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Final Report
Poland Activity 1, Task 2
IRP Development at ZE Torun

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1. Executive Summary

Under contract to USAID, Electrotek Concepts (Contract No. DHR-0030-C-5064-00), has been tasked to help electric distribution companies in Poland develop capabilities in Integrated Resource Planning (IRP). An essential element in the IRP process is a solid understanding of how and when customers use energy. This allows for a much better targeting of resources to most efficiently and cost-effectively service load. Electrotek has procured and installed an end-use load forecasting model from Systematic Solutions (Energy 2020) at a Polish distribution company, Zaklad Energetyczyny Torun (ZET), and trained ZET personnel in its use. Load forecasting is a critical input to many other technical and financial planning functions.

ZE Torun (ZET) is a distribution company located in the northern city of Torun. Starting with the training and technical support provided by Electrotek, ZET has made considerable progress in strengthening and expanding their planning capabilities. To complete the data and system tools needed, ZET is acquiring and installing a German planning model and information system as another piece of their IRP package.

There is significant and growing institutional momentum to use Energy 2020. As a result of this effort, ZET now has and is actively using an end-use planning approach, so that they are better able to identify and evaluate specific customer and system strategies as an integral part of their planning process. Such an approach will allow ZET to more effectively target their resources to address specific (e.g. local) conditions. Furthermore, ZET has taken the first end-use forecast model that they developed, and demonstrating an appreciation for its value, expanded the model structure to incorporate both new customer classes as well as end-uses. ZET has in two instances altered the structure of the load-forecasting model to expand the level of detail. Energy 2020 is integrated into the planning process, including interface with the German R/6 information system. This demonstrates a clear endorsement of Electrotek's approach and a strong commitment to more sophisticated planning at ZET.

2. Introduction

With the pending restructuring and privatization of ZE Torun, as well as the other distribution companies in Poland, there is a very strong incentive to develop and enhance planning capabilities. The advent of more competitive markets compels ZET to better understand how their customers use energy so that they may be able to respond and plan in such a dynamic environment. Such a capability will enable ZET to consider a broader range of options to serve load and maintain system reliability at a lower cost.

Serving as the prime contractor for this effort, Electrotek was assisted by three subcontractors: Systematic Solutions, CNEX (Central Maine Power) and FEWE/Krakow. The project team worked closely with USAID/Warsaw to develop and implement the project plan. Such assistance has been a major element in the project's success.

The project was designed to first introduce ZET staff to the principles of IRP. Next, a needs assessment was conducted to evaluate the existing institutional and management information systems (MIS) capabilities to determine what level of planning currently existed. Based on this assessment, Electrotek worked with ZET to define their planning requirements, and to help them satisfy these planning requirements with tools, training and technical support.

Upon completion of the needs assessment and the development of a project approach, Electrotek began the procurement process for the planning software, training and support. A software license for Energy 2020, a flexible end-use load forecasting model, was purchased for ZET. Two one-week training sessions were also provided, as well as extensive on-going technical support.

In this report, the project background will be provided, which will profile ZET. Next, the project objectives will be detailed, including discussion of the requirements for implementing modern planning methods at ZET. Following that, the project approach will be described, including specific tasks, objectives and strategies. Finally, the project results will be presented.

3. Project Background

This section gives a brief overview of the project. First, a profile of ZET is offered, followed by a summary description of the ZET institutional planning capabilities.

Company Profile

ZE Torun is an electric distribution company located on the banks of the Vistula River northwest of Warsaw. The company offices are situated in the city of Torun. In 1997, ZET had a system peak (winter) of 610 MW. In 1997 the company had annual sales of about 4.3 TWh, with 11.6% (504 GWh) to residential customers, 12% (518 GWh) to commercial customers, and 28% (1,209 GWh) to industrial customers. The balance of sales was for resale, transport and agriculture. By way of comparison, 1990 sales were 3.9 TWh, with 13.9% (547.5 GWh) to residential customers, 4.6% (183 GWh) to commercial customers, and 40.2% (1582 GWh) to industrial customers.

The company serves over 300 thousand residential, commercial and industrial customers. In terms of this customer base, recent historical experience shows some interesting trends. While industrial loads have declined substantially, like much of Central and Eastern Europe, they are now recovering from recent lows.

While the number of residential customers served has risen slightly over the last decade, in recent years there has been a leveling of residential customers, with a gradual shift of residential load toward the urban areas.

The company's industrial load had declined to 75% of pre-1989 levels, from 1.6 TWh in 1990 to 1.2 TWh in 1997, and has only recently begun to rebound. The company has several large industrial customers who account for a major portion of total industrial load.

The most active customer class is the commercial class, with sales increasing faster than any other customer class. As a class, commercial sales have increased almost threefold from 1990 to 1997. Commercial sales accounted for about 12% of total sales (518 GWh) in 1997 versus 4.6% of total sales (183 GWh) in 1990.

ZET Planning Capabilities & Practices

At the outset of the project in 1996, ZET had good technical planning skills and capabilities. While system monitoring and control was not state-of-the-art, it was fundamentally sound though limited in scope and capability. The corporate and financial planning capabilities were not nearly as well developed as the technical side. There was little flow of information among departments. Technical data were used for technical analysis; financial planning and analysis was

not tightly integrated with technical planning and analysis. There was little strategic planning, where objectives and strategies are tied, monitored and evaluated. While ZET was technically quite sound, they were not yet using modern long-term strategic planning and analysis methods. Information was segmented, with very little data exchange among departments. While the corporate MIS infrastructure could support such exchanges, the vision for its value had not yet been realized. Aside from billing information, there was limited data collection regarding customers. Furthermore, there was little compilation and use of existing data for purposes beyond billing. It was clear that ZET would need assistance in understanding planning from a more global perspective.

The ZET staff skill levels were quite good. Electrotek worked most closely with Justyna Bojarczyk and Janina Siegert. There was a strong commitment from the top (the activity was overseen by Commercial Vice President Marek Rucinski) and a strong drive on the part of ZET staff to learn and understand modern planning methods. There was a concerted effort to involve any and all key players at ZET who could support the planning process. There was complete and timely access to the finance department, the operations and dispatch departments, and the management information systems department. From the beginning, this project has been characterized with a high degree of professionalism by ZET, with high levels of cooperation and coordination. They have been key to the success of the effort.

4. Project Objectives

This activity contributed to USAID Strategic Objective 1.3 (Modern planning and management methods) by providing utilities with the tools and training to perform advanced planning. Consistent with the objectives detailed in the project workplan developed by Electrotek and USAID, Electrotek developed a technical approach to achieve these objectives. There were three explicit objectives:

1. Develop planning skills
2. Provide models/training/technical support
3. Develop a resource/investment plan

1. *Develop Planning Skills* -- Based on what was learned over the course of several site visits and extensive correspondence, it was clear that ZET would benefit from information exchange in the form of seminars and workshops on the elements of IRP and its practice. The target audience for such an effort would be senior management and financial and technical staff. The purpose was to teach the theory and practice of IRP, and to demonstrate its benefits.
2. *Provide Models / Training / Technical Support* -- Based on the results of the requirements analysis and with close collaboration with ZET, Electrotek identified and prioritized planning capabilities at ZET that needed to be developed, and provided these planning models. In addition, extensive training and technical support was provided.
3. *Develop Plan* – Using the planning models and training, ZET would then develop appropriate IRP plans. Electrotek would provide any technical support necessary to put this planning capability into practice.

5. Project Approach

Consistent with the workplan, and in support of specific project objectives, Electrotek developed a project approach that began with the building of a foundation for IRP at ZET, and then progressed to developing and using these planning skills. The approach, which had three discrete activities, was designed to teach IRP, develop the skills and capabilities necessary to support IRP, and finally to use these capabilities in the planning process.

1. Introduce IRP Concepts

In mid-1997, Electrotek staff held a series of seminars, meetings and workshops on IRP for ZET senior management. These forums were structured to explain IRP and to illustrate how it is practiced. They examined the integration of financial, technical, marketing and corporate data to better understand the company's cost of providing service. In addition, a range of issues (e.g., tariff design, marketing, supply analysis) was presented and examined to demonstrate the application of IRP principles to real problems. This technology transfer seminar developed a strong consensus in support of IRP among the ZET management team.

2. Provide Models/Training/Technical Support

With a limited amount of experience in IRP or its individual components, ZET required a solid foundation upon which to start building its IRP capabilities. While there were many corporate functions within ZET that could support the IRP process, no attempts had been made at collecting, compiling and consolidating corporate data, let alone customer and other information.

Based on close collaboration with ZET, a load-forecasting model was determined to be a critical first step. The desired load-forecasting methodology was an end-use approach. Such a tool would provide ZET not only the ability to forecast system loads, but also would allow ZET to conduct more detailed analysis of customer support, marketing, DSM, and financial and cost analysis functions.

Based upon Electrotek's experience in implementing modern power system planning methods in the Baltic countries, Energy 2020 by Systematic Solutions, Inc. (SSI) was selected as the load-forecasting model for ZET. In July 1997, a version of Energy 2020 was delivered to ZET. This was used to demonstrate the model structure. Using this model as a tutorial, Electrotek and SSI reviewed the model structure with ZET and further refined this structure.

In September 1997, Electrotek and SSI returned to Torun with a revised load-forecast model structure to reflect a further delineation of the industrial sector. This revision was made at the request of ZET, and demonstrated their growing understanding of the value of the model and how to use it. Using the first revision, a further review was conducted and a draft forecast was developed.

During the period from September 1997 to June 1998, ZET continued to develop forecasts to investigate the impact on load changes for specific customer classes. These forecasts were then used with other corporate models to estimate the impact of these changes on ZET. During this period, ZET began a serious effort at integrating their planning functions to take advantage of the wealth of information developed in this project as well as other corporate data.

In early 1998, ZET requested additional structural changes to Energy 2020, to again increase the resolution of the industrial sector and to account for new commercial end-uses. The revised structure was delivered to ZET in June 1998, along with additional technical support. And finally, in February 1999, ZET again requested structural changes to the model. On this occasion, SSI and Electrotek worked with ZET to demonstrate how the structure can be changed, as well as how to recalibrate the model for the new structure. ZET has expressed strong satisfaction with the model, as evidenced by its continued evolution in support of more advanced planning capabilities.

In 1998, ZET committed to purchase an integrated information system software package (R/6) from a German vendor (SAP). This was a major element in the restructuring of the company and it has become central to management oversight and planning. The load forecast from Energy 2020, however, is what drives all the planning and revenue assessment functions of the integrated package.

3. *Develop Load Forecasts*

Using the Energy 2020 model in its various structures, ZET developed a series of load forecasts. These forecasts have provided ZET with a structural forecast of energy consumption and peak demands. Figure 1 (attached) shows a load forecast by sector developed by ZET using Energy 2020. This particular forecast is based upon a strong economic environment that supports industrial growth in ZET's service territory as well as steady growth in the commercial sector.

The use of these forecasts at ZET is another favorable development. Currently, the forecasts have been used to support technical planning of the distribution system and the evaluation of increased energy efficiency on the system. Additional Energy 2020 forecasts are used for sales and revenue forecasts to support financial planning and analysis, and customer marketing to actively help customers adopt to the changing energy markets, all of which tie into the R/6 system. Planning has clearly become more integrated.

6. Accomplishments – Deliverables

ZET has successfully developed and implemented modern advanced planning methods. As project deliverables, Electrotek accomplished the following:

- Installation of IRP model at ZET
- Technical training
- IRP plan development

Over the course of this project, several other accomplishments have been achieved which have provided additional support to IRP development. These include a process review and requirements analysis, follow up training and technical support, and continued expansion of the Energy 2020 model structure.

ZET has completed installation of a new, state of the art integrated information system, with financial management modules (the R/6 software). Energy 2020 is a key element of ZET's information system, and is fundamental to their planning process.

The beneficiary of this effort, ZET, has expressed their strongest gratitude and appreciation for the assistance provided by USAID. They have acknowledged the excellent cooperation and assistance they have received from USAID. Moreover, they are actively using these tools, training and experience to chart their way in Poland's evolving power markets.
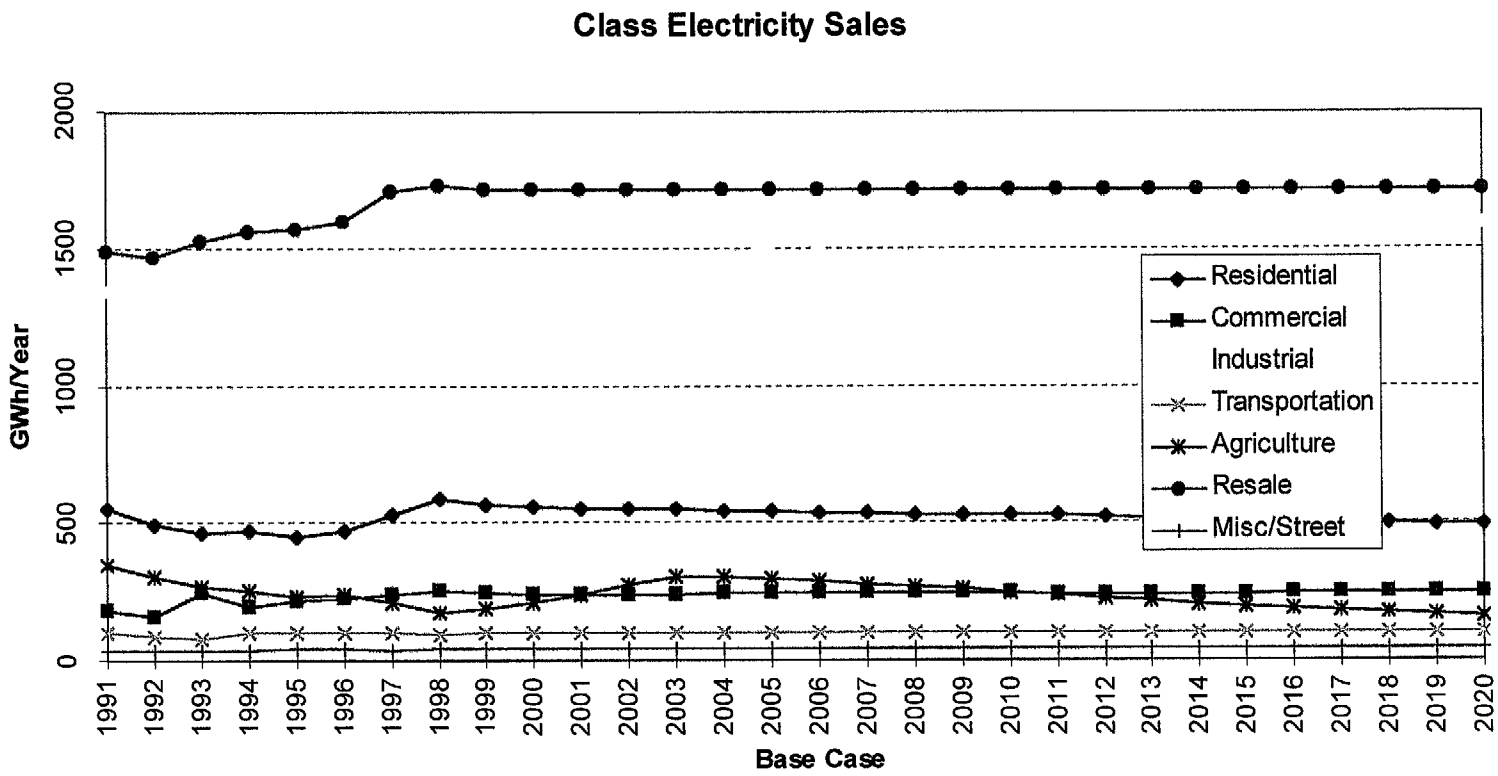
Figure 1
ZE Torun Draft Load Forecast