

The case of eco-green city in Korea

– Combined Reuse System of Treated Sewage and Rainwater

2013. 3



Gyesoo, Jung



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Introduction

INTRODUCTION



Background & objective

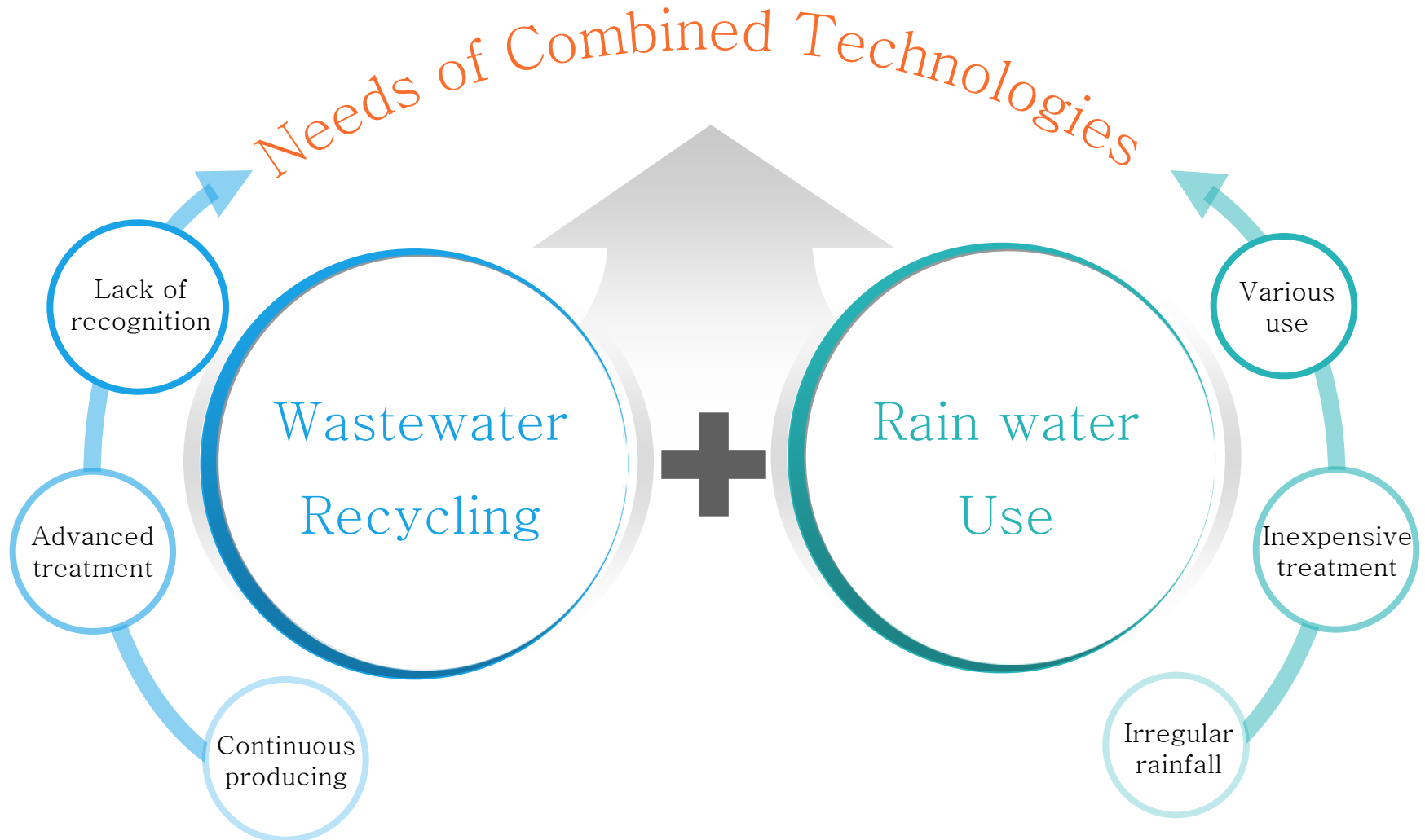
- **Reorganizing** the infrastructure and life style for **low carbon**
- **Minimizing** the environmental **pollution**, Creating a new job and leading **green growth**
- So suggest the urban planning model based on **Eco-Cycle and the action plan**
- Realize the **low-carbon society** by promoting the eco-friendly city

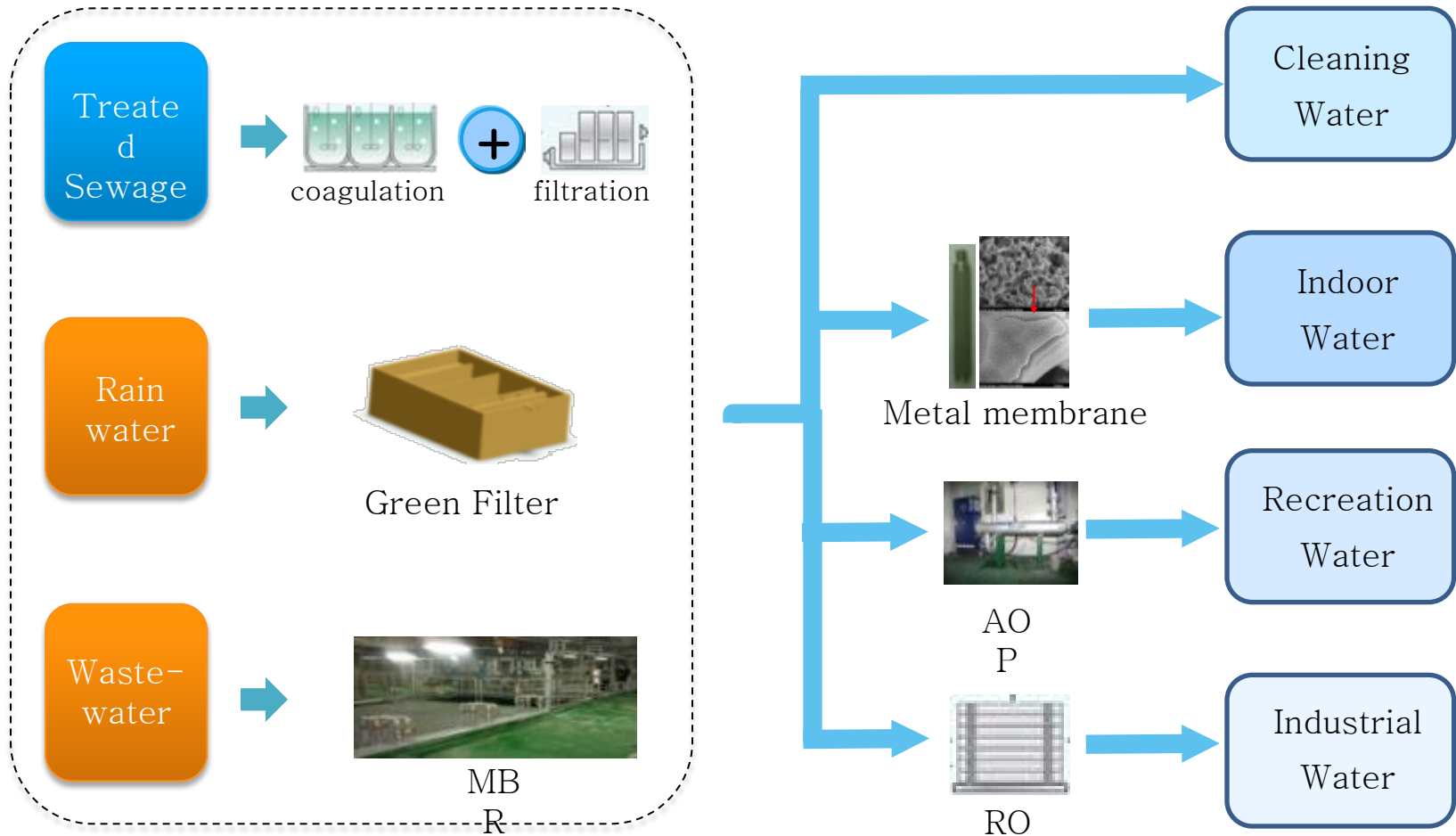
Outline of Gangneung Green city

- Location : Gyoung-po area, Gangneung city
- Area : 18.3 km² (1.7% of Whole area)
- Asset : 1,000 billion won (\$870 million)
- Period : 2011~2020 (1st Stage : ~2012, 2nd Stage : ~2016, 3rd Stage : ~2020)

- **Feb. 2009**, The President suggest the trial green city in Kangwon regional development conference
- **Jul. 2009**, Designate the **Kyong-po area** for demonstration project for green-city
- **Jan. 2010**, An announcement of ascertain the developing model and fundamental conception
- **Dec. 2010**, finish of master planning project for green-city
 - ✓ Area : 18.3km² / estimated population : 23,000ppl
- **~2012**, Progress leading business of developing model









Integrated smart water management system



Generation of sewage and rain water

- Management of WWTP
- Collection of Rainwater

Management of non-point sources

- Rain water pre-treatment
- Penetration and storage

Treatment for reuse

- Operating treatment facility
- Product treated water for use

Water supply

- Stable and efficient water supply by smart operation system

- 1 Customization of combined reuse process of treated sewage and rain water
- 2 Development of smart management system for stable and efficient supply of treated water
- 3 Verification of performance and economics of combined reuse system in Demo-Plant (100m³/day)
- 4 Connection to the Gangneung low carbon green model city project as a reference case

Materials and Methods

MATERIALS AND METHODS



Weather Forecast

Local Management



Web Monitoring



Combined Remote Control & Monitoring

Sewage Reuse



Smart mode

Data from HMI

Process Simulation

Rainwater Reuse



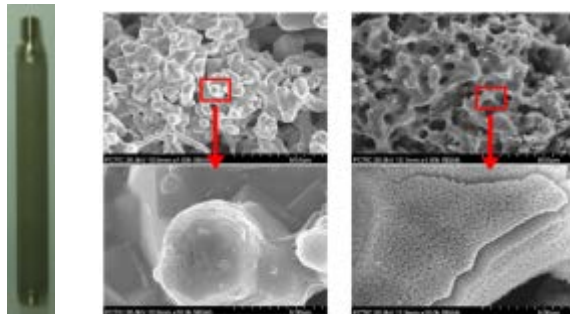
Metal membrane

Stainless Steel Membrane



- Thermal resistance (~990°C),
Chemical Resistance (acid / Alkali)
- Semi-permanent use
and intermittent operation

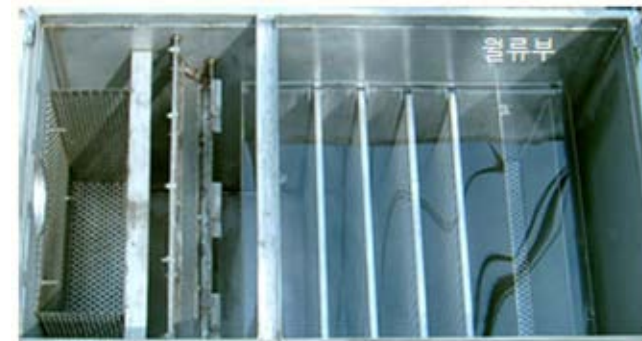
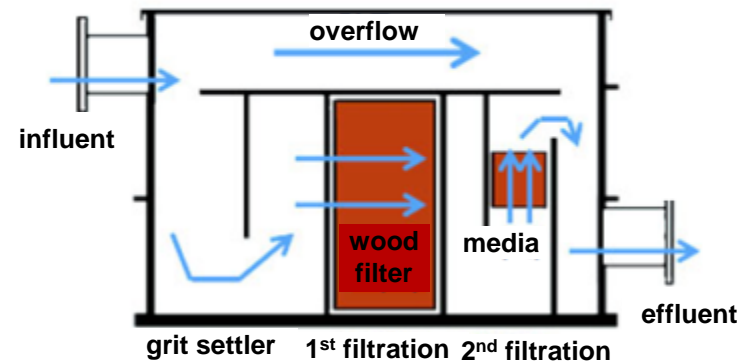
TiO₂ Steel Membrane



- unnecessary of photocatalytic separation process
- maximizing area of adsorption of pollutants

Initial rainwater treatment facilities

Green Filter



- sediment and filtration in a tank
- non-pumping and convenient installation and management

Rainwater from Road Surface

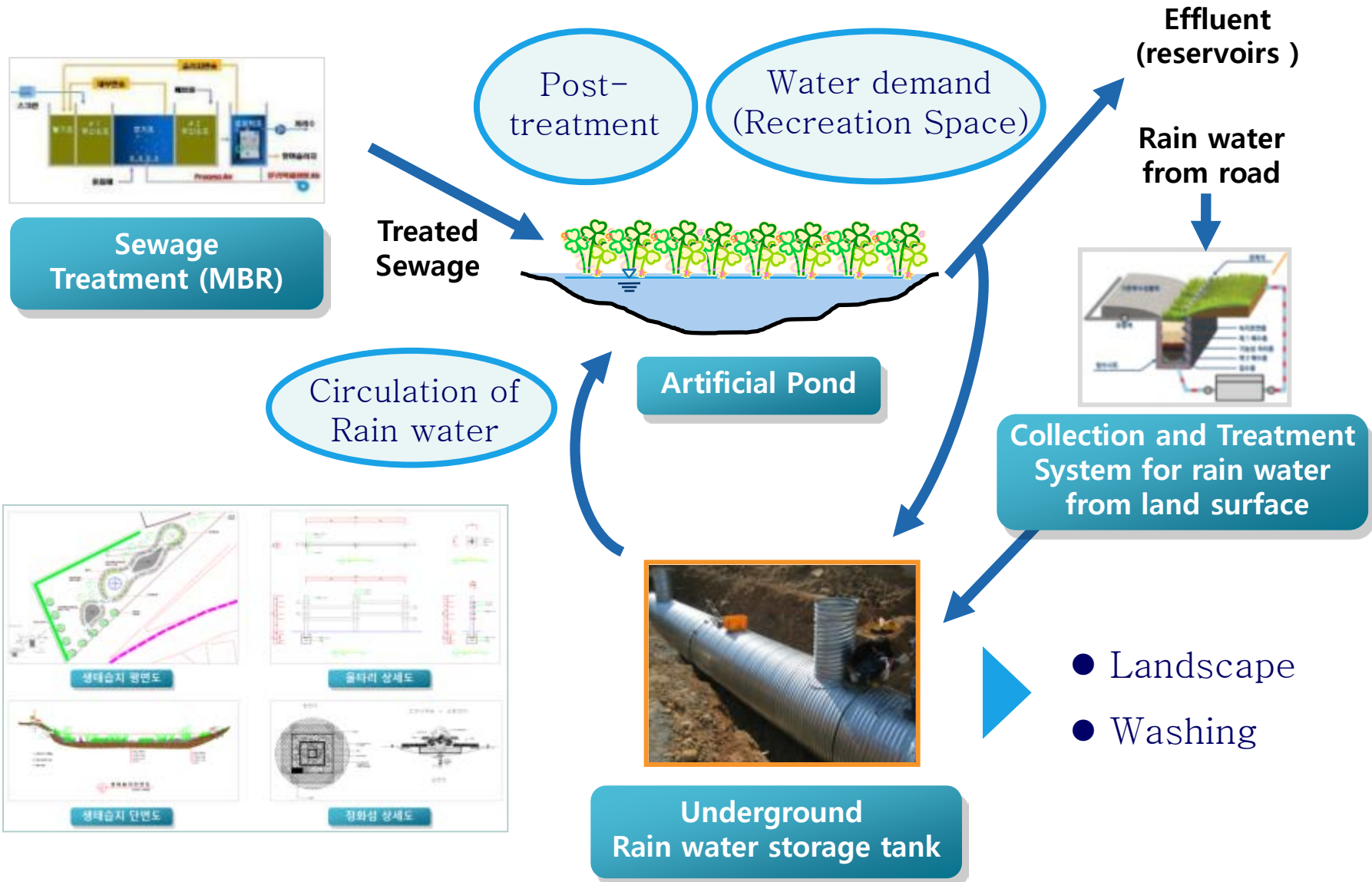


- reduction of non-point source and expansion of collecting surface
- functional media layer for heavy metals and nutrients

Ecological restoration & purification



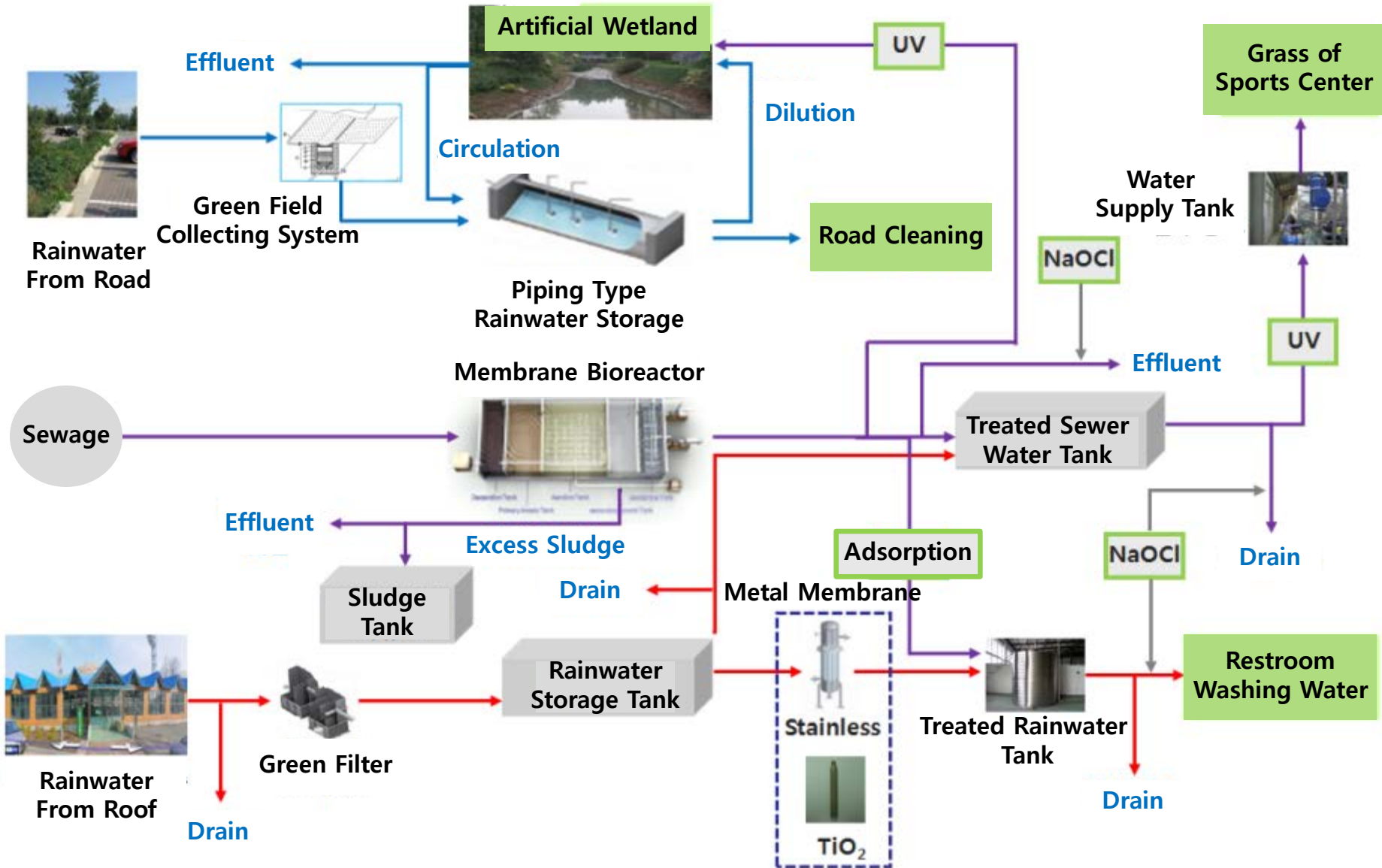
- aquatic plant island
- Purification by aquatic plants
- Acceleration of circulation
- Algae removal by fine ionized burble



Results and Discussions

RESULTS AND DISCUSSIONS



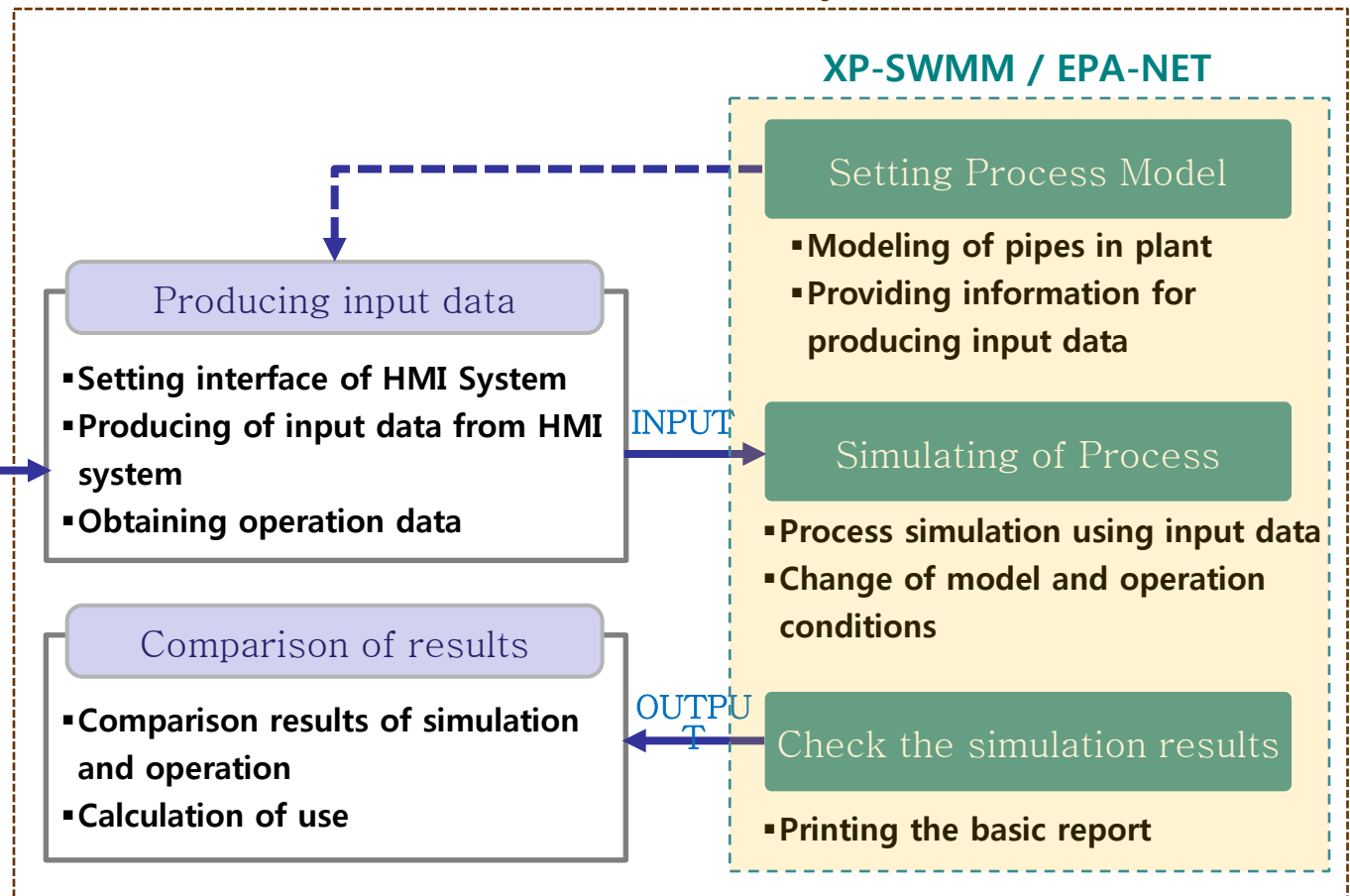


- Application of XP-SWMM & EPA-NET for process simulation
- Prediction of water demand and supply → assist of water management

Monitoring and control System (HMI)



Process Simulation System



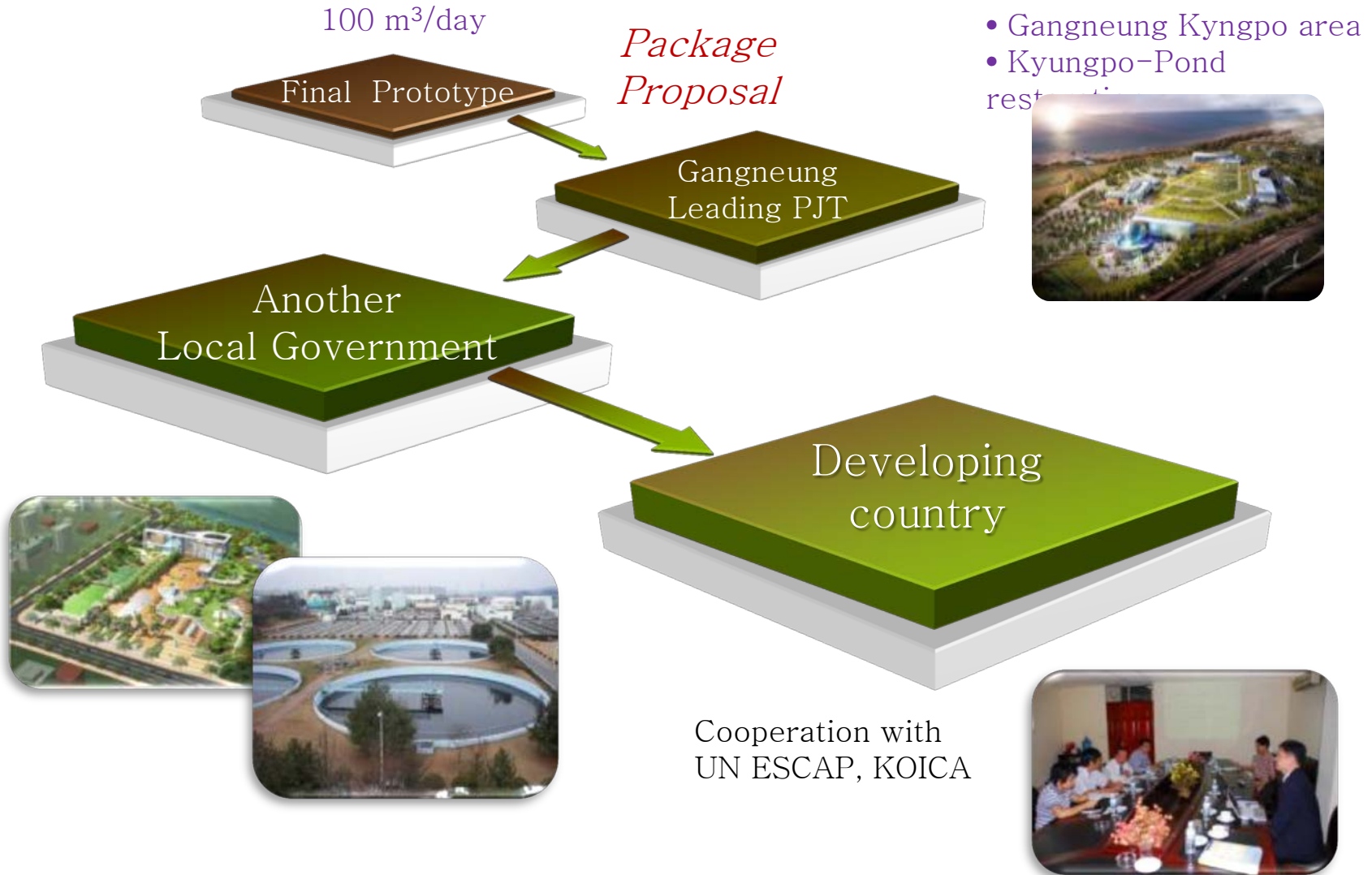
Future plan



1 Amount of treated water supply and quality of supply water

2 Assessment of economical Value of the plant
– operation cost, benefit from replacement of tap water

3 Verification of smart reuse system
– Operation mode system through a rainfall forecast
– Process simulation program



Thank You

gsjung@keco.or.kr

