EGAT is Thailand’s leading state-owned power utility under the Ministry of Energy, responsible for electric power generation and transmission for the whole country as well as bulk electric energy sales. It is the largest power producer in Thailand, owning and operating power plants of different types and sizes which are located in 45 sites across the country with a total installed capacity of 15,757.13 MW (as of March 2018). The power generation facilities consist of 3 thermal power plants, 6 combined cycle power plants, 24 hydropower plants, 9 renewable energy plants, 4 diesel power plants, and Lamtakong Jolabha Vadhana Power Plant. In addition EGAT also owns and operates a high voltage transmission network which covers all parts of the country. Under Thailand’s electricity supply industry, EGAT purchases bulk electricity from private power producers and neighboring countries and sells wholesale electric energy to two distributing authorities and a small number of direct industrial customers as well as neighboring utilities. EGAT also engages in energy-related services businesses and expands its business and investment in electricity and other energy-related businesses at home and abroad. In order to improve its own plants, EGAT enlisted one of the most important engineering companies in Thailand: TDS Technology (Thailand) Co.,Ltd. TDS Technology (S) Pte Ltd has been founded in 1996 in Singapore as a value-added distributor to provide optimum total system solutions to meet and satisfy customers’ needs and requirements for the benefits of the industry.
In 2004, TDS Technology setup its first subsidiary in Thailand, TDS Technology (Thailand) Co., Ltd, with the task to manage the local distribution of a complete range of products for the control and the industrial automation for several manufacturing industries, especially in the industrial automation and process industries. TDS Technology team offers customers optimum solutions and an efficient service thanks to the deep experience and application know-how, acquired over the years, that is constantly enriched with technical training. This way, TDS offers a complete service to its customers: analysis of customer needs, products specifications, solutions offering the prompt delivery of turnkey solutions and after-sales technical support.

The purpose
Among EGAT power plants, there is Mae Moh plant. Constructed in the late 60s and located in Lampang Province, currently consisting of 10 generating units. Having a production capacity of 2,400 MW, the Mae Moh Power Plant can supply 50% of the electricity to the northern area, 30% to the central area, and 20% to the northeastern area of Thailand. Mae Moh Mine is a coal mine with an open pit and it is equipped with tailing pond. The purpose of the coal mine is to produce and deliver lignite coal to Mae Moh power plant according to the quantity and quality that the power plant needs, 16.5 million tons per year in average.

Located in the monsoon area, where there is an average rainfall of 1,200 mm / year, and having an excavation area of 36 square kilometers during the rainy season, the amount of water that flows nearby the power plant is considerable and the risk of damage caused by the water poured into the area is very high. On the basis of this, EGAT required TDS Technology to implement automatic water pumping system from the tailing pond in order to maintain operation of the extraction of lignite coal from the mine even during the heavy rainfall, while at the same time to employ a minimum number of operators on site, given the high risk to which they are subjected in that period of the year.
The Application

Studying the various possible solutions and implementations, TDS Technology concluded that it was required to expand and automate the whole water pumping system. To do this, a fiber optic connection system was implemented between the two control rooms where the two Movicon servers were installed and the different pumping stations located along the entire tailing pond. Each of the twelve pumping stations is equipped with a Beckoff PLC and a Danfoss inverter. The inverter, driving the turbine pumps that eject the excess water, is connected to the Beckoff PLC via a Profibus connection. All the pumping stations communicate with the Movicon servers via Twincat protocol. Each pumping station is also equipped with a pressure control valve to avoid overheating problems of the same. The Movicon SCADA has been installed on the 2 servers that are located in the two control rooms. The redundancy option has been enabled in order to ensure continuous operation even in case of failure of one of the two servers. Being a highly critical installation, the redundancy feature has helped TDS Technology to provide EGAT with an almost unlimited service continuity.

The Movicon application monitors each status and the efficiency of the twelve pumping stations. The use of the Movicon Historian option allowed to record and save the different parameters logged within a SQL database. Among the different parameters, the most relevant ones that are registered through Movicon are the status of the centrifugal pumps and the pressures detected by the pressure control valves. All data is stored for a minimum of two years within the SQL Database. Data archiving allows operators to perform chronological and statistical analysis, which are indispensable for understanding the functionality of the plant and improving, where necessary, the operation of the plant itself. Movicon also monitors in real-time the status of the alarms present in the system, displaying them both through the classic grid view but also by using the information banner display on all pages of the project. TDS Technology has also proposed to EGAT the installation of the Alarm Dispatcher module. The implementation of this powerful alarm manager allows to send notifications by SMS, VoIP and E-mail in case of an event considered critical by the operators and maintainers of EGAT. In

![Diagram of the pumping system](image-url)
this way, the staff is always notified and can promptly intervene in case of critical issues. The archiving of the alarms on the database allows the statistical and chronological analysis in order to analyze the critical events that occurred in the plant, make improvements, and plan maintenance events.

The Web Client option has also been added to the Movicon servers. This functionality through HTML5 technology allows the operator to access the system and view the application via browser and via mobile devices such as smartphones or tablets.

The benefits of using Movicon

“The use of the Movicon SCADA has brought several benefits to EGAT, which was very satisfied by the service offered by TDS Technology and by the Progea products” declares Winyoo Lerdkham, General Manager of TDS Technology.

“Thanks to the remote monitoring of the plant”, continues Virote Ritbun, Assistant Engineer Manager of TDS Technology “EGAT has been able to reduce the use of personnel allocated at the coal mine and at the pumping stations, going from seven operators to one with a considerable reduction of risks. Furthermore, with the installation of the Alarm Dispatcher option, personnel are promptly alerted by messages and e-mails in case of problems and device or sensors failures and can promptly intervene, trying to avoid downtimes to the plant operation or reducing to the minimum the operativity of the same.

In addition, EGAT particularly appreciated Movicon’s Historian function, which, thanks to the parameterization of the parameters in the SQL database, allows operators to access the collected data and perform chronological and statistical analysis in order to make improvements to the plant.”

“The use of Movicon has brought several benefits, including the capability to remotely manage the mine and pumping stations, especially during rainy season.”

Virote Ritbun, Assistant Engineer Manager - TDS Technology (Thailand) Co.,Ltd