TECHNOLOGY
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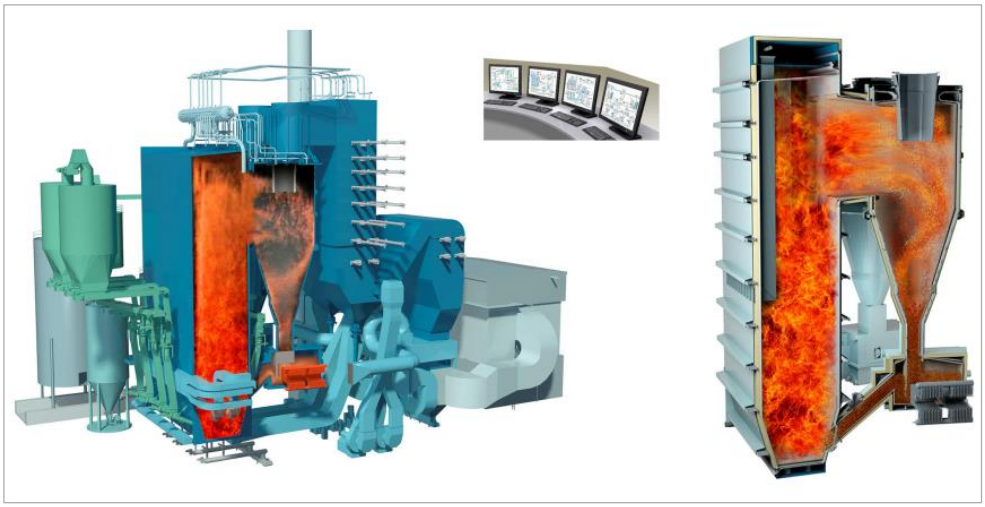
The journey of technology

Technology seminar, new solutions applied to thermal power plants

On September 16, 2022, in Ho Chi Minh City, VALMET and SEACO Vietnam Company organized a technology seminar, introducing new solutions applied to multi-fuel thermal power plants and boilers.

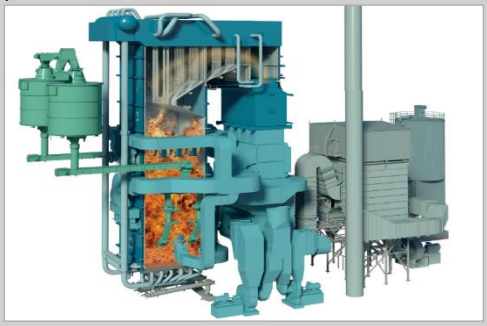
The seminar was attended by the CEO, Deputy CEO of Investment and Construction, and representatives from various departments of EVNGENCO3 (Power Generation Corporation 3). Also present were representatives from thermal power companies such as Phu My, Vinh Tan, Mong Duong, and EVNGENCO3's Power Plant Repair and Maintenance Service Company. From VALMET, there were Mr. Juhani Viiala - Senior Director for the Asia-Pacific region, Mr. Khoa Nguyen, and Mr. Tuyen Huynh, who are responsible for business management in Vietnam. SEACO Vietnam Company was represented by Mr. Bui Xuan Dung - Chairman of the Board of Directors, and Mr. Nguyen Anh Dung - CEO, who also participated in the presentations.

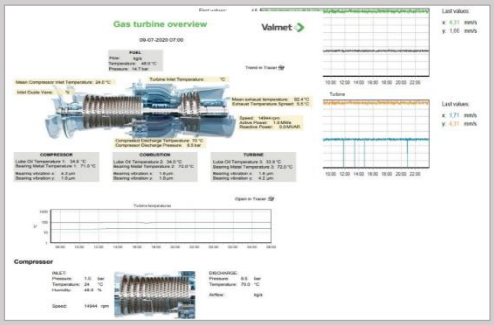


At the seminar, Valmet presented the Flexible Multi-Fuel Boiler solution, which includes the following components: conversion technology to enable existing boilers to co-fire coal, municipal solid waste, industrial waste, recycled wood, wood, biomass, and waste materials; Valmet's CFB and BFB boiler technology (Bubbling Fluidized Bed technology); Integration of gas combustion into existing PC boilers by adding biomass reception systems and CFB gasification systems; Exhaust gas treatment system.

In addition, Valmet also presented the Valmet DNA information management system and Valmet's boiler diagnostic system using imaging and sound.

The technologies and solutions presented by Valmet at the seminar have contributed to EVNGENCO3's proactive approach in selecting technology, improving operational efficiency, increasing labor productivity, and enhancing the reliability of power supply. These efforts are particularly important for Vietnam's commitment to achieving net-zero emissions by 2050, as stated at the COP26 conference. Valmet's solutions have helped EVNGENCO3 become more self-reliant and aligned with the goals of sustainable development in the power generation sector.





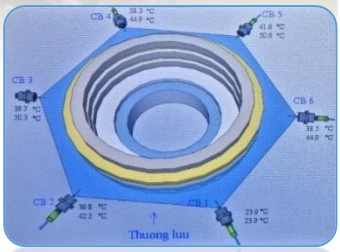
Monitoring the temperature of the coal brush, sliding ring of Unit H2 at Srepok 3 hydroelectric power plant

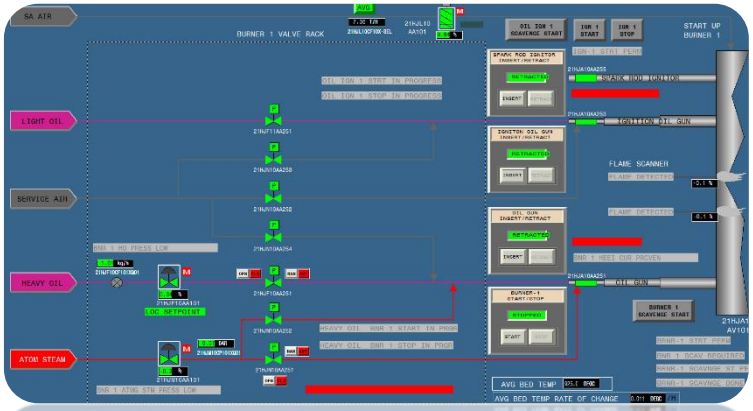
At the Buon Tua Srah, Buon Kuop, and Srepok 3 hydroelectric power plants, the temperature of the generator rotor rim and coal brush is regularly measured on a weekly basis using thermal guns or thermal cameras at random positions while the units are in operation. The generator rotor rim has a wide diameter and a large number of coal brushes (approximately 112 brushes at the Srêpốk 3 hydroelectric power plant), evenly distributed on the rotor rim. Due to the wide distribution and large quantity of coal brushes, it is difficult to continuously measure the temperature of the entire rim, making it challenging to detect localized overheating phenomena at certain positions where the coal brushes have poor contact.

Moreover, the accumulation of coal dust on the brushes can lead to erosion and damage to the generator rotor rim, causing malfunctions.

To monitor the entire generator rotor rim, the Buon Kuop hydroelectric power plant has implemented a system consisting of 6 sensors placed around the rim, spaced 600 apart. These sensors are capable of measuring temperature and have a wide scanning angle. They operate under conditions of steam and high temperatures (70-900C) in the high magnetic field area (within the generator compartment). They can be connected according to industrial standards to transmit signals to the plant's SCADA system.

The system can identify the location of abnormal heat points and display parameters such as minimum, maximum, and average temperature to evaluate the condition of the sliding ring system. This helps in promptly implementing maintenance solutions. Additionally, the system is equipped with alarm values, and it stores data on the SCADA system and the HMI screen.



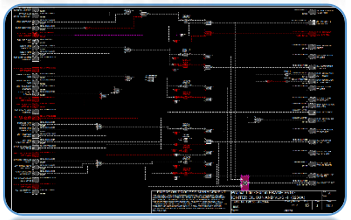


Add operation interface and control logic to the fuel nozzle system.

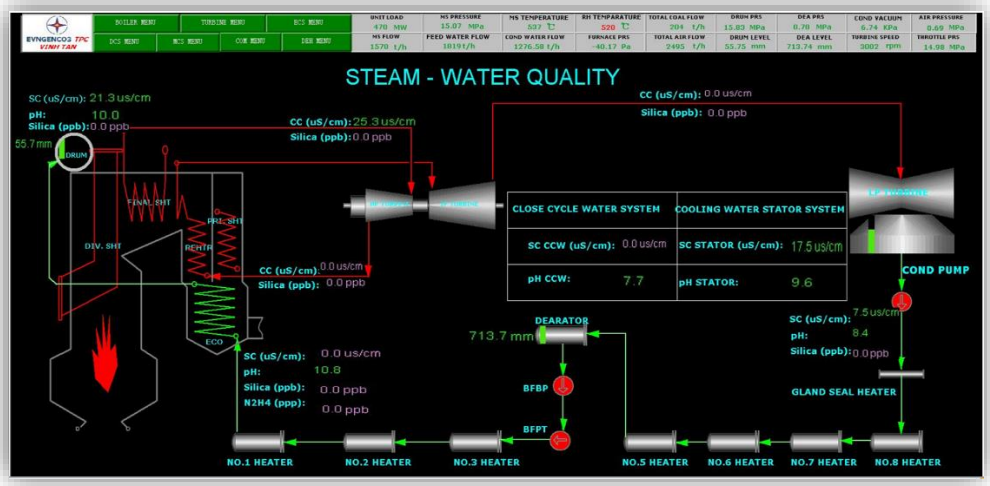
The fuel nozzle system of the main boiler in Mong Duong 1 Thermal Power Plant includes an ignition gun, main diesel oil (DO) nozzle, and fuel feed nozzle. It also consists of quick-closing valves, DO oil control valves, and fuel gas control valves.

The control system features an operation interface and sequential automatic control logic, which means that if any of the devices are faulty, the fuel cannot be ignited. In such cases, intervention from the C&I (Control and Instrumentation) team is required for troubleshooting and resolution.

Mong Duong Thermal Power Plant has designed and added control logic and an operation interface in Manual mode. This allows individual control of each device, reducing time and manpower during the fuel combustion process. It also enables the power plant to actively operate the fuel nozzle system during equipment testing before startup, initial fuel ignition, co-firing with oil, as well as during boiler shutdown and in the event of any boiler malfunctions.



Connecting the steam-water sampling and quality analysis system to the Distributed Control System (DCS)



The steam-water sampling and quality analysis system of Vĩnh Tân 2 thermal power plant is designed to include 8 measurement positions: steam drum, economizer, condensate pump discharge, high-pressure turbine inlet steam, main steam inlet to reheat, intermediate pressure turbine exhaust steam, closed cooling water, stator cooling water. The main sensor devices include conductivity (SC), pH, Silica, and N2H4 measurement.

The signals are connected and displayed on the interface of the ARC Mobile Device (configured and installed with ARC View Mobile monitoring software) via Bluetooth communication.

Vinh Tan thermal power plant has improved the installation, connection, and transmission of signals from the steam-water quality analysis system to the DCS system for online monitoring, providing timely alerts and adjustments to maintain the quality of steam and water during operation, ensuring the plant operates safely, reliably, and stably. This helps extend the lifespan of key equipment such as boilers and turbines.

Continuous real-time online monitoring; Storing data in the history for data retrieval purposes during investigations, analysis, and evaluation of the causes of incidents.

Vertical-axis wind turbine for offshore wind power generation

The Swedish company SeaTwirl is developing a vertical-axis floating wind turbine called S2x.

The S2x features three vertically oriented rotor blades and is mounted on a floating column with a low center of gravity. The heavy base acts as a keel to help maintain stability.

The S2x has a height of approximately 55m above the water surface, and the central column will extend deep into the seabed by 80m. Therefore, it needs to be installed in deep-sea areas with a minimum depth of 100m. It has a power capacity of 1 MW. The power will be cut off if the wind speed exceeds 90 km/h (although it is designed to withstand wind speeds of up to 180 km/h).

Placing the generator and gearbox near the water surface provides convenience for maintenance and repairs. The S2x does not require wind direction alignment, eliminating the need for orientation mechanisms and wind sensors. Multiple S2x turbines can be placed closer together compared to horizontal-axis turbines, increasing power output within the same area.

The S2x is expected to be operational in 2023, with a testing period of 5 years and an estimated lifespan of 25-30 years.