World Water Challenge 2024

Program Book

Ministry of Environment

KOREA WATER FORUM

KIWW 2024

World Water Challenge 2024

DATE November 14th, 2024

VENUE #306A / Daegu, Rep. of Korea

Ministry of Environment

KOREA WATER FORUM

BACKGROUND

World Water Challenge (WWCH) is an international contest hosted by the Ministry of Environment of Korea and organized by Korea Water Forum for water solutions. As a follow up activity of the 7th World Water Forum in 2015, it has been annually held in conjunction with Korea International Water Week (KIWW) to identify imminent global water issues and to find feasible solutions based on the core value of “Implementation”.

Celebrating its 10th edition, World Water Challenge 2024 is expected to serve its role as an important platform to share not only innovative scientific/technological methods but also policies towards solving defined water problems around the world and to build a broad network among the experts and stakeholders in the water sector as well as the solution providers.

This year, a total of 10 finalists for 4 main topics will gather from 9 different countries to present in the Final Round. Up to three winners (1 Best, 2 Outstanding) will be selected and awarded with cash prize, trophy as well as the opportunity to be invited to WWCH 2025 the following year.

OBJECTIVES

· To seek innovative ideas and practices from around the world based on science, technology and policy that contribute to the achievement of Sustainable Development Goals

· To connect local and global water initiative and share the vision for implementing water solutions based on water partnership and cooperation

· To provide a networking platform for participants from public/private institutions and academia in the water sector through sharing of cutting-edge technology and know-hows

OVERVIEW

· **Date and Time** November 14th, 2024 / 13:30 - 18:00

· **Venue** #306A, EXCO, Daegu, Rep. of Korea

· **Host / Organizer** Ministry of Environment, Rep. of Korea / Korea Water Forum

Session Schedule

TIME	CONTENTS
13:30 - 13:32 (02')	Opening
13:32 - 13:36 (04')	Opening Remarks
13:36 - 13:40 (04')	Welcoming Remarks
13:40 - 13:55 (15')	Invited Speaker: ‘The Best’ prize winner of WWCH2023
13:55 - 14:00 (05’)	Evaluation Criteria of World Water Challenge 2024
Main Topic : Smart Water Technologies	
14:00 - 14:20 (20)	Solution 1 Cutting-edge Technology for Smart Pipeline System
14:20 - 14:40 (20’)	Solution 2 Hydro Heroes: City Quest - Gamifying Urban Water
14:40 - 15:00 (20’)	Solution 3 Smart Water City: Technical Solution Platforms as an Evaluation Criteria and Implementation Guidance
15:00 - 15:20 (20’)	Solution 4 Healthcare Tailored Smart Water Management Solution
15:20 - 15:35 (15’)	Break
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15:55 - 16:15 (20’)	Solution 6 Visenleer
16:15 - 16:35 (20’)	Solution 7 Fry Cradle - Sustainable Fish Fry Rearing Recirculating System
16:35 - 16:55 (20’)	Solution 8 Resilient Water Reservoirs: Local Solutions to Global Challenges
16:55 - 17:10 (15’)	Break
Main Topic: Water Resource Management	
17:10 - 17:30 (20’)	Solution 9 Development of Dead Sea-Nile Reservoir and Large Diameter Composite-Concrete Water Pipe
Main Topic: Water and Wastewater Treatment	
17:30 - 17:50 (20’)	Solution 10 3MINS WTP
17:50 - 17:54 (04’)	Closing Remarks
17:54 - 17:55 (01’)	Award Ceremony Announcement
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World Water Challenge 2024

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- Suhyung Jang, K-water

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Healthcare Tailored Smart Water Management Solution

- Zoubeir Zarrouk, WaterSec

Solution 1

Cutting-edge Technology for Smart Pipeline System

Jenny Chan, Hyele Limited

Hyele Limited is dedicated to accelerating the development of smart cities by introducing an innovative technology to save water and energy and assist in rendering urban water infrastructures sustainable, resilient and adaptive. Hyele recognizes that water supply infrastructure is a fundamental component of cities. Any faults or defects such as leaks and bursts can potentially paralyze large portion of a city's operations. Indeed, leaks and bursts have in the past resulted in floods, business, water supply, and traffic disruptions, financial, water and energy losses, as well as adverse health and environmental impacts.

The Hyele solution leverages long-range, low-amplitude water pressure waves to perform comprehensive and precise condition assessments of water mains infrastructure. This innovative method provides a unique approach that enables utility owners to accurately evaluate buried pipelines. Through this assessment, issues such as leaks, blockages, and weakening pipe strength can be identified without causing service disruptions or requiring invasive measurements. By harnessing this distinctive capability, utilities can enhance the efficiency of their pipeline maintenance programs and repair operations.

Rather than reacting to problems as they arise, our technology facilitates a proactive asset management strategy and integrity monitoring for crucial yet concealed infrastructure assets. This proactive approach is applicable not only to the water distribution sector but also to industries with extensive buried pipe networks. Distinguishing itself from existing solutions in the market, our technology encompasses features such as:

· Active testing: Probing the system actively to identify potential pipe defects.

· Passive testing: Detecting bursts and harmful transients.

· Real-time monitoring: Evaluating system dynamics and demand patterns.

· On-demand and automatically generated reports.

· On-demand sensor control and monitoring expansion.

· Scalable to any type of pipe material.

· Flexible and high sampling rates.

A notable advantage of our non-intrusive technology lies in its implementation ease, requiring minimal construction work or traffic management. By leveraging existing pipeline access points like fire hydrants, inspection tees, and air valve tees, utilities can efficiently and cost-effectively evaluate the condition of their distribution networks. This streamlined approach aids in prioritizing remediation and replacement projects, minimizing disruptions to water services while maximizing the use of aging yet well-maintained pipelines.

Incorporating Hyele's innovative water infrastructure solution is crucial for enhancing urban sustainability, adaptability, and carbon neutrality. By empowering utility providers, designers, and asset management entities to boost revenues, cut costs, and reduce disruptions, our technologies support the evolution of sustainable, adaptive, and environmentally friendly cities. Customers benefit from water and energy conservation, incident prevention, and substantial cost savings across operations, maintenance, energy consumption, and non-revenue water. Aligned with ESG principles and the UN Sustainable Development Goals 6, 9, and 11, Hyele's solution promotes economic, environmental, and social well-being within the communities they serve, enhancing efficiency, safety, and the long-term sustainability of water infrastructure.

Solution 2

Hydro Heroes: City Quest- Gamifying Urban Water Management

Joshua Bon A. Roco

Water management is a critical issue globally, directly linked to Sustainable Development Goal 6 (SDG 6), which aims to ensure availability and sustainable management of water and sanitation for all. Urban areas face significant challenges, including illegal wastewater discharges, unauthorized water connections, and water pipe leaks. These issues lead to water wastage, contamination, and increased costs for municipalities. Effective management requires active monitoring and reporting, which can be resource-intensive for local authorities. Engaging the public in identifying and reporting these issues can significantly enhance urban water management.

Hydro Heroes: City Quest is an innovative mobile application that gamifies the process of reporting water-related issues in urban areas. Inspired by the success of Pokémon Go, this app encourages citizens to actively participate in water and wastewater management by reporting problems they encounter in their daily lives. The app combines elements of augmented reality (AR), community engagement, and educational content to create an immersive and rewarding experience for users.

The app's core features include reporting issues like illegal wastewater discharges, water pipe leaks, and unauthorized water connections using photos and GPS tagging. Verified reports earn more points. Points and rewards are integral, with each report contributing to the user's score. Users start with a basic avatar that evolves as they accumulate points, unlocking new abilities and features. Virtual currency earned through reporting can be exchanged for real-world rewards like discounts, vouchers, or donations to environmental causes.

Educational content within the app offers information on water management and how to identify issues. Gamified learning modules and tutorials help users improve their reporting skills. Community engagement is fostered through leaderboards and team challenges.

To scale up, the app can partner with local governments and environmental organizations to integrate into existing water management systems and promote the app. Engaging local businesses to sponsor rewards can enhance the app's appeal. Enhanced features could include AI and machine learning for better issue detection and verification, filtering out false reports, and prioritizing critical issues. Expanding the variety and value of rewards can further motivate users.

Policy integration involves advocating for regulatory support and funding from local governments. The data collected can inform urban planning and water management policies. Promotion efforts could include marketing campaigns and integrating the app into school curriculums.

Imagine a player named Alex who uses Hydro Heroes: City Quest to report an illegal wastewater discharge by taking a photo and tagging the location. The app verifies the report with AI and notifies the local water authority. Alex earns points, evolving their avatar. Over time, Alex completes challenges, participates in community events, and learns about water management.

Hydro Heroes: City Quest uses gamification to engage citizens in water management. By integrating existing features and scaling up through partnerships and policy support, the app can help achieve SDG 6, fostering environmental stewardship and community involvement.

Solution 3

Smart Water City: Technical Solution Platforms as an Evaluation Criteria and Implementation Guidance

Suhyung Jang, K-water

Urban areas worldwide face critical challenges in delivering water services and managing water resources. Issues like water scarcity, pollution, flooding, limited access to clean drinking water and sanitation have become widespread due to a combination of natural limitations such as climate change, population growth, and human made factors

Meanwhile, the Smart Water City (SWC) can improve the quality of life of citizens and the urban sustainability by solving these multifaceted water challenges based on various smart technologies and ICTs throughout the urban water cycle. Cities in many countries pursue the SWC with high-end smart technologies supported financially and technically by donor countries (organizations) and high-tech enterprises, but there is a fundamental question whether they are ready to adopt the high-end smart technologies considering self-reliant operational management with current IoT systems and technical capacity,

In this respect, as a criterion and guidance, the technical platforms for the SWC can play a key role to evaluate current urban water systems and implement a priority project in line with a long-term roadmap in step with applicable technology readiness levels (TRLs). K-water has developed two technical solution platforms for the SWC (certification and implementation).

The first set is the technical certification platform as a criterion of the SWC which evaluates how cities use technologies, including ICTs to strength disaster resilience, minimize vulnerability, ensure the sufficiency of water supply, and maintain water quality, and balance the urban ecosystem. This platform consists of three main categories: urban water cycle, water disaster management, and water supply and treatment. These three main categories break down into 14 subcategories with 78 key performance indicators (KPIs) which are sets of values to measure the performance of criteria with two types: Sustainability and Smartness. As technical aspects sustainability provides a fundamental framework for preserving and improving the quality of life of citizens, and aids in the stability of the urban water system. Smartness defines the city's capacity to utilize a more sophisticated form of technologies in achieving and improving the sustainability of the urban water management system. This platform covering whole urban water systems provides the KPIs, evaluation guidelines and pilot test results.

The second set is the technical implementation platform linking closely with the technical certification platform This platform is to enhance capacity building in order to adopt and design the priority projects in line with the technical readiness levels (TRL 1 ~ 4) considering the current infrastructures and loT systems, and financial and technical capacities. Each TRL has its own technical groups to achieve the functional purposes, so a target country or city can select a combination of implementing technologies. This platform consists of three main categories and 7 subcategories: water safety (flood protection, drought mitigation), water supply (water treatment, wastewater treatment, water network) and water coexistence (net-zero, water-friendly environment) with three types of technical guidance (specification, manual, field application case) by four TRLs.

As such, the technical solution platforms as evaluation criteria and implementation guidance for the SWC would be right and beneficial to resolve the urban water challenges and to achieve SDGS.

Solution 4

Healthcare Tailored Smart Water Management Solution

Zoubeir Zarrouk, WaterSec

Nowadays many institutions, especially Hospitals are grappling with challenges posed by their legacy water infrastructure. The outdated system frequently experiences leaks and water-distribution issues, which disrupt the hospital's operations and lead to significant water waste. Additionally, the lack of real-time monitoring makes it difficult for them to manage water usage effectively, resulting in inflated water bills and unoptimized water use, which are critical in most segments where consistent and reliable water supply is essential.

To address these issues, WaterSec proposes the implementation of a Smart Water Management System tailored to the hospital's specific needs. The solution includes real-time water monitoring facilitated by a user-friendly dashboard, allowing for continuous oversight of water usage. This system not only tracks water consumption but also sets customizable thresholds to prevent overuse. In case of leaks or unusual usage patterns, WaterSec AI-powered leak-detection system algorithms will alert the hospital staff immediately, enabling rapid response to any issues.

WaterSec’s business strategy tackles these problems by integrating IoT and AI technologies to optimize water usage incorporating a robust data analytics framework where the system continuously collects real-time data from sensors installed throughout the hospital's water infrastructure. By leveraging AI-driven analytics, WaterSec provides predictive maintenance, reducing unplanned downtime and extending the lifespan of the Hospital water-infrastructure.

Additionally, WaterSec is committed to transparency by openly sharing collected data and building comprehensive water consumption patterns that stakeholders can access. This fosters collaboration, informs better decision-making, and promotes a culture of sustainable water management. Furthermore, our solution encourages behavioral change by providing actionable insights and clear data visualizations, driving the adoption of responsible water practices (Gamification; Incentives….).

World Water Challenge 2024

Main Topic

Ecosystem and Water

Solution 5

Revitalizing the Ayung Watershed: A Water Stewardship Comprehensive Approach to Bali Water Crisis

- Cut Endah Setya Handayaningsih, Danone Indonesia

Solution 6

Visenleer

- Moemen Sobh, Visenleer

Solution 7

Fry Cradle - Sustainable Fish Fry Rearing Recirculating System

- Chu-An Chuang, National Taipei University of Education

Solution 8

**Resilient Water Reservoirs:
Local Solutions to Global Challenges**

- ILBOUDO Dieudonne, General Directorate of Agro-pastoral Development and Irrigation

Solution 5

Revitalizing the Ayung Watershed: A Water Stewardship Comprehensive Approach to Bali Water Crisis

Cut Endah Setya Handayaningsih, Danone Indonesia

Ayung Watershed as one of the largest water sources on Bali Island supports a significant population with high agricultural, tourism, and industrial activities. However, it faces a severe water crisis, with its water balance nearing a critical point due to excessive groundwater abstraction for various uses. This over-extraction has significantly reduced available water resources in the watershed.

With the watershed's reduced capacity to retain water, it has been observed that 97% of the water supply within the Ayung Watershed ends up as runoff, resulting in the loss of valuable water resources. The high runoff rate increases the risk of flooding and soil erosion, further complicating water management issues.

To address the multifaceted problems in the Ayung Watershed, a threefold solution has been proposed. This involves empowering and strengthening a Multi-Stakeholder Forum to implement Payment for Ecosystem Services (PES) through two pilot activities: infiltration well maintenance in the midstream and regenerative agroforestry practices upstream.

The comprehensive and innovative solutions combined in this water stewardship project aim to resolve the complex problems experienced by the Ayung Watershed. By addressing issues of groundwater abstraction, green area reduction, seawater intrusion, and runoff, the project seeks to restore the water balance and ensure the sustainable use of precious water resources. Involving all stakeholders in the process ensures that the solution is effective, equitable, and sustainable in the long term.

Solution 6

Visenleer

Moemen Sobh, Visenleer

Egypt, particularly Port Said, faces a critical water crisis, with the country experiencing a deficit of 7 billion cubic meters, potentially running out of water by 2025. This shortage is exacerbated by climate change impacts on El Manzala Lake, unsustainable fishing practices, and the environmental challenges of fast fashion. The degradation of El Manzala Lake has caused severe biodiversity loss, disrupting the ecosystem and leading to unemployment among thousands of fishermen who rely on the lake for their livelihood. Port Said's nutrition depends heavily on marine life, with 90% of local food sourced from the lake. The decline in fish populations poses a threat of famine and regional instability. Additionally, over 10 tons of fish waste are improperly disposed of each week, further polluting the already strained water resources. These issues clash with the United Nations' Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production), and SDG 14 (Life Below Water). Solving these interconnected problems requires a comprehensive, multi-sectoral strategy to restore ecological balance, support sustainable livelihoods, and promote responsible consumption.

Visenleer's Solution

Visenleer is a groundbreaking multi-disciplinary initiative addressing Port Said's environmental challenges through four pillars: Education, Services, Water, and Products. The project seeks to foster sustainable practices, empower local communities, and conserve biodiversity.

Products Pillar: Visenleer is the first regenerative initiative in the MENA region to create sustainable textiles from ocean waste. This 100% organic method transforms discarded materials into durable textiles that are nine times stronger than traditional leather. The production process is carbon-neutral and enhances soil, water, and air quality, benefiting biodiversity. Visenleer provides local fishermen with a new revenue stream, offering 30% more per fish sold, thus improving their livelihoods. By replacing animal and synthetic leather in high-end fashion, the initiative promotes a greener, more sustainable alternative.

Manzala Farm Pillar: Visenleer is introducing modular water farms, a floating system designed to address water scarcity and food production:

· Floating Design: A 70 m^2 octagonal platform on recycled plastic drums, deployable in coastal and lake areas like El Manzala Lake.

· Fresh Water Production: Solar stills produce 150 liters of freshwater daily, using sunlight and photovoltaic panels.

· Hydroponic Agriculture: The system uses 70% less water and integrates 15% seawater, reducing freshwater dependency.

· Modularity and Scalability: The platform can support two families, and multiple units can scale to sustain entire communities.

Services Pillar: Visenleer is engaged in a cultivation-restoration project for El Manzala Lake, focusing on seaweed farming to boost biodiversity and using 3D printing technology to rebuild coral reefs. Equipped with sensors and advanced tracking technology, the project monitors biodiversity, pollution, and fishing activities, providing real-time guidance to fishermen on sustainable practices. This approach aims to restore the lake's ecosystem and offer valuable services to the fishing community.

Education Pillar: Education is central to Visenleer's mission. The project introduces school and university curriculums tailored to the local community, raising awareness about Mediterranean Sea conservation. By educating the younger generation, Visenleer empowers them to play an active role in preserving this critical resource.

Solution 7

Fry Cradle - Sustainable Fish Fry Rearing Recirculating System

Chu-An Chuang, National Taipei University of Education

Fry Cradle is a sustainable fish fry-rearing recirculating system that leverages the interactions between fish fry, biofloc, Tubifex worms, and rotifers.

Research has found that fish feces, respiration, and other excretions contribute about 1.65 billion tons of carbon annually, accounting for around 16% of global carbon emissions. Improper disposal of fish waste in aquaculture can lead to the accumulation of ammonia and nitrogen in ponds, reduced dissolved oxygen levels, excessive algae growth, and sediment buildup, all of which can cause fish mortality. Fish fry, in particular, are sensitive to water quality changes; when exposed to ammonia for 24 hours, the mortality rate of fish fry reaches 20%.

Fry Cradle system raises fish fry based on their growth timeline, with fry feeding on rotifers, Tubifex worms, and biofloc at the appropriate stages. Biofloc helps process fish waste by reducing ammonia and nitrite levels through nitrification and ammonification. Tubifex worms and rotifers are cultured in a lower tank with recirculating water, where the worms feed on fish waste and serve as food for the fry. Additionally, water passes through four filters to remove suspended solids, heavy metals, and pathogens, and an oxygen generator increases dissolved oxygen levels. The system utilizes Recirculating Aquaculture System (RAS) technology to intelligently monitor key parameters like fry density, water temperature, ammonia concentration, dissolved oxygen levels, and feed density, ensuring optimal growth conditions for the fry. Fry Cradle purifies the water, creates a healthy breeding environment, and promotes a sustainable cycle while reducing labor and feed costs for fish farmers.

Solution 8

Resilient Water Reservoirs: Local Solutions to Global Challenges

ILBOUDO Dieudonne, General Directorate of Agro-pastoral Development and Irrigation

Invasive aquatic plants and gully erosion represent significant environmental challenges in most regions of the world, seriously affecting local ecosystems, water quality and reservoir functionality. Invasive species such as water hyacinth, giant salvinia and water lettuce disrupt aquatic environments, forming dense mats that obstruct water flow, reduce oxygen levels and block sunlight penetration. Gully erosion, caused by deforestation, poor agricultural practices and intense rainfall, leads to sedimentation in reservoirs, reducing their capacity and degrading water quality. These problems require holistic, community-led solutions to restore ecological balance and ensure sustainable water management.

My proposal focuses on the establishment of Local Water Committees (LWCs) and Water User Committees (WUCs) to promote participatory water governance and integrate diverse local perspectives. The LWCs and WUCs, comprised of stakeholders such as fishermen, farmers, and local authorities, will oversee sustainable water resource management through training, logistical support, and the implementation of traditional and nature-based methods. This includes removing invasive plants, treating gullies, and reforesting reservoir banks to improve soil stability and water quality.

Innovative technologies such as artificial intelligence (AI), machine learning (ML), and deep learning (DL) will be used for invasive species detection and management, assessing gully erosion, and optimizing reforestation efforts. AI-based analytics and remote sensing will improve data accuracy, while community engagement and traditional knowledge will ensure culturally appropriate and effective interventions.

Case studies from the Cascades region of Burkina Faso highlight successful community-based initiatives, demonstrating significant environmental and social benefits. These projects underscore the importance of community mobilization, collaboration, and adaptive management strategies. By leveraging local knowledge and resources, fostering partnerships, and securing sustainable financing, the proposed solution aims to restore ecological health, empower communities, and promote sustainable development.

World Water Challenge 2024

Main Topic

Water Resource Management

Solution 9

Development of Dead Sea-Nile Reservoir and Large Diameter Composite-Concrete Water Pipe

- Annie Han, The World Sustainability Consortium

Solution 9

Development of Dead Sea-Nile Reservoir and Large Diameter Composite-Concrete Water Pipe

Annie Han, The World Sustainability Consortium

Supplying water in arid areas is a significant challenge (Nature Water 1, 568–572, 2023; Nature 627, 732-734, 2024). The Middle East generates 5 billion m3 of desalinated water annually, accounting for half of the world's total. However, much of the Nile's water is wasted as it flows into the Mediterranean Sea due to inadequate storage at the Nile plain.

I propose utilizing the Dead Sea valley, located 429 meters below sea level, as a natural reservoir for Nile water. By converting its southern portion into a freshwater lake through dam construction, we offer a viable solution. The Nile's average flow is 2750 m3/s, and diverting 200 -600 m3/s to the Dead Sea could yield 6.3 – 18 billion m3 of water annually, valued at approximately $4 billion if desalinated. This initiative could save $2 billion annually in oil or gas typically used in desalination processes, effectively reducing energy consumption and carbon emissions.

Although the initial investment for constructing the aqueduct and reservoir is estimated more than $10 billion, the long-term benefits are substantial. This reservoir has the potential to supply water to 70 million people, based on European water supply standards. Achieving such a remarkable benefit requires cooperation and peace, which could play a crucial role in fostering enduring peace in the Middle East.

We aim to continue the project by developing a structure for the large diameter water pipe (4-12 meters). The design includes a concrete inner layer sandwiched between a composite outer and innermost layers. Compared to traditional fully composite pipes, this structure allows for thinner composite layers, reducing costs by 30% to 40% while still maintaining durability and strength. It is also much lighter and stronger than completely concrete pipes and can deliver high-pressure water without leaking. The 8-12 meter composite-concrete water pipe can also be used to build immersed tunnels for cars and trains, reducing both the cost and time required for constructing the tunnels.

We founded The World Sustainability Consortium to coordinate stakeholders and garner support for my initiative. The recognition of this project by UN Water and its invitation to join the Water Action Agenda of the United Nations further underscore the importance of the endeavor in advancing global water sustainability goals.

World Water Challenge 2024

Main Topic

Water and Wastewater Treatment

Solution 10

3MINS WTP

- Eunmi Kim, SSENG

Solution 10

3MINS WTP

Eunmi Kim, SSENG

Established in 1999, SSENG is a Korea-based sustainable water treatment company who invented the first & finest microfibre filtration technology in the world. Our innovative solution for water management, **3MINS WTP — smaller, faster, affordable and sustainable —** has a remarkable water treatment efficiency. It purifies water to a drinkable standard in a mere **3 minutes**.

Compared to the Rapid Sand Filtration (RSF) system, which has been used globally for 140 years, SSENG's 3MINS WTP system offers significantly reduced metrics: the retention time and volume are "1/100", the construction period is shortened to "1/5", and the construction and operational costs are reduced to "1/3". However, the water quality from our fibre filter and the sand filter are equal, with an NTU of < 0.1 and a removal rate (for 5µm particle) of over 99.99%.

We have two types of filtration devices: Pore Control Fibre (PCF) filters by pressure and Gravity Flow Fibre Filter (GFF) filters by gravity.

Our PCF filtration system consists a perforated cylindrical strainer surrounded by flexible fibre bundles. Unlike traditional sand filtration, it does not need flocculation nor sedimentation, but instant coagulation* (1sec), then direct microfibre filtration (3min). During filtration, the fibres are tightened upward, creating a squeeze effect and compressing the air gap. As a result, this removes impurities and suspended solids (SS) through narrow pores* and 15cm deep-pressure filtration. During the backwashing, the fibres are loosened to make wider pores that enable water and air to vigorously shake off and eliminate SS. This process takes a short time and requires only 5% of raw water.

Our GFF filtration system is similar in principle to the PCF system but relies on gravity. It utilises a 30cm water level difference and a 1cm compressed microfibre layer filter, requiring no additional filtering power beyond gravity. Filtered water flows into backwashing water, eliminating the need for a pump and reducing power costs. Additionally, the use of lighter fibre with a shorter filtration depth than sand can further reduce backwashing costs.

Along with our extraordinary energy efficiency improvement technology, it is not just a lot more **SPACE-ECONOMICAL** and **COST&ENERGY-EFFICIENT**, but also **SUSTAINABLE**. As a company pursuing carbon neutrality, our filtration system can reduce carbon emissions by up to 66.6% (2/3) when it is operating compared to other systems on the market.

Furthermore, our filtration system recycles water for agricultural, industrial use which is a sustainable way to solve the water shortage in today's world. We have installed 20+ re-use water facilities, for instance in Gimpo Airport Sky Park (Seoul's secondary airport). Also, our technology requires only instant coagulation (1s) unlike conventional coagulation and flocculation. As a result, we use less coagulant (1/3), making the drinking water safer.

Lastly, Water quality is ensured by CCTV monitoring at all times through automatic backwash by pressure, time and turbidity. The PLC (Programmable Logic Controller), HMI (Human-Machine Interface) and internet connection allows us to remotely control the overseas site. We are enhancing our technology by integrating an AI-powered full automation system.

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