

**Efficient Plant Operation**  
**with HanPHI®**  
**at Korea South-East Power Company (KOEN)**

CASE STUDY

# Improved Plant Management

Korea South-East Power Company (KOEN) is a major power generation company which provides approximately 10,000 megawatts of electricity from 5 plants across the country. KOEN generates electricity for metropolitan areas and southern Korea. In total, KOEN generates approximately 10 percent of South Korea's annual net electricity.

Since installing HanPHI in 2012, KOEN has proactively managed its plants. With HanPHI, KOEN has **increased its annual electricity output** and the lifecycle of its assets. Additionally, the fleet of plants have significantly **decreased maintenance costs**, repair times, fuel usage, and unscheduled downtime.

## Challenges:

Power plants commonly manage assets through regular maintenance, repair, and replacement of equipment and systems. However, equipment failure is highly unpredictable when using traditional alarm systems, and often results in catastrophic damages to both the equipment and workers.

When unscheduled downtime occurs, it takes significant financial and human resources to repair or replace the equipment. On average, power plants experience two to three unscheduled downtimes each year, representing a cost of \$50,000 or more. To reduce costs and improve reliability and availability, KOEN needed a better understanding of the current plant status.

*KOEN produces*  
**10,000 MWs**  
*of electricity across 5 plants.*

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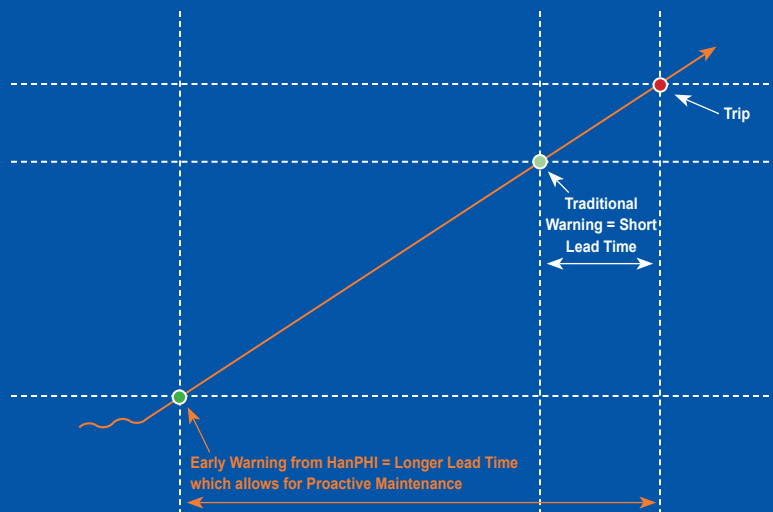
*The power generated represents approximately*  
**10%**  
*of South Korea's annual net electricity.*

## Key Threats KOEN Needed to Mitigate

What's the value of early fault detection?

- Asset Protection
- Increased Availability
- Cost Reduction
- Extended Lifespan

Traditional Warning vs Early Warning with HanPHI:



- **Limited Insight of Current Plant Operation**

Detecting abnormal equipment behavior based on the threshold of actual values fails to reflect context information. In order to produce meaningful intelligence, KOEN needed to learn the operating environment and characteristics of equipment prior to configuring normal parameters for each piece of equipment. With intelligence based on the current plant operation, KOEN could predict impending failures and secure sufficient lead time for maintenance.

- **Random Failures**

A process plant constantly runs thousands of pieces of rotating and non-rotating equipment, which operate systematically to produce output. To maintain the desired level of output, KOEN must maintain its equipment, but maintenance based solely on equipment age ignores the fact that a majority of failures are random. Thus, a majority of failures cannot benefit from a limit on operating age. Since failures do not have timelines, KOEN needed a solution to enable predictive maintenance.

- **Short Lead Time**

Every second of a power plant's operation is critical, and assets throughout the plant transmit huge amounts of data. Traditional alarm systems are capable of using this real-time data to alert plants when values operate outside of acceptable parameters which can lead to part failure, unplanned outages, or destruction. However, such alarms do not provide the lead time a plant truly needs to plan and act, and KOEN needed early warnings to enable proper lead times.

# Solution & Benefits

In 2012, KOEN installed HanPHI to proactively manage its plants by capturing valuable information embedded in an ocean of data and using it to predict upcoming and hidden equipment failures based on dynamic evaluations of expected and real-time values. Such discoveries are possible via HanPHI's patented intelligent predictive modeling technology. Every day, KOEN leverages this innovative solution to achieve operational excellence through:

- **Increased Lead Time**

With a clear view of impending equipment failure, KOEN prepares for critical failures well beforehand. HanPHI monitors all equipment in real time, constantly learning the normal patterns of individual equipment. Then, continuously monitors and identifies even the slightest sign of impending failure and provides clear view of relevant equipment through *SuccessTree* with days or weeks of advance notice.

- **Operation and Maintenance Cost Savings**

In the first three months after installing HanPHI, KOEN estimated saving \$700,000 through prevention of equipment failure and improved maintenance schedules. After two years and three months, those savings reached approximately \$4 million in improved operations and maintenance.

- **Actionable Intelligence**

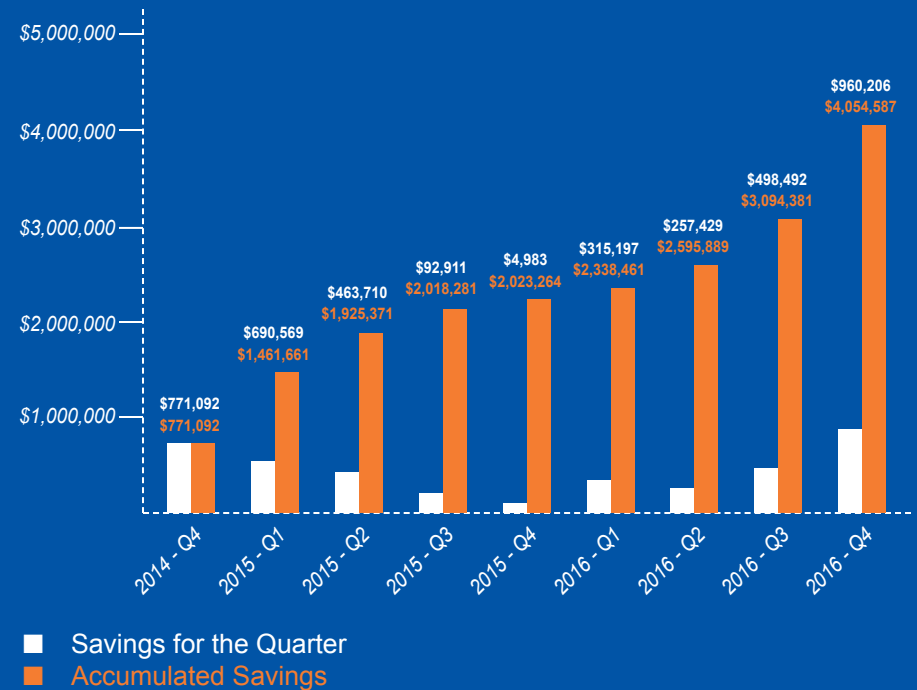
With HanPHI, KOEN realized the benefits of predictive maintenance. Management now accesses an intuitive and clear overview of entire plant floors, enabling optimal plant operation. With actionable intelligence, KOEN experiences asset-protection improvements, increased availability, cost reductions, and extended equipment lifespans.

In just over 2 years, HanPHI saved KOEN

# \$4 million

in operational and maintenance costs.

OPERATION & MAINTENANCE COST SAVINGS AT KOEN:



## About HanAra Software

HanAra Software connects deep industry knowledge with innovative technology to provide integrated data management and predictive maintenance solutions for process plant management. Through the implementation of HanAra solutions, plants enjoy results including reduced costs, increased efficiencies, and ultimately improved plant safety. HanAra Software combines solutions with training and care programs to support clients every step of the way.

HanAra Software is the United States headquarters of South Korean-based BNF Technology. BNF Technology is a professional software development company that provides optimized software solutions for operational management of process plants. Coal-fired, combined-cycle, seawater desalination, and petrochemical plants use our solutions. Since our founding in the year 2000, BNF Technology has provided various solutions to more than 150 units across two continents to help them achieve operational excellence.

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**To turn your data into actionable intelligence,**  
**call: 737.209.9220**  
**or email: [info@hanarasoft.com](mailto:info@hanarasoft.com)**

## About The Korea South-East Power Company

Korea South-East Power Company (KOEN) focuses on providing a stable and economical power supply to South Korea. To foster the nation's innovation and growth, KOEN operates with three guiding principles: cost innovation, process innovation, and field innovation. Through its adoption of advanced technology, KOEN strives to be the global standard of technology adoption in the power generation field.

With its 6 power generation complexes, KOEN represents 10% of Korea's power generation capacity. KOEN operates a mixture of thermal and combined power plants that utilize LNG and coal with some renewable energy sources.

