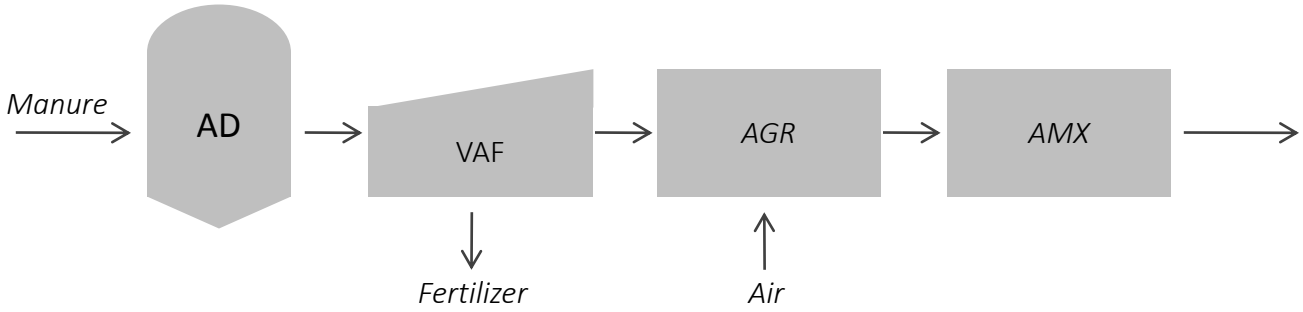


Side-stream AMX™



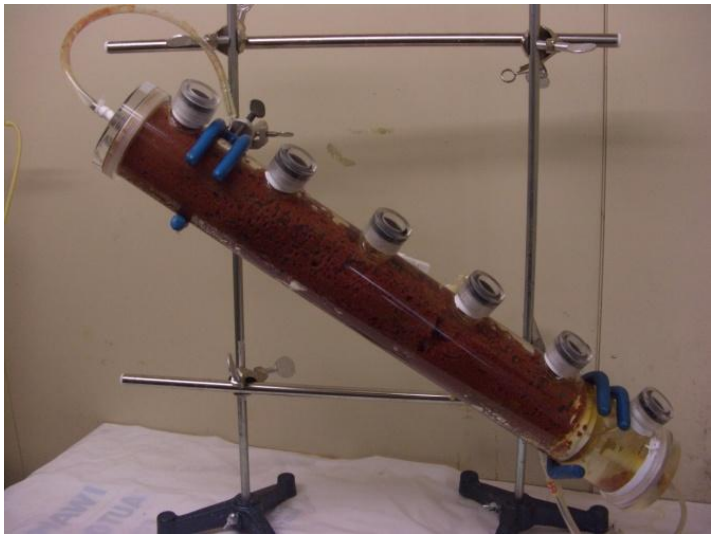


Industrial AMX™

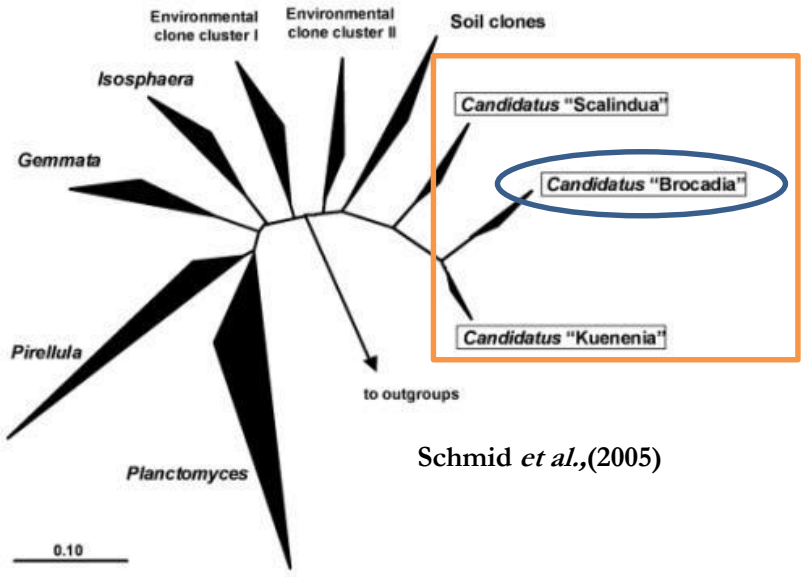


The Most Efficient Anammox Bacteria – *Candidatus* "Brocadia sinica"

- BKT's unique Anammox Solution: *Candidatus* "Brocadia sinica" JPN1
- Original enrichment at Hokkaido University by P**rofessor Satoshi Okabe**



(Okabe et al, unpublished)



Schmid *et al.*,(2005)

Anammox bacteria

BKT's Anammox

Energy Division

Energy Solutions

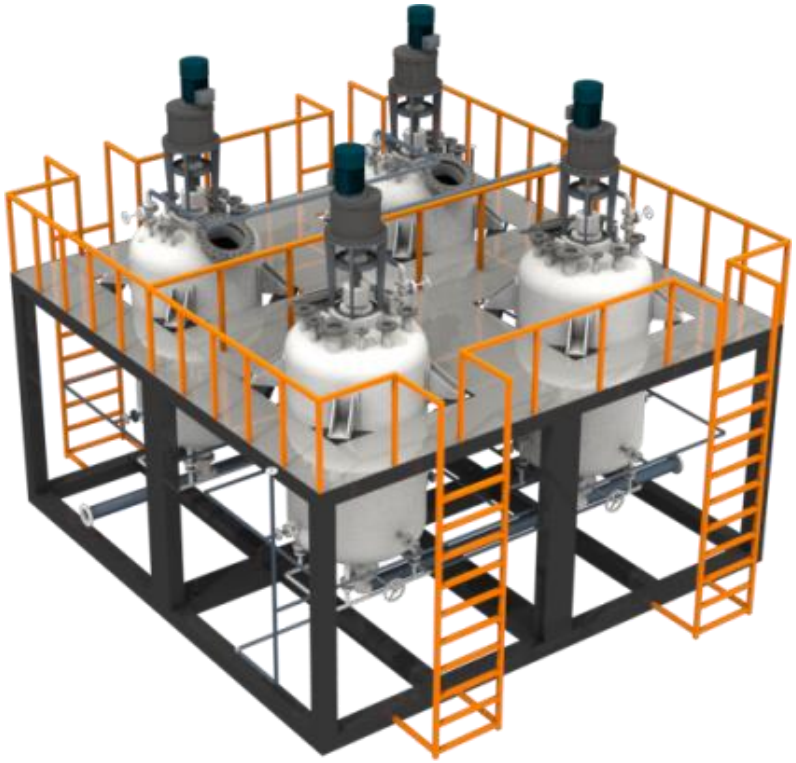
- Energy production

  - COWT (Cyclic Organic Waste Thermal Treatment)
  - BEAD (BKT's Enhanced Anaerobic Digestion)

- Energy savings

  - Process development (Activated algae, Anammox, TWP)
  - Production hardware (High Oxygen Turbo Blower)
  - Operations software (Energy Optimization System, Soft sensor)

Energy Production: COWT



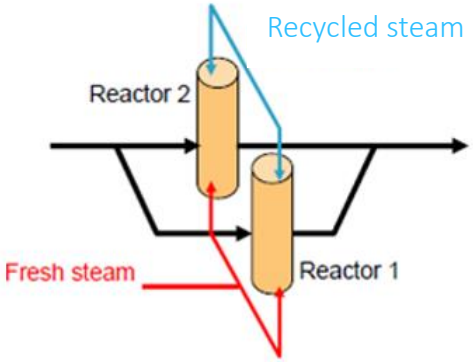
- Thermal Hydrolysis System
- Organic waste treatment
  - Sludge
  - Animal remains

Energy Production: COWT

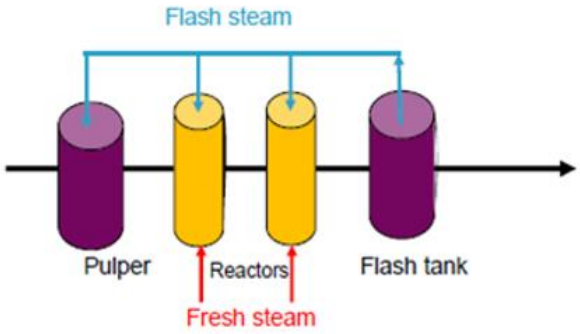
What is COWT?

- BKT's Thermal Hydrolysis (THP) Solution: Cyclic Organic Waste Thermal Process

- Steam recycled between pair reactors to maximize energy recovery
  - Thermal energy transferred directly between reactors to **minimize heat loss**
  - Pair reactors in parallel to minimize **footprint and cost**
  - **Reduces cost of equipment from additional tanks**



COWT

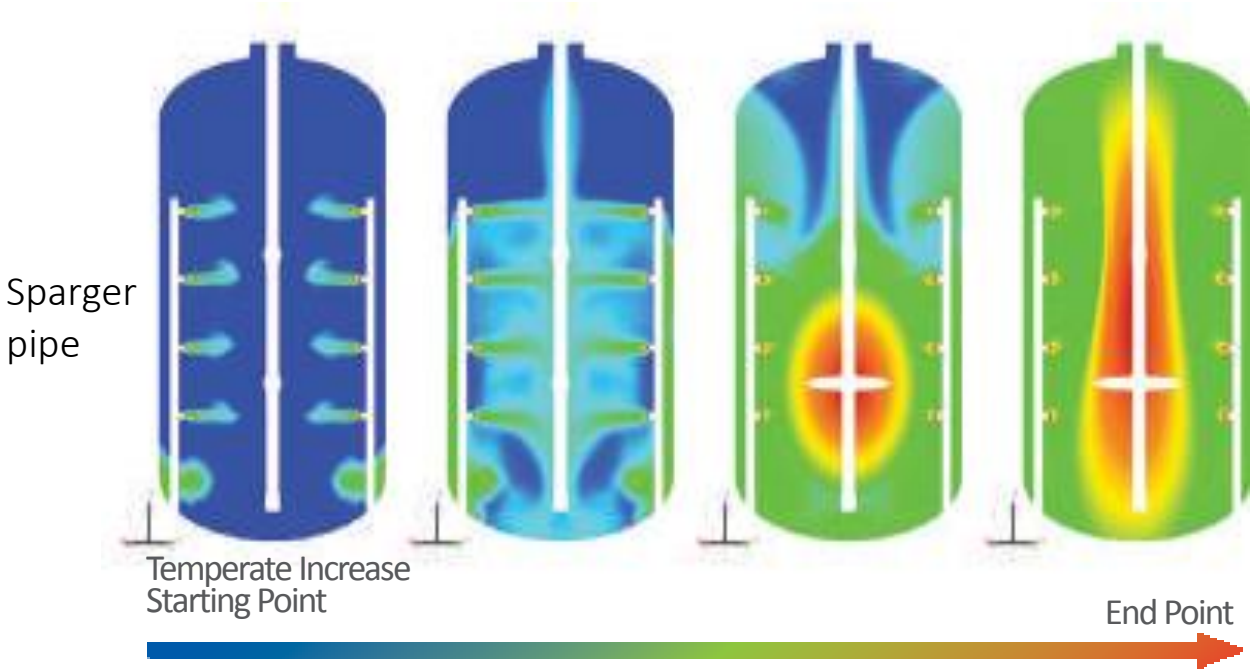


Alternative THP

Energy Production: COWT

What is COWT?

Direct heat transfer using patented *multipoint sparger* steam pipe modules



Flexibility in adjusting operation parameters (temperature, pressure, alternating feed, timing, etc) facilitates determination of optimal operation condition based on changing feed characteristics

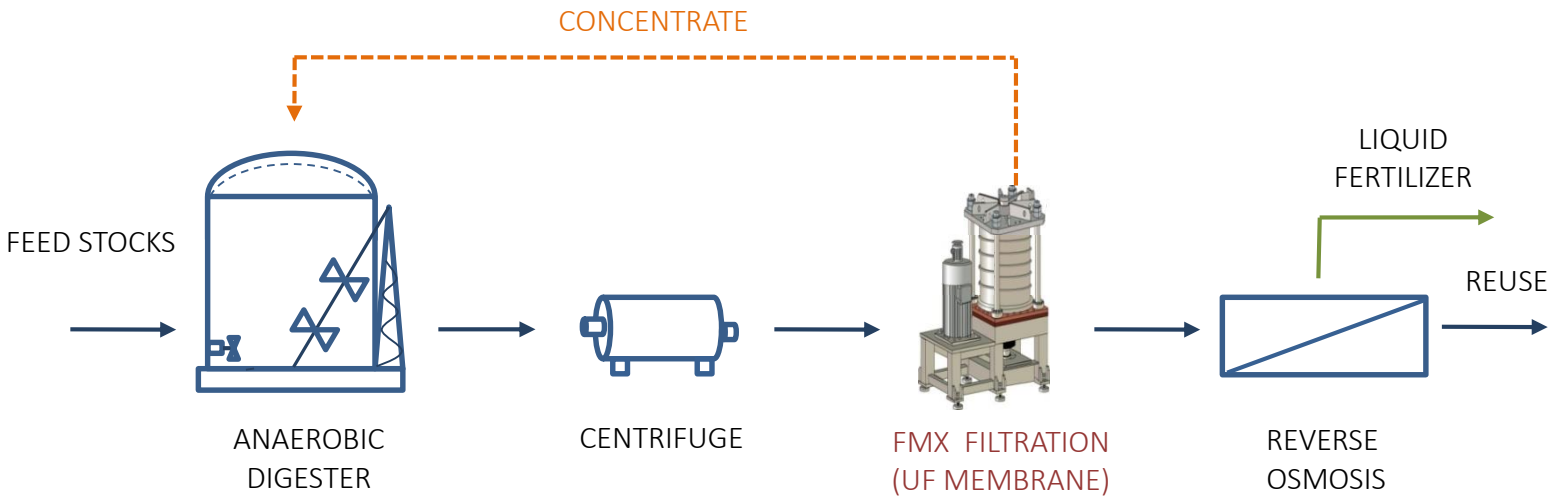
Energy Production: BEAD

Advanced process for treatment of biogas plant digester effluent

BKT's Enhanced Anaerobic Digestion (BEAD) provides an efficiency-enhancing solution,

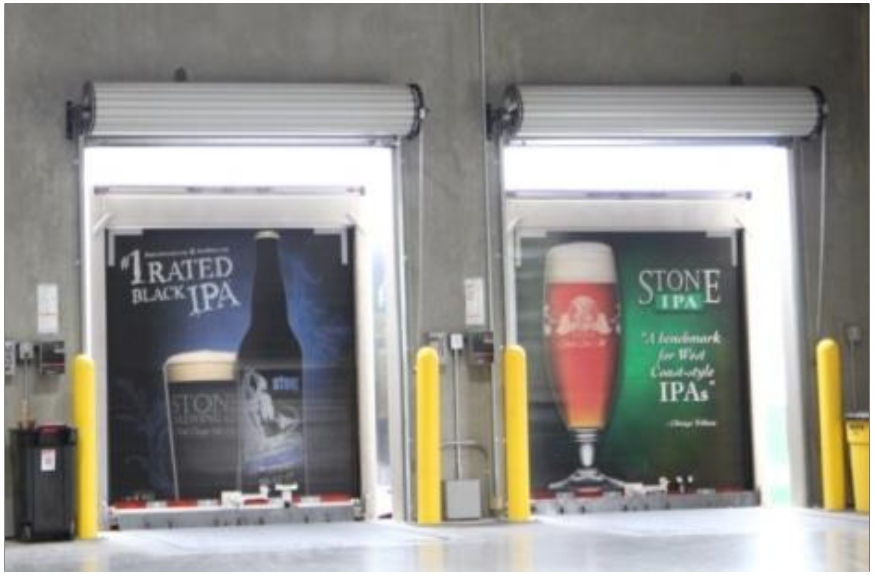
- Increases biogas productivity
- Increases process train stability

* Reference: 't Haantje Bio Gas Plant (MTI, The Netherland)



Energy Savings: BKTurbo

High-Efficiency Turbo Blower



- BKTurbo reduces energy consumption for aeration by 20-40%.
- Currently developing High-oxygen turbo blower model.

Energy Savings: Future Advances

High Efficiency Aeration System (currently under development)

Air → Turbo blower + Oxygen Generator →

High Oxygen Turbo-Blower (HOT)

High Efficiency Diffuser

40-50% HOT + 10% Diffuser = 50-60% Total Energy savings

Energy Savings: Future Advances

Energy Optimization System (EOS)

Scenario Optimizer

- Designed for plant-wide control
- Influent loading estimation tool using soft sensor and data mining

Chemical Optimizer

- External carbon source control
- Effluent Soluble-P control

Aeration Optimizer

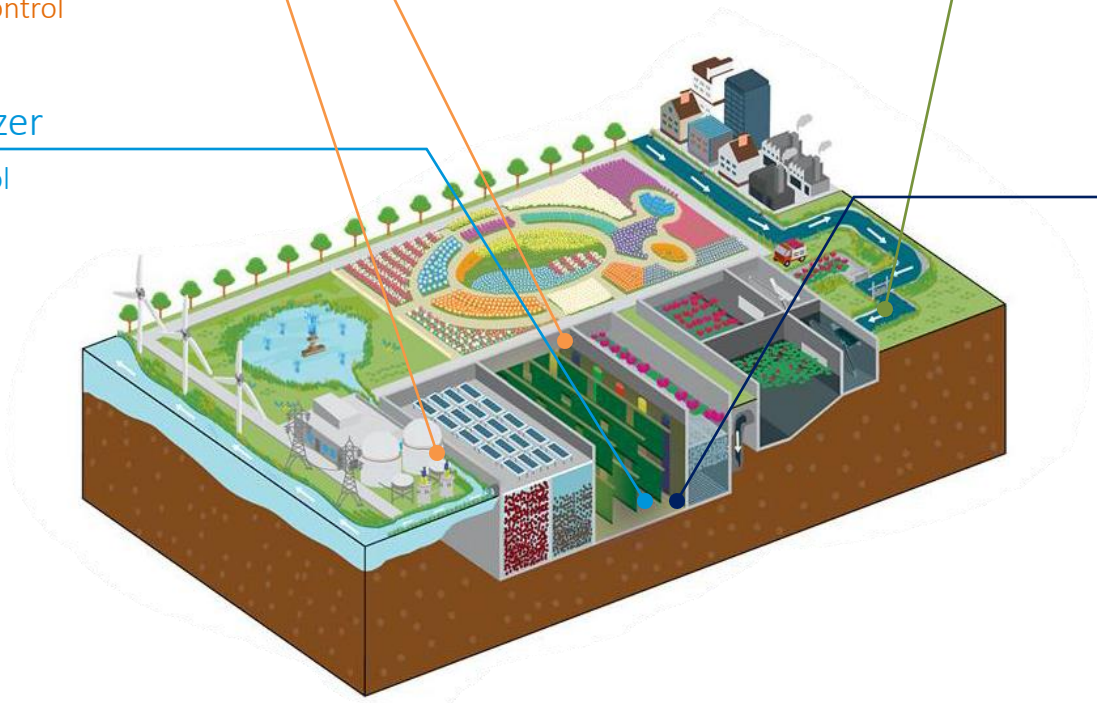
- Turbo-Blower control

Soft sensor

- Estimate the influent organic loading
- Influent loading control

Activated Sludge Optimizer

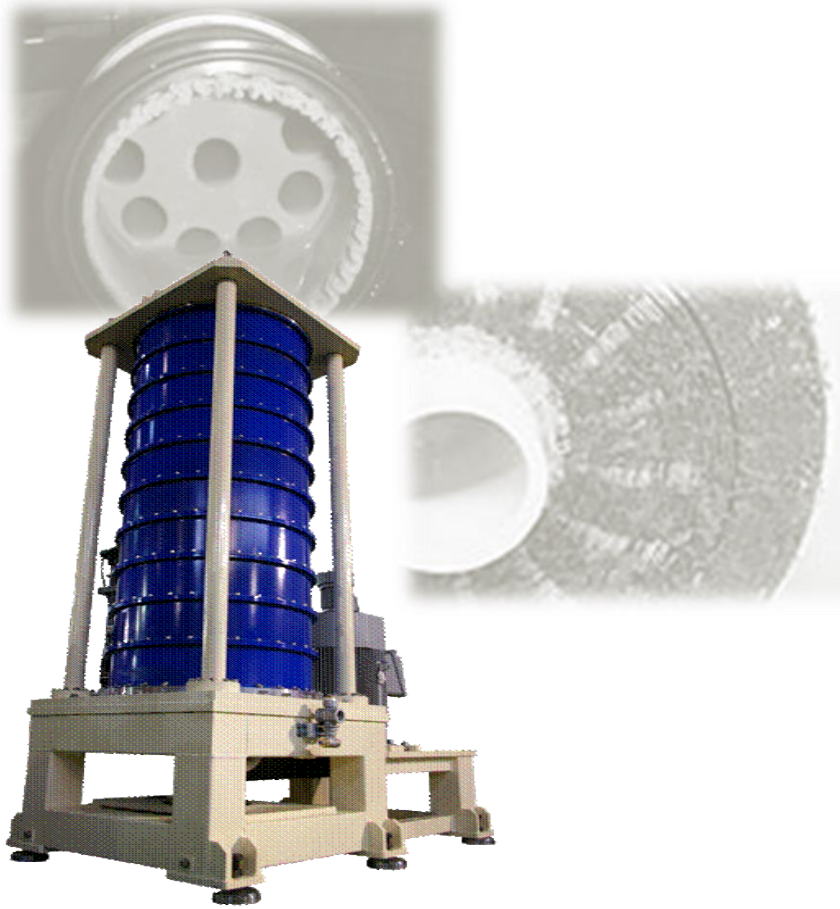
- Recycle pump control
- SRT control



Membrane Division

Core Technology

FMX Anti-Fouling Membrane Filtration



FMX is an anti-fouling membrane filtration system specialized for high-solids applications beyond the capability of conventional systems.

Wastewater Applications

FMX in Wastewater Treatment

Shale Gas Produced Water Processing

Reuse & Discharge

Flue Gas Desulfurization WWT

Emission Regulation Compliance

* Funded by U.S. Dept. of Energy, both the produced water and FGD projects have been successfully completed.

Manufacturing Applications

Chemical Manufacturing Processes

Samsung Fine Chemicals
South Korea

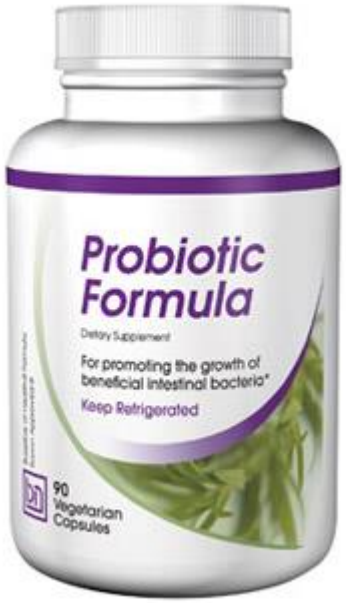
Nalco
United States

Manufacturing Applications

Biotech Manufacturing Processes

CJ Bio L-Methionine Production

Malaysia

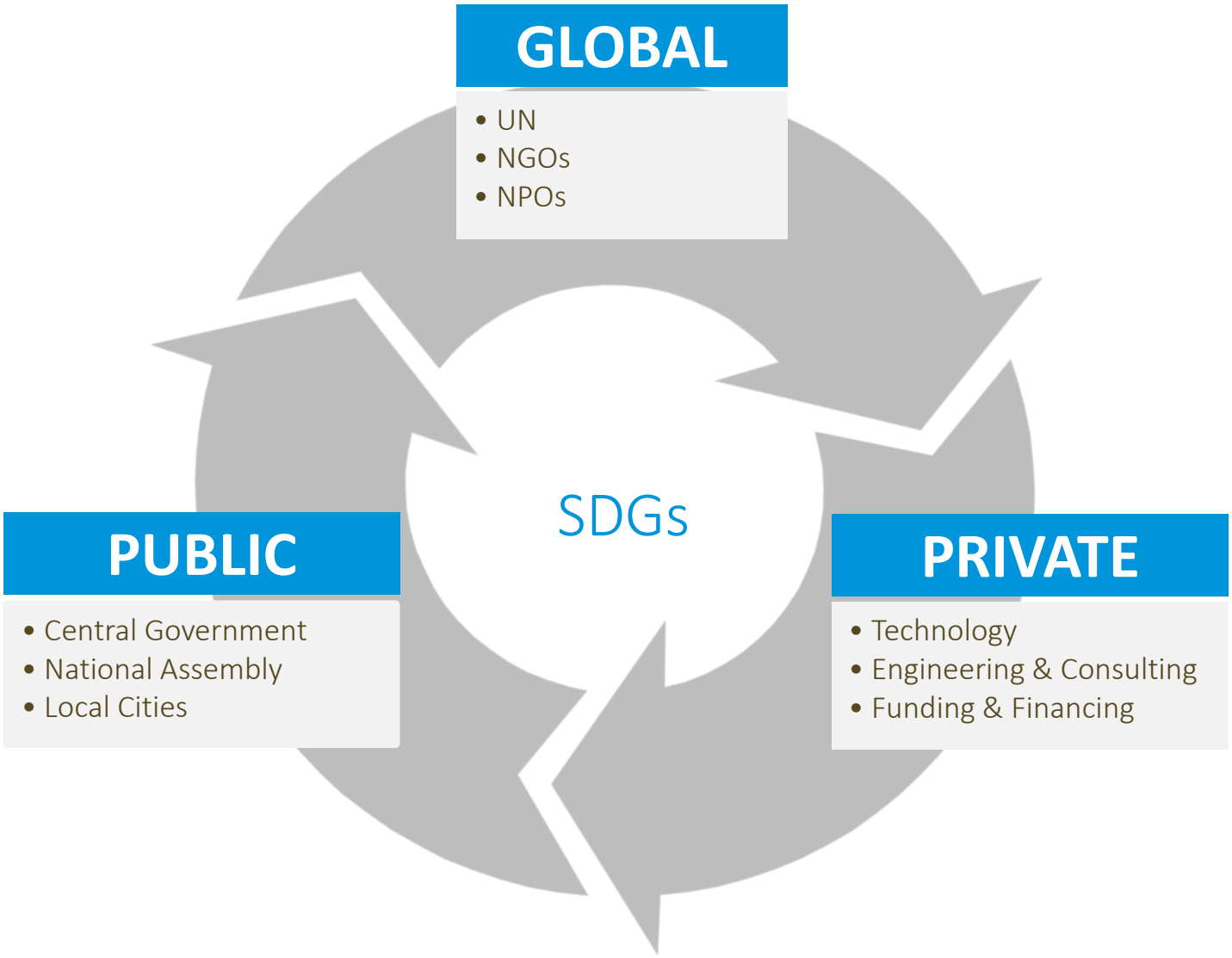


BiFiDo Probiotics Manufacturing

South Korea

Global Presence

Partnership



UN SDGs Initiative

UN Partnership for the SDGs Platform

Officially registered as the

[Tomorrow Water Initiative (#12177)]

UN ECOSOC High-Level Segment

PARTNERSHIP EXCHANGE

UNITED NATIONS

ECOSOC
United Nations

- Accepted **2016 UN ECOSOC High-Level Segment**

For example, we are working on the water treatment project with BKT, an international wastewater treatment business. BKT's independent technologies to treat livestock excretions that are high density wastewater, sewerage and groundwater are contributing heavily to the water environment improvement. Especially this water treatment system enables to convert wastewater to nitrogen and phosphorus which are usable as fertilizer and organic material, an important source of energy with clean water.

This world-class technology does not only contribute to improvement of energy efficiency but also to mitigation of environmental problems. As such, ASD is struggling to widen opportunities for the enterprises with eco friendly technology like BKT to practically participate in the SDGs, and make changes in policy making process to facilitate the implementation of the SDGs.

National Government Initiative

Municipal Water Policy and Technical Consulting

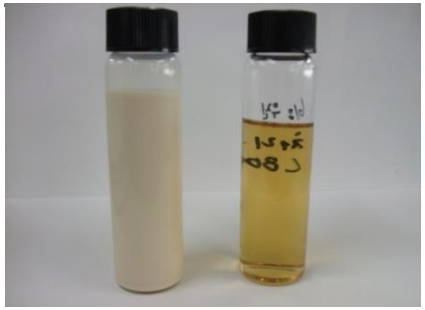
- Key consultant in the Vietnamese government's "Capacity Building Project"
- Influencer for creation of national environmental policy, affecting 12 main counties.
- Guidance for training of government officials
- Development of operations & maintenance procedures
- Determination of new fee structures.

Klang River Rehabilitation

Klang River Cleaning & Development Project (Malaysia)

Bio-Traditional Chinese Medicine (TCM) Production

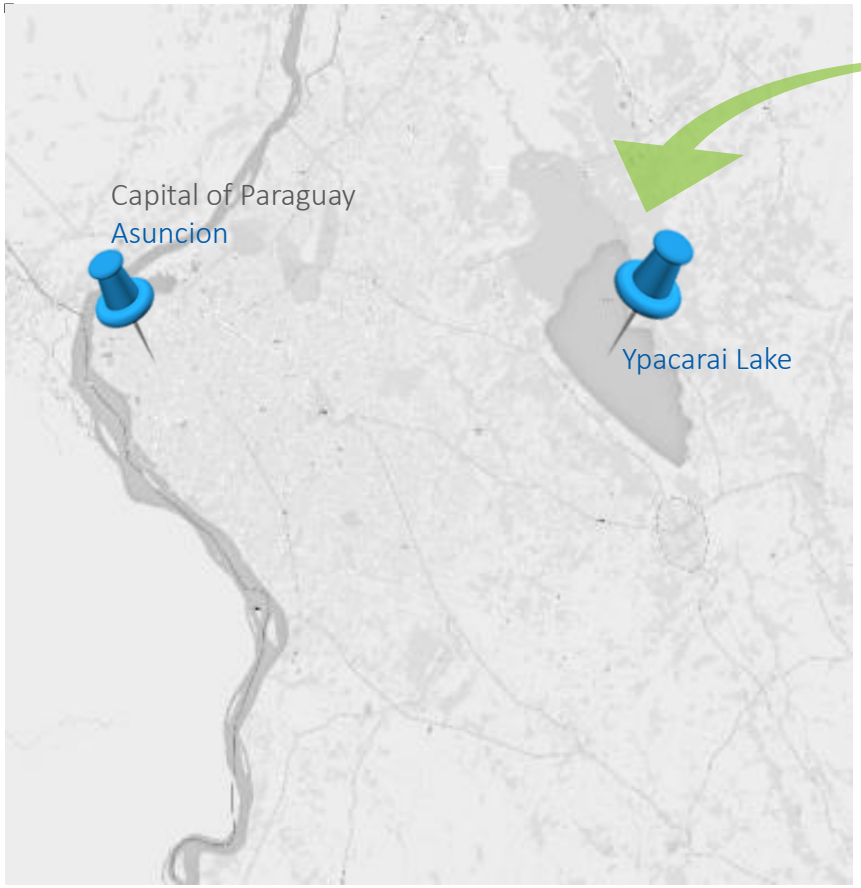
Membrane Purification Application



- Application of FMX membrane filtration system for more economical production of Chinese herbal medicine.
- Simpler and faster solution than previous evaporation process.

Ypacarai Lake Rehabilitation

Restoration of Ypacarai Lake



YPACARAI LAKE

Once one of Paraguay's main tourist attractions, Ypacarai Lake had become so contaminated that visitors were banned from swimming in its waters.

Ypacarai Lake Rehabilitation

Paraguay Government's Lake Rehabilitation Project

(Ypacarai Lake)

Radio Archivo Servicios Clasificados Redes Iniciar sesión Registrarse

28 de noviembre de 2013
05:23 (ACTUALIZADO HACE 54 MIN)

23 °C
CHAPARRÓN

NOTICIAS | EDICIÓN IMPRESA | NACIONALES | DEPORTES | ESPECTÁCULOS | ESPECIALES | MUL

Inicio > Edición Impresa > Interior > Gobierno apoyará a técnicos de Corea en la recuperación del lago Ypacaraí

29 DE OCTUBRE DE 2013 | REUNIÓN CON EL PRESIDENTE DE LA REPÚBLICA

Gobierno apoyará a técnicos de Corea en la recuperación del lago Ypacaraí

El Gobierno apoyará a los técnicos de Corea que trabajarán con la Gobernación del departamento Central para recuperar el lago Ypacaraí. Se espera que en los próximos sesenta días se tengan los primeros resultados en las zonas ribereñas para después ampliar el proceso de limpieza al interior del lago.

BKT Representatives meet with the President of Paraguay

Central State of Paraguay MOU

President of Paraguay, Horacio Cartes, met with BKT's CEO, Dong Woo Kim to discuss this wastewater treatment project.

Ypacarai Lake Rehabilitation

Restoration of Ypacarai Lake

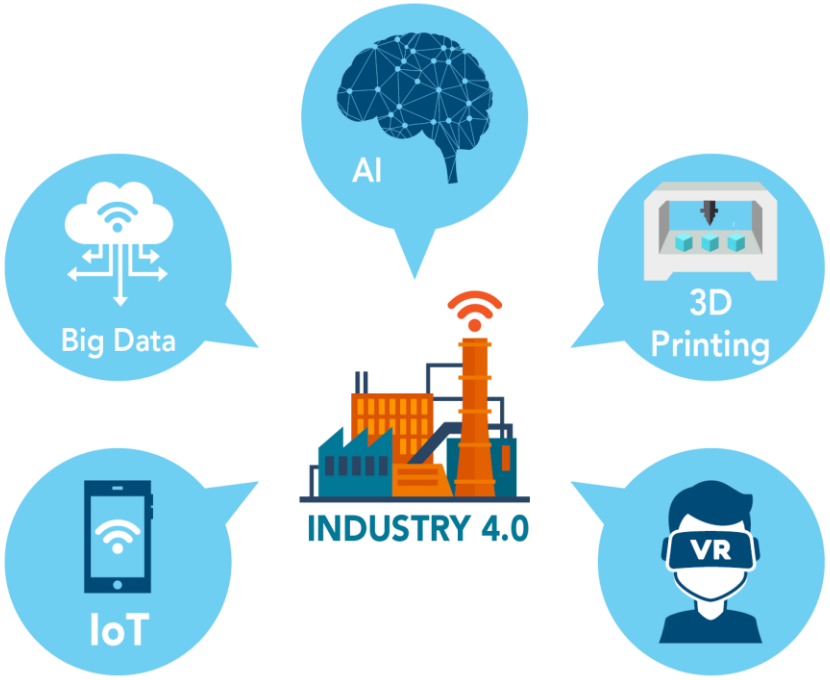
Before


After

Ypacarai Lake Purification Site

President’s delegation

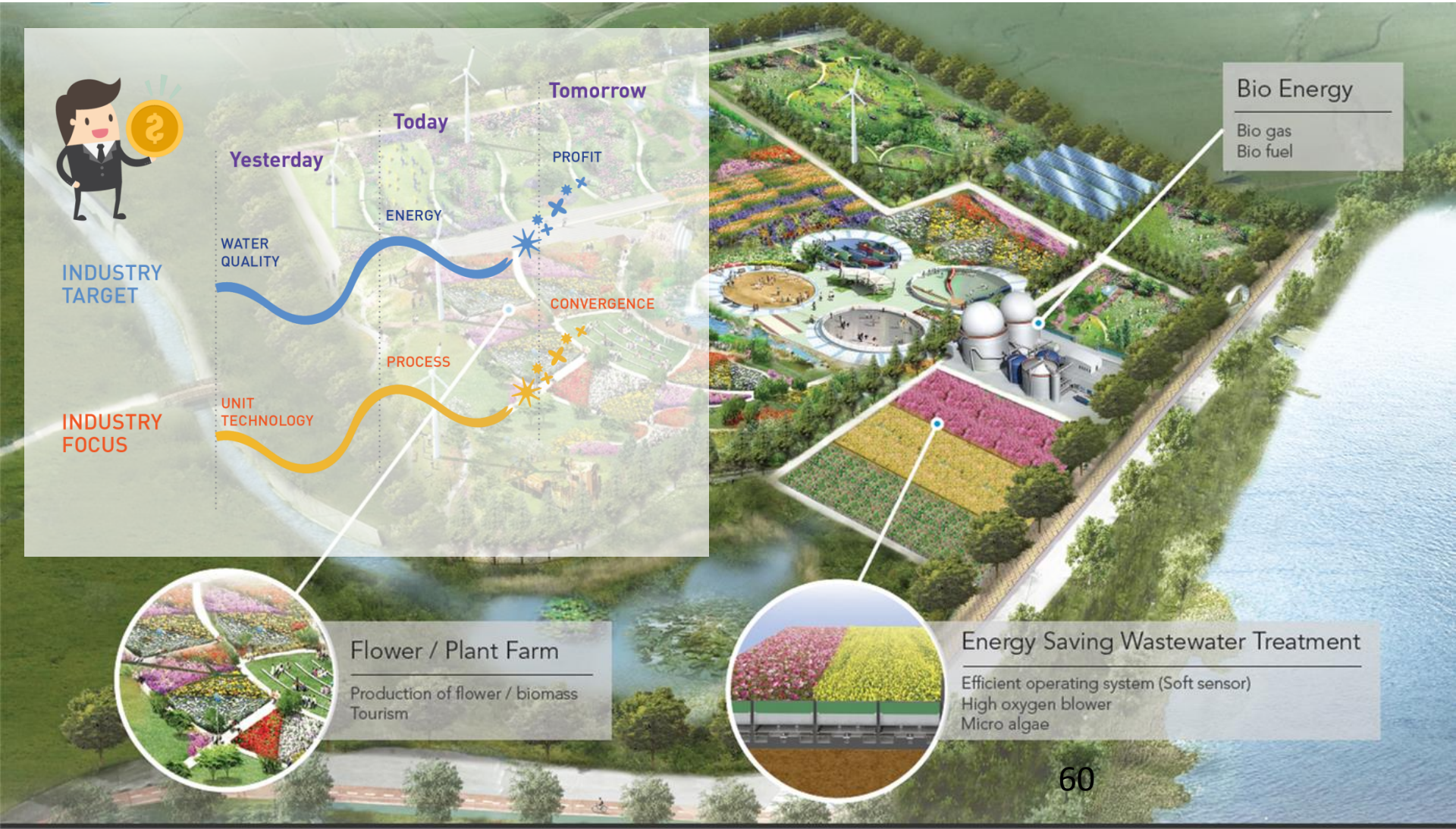
Water Industry 4.0



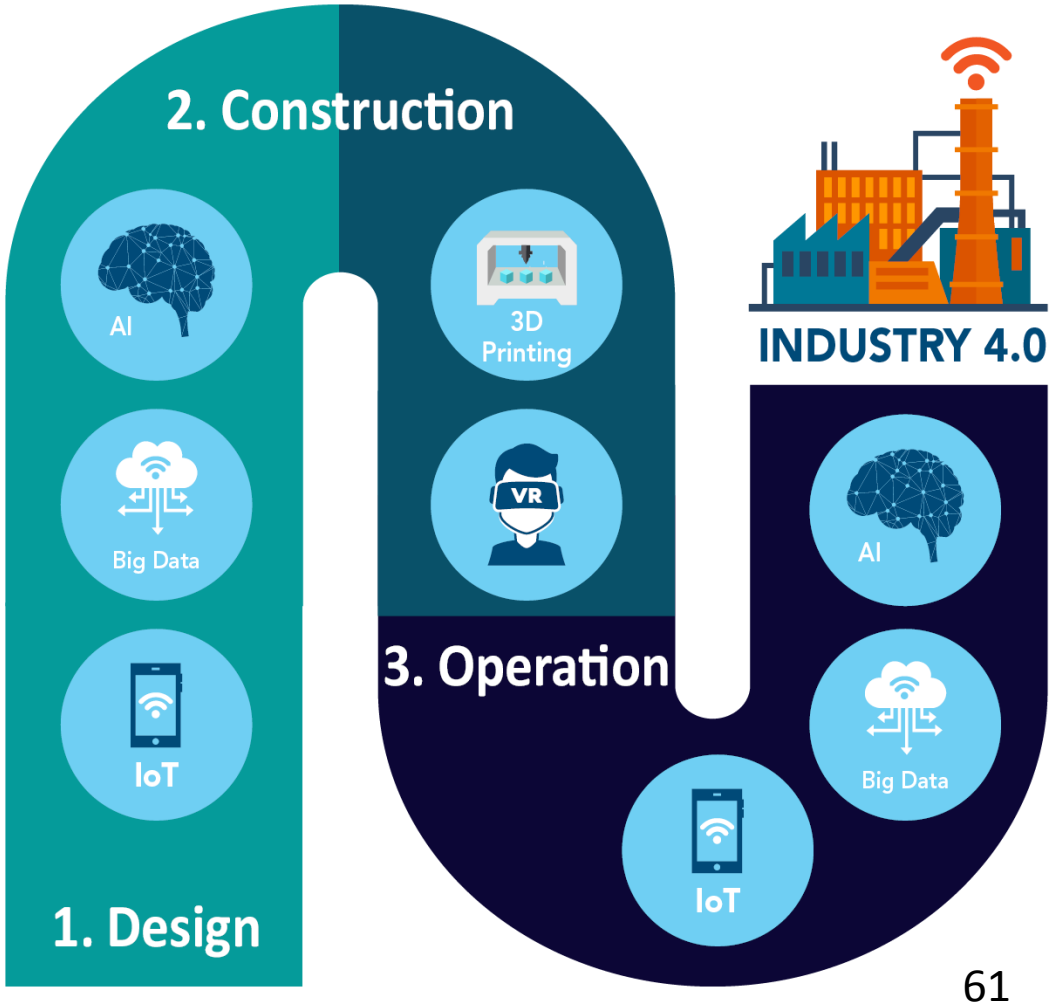
BKT
Innovation Beyond Waste

Water Industry 4.0

Future of Water Industry | 1. From Cost-stream To Profit-stream



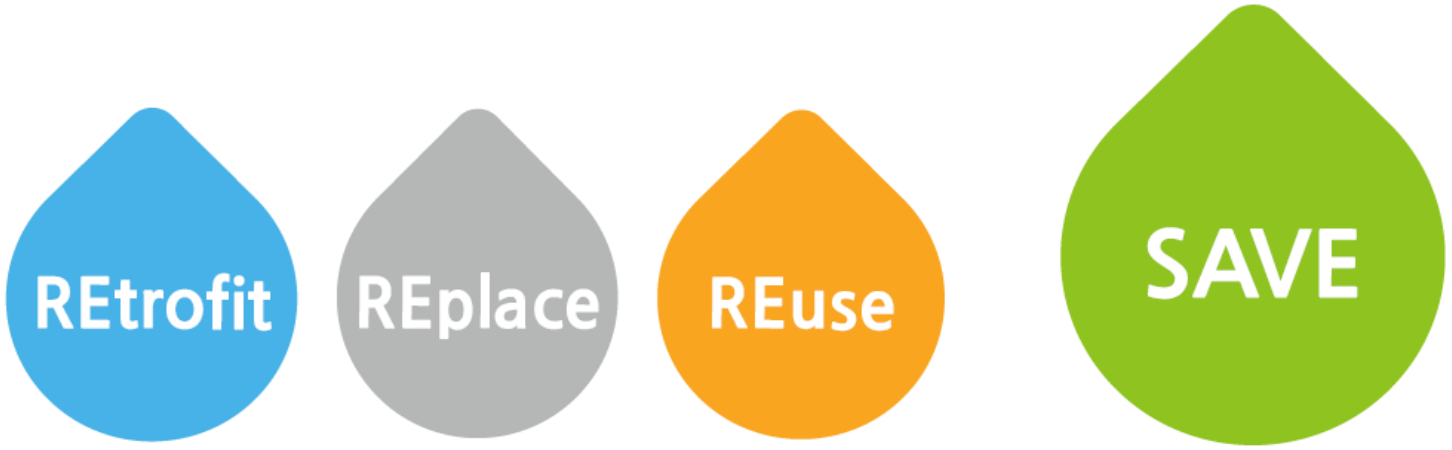
Future of Water Industry | 2. Smart Water Factory



Future of Water Industry | 3. Smart Water City

- Increasing the value of the Smart City
- One Water ;

  Utility water, wastewater, LID, Energy, ICT
- Fine Particle Air pollution, Heat island effect control



BKT | Innovation Beyond Waste