LSIS Water Solutions
for Water-Energy-Food Nexus
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LSIS Water Solutions

Rural Water Management Solution
Water/Wastewater Management Solution
Water Energy Management Solution
Valuable water, Happy future

The source of life, WATER.
Water has opened life for us.
Life that flows eternally bearing the life of mankind.
But now, Humanity is faced with a serious water crisis threatening our survival.
Everyone can enjoy precious water,
we need wisdom and determination to keep up.
Now, LSIS Water Solutions protects the future of water.
Global Water Issues

"Water" is a top priority for the future of mankind.

No one can be free in a global water crisis!
Water has become a top priority for the future of mankind.

Interest in resource security is increasing due to global issues such as population growth, urbanization, and climate change.

Water shortage increases translate into the recognition that water resources need active management.

Since it is beyond just matter of water, the new paradigm, Water-Energy-Food Nexus, is on the rise to understand the connectivity between water, energy and food to be managed in integrated manner.
Our Approach

LSIS Water Solutions goes hope beyond the crisis.

LSIS will offer the automation & ICT-based water management solutions in order to solve a variety of water-related issues.

Automation & Smart ICT Solution-based operations
Solution Overview

- **F** Disaster prediction and damage minimization due to climate change
- **E** Complementing energy required for water intaking via installing floating photovoltaic generator using the space in dam or reservoir.
- **W** Integrated water management from all sectors to stabilize supply and improve water quality.
- **E** Power energy savings through monitoring real-time efficiency of pump operation
- **W** NRW reduction and systematic facility maintenance via pipeline network diagnosis/leakage analysis
- **E** Energy recovery by applying micro hydro power generator to the pressure reducing valves.

- **F** Optimized utilization of water through integrated management of real-time operating information on the reservoir
- **E** Establishing Smart Water Station powered with solar energy to minimize power consumption

![Diagram of LSIS Water Solutions]
Environmental pollution prevention through quality management for treated water in real time.
The best of the best smart water management

A top priority for agricultural water management is to ‘find(figure) out or check or understand’ the possession and usage status of water resource. To this end, LSIS Smart Water Station collects and manages critical information such as water level, flow, quality, rainfall etc. from dams, weirs, reservoirs, pump stations and irrigation canals in real time.

In particular, the Smart Water Station has improved convenience for easy installation its operations using photovoltaic power without a separate commercial power. The Smart Water Station is available on on-site facilities extended to various sectors of water resources for gathering information in addition to the integrated agricultural management.

It offers advanced solutions for intelligent agricultural management such as simulation for reservoir and drainage, flood impact analysis using information from irrigation facilities to achieve optimal use of limited water resources.
When exact ‘understand’ of the water reserves in the country or region is required or in an attempt to alleviate water shortages and damage from disaster with optimal management for water resource, Rural Water Management will help.

**Intangible Values**

**Identify water reserves**  
Investigating and understanding of national water reserves by the Smart Water Station

**Efficient use**  
Optimizing allocation equal to regions on limited water resources by Intelligent Agricultural Management

**Minimize disaster damage**  
Rainfall, water level, water flow, image information by disaster warning

**Cost & Expected Effects**

- **Facility size**  
  (Smart Water Station, 100 Sets)  
  Including Intelligent Agricultural Management Software

- **Cost (USD 3.4 M)**  
  Smart Water Station: USD 2.5 M  
  Management System: USD 0.9 M

- **Expected effects (USD 0.7 M)**  
  Irrigation efficiency: 16%  
  Saving water: 16 M ton/year (10,000ha)

**Key Project**

Real-time management for major operational information (water level, rainfall, site image) of water resources such as weirs and reservoirs

<table>
<thead>
<tr>
<th>Owner</th>
<th>Korea Rural Community Corp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Area</td>
<td>Thailand/Myanmar/ Vietnam</td>
</tr>
<tr>
<td>Facility</td>
<td>Dam, Weir, Reservoir</td>
</tr>
</tbody>
</table>

Real-time integrated management for all reservoir’s operational information (water level, rainfall, pondage, water reserve rates, site image)

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Supply Area</td>
<td>Republic of Korea</td>
</tr>
<tr>
<td>Facility</td>
<td>1,620 reservoirs</td>
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</tbody>
</table>
Water/Wastewater Management Solution

A rapid and effective response by automation, integration and advancement

Automation system is needed for effective and efficient water/wastewater management. LSIS Water/Wastewater management solution enables optimal unit and integrated operation for water/wastewater plant and distribution pipeline network.

The first step is the automation solution which is for real time monitoring of operating status in all plants for water/wastewater treatment. With this, it is also possible to remotely control field facilities such as pumps and valves.

In the next step, with integration solution which is run in integrated operation center, integrated water treatment plant and wastewater treatment plant, integrated management for the facilities distributed over wide area can be performed with benefits such as stable/uninterrupted water supply, prompt response to accident which are difficult to be handled with single plant management system.

In the final step, by introducing ICT based advanced solution, it is possible to optimize efficiency for water supply by analyzing and diagnosing information of water treatment facilities and pipeline network, energy saving by optimal pump operation and water resource use by NRW reduction.
If you want to improve the water quality and supply reliability of water supply from disruptive accidents, minimize energy consumption required in the production and supply process, reduce the water leakage rate, and reduce NRW the LSIS Water/Wastewater Management Solution will help.

**Intangible Values**

- **Improved water/sewage quality**
  Real-time monitoring and control for water management by Automation Solution

- **Stabilized water supply**
  Metropolitan waterworks system management by Integration Solution

- **Reduced energy costs**
  Optimal pump operation and NRW management by Advanced Solution

**Cost & Expected Effects**

- **Facility size**
  Total 300,000m³/day water treatment capacity
  Water intake/Treatment/Reservoir facilities

- **Cost (USD 4.3 M)**
  Automation: USD 2.1 M
  Integration: USD 1.3 M
  Advanced: USD 0.9 M

- **Expected effects (USD 0.6 M)**
  Power costs: 0.4 M USD/year
  Chemical costs: 0.04 M USD/year
  Others: 0.17 M USD/year

**Key Project**

- **World’s largest integrated water management system**

**Owner**
- K-water

**Supply Area**
- 24 local governments around Seoul

**Capacity**
- 8,535,000m³/day

**Facilities**
- 5 intake plants, 7 water treatment plants, 12 pump stations

**Pipeline network**
- Total of 816 Km via phase #1~#6

**Operational Status**
- Supply 4.2M ton/day for 13 million people

**Delivery information**
- Water system status monitoring, demand forecasting, pumping & supply control, pipeline network analysis, facility information management
Innovative energy management solutions for tomorrow

You need a systematic energy management needed for required in water production and its operation through the entire process from the water resource to a faucet.

Energy management solution brings cost saving and CO₂ reduction effects by maximizing energy efficiency put into production of potable water.

First of all, it is possible to have new energy source by installing photovoltaic power generator to create renewable energy using wide space in water/wastewater treatment plant.

In terms of plant operation, it keeps balance for water supply by forecasting water demand and optimizes pump operation which takes biggest portion of energy use in water/wastewater treatment process.

Also, as installing micro hydro power generation equipment to the pressure reducing valve at the rare part of reservoir, wasting energy can be recovered.

Finally, in order to maximize reliability and cost efficiency of power use for facility operation, it manages externally supplied energy and internally created renewable energy with energy storage system.
When it is required to manage energy use in overall water treatment and supply process and save energy cost in order to reduce CO₂ emission to the ultimate, water energy management solution will give an answer.

Intangible Values

- **Effective Energy Management**: Optimizing energy management required in water treatment and supply by Demand Forecast, Supply Analysis
- **Operating Cost Down**: Economic Usage of Energy by Energy Saving and Management
- **CO₂ Reduction**: Renewable Energy Generation by Solar & Micro Hydro Power

Cost & Expected Effects

- **Facility size**: Total 250,000m³/day water intake capacity
  - Water intake/Treatment/Reservoir facility

- **Cost (USD 3.8 M)**
  - Water EMS: USD 0.08 M
  - PV (2MW): USD 2.7 M
  - ESS (1MWh): USD 0.6 M
  - PEMS (6EA): USD 0.25 M
  - Micro Hydro (20kW): USD 0.16 M

- **Expected effects (USD 0.5 M)**
  - Power savings: 0.17 M USD/year
  - PV: 0.27 M USD/year
  - Micro Hydro: 0.01 M USD/year
Offering Value

We promise to offer a healthy water solution.

Combining accumulated automation knowledge in water treatment process and the most advanced ICT technologies, we will provide the best solution for systematic and scientific water management.

To determine the amount of available water resources of the state and other institutions, and optimize the allocation and management of limited agricultural water to contribute to increasing food production.

By monitoring the status of the entire water supply system in real time, it is possible to achieve a stable water supply, water quality improvement, with less leakage.

It can actively respond to climate change by integrated energy management for CO₂ reduction via energy saving, renewable energy generation and energy recovery based on ICT technologies.
Major Project

Water & Wastewater Management System

- Kwangam water treatment plant integrated management system (2013)
- Seongnam water treatment plant advanced treatment instrumentation and control equipment (2012)
- Geum river section No. 6 of 4 river project monitoring and control system (2012)
- Kyungpook water intake plant monitoring and control system (2011)
- Seogwipo City sewer system (2009)
- Cheongju sewage advanced treatment monitoring and control system (2005)
- Busan Duksan water treatment plant instrumentation control equipment (2004)
- Step 6 metropolitan area instrumentation and control equipment (2002)
- Mongólia, Yarmag water supply equipment monitoring and control system (2014)
- Jordan, Supply and installation of System Control and Data Acquisition of Disi water Drawing project (2014)
- Vietnam, Thien Thenh water treatment plant monitoring and control system Phase 1 (2002)

<table>
<thead>
<tr>
<th>Project</th>
<th>Employer</th>
<th>Completion</th>
<th>Deliverables</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kwang-am water treatment plant integrated management system</td>
<td>Seoul city</td>
<td>2013</td>
<td>SCADA, process diagnosis, facility information management</td>
<td>USD 2.3 M</td>
</tr>
</tbody>
</table>

Integrated water management system

- Gyeongnam water integrated management system (2009)
- Amsa water treatment plant integrated monitoring and control system (2006)
- Seoul Metropolitan Area integrated management system (2005)
- Geum River Northern Area water treatment plant integrated management system (2005)

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<tbody>
<tr>
<td>Seoul Metropolitan Area integrated management system</td>
<td>K-water</td>
<td>2005</td>
<td>Integrated management system, water resources integrated management solution</td>
<td>USD 5.3 M</td>
</tr>
</tbody>
</table>

Others

- Hapcheon Dam floating photovoltaic system 500kW (2012)
- LSIS Cheongju plant PCS, PMS 1MW (2015)
- KEPCO West Anseong frequency regulation PCS 16MW (2014)
- Samsung SDI Giheung plant PCS 5MW (2014)
- Jeju Test-bed total operation center EMS (2013)
- Jeju EMS (2004)
- Angye small hydro (2014)
- Gabuk small hydro (2012)
About LSIS

We will continue to grow into a world-class water company.

LSIS Co., Ltd was established in 1974, achieving in 2014 revenues of 1.5 billion dollars in the industrial power, automation, and convergence business sectors, with 3,500 employees. Thomson Reuters has recognized LSIS business competitiveness selecting it for four consecutive years among the world’s top 100 Innovations.

Core Business

Power Business
LSIS can compete in the same level with the world’s top players based on the advancement of electric power solutions that maximize efficiency and system stability.

- GIS
- HVDC
- Power transformers

Automation & Drive Business
LSIS’s automation and drive systems, with integrated core hardware, software technologies and technology services, offer the most effective solutions in a wide range of industrial workplaces.

- PLC, HMI, Servo
- VFD (LV), VFD (MV)
- Automation System (DCS, RTU)

Convergence Business
Convergence of electric power, electronics and automation gives birth to photovoltaics, smart grid, and climate change solutions. LSIS’s world-class technology will serve as the engine for green growth.

- Railway System
- Smart Grid
- Photovoltaic System (PV, ESS, PCU)
- Green Car Solutions
LSIS has four plants in Korea, 8 overseas subsidiaries, and 10 overseas branches, securing 224 distributors in 77 countries to expand its business around the world.

Global Network

Manufacturing/retailing subsidiaries (8)
China (Wuxi, Dalian, Hubei), Vietnam (Hanoi), the Netherlands (Amsterdam), Japan (Tokyo), UAE (Dubai), United States (Chicago)

Overseas branches (10)
China (Shanghai, Beijing, Qingdao, Guangzhou, Chengdu, Wuxi), Vietnam (Ho Chi Minh), Japan (Tokyo), India (Gurgaon), Russia (Moscow)

Service centers (18)
China (Shanghai 3, Beijing 2, Quanzhou, Guangzhou, Xiangtan, Foshan, Jinan, Qingdao, Shenyang, Changzhou, Wuxi, Nanjing, Wuhan, Chengdu, Chongqing)
Following a strategic separation from the LG Group in 2003, LS has achieved an accelerated growth to become a model of successful corporate divesture. The LS Group is currently made up of 24 subsidiaries, with 7 leaders in their respective fields in Korea. The LS Group’s advanced technology and customer oriented philosophy will be fully engaged to support each one of its subsidiaries to become a global leader.