

PEA SMART WEB-BASED APPLICATIONS FOR CUSTOMER SERVICES

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ABSTRACT

This paper describes the project namely PEA smart web-based applications for customer services. It shows developing PEA web-based applications in four procedures. (i) The procedure for customers to apply for new electricity connections. (ii) The procedure for customers to reconnect their power supply that has been suspended on account of non-payment of dues. (iii) The procedure for customers to provide up-to-date information about electric outage status. (iv) The procedure for customer complaint and suggestion. They can be used by anybody that has accessed to internet and mobile phone. The PEA customers will get the progress report of their requests via short message service (SMS) or E-mail which designed to send automatically data from SAP database of PEA internal process. In addition, GIS technology is used by customers to inform their location of electric utility service. Lastly, the comparison between the project and other online electricity utility applications and websites in Thailand is demonstrated. It concludes that the PEA smart web-based applications for customer services have efficiency and various procedures more than other related them.

I. INTRODUCTION

In Thailand, the electric utility service provider has mainly two organizations, the Provincial Electricity Authority (PEA) and the Metropolitan Electricity Authority (MEA). The PEA is the largest utility in Thailand, providing electricity to more than 16 million customers. The PEA has expanded electricity supply to all areas covered 74 provinces, with the exception of Bangkok, Nonthaburi and Samut Prakran provinces. For decades, PEA has been investing to continuously improve internal process for moving towards the PEA smart grid, especially technologies such as Supervisory Control and Data Acquisition (SCADA), Geographic Information System (GIS), System Application in Data Processing (SAP), Automatic Meter Reading System (AMR) etc. For e-service, the PEA has many ways for customer relationship management to approach and communicate information such as online applications on tablet or mobile phone, Website, LINE, Twitter, Facebook and Instagram. However, these applications are not only the lack of a tracking system for their online-customers requests, but also the lack of the two-way

communications channel with their customers. Recently, the wireless communication networks are extended in the wide areas. The tablet or smart phone is getting popular rapidly [1]. As a result, many people come to have interest in the utilization based on internet networks. For electricity utility, the implementation of web-based applications is possible to enhance the quality of customer service and also maximize satisfaction. The customer will enable to self-service by integrating between engineering and operation processes in front and back office. The applications make it easy to use and allow customer interaction with back office systems.

In 2015, one of PEA strategy plans is the project namely PEA smart web-based applications for customer services. The architecture of the proposed system is shown as Fig 1. The core system technologies of PEA such as GIS technology and SAP database will be integrated to apply in these procedures. The program will choose the important data for their request of customers which receive from different SAP databases and convert to information for communicating with their customers.

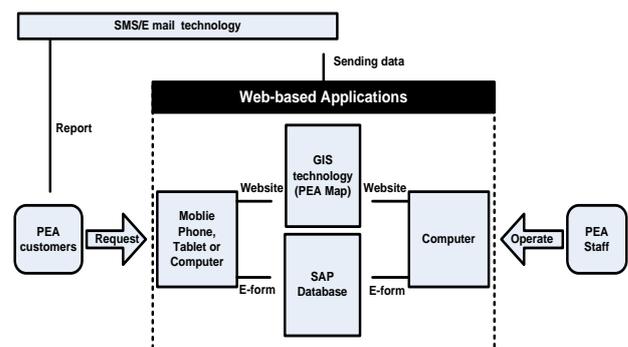


Figure 1. The architecture of the proposed system

Preliminary, the four main PEA procedures will be developed, (i) the procedure for customers to apply for new electricity connections. (ii) The procedure for customers to reconnect their power supply that has been suspended on account of non-payment of dues. (iii) The procedure for customers to provide up-to-date information about electric outage status. (iv) The procedure for customer complaint and suggestion. Therefore, the GIS technology and SAP database of PEA is addressed in part II and III respectively. Lastly, the step of all PEA developing procedures will be demonstrated.

II. GIS TECHNOLOGY

GIS technology is a special-purpose digital database in which the geographically-referenced information system that projects data in map and table formats. [2] PEA has adopted GIS technology, with reference to the 1 : 4,000 color orthophoto maps for the whole country compiled by the Land Development, for the management of all its operations from the planning, Installation, transmission to the maintenance steps of PEA's electrical power distribution system. GIS technology is essential to the enhancement of PEA's operation stability and services. It enables PEA's implementation of many new, fast, accurate and extensive customer services. GIS technology is also used to support other PEA's operations such as the SCADA, the core business software package, and 1129 PEA Call Center.

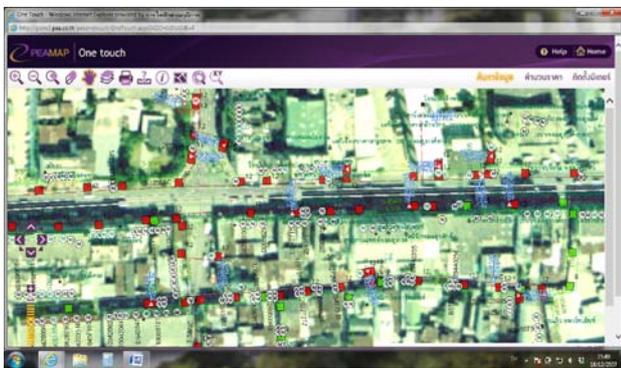


Figure 2. The PEA map website

For customer service, PEA GIS database made it easy to use for their customer and PEA staff. It is called namely "PEA map" which is showed as Fig 2. The user can indicate and specify their electricity connections on PEA map via website on tablet or mobile phone. After that, PEA staff will receive and analysis the concern information of their customers such as nearly distribution or transmission system distance, electricity needs and other circumstances etc.

III. PEA SAP SYSTEM

System Application in Data Processing (SAP) is the Enterprise Resource Planning (ERP) software which features the centralized database and integration modules entire organization together in real time. SAP has been traditionally involved in helping customers modernize their back-office operations by integrating business processes [3]. PEA is an organization which adopts the SAP ERP software. The adaptation is split into two parts. The first part is called SAP R/3. It consists of 6 modules such as Financial Management (FI), Controlling (CO), Human Resources (HR), Material Management System (MM), Plant Maintenance (PM) and Project System (PS). And the second part is call SAP IS-U. It has 6 modules

such as Customer System (CS), Device Management (DM), Billing System (BIL), Financial Contract Account (FI-CA), Energy Data Management (EDM), Work Management System (WMS). The results that PEA receives from the go-live of the SAP systems are Outage Management System (OMS) and Bill Printing Payment Management (BPM). The overview of PEA SAP System is demonstrated in fig 3.

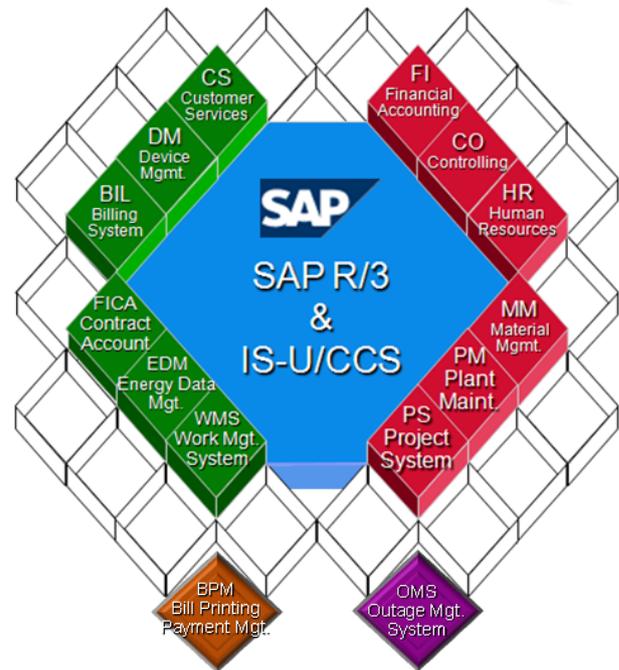


Figure 3. The overview of PEA SAP System

IV. THE PROPOSED PROCEDURE

Normally, the PEA procedures for customer services are divided into the front and back office. The front office is the part which contact with their customers. The back office is concerned about PEA staff and internal process. In this paper, the four main PEA procedures will be proposed. (i) The procedure for customers to apply for new electricity connections. (ii) The procedure for customers to reconnect their power supply that has been suspended on account of non-payment of dues. (iii) The procedure for customers to provide up-to-date information about electric outage status. (iv) The procedure for customer complaint and suggestion. The PEA GIS technology and SAP system will be integrated to apply in these procedures.

(i) The procedure for customers to apply for new electricity connections.

Firstly, the new customers must apply to the online system for verify personal data such their name, address, ID number and mobile phone number etc. Secondly, the new electric utility service location will be provided by

the customer via PEA GIS technology or called namely “PEA map”. Then, the new customers will specify the electric utility demand or choose magnitude of meter. Lastly, the system will calculate total expenditure and sending it to the new customers by e-mail and SMS for online payment. After that, all data will be moved automatically to SAP database in the PEA back office where the data is investigated and rectified by the PEA staff. The SMS technology will be linked with SAP database for the customers to track PEA internal process following as CS, WMS and DM module respectively. The procedure diagram for customers to apply for new electricity connections is showed in Fig 4.

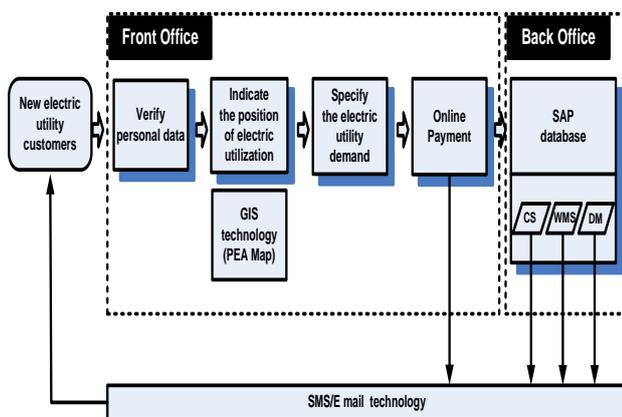


Figure 4. The procedure diagram for customers to apply for new electricity connections

(ii) The procedure for customers to reconnect their power supply that has been suspended on account of non-payment of dues.

The customers will suffer and need to quickly reconnect their power supply when they have been suspended on account of non-payment of dues. In this case, if the account of non-payment is cleared. PEA will reconnect their power supply within 24 hours. The proposed procedure can do it through internet all steps. The first step for this case is the customers can verify their personal data on internet. Secondly, they indicate electric utility service location will be provided by the customer on PEA map. This step can use ID users for searching the location of electric utility service. Then, they must to pay off the account of the last dues on online payment. In back office part, the operations of PEA staff on SAP systems such as WMS module and DM module respectively will be linked with SMS/E-mail technology for sending report to their customers. For WMS module process, PEA staff will create a customer order for commanding the staff which operates a meter installation. For DM module process, The meter will be taken for installation in SAP system. The procedure for customers to reconnect their power supply that has been suspended on account of non-payment of dues is showed in Fig 5.

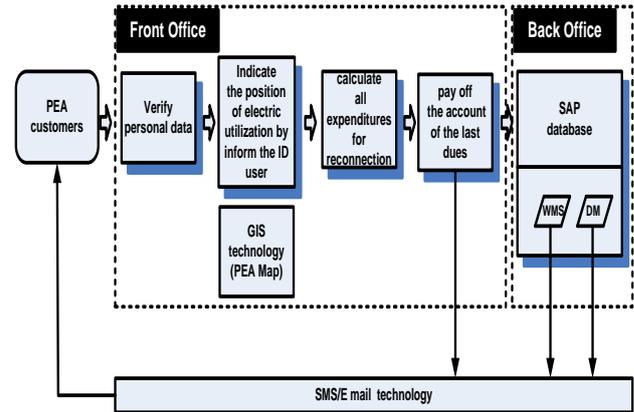


Figure 5. The procedure diagram for customers to reconnect their power supply that has been suspended on account of non-payment of dues

(iii) The procedure for customers to provide up-to-date information about electric outage status.

In the front office part, the PEA customers can provide the information about electric outage system on PEA map website. All information will be sent directly to the OMS module database and automatically send back the message to their customers for thank you to provide power failure notice details. In the back office part, PEA staffs will get the outage information from the OMS module system. The restoration of the electricity system will be operated and finished within four hours. Then, the PEA staffs will inform on the OMS module to close the problem and the system will send the message to their customers again by specify the causes of the problem, the position of problem and the duration to fix the problem. The procedure for customers to provide up-to-date information about electric outage status is briefly showed in Fig 6.

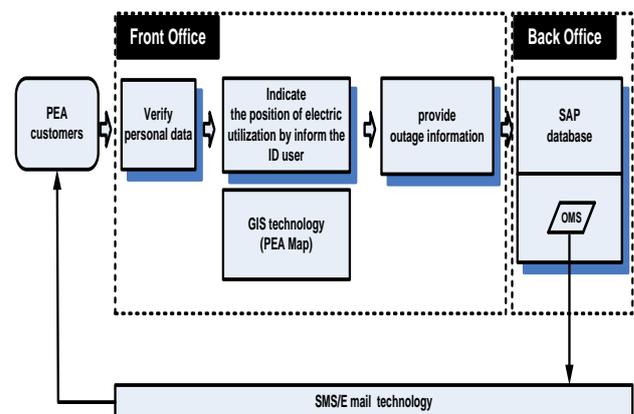


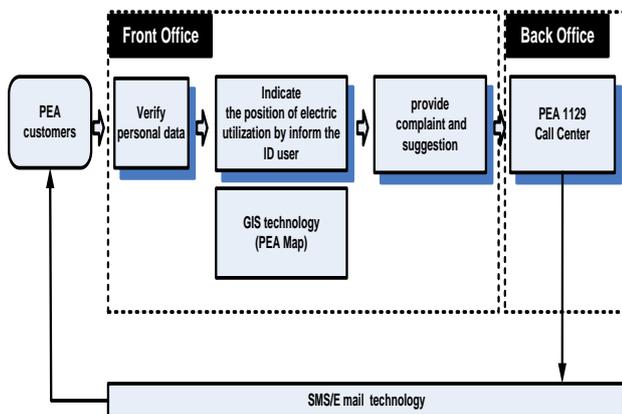
Figure 6. The procedure diagram for customers to provide up-to-date information about electric outage status

Table 1 : The comparison of the online electricity utility applications and websites in Thailand

No.	Procedure for	The comparison of the online electricity utility applications and websites in Thailand			
		MEA Smart Life	PEA AR	Other PEA Online Channel	PEA Smart Web-based Applications
1	payment of bills online	Yes (App/Web-Admin)	Yes (App/Web-Admin)	-	Yes (App/Web-Auto)
2	customers to apply for new electricity connections	-	-	Yes (Web-Admin)	Yes (App/Web-Auto)
3	customers to reconnect their power supply that has been suspended on account of non-payment of dues.	-	-	-	Yes (App/Web-Auto)
4	customers to provide up-to-date information about electric outage status	Yes (App/Web-Admin)	-	Yes (Web-Admin)	Yes (App/Web-Auto)
5	customers complaint and suggestion	Yes (App/Web-Admin)	Yes (App/Web-Admin)	-	Yes (App/Web-Auto)

(iv) The procedure for customer complaint and suggestion

For this process, the PEA customers will be allowed to complain and suggest about PEA operations, services or indicating dangerous points in the electric system through internet. Normally, the PEA channels for complaint and suggestion have many ways such as 1129 Call Center and PEA website but they cannot indicate their locations to inform more details. This process will be developed for customers to indicate their locations via internet and send back automatically SMS/E-mail to their customers. The procedure for customer complaint and suggestion is showed in Fig 6


Figure 7. The procedure diagram for customer complaint and suggestion

V. COMPARISON OF OTHER APPLICATIONS

In this paper, the comparison between the project and other online electricity utility applications and websites in Thailand is demonstrated in Table 1. The applications of electric utility service providers in Thailand are addressed and compared in five main processes. Some system is implemented by the administrators. The human error can

happen from this system in anytime. In order to reduce human errors, automatic systems could be replaced by the web-based applications. It concludes that the PEA smart web-based applications for customer services have efficiency and various procedures more than other related them.

VI. CONCLUSIONS

This paper presents a project about developing PEA web-based applications that allow customers to communicate with PEA through internet or smart phone. This system is practicable to increase the quality of customer service and enhance satisfaction. Furthermore, the system will help PEA and customers to manage all the processes faster and effective via SMS and website. The GIS technology and SAP database are merged for processes of front and back office to serve online customers. In order to reduce human errors, the SAP database and SMS technology are used to replace the administrator systems which will help to decrease human errors in another way. The comparison between the project and other online electricity utility applications and websites in Thailand is showed. It concludes that the PEA smart web-based applications for customer services are more efficient services than other related them.

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