

HS ORKA PULSE™ 4.0 SCADA Project

HS Orka is the third largest energy provider in Iceland, generating approximately 8% of the power in the country. The company operates two geothermal power stations at Reykjanes located in the southern peninsula of Iceland: Reykjanesvirkjun and Svartsengi.

Each power station is based on deep drilling, reaching a depth of roughly 2-3 kilometers in 800 years young volcanic soil. High pressure steam is obtained from the deep drillings that enable power generation and water supply for domestic heating.

Recently, HS Orka upgraded their PULSE™ SCADA HMI Command and Control system to the new version 4.0 of the solution.

History of the Control Systems operations

The control systems of these power stations were planned and conducted by RT, the Icelandic company headed by Ágúst H. Bjarnason, who is one of the leaders and founders of the Icelandic Engineers Association.

Over the years, RT merged with the engineering firm Verkis, and HS who was split into two companies: HS Orka, which is designed for power generation, and HS Veitur, which is responsible for the water supply.

The power stations became Afcon customers almost 30 years ago, since its establishment, at which point they found Afcon's P-CIM product to best meet their requirements for HMI/SACADA solution.

In 2015, the software system was upgraded to the advanced PULSE™ SCADA HMI solution.

The system is considered large and complex, and includes more than 25,000 I/Os distributed over a dozen servers and several dozen client stations in the control room at each of the sites. The application developed for this customer

deploys more than 2,500 active operation and monitoring screens in both control rooms.

Svartsengi power plant - today



Svartsengi power station has a production capacity of 75 MW of electricity and 190 MW of heat. The PULSE™ handles water supply, electricity generation, and high voltage switching. The servers communicate with Programmable Logic Controllers (PLCs) controlling the systems that absorb steam coming from deep geothermal wells deep within the earth. Dry steam is separated for turbines generating hot water for use by residents in neighboring cities.



The control systems are based on Siemens Control Networks, GE MODBUS protocol, and high-voltage systems that communicate with the IEC104 SCADA protocol.

The system is managed by a central server, which manages the database, workstations, and reporting system which enables running the power generation efficiently.

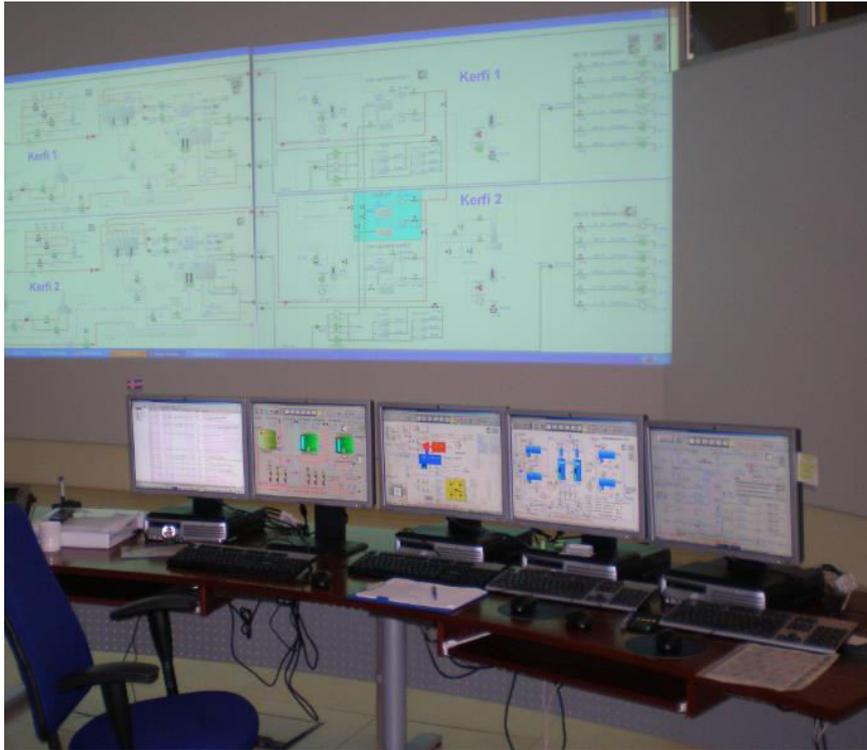
The data obtained from the system is also used for customer relationship management, pricing and billing purposes.

Reykjanesvirkjun Power Plant



The Reykjanes Power Plant, located about twenty kilometers away from the Svartsengi station, has a production capacity of 100MW of electricity.

The Svartsengi systems are based on several I/O servers and a central server that manages several client stations.



Due to the size of the system and its critical nature, the upgrade program was executed in two phases: Reykjanes Power Plant first, and then Svartsengi. After installing the new system, a handover was planned and executed, and following final approval the old system was suspended and the new system was implemented in a production environment.

PULSE™ software supports the latest technologies and enables control of multiple sites and systems from one central control room. The operators receive real-time alerts allowing them to control and react to every event that occurs on the system.

The information is stored and analyzed based on a modern DB system that allows effective management of the stations.

From an engineering perspective, the system is easy to maintain and enables local teams to make changes if necessary. PULSE™ supports the latest technology in cyber security and enables operating in a very secured IT environment.