The EGAT’s AMR System

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1. Introduction

The Electricity Generating Authority of Thailand (EGAT) was formed in May 1969 after the merging of the three independent state-owned enterprises. EGAT has the main responsibility to provide all electric power generation and transmission in the country. There are two distribution utilities, the Metropolitan Electricity Authority (MEA), which covers metropolitan area (Bangkok and neighboring provinces), and the Provincial Electricity Authority (PEA), which covers the rest area of the country.

According to high growth in electricity demand, EGAT cannot manage without the help of the private sector. The Thai government decided to allow private sector to participate in power development since the end of 1992, and advised EGAT to be the power single buyer in Thailand other than the above responsibility. The three schemes for private sector participation were:

1) participation in EGAT’s subsidiary company;
2) through the Small Power Producers (SPPs) program; and
3) through the Independent Power Producers (IPPs) program

2. Metering History

In the 70’s and 80’s, all metering of the energy exchange at the high and medium voltage levels among the three state enterprises (EGAT, MEA and PEA) was done by electromechanical meter of class 1.0, with registration of demand values every half-hours by demand printer on paper strip. The transfer of the energy information to the demand printer was done by pulses, as this was the only available solution at that time.

At the end of the 80’s, EGAT decided to purchase the electronic meters because of the competitive price, increasing of the overall accuracy class from 1.0 to 0.5s and 0.2s, more measuring functions supported with communication facilities for meter configuration, calibration and data collection.

Since the time of private sector participated in power market, EGAT has increased the overall accuracy and performance of the metering installations on the IPPs and SPPs exchange points by installing very high accuracy meters of
class 0.2S and local universal telecounting instruments (data logging device or RTU) with multiple communication ports. The main reason for these changes were:
- increase in metering accuracy to the highest level available on the market, which improves the billing between EGAT, IPPs and SPPs.
- give the local generators direct access to the data logger, whereby they can collect the same metering data as EGAT is using in the central station for their billing information.

3. EGAT’s Automatic Meter Reading (AMR) System

3.1 Metering points
As the power single buyer, EGAT purchase electric energy from Generators (IPPs, SPPs) and sell it to MEA, PEA and Direct Customers. Therefore, metering points are the energy exchange points between EGAT and the parties as shown in Fig.1.

![Fig. 1 Metering points](image)

At present, the design criteria of revenue metering system should have two independent measuring circuits for each metering point, the main system and backup system. At normal operation, the energy measurement from main system is using for the billing purpose, data from the backup system is the checking information and will be using for billing only during the period that
main system out of service. Each metering circuit consists of energy meters, instrument transformers (VTs and CTs), data recorder (RTU) and other accessories. However, most of EGAT’s existing circuits are not complete main and backup system, the main and backup energy meters are installed by using the same voltage and current transformers. The typical configuration of EGAT’s metering system are shown in Fig. 3
3.2 The existing AMR system

EGAT has been employing the AMR system since 1997. The configuration of the existing AMR system is shown in Fig. 4.

**Fig. 4 The existing EGAT’s AMR System**

**Data logging devices**
According to wide range of energy meters types, most of them couldn’t record the measurement values, thus installing the data logger (universal telecounting device) is installed at least one unit in every metering site. This device is connected to and communicate with the meters for local processing and data recording purposes, and also connected to printer to print the measured values. The data logger also is able to communicate with the computer server in central station via dial up network for collecting data and time synchronisation.

**Data central station**
The computer server for this AMR system is installed at the EGAT headquarters. The system is an open, client-server, with multiuser, multitasking
and LAN/WAN capabilities, making use of a relational database with standardised SQL interfaces.

The server will communicate automatically on daily basis or on request with up to seven data loggers simultaneously, to collect metering profiles, events and alarms concerning the meters or the data loggers itself. After collection, validation and editing of all the data, reports are generated and distributed to all users, such as billing, dispatching and planning department of EGAT, and also transferred to MEA and PEA too.

3.3 The future AMR system

New technology meters
According to the progression of electronic and communication technology, EGAT decided to purchase the new technology electronic TOU meters last year. These TOU meters will be installed at the energy exchange points between EGAT, MEA and PEA, to improve the overall performance. All meters are very high accuracy of class 0.2S, more measuring, processing functions and data recording supported, and support for multi-accessing by using multiple ports (RS-323, RS-485 and ethernet ports) of the meter via the suitable communication media, such as dial up (PSTN or GSM) and IP based network.

The new TOU meters will be replaced the existing main system (meters + data loggers), and the main system will be acted as the new backup system. At present, some of the new meters were installed and are under testing condition.

New central station
EGAT is considering to implement the new central station system, the proposed common system (hardware and software packages) should serve both of the existing system and the new TOU meters system. The configuration of new EGAT’s AMR system is shown in Fig. 5.
Fig. 5 The new EGAT’s AMR System
4. Conclusion

For over five years experience, it is proved that the implemented AMR system is efficient for EGAT’s business as follows:
- accurate and reliable metering, as the system is able to monitor working condition of the metering circuits on daily basis
- fast collection of daily, weekly and monthly billing data, resulting in an improved cash flow situation
- data available daily for load forecasting, load planning, statistics and other purposes

However, the operation and maintenance of AMR system has to keep developing from time to time, to suit the future Electric Supply Industry condition and new technology progression at the appropriate period.