FINAL REPORT
Energy Efficiency and Environmental Management Workshop

Prepared by:
The University of Tennessee
Schools of Business and Engineering
Central and East European Center
Alliance of Universities for Democracy

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and

Participating Universities:
Academy of Mining and Metallurgy
Warsaw Technical University
Silesian Technical University
Technical University of Kraków

22 January 1999
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ENERGY EFFICIENCY and ENVIRONMENTAL MANAGEMENT WORKSHOP

Conducted for United States Agency for International Development
Eastern Europe Regional Energy Efficiency project
contract DHR-0030-C-00-5064-00

by
The University of Tennessee
Schools of Business and Engineering
Central and East European Center
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Participating Polish Universities:

Academy of Mining and Metallurgy
Warsaw Technical University
Silesian Technical University
Technical University of Krakow

Report Submitted by:

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22 January 1999
Final Report for the Polish Energy Efficiency/Environmental Management Project (C-5022-UT-0000)
submitted to:
Electrotek Concepts Inc., Knoxville, Tennessee

OVERVIEW

This project involved training in technical and financial analysis of energy efficiency/environment programs at four universities in Poland. It was a collaboration between faculties of engineering and management of: The University of Mining and Metallurgy, Krakow; Technical University of Krakow; Technical University of Warsaw; Silesian Technical University, Gliwice/Katowice, the University of Tennessee (UT) and Czech Technical University, Prague. The project supported development of pre- and post-graduate courses in environment and energy efficiency at the Polish universities. The project was operated in conjunction with Electrotek Concepts Inc., The Polish Foundation for Energy Efficiency Center in Krakow, The University of Tennessee, Knoxville and The Alliance of Universities for Democracy.

SUMMARY of PROJECT PHASES

1. Project announcement and planning - November, 1997, Warsaw
Planning meetings with project principals were held during and following the Seventh Annual Conference of the Alliance of Universities for Democracy (AUDEM), Nov. 2-5, 1997. This project followed a similar effort begun last year in the Czech Republic. Representatives of the four participating Czech universities were invited to Warsaw to share their experiences in curriculum development with counterparts in the Polish project. Since this topic and approach are of value across Central and East Europe, representatives from both Czech and Polish universities were invited to report on project accomplishments and plans in a formal session during the AUDEM Conference.

Project meetings during the Conference involved officials and faculty from the Polish technical universities, Czech technical universities, UT and Electrotek staff. Following the Conference, project staff met with faculty and other officials at the Technical University of Warsaw and then traveled to Gliwice and Krakow for meetings with faculty and staff of the other three participating universities.

Specific interests of faculty at the four Polish universities were solicited in order to help tailor content of the Phase 2 Workshop.

A five day workshop was held for approximately 25 faculty from the Polish universities. The University of Mining and Metallurgy, Krakow was local host for the Workshop held near Krakow assisting with classroom space, lodging and meals for all participants and project faculty. The Krakow workshop instructional team included UT professors Richard Jendrucko (engineering),
Jerry Fryxell (business management) and Tom Dean (environmental management) and Karel Kabele (engineering) of Czech Technical University in Prague. Magdelena Repasova of Technical University of Kosice, Slovak Republic, also attended the workshop.

UT project principals visited each community for three weekdays to work directly with designated faculty, university and area business and government leaders to assist Polish university faculty as they consider curriculum revisions/additions to pre-and post-graduate courses for offering within the community and/or the university.

Targets for this phase included: an energy/waste assessment of an industrial site in each city conducted by Polish project participants with coaching and advice by the UT team; drafting a report of findings and recommendations; and first steps toward development of case studies for classroom use based on the industrial visit.

Three faculty from each of the four Polish universities participating in the Workshop traveled to Knoxville for two weeks of advanced energy efficiency instruction, visits with area firms employing energy efficiency and environmental management techniques and individualized support from UT engineering and business faculty as they continued to tailor curriculum materials and refine strategies on organization and management of a university-based Energy Environmental Assessment Center (EEAC) within the Polish universities.

While in Tennessee they participated in a wide range of activities from energy/waste assessment of a regional manufacturing plant to visits to community-based environmental and energy efficiency awareness programs.

Two faculty from each Polish university joined several members of the project team at the Ninth Annual Conference of AUDEM in Nitra, Slovakia. Conference presentations were given by each of the Polish universities on activities related to curriculum development and also energy and environment assessment centers.

DETAILED PROJECT ACTIVITY

PHASE 1 - PROJECT ANNOUNCEMENT AND PLANNING

Phase 1 took place in Poland between November 2 and 8, 1997. Project personnel participating from the University of Tennessee were: Richard Jendrucko, Jerry Fryxell, David Hake, Joan Markel and Oscar Fowler.

This project in Poland follows a similar effort in the Czech Republic. Representatives of the three participating Czech technical universities participated in the Warsaw AUDEM Conference,
November 2-5, 1997, sharing experiences in curriculum development with counterparts in the Polish project. About 170 persons attended the Warsaw Conference from about 70 member universities in 12 countries. The listing from the November 4 Conference session follows:

SESSION 9C -- Early Results from an Energy Efficiency/Environment Curriculum Project in the Czech Republic
Presiding: Oscar FOWLER, Associate Professor and Head, Department of Management, University of Tennessee, Knoxville

Environmental Education at TUL and Issues in Euroregion Niesse and Black Triangle
Jiri KRATOCHVIL, Professor and Head, and Jaroslav SULC, Professor, Department of Power Engineering, Technical University of Liberec, Liberec, Czech Republic

The Role of Energy Efficiency In the Czech Republic
Pavel KOLAT, Professor and Head, Department of Power Engineering, and Leos PCHALEK, Lecturer, Technical University of Ostrava, Ostrava, Czech Republic

Application of the Experiences in Energy Efficiency in the Education Schedule of CTZ: Prague
Karel KABELE, Assistant Professor, Department of Building Services Engineering; Jan KYNCL, Assistant Professor, Department of Power Engineering; and Jiri TUMA, Professor, Department of Power Engineering, Czech Technical University in Prague, Czech Republic

Discussants:
Richard JENDRUCKO, Professor and Director, Industrial Assessment Center, College of Engineering and Jerry FRYXELL, Associate Professor of Management, College of Business Administration, University of Tennessee, Knoxville

The Polish project participants made presentations based on current activities at their universities in project areas also on November 4:

SESSION 10B -- Plans for an Energy Efficiency/Environment Curriculum Project in Poland
Presiding: Richard JENDRUCKO, Professor, Department of Mechanical Engineering, University of Tennessee, Knoxville, Tennessee

Issues and Opportunities at the University of Mining and Metallurgy, Krakow
Adam GULA, Professor, University of Mining and Metallurgy, Krakow and Director of the Polish Foundation for Energy Efficiency, Krakow

Energy/Environment Issues at Technical University of Krakow
Tomasz STYPKA and Wilhelm OKARMUS, Professors, Technical University of Krakow

Energy/Environment Issues at Warsaw University of Technology
Jerzy SOWA, Assistant Professor of Environmental Engineering, Warsaw University of Technology

Energy/Environment Issues at Silesian Technical University
Jerzy BARGLIK, Professor, Silesian Technical University, Katowice

Energy/Environment Issues at University of Tennessee and Polish Project Overview
Richard JENDRUCKO, University of Tennessee

The presentation of Adam Gula was most significant for this project as he elaborated on several energy-related programs with which he has been involved since 1993, demonstrating what can be done to involve students in significant university-based projects.

Planning Meetings
Several planning meetings were held with Polish universities following the Warsaw Conference. The purpose of each of these meetings was: to outline overall project goals, get input from Polish university faculty on specific needs/interests in area of energy/environment training and curriculum; review content of the Phase 2 Energy Efficiency Workshop and determine what type
of faculty should participate in the Workshop.

On Wednesday, November 5, the UT team met with faculty at the Technical University of Warsaw coordinated there by Prof. Jerzy Sowa, Faculty of Environmental Engineering. On Wednesday evening the group traveled to Krakow and met Thursday, November 6 at the University of Mining and Metallurgy, Krakow (AGH) joined by several faculty from the Technical University of Krakow (PK). AGH participation was coordinated by Prof. Adam Gula and PK faculty coordinator was Prof. Tomasz Stypka. The final meeting in this phase was held in Gliwice at Silisean Technical University on Friday, November 7 coordinated by Prof. Jerzy Barglik.


The dramatic change to a market economy from a centrally planned economy necessitates a shift in approach and values regarding energy usage. While such a shift is unattainable in this particular phase of the project, there needs to be a recognition that the simple delivery of "facts" through the lecture method is ineffective to develop an awareness of the need for behavioral change and value clarification related to widespread adoption of lower technology energy conservation methods.

Thus, this Workshop employed a variety of pedagogies. The diversity of approaches and immediate pedagogical support in each project phase is intended both to improve teaching effectiveness related to this program, and, equally important, to provide a deeper understanding of pedagogical options in curriculum design.

Overall objectives of Phase 2 were:
* to understand energy efficiency programs in the context of the new ISO 14000 standards for environmental management systems;
* to examine current "state-of-the-art" practices in energy efficiency and explore their application in Poland;
* to explore ways in which Polish universities can be increasingly involved in improving energy efficiency;
* to create curricula targeted to specific learning objectives related to energy efficiency and to identify the appropriate pedagogical means for accomplishing them; and
* to generate interest in the energy environment assessment model for student training

Logistics
Instructors for the Workshop were: Dr. Richard Jendrucko, Professor, Department of Mechanical Engineering; Dr. Jerry Fryxell, Associate Professor, Department of Management; Dr. Thomas Dean, Associate Professor, Department of Management, all at The University of Tennessee and Dr. Karel Kabele, Associate Professor, Czech Technical University, Prague, Czech Republic.

The Workshop took place in the Krakow area from Friday, February 13 through Wednesday,
February 18, 1998 and was held in two locations. Sessions on Friday, Feb. 13 through Monday, Feb. 16 were held at the University of Mining and Metallurgy, Krakow (AGH) in order to be able to utilize the PC laboratory at AGH. Sessions on Feb. 17 and 18 were held at military recreation site in Wadowice, Poland whose facilities were less expensive than those in Krakow.

Participants
Twenty-five persons participated in one or more sessions. Eleven participants attended all sessions. Several other professors/instructors from AGE and the Technical University in Krakow participated in one or more sessions they felt of particular interest during the time the Workshop sessions were held at AGE. Participants included the following persons.

Faculty from Warsaw University of Technology:
Jerzy Sowa, Coordinator
Mieczyslaw Dzierzgowski
Krzysztof Wojdyga
Ryszard Zwierzchowski
Aleksander Panek
Andrzej Wiszniewski

Faculty from University of Mining and Metallurgy, Krakow (AGE):
Adam Gula, Coordinator and also Workshop Logistics
Stefan Taczanowski
Jerzy Janczyszyn
Artur Skoczek
Alicja Byrska-Rapala

Faculty from Technical University, Krakow:
Tomasz Stypka, Coordinator
Marian Hopkowicz
Jacek Schnotale
Tomasz Kisielewicz
Jolanta Ginwont
Katarzyna Nowak

Faculty from Silesian Technical University, Gliwice:
Jerzy Barglik, Coordinator
Edward Siwy
Tadeusz Chmielniak
Janusz Kotowicz
Jozef Haber

Guest participants: Dr. Magdalena Repasova, Professor, Technical University of Kosice, Kosice, Slovakia and Jolanta Swiatowska and Jaquelin Cochran, both with the Polish Foundation for
Energy Efficiency (FEWE).

Workshop Overview

Two notebooks were prepared for the Workshop and given to each participant: Notebook 1 - *Technical Training and Municipal / NGO / University Networking for Energy Efficiency*, (283 pages), and Notebook 2 - *Teaching Notes for Course Modules*, (122 pages). (They are attached as Appendix A.)

The notebooks contained the course outline, an outline and specific materials for each of the fifteen modules during the five day workshop, copies of all overheads used during the week, copies of especially valuable articles from journals, full copies of the several cases that were used as training aids during the Workshop, glossaries of terms and other materials.

Dr. Karel Kabele, a professor at Czech Technical University and an instructor for this Workshop, was a participant last year in the Czech project of this same name. He was invited to join the faculty for the Polish project since he was able to integrate many of the concepts introduced during the Czech project. His participation as an instructor added credibility to the workshop. Specifically, Prof. Kabele found a number of practical ways to integrate Western pedagogies from the Czech project last year with higher education realities in the Czech Republic. Czech Technical University shares many of the same challenges faced by technical universities in Poland and throughout Central and Eastern Europe. For example, at critical points Prof. Kabele was able to interject his own experience to ideas as they were being presented by the UT faculty. Sometimes when participants would question the relevance of a concept or pedagogy he would add something like, "you may not think this would work at your university or with your students, but believe me, it does. I tried it at Czech Tech and it works."

In addition, Professor Kabele added unique computer software he has begun to use in his classes as a result of the Czech energy efficiency/environmental management. He demonstrated this software at the Polish Workshop and provided copies of the software to the participants. The practical hands-on computer use sessions organized by Karel Kabele clearly demonstrated state-of-the-art access of Web-based information, the use of energy analysis software and the inclusion of energy efficiency topics into engineering curricula.

This workshop was an improvement in comparison to the Czech project due to the integration of presentation of interactive teaching methods with topics in energy and environmental management. The English language competency of the Polish participants was of a high level and greatly enhanced the ability to exchange ideas effectively.

Participant Evaluation

A Program Evaluation Form was passed to all participants near the end of the Workshop asking them to indicate the effectiveness of each content session in terms of the relevance of content and pedagogy. The anonymous form also requested overall Workshop Summary opinions.
The overall response was extremely positive, even better than the average 90% acceptance in the Czech project. Programs of this type, essentially intercultural, seldom have the high degree of acceptance that these programs received. This was due in part to the international experience of the instructors in Central and Eastern Europe, in part to the content knowledge and pedagogical maturity of the instructors, and in part to the information gained from the potential Workshop participants themselves during Phase 1 of this project and finally also due to inclusion of Prof. Kabele from Czech Technical University as a member of the Workshop instructional staff.

Summary
Of the eighteen respondents to the Summary section:
* 95 percent agreed (9 strongly agreed, 8 agreed) that "overall, this program provided information that will be useful to the energy curriculum at my university;"
* 95% agreed (7 strongly agreed, 10 agreed) that "the content of the program was appropriate and clear;" and
* 90% agreed that "the program was well organized."

Detailed Responses
As the data above indicate, the overall response was highly positive. Detailed participant data is available for each of the 18 Phase 2 workshop modules (Appendix B). Selected responses to specific modules are presented below to demonstrate the range of topics covered and also the general enthusiasm of the participants toward the relevance of both content and pedagogy.

Saturday, Module II - Fryxell: Commons Simulation, a team based simulation of decisions top management must make when faced with tradeoffs between profitability and pollution when manufacturing process is dependent on a water resource shared by all other (teams) firms.
Content:
0 - this was mostly irrelevant
1 - I will probably use something
2 - I will use some content
7 - I will use much content
8 - I will use almost all of this content
Pedagogy:
0 - this module had no effect on how I will teach in the future
4 - I liked this session and how it was taught
12 - I liked this session and will try this approach

Saturday, Module III - Dean: Environmental Economics and Regulation.
Content:
0 - this was mostly irrelevant
1 - I will probably use something
8 - I will use some content
7 - I will use much content
Saturday, Module III - Kabele: Internet Session featuring energy efficiency and environmental management resources available through the Internet.

Content:
- 1 - this was mostly irrelevant
- 0 - I will probably use something
- 3 - I will use some content
- 6 - I will use much content
- 11 - I will use almost all of this content

Pedagogy:
- 0 - this module had no effect on how I will teach in the future
- 11 - I liked this session and how it was taught
- 8 - I liked this session and will try this approach

Sunday Module I - Jendrucko: Electric Power and Manufacturing Plants

Content:
- 0 - this was mostly irrelevant
- 0 - I will probably use something
- 4 - I will use some content
- 5 - I will use much content
- 5 - I will use almost all of this content

Pedagogy:
- 0 - this module had no effect on how I will teach in the future
- 5 - I liked this session and how it was taught
- 9 - I liked this session and will try this approach

Sunday, Module II - Dean: The "Green Lights" Case Study

Content:
- 0 - this was mostly irrelevant
- 2 - I will probably use something
- 3 - I will use some content
- 3 - I will use much content
- 5 - I will use almost all of this content

Pedagogy:
- 0 - this module had no effect on how I will teach in the future
- 4 - I liked this session and how it was taught
- 9 - I liked this session and will try this approach
Sunday, Module IV - Kabele: Residential Energy Use and Software

Content:
0 - this was mostly irrelevant
0 - I will probably use something
5 - I will use some content
4 - I will use much content
7 - I will use almost all of this content

Pedagogy:
1 - this module had no effect on how I will teach in the future
5 - I liked this session and how it was taught
11 - I liked this session and will try this approach

Monday, Module I - Jendrucko: The Assessment Center Model

Content:
0 - this was mostly irrelevant
1 - I will probably use something
1 - I will use some content
10 - I will use much content
6 - I will use almost all of this content

Pedagogy:
0 - this module had no effect on how I will teach in the future
9 - I liked this session and how it was taught
8 - I liked this session and will try this approach

Monday, Module III - Fryxell: Group Decision Making Exercise

Content:
0 - this was mostly irrelevant
0 - I will probably use something
4 - I will use some content
5 - I will use much content
9 - I will use almost all of this content

Pedagogy:
0 - this module had no effect on how I will teach in the future
6 - I liked this session and how it was taught
11 - I liked this session and will try this approach

PHASE 3 - IMPLEMENTATION SUPPORT: Warsaw, Gliwice and Krakow, May 29-June 10, 1998

The UT team traveled to Poland to work further with Polish project faculty in demonstration of energy assessment protocols through an actual visit to a Polish manufacturing plant and to assist Polish faculty in collection of information for future development of case studies for classroom use. Because of time constraints, the UT team joined Polish project faculty for visits to three
plants. Faculty from AGH and Technical University of Krakow (PK) were asked to participate in the same assessment. The schedule in each city included:

(a) a pre-plant visit planning session in which the project team and Polish faculty participants will review the assessment questionnaire and discuss specific procedures for the plant visit.

(b) the plant visit itself - information for the energy assessment will be developed as well as other inputs for the case study, and

(c) post-plant information analysis session working with Polish faculty. This will also include pre-planning of specific goals for the U.S. visit in Phase 4 of the project.

UT team participating in Phase 3 was: Rich Jendrucko, Jerry Fryxell, Tom Dean, Karel Kabele and Dave Hake.

**Plant Visit #1: Warsaw and area, May 29 - June 2**

The pre-plant visit was held Saturday, May 30 at the Technical University of Warsaw with faculty Jerzy Sowa, Andrzej Wiszniewski and Krzysztof Wojdyga. Rich Jendrucko led an overview of plant visit assessment process and review of the 14 page questionnaire used at the UT Industrial Assessment Center to guide the data collection process. Tom Dean and Jerry Fryxell led discussion of factors considered in adapting the audit into a instructional case framework. Jerzy Sowa and the Technical University of Warsaw faculty team briefed the UT group on the company to be visited Monday.

On Monday, June 1, the UT and Polish faculty group (eight persons in all) traveled 30 kilometers south of Warsaw to visit HORTEX, a fruit-and-vegetable juice company in Gora Kalwaria. Participants in the meeting from the plant included the plant manager and several assistants. The energy assessment was led by Jendrucko with translation and technical interpretation assistance provided by the Polish faculty. Processes of juice and concentrate production were described in detail which led to description of all energy using equipment. The meeting required most of the morning. In the afternoon there was a tour of the plant facility - steam plant and equipment used to process fruit into juice and concentrate and package it for distribution. While most equipment was new and some modern, such as that used in packaging, the plant was in an old facility. The steam network had been built 30 years earlier and experienced losses of 30-35% providing steam from the power plant to juice plants. There was also an emissions problem as the existing steam plant uses heavy sulphur oil from Russia via a Polish refinery. The Polish refinery will cease production of heavy oil in the near future. Alternate heating sources and their costs were discussed.

Also in the afternoon, Fryxell and Dean led a brief discussion of other management aspects at Hortex which would be useful in developing the teaching case material. This included market indicators for juice and concentrate produced by Hortex. The Gora Kalwaria plant is one of eight in the Hortex group. Hortex has 45% of the Polish juice market with a strong brand name and a business strategy of being the low-cost quality producer. Hortex is facing stiff competition in the concentrate for export market. Management mentioned ecological concerns that affect overall cost and quality: 1) they want apples and other fruit that are grown free of pesticides, and 2) they
want to use processes that are environmentally responsible. Management at Gora Kalwaria plant feel the future market will increase but Hortex share will decrease.

On June 2 a post-plant visit meeting was held between the UT team and the Polish faculty at the Technical University of Warsaw. Information gathered the previous day was reviewed and additional information was added based on previous work the Polish faculty had done with Hortex. Prior to Phase 4 of this project, the Warsaw faculty were to develop a preliminary draft of an energy assessment report based on Hortex. They were also to develop a draft of a teaching case should describe the decisions facing management and use the information gathered to integrate the technical and management issues.

Prof. Kabele described his experience with student teams engaged in industrial energy assessments as part of his course at the Czech Technical University in Prague. Plans to add a student assessment team component to the Technical University of Warsaw existing energy assessment center were elaborated on by Sowa, Wiszniewski and Wojdyga.

Preliminary plans for Phase 4 were discussed. The UT team left for Katowice late in the afternoon of Tuesday, June 2.

Plant Visit #2: Gliwice / Katowice area, June 2 - 5
The UT team met with Silesian Technical University (STU) faculty in the American Polish Center all day, Wednesday June 3 for the pre-plant visit. Three faculty of STU were: Tadeusz Chmielniak, Edward Siwy and Jozef Haber. Also the group met during the day with Prof. Jerzy Sowa and Vice-Rector for Science, Prof. Remigiusz Sosnowski.

Process and results for the day's meeting was similar to that with the faculty team in Warsaw. On Thursday, June 4 the STU faculty led the UT team for a visit to Orzel Bialy Non-Ferrous Plant in Bytom. This visit was coordinated by Prof. Jerzy Barglik. The UT and STU teams met with the plant manager and several top assistants; however at some points there were as many as 15 observers at the meeting table. While they mostly were there as observers, occasionally the plant manager would direct a specific question to one of the unit managers present. All conversations were through a translator on the Orzel Bialy staff which slowed the process somewhat.

The energy assessment was once again led by Rich Jendrucko. The process continued until lunch, which was taken in the same conference room.

Orzel Bialy was formerly a large zinc and lead mine owned by the Polish government. Anticipating changes, the conversion from lead and zinc mine to a battery reprocessing operation was started in 1989. Now the company is private owned in part by a group of former employees of the lead and zinc mine. All active mining operations has ceased. The newly privatized firm operates on the campus of the former mine.
About 5,000 tons of old auto batteries per year are input. Antimonial lead recovered from these batteries is the chief product of the firm. Batteries will not be accepted at the plant without electrolyte by law, but no particular action is taken when batteries without electrolyte are found. "it is just a law", but "there is no law that tells us what we must do."

The process starts with crushing the old batteries after draining remaining electrolyte. Reprocessed electrolyte could also be marketed (in the same concentrate as the original) but high transportation cost of the electrolyte has slowed that possibility for now. This process operates about 5 hours each day. Materials classification follows to segregate materials before further processing. Then segregated materials are melted to recover lead. Lead in ingot form and not highly refined (97% lead, 3% antimony plus small amount of bismuth and trace amounts of copper and zinc) is sold to Polish and foreign smelters for further refining. All energy sources were described with energy consumption noted. The power plant includes three boilers of different sizes which operate only in the heating season. Thirty percent of the water heated is for company use, 70% is sold outside the company. Questions about revenue from these outside sales prompted chuckles. One of the customers is a school owned by the plant prior to 1989. Heating pipes for the school come from the plant and the plant must continue to provide heating; it is not clear whether this is by law or just by custom. The plant buys powdered coal to run the boilers which were built in the early 1980s. The plant is now considering replacing coal boilers with gas boilers.

Waste from the plant's processes goes to the firm's own landfill. Slag from boilers is used on site for such purposes as road building. Emissions of lead compounds is less than that allowed by law. Orzel Bialy also produces health masks and other safety equipment. The battery recycling idea was the result of their "health and safety first" campaign.

Near day's end, responding to final questions about energy uses, company management mentioned that they also operated thirteen 400 kilowatt pumps (6 active at any time with one backup) each with capacity of 8.2 cubic liters per minute. These were used to pump water from the unused zinc mine so that ground water buildup in the zinc mine shafts would not be a threat to active coal mines in the immediate area. After settlement of some of the solids in the water pumped from the zinc mine, the water is discharged into the river. Liability for discharge into the river is some 3,000,000 zlotys charged by the Polish Environmental Protection Agency.

The UT and STU group was taken on a tour of the power plant and reprocessing facilities. During final interviews by Fryxell and Dean late in the day on other aspects of management that might be helpful in case development the plant manager mentioned that soon there would be another battery recycling plant in Poland - the nation's second such facility, with Orzel Bialy being the first. The new facility was financed in part with funds from Polish EPA and would open just 12 km from the Orzel Bialy plant. The manager noted that this would bring competition for the plant's input of used batteries. They do not know what will happen when the new plant is opened. Management was well aware that the since new plant would not have to factor in costs of providing heat to a school or pumping water from an unused zinc mine; its profitability may
enable them to win competition for used batteries which might eventually force Orzel Bialy out of business. Management noted also that part of their liability payments to Polish EPA for water discharge were "being used to help finance the competition's plant."

The post-plant visit was held Friday, June 5 again at the Polish-American Center. The strategic elements at Orzel Bialy were discussed. The social costs incurred by Orzel Bialy were discussed at some length. Clearly, to the UT team, these are interesting aspects of a possible case study for Polish students. Jerry Fryxell led a discussion of the case study writing process with suggestions for possibly developing an energy case based on energy conservation measures and a second possible case in strategy from the point of view of the Orzel Bialy top management. Both of course assume availability of additional information and also permission to disclose this information in a case.

Phase 4 planning discussion ended the series of meetings with STU faculty.

**Plant Visit #3: Krakow area, June 6 - 9**
The pre-plant visit meeting with faculty of the University of Mining and Metallurgy, Krakow (AGH) and Technical University of Krakow (PK) was held at AGH on Saturday, June 6. AGH faculty participants were Professors Adam Gula, Jerzy Janczyszyn and Artur Skoczek. PK faculty participants were Tomasz Stypka, Tomasz Kisielewicz and Jacek Schnotale.

The plant visit of June 8 was to the KFK, Krakow Cable Factory. KFK, established in 1929, is a large integrated facility which produces power, signal and control, and telecommunication cables of all types, bare aluminum and copper conductors and a variety of specialty products. The plant is currently one of the most modern rubber-covered cable producers in the world. It is both ISO 9001 and 14001 certified. The environmental certification was only the second achieved in Poland.

Plant managers selected the plant building housing the rubber-coated cable production operations for touring by the project participants. This clean, modern facility is equipped with equipment under five years of age for state-of-the art production of power cables.

Production processes included in the plant tour included the stretching and braiding of metal wire to form cables and the continuous rubber coating of these cables. Metal cables are rubber-coated by pulling cable from a spool through a rubber extruder which deposits a surface coating of uncured rubber. The coated cable is then passed through a steam-pressurized enclosure for the heat-vulcanization followed by water cooling of the rubber coating. Cable exiting the cooling section is wound onto spools for shipment.

In the toured facility, energy is used in the forms of electricity for the operation of electric motor drives, extruder heater band heating and facility lighting, and steam for rubber vulcanization and building space heating. The steam for the vulcanization process is produced in four new dedicated boilers to assure the purity of steam contacting the rubber.
Since the Rubber Cable Department was only recently equipped with state-of-the-art rubber-coated cable production equipment, the project participants had more of an opportunity to observe the use of highly energy-efficient equipment rather than a seasoned plant operation with many opportunities for energy efficiency improvement. Nevertheless, the Polish participants with the assistance of the US team members were able to identify a number of areas for consideration of energy conservation measures including:

- Application of insulation covers to the heated section of the extruders.
- The recovery and reuse of hot steam condensate
- Vulcanization by means other than with steam (e.g. Nitrogen vulcanization)
- Improvement of facility lighting efficiency
- Improve building envelope characteristics to reduce heat loss during heating season

Follow-up meetings were held again at AGH on Tuesday, June 9. Based on the site visit and possible additional information, this experience led to possible development of two cases. A case to be considered by Technical University of Krakow faculty would focus on the economics of implementing the several energy efficiency options faced by management at KFK.

A second case which focused on the effects of ISO 14001 was to be developed further by the AGH faculty. The day concluded with a review of Phase 4 tentative schedule and related planning discussions.

The UT team departed Poland Wednesday, June 10.

PHASE 4 - CURRICULUM DEVELOPMENT

Three faculty participants from each of the four Polish universities participating in the Workshop traveled to Knoxville for two weeks of advanced energy efficiency instruction and visits to area firms. Polish professors participating in Phase 4 were:

**Warsaw University of Technology:**

- Jerzy Sowa, Krzysztof Wojdyga, and Andrzej Wiszniewski;

**University of Mining and Metallurgy, Krakow (AGH):**

- Adam Gula, Jerzy Janczyszyn, and Artur Skoczek;

**Technical University, Krakow:**

- Tomasz Stypka, Jacek Schnotele, and Tomasz Kisielewicz;

**Silesian Technical University, Gliwice:**

- Jozef Haber, Edward Siwy and Tadeusz Chmielniak.

The overall goal of the two-week visit by the Polish delegation was to provide training and follow-up experiences to complement a comprehensive and well-rounded background for energy efficiency/environmental management course development. The program schedule included a balance of classroom lectures, group visits to selected facilities and a series of work-group
sessions. Facility visits included inspection of industrial installations to illustrate a variety of energy efficiency and environmental management systems and principles.

Specific content was tailored as a result of the Phase 2 Workshop and Phase 3 experiences in Poland.

Of central importance to the program is elaboration of the energy and environmental assessment center model utilizing the UT Industrial Assessment Center program. While at UT the visiting Polish faculty participated in conducting an energy/waste assessment of a regional manufacturing plant. This activity was followed by data analysis and discussion of the design of the report for submission to clients. Finally on this important dimension, there were discussions on organization and management of a university-based Energy & Environment Assessment Center (EEAC).

Participants in the Study Tour arrived July 3 and departed July 17, 1998. Review of the following agenda amply illustrates the objectives set out above for this phase of the project. UT project principals included Tom Dean, Jerry Fryxell, Rich Jendrucko, Dave Hake and Judy Snow, Administrative Manager of the UT Central and East European Center. The Phase 4 visit was coordinated through this Center.

**Agenda of Phase 4 Activity**

<table>
<thead>
<tr>
<th>SATURDAY, JULY 4</th>
<th>MONDAY, JULY 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12:00</strong> Appalachian Museum (optional) Meet in Hotel Lobby.</td>
<td><strong>9.00</strong> Welcome to The University of Tennessee. Pass out textbooks ordered for each Polish faculty member (cost $198 per person).</td>
</tr>
<tr>
<td><strong>5:00</strong> Walk to the World’s Fair Site.</td>
<td><strong>9.30</strong> Work Group Sessions to prepare for Tuesday presentations by Polish faculty. Rooms are</td>
</tr>
<tr>
<td>Independence Day Celebrations at the World’s Fair Site.</td>
<td><strong>11.30</strong> Lunch at the Copper Cellar</td>
</tr>
<tr>
<td><strong>8:00</strong> Tennessee Pavilion for Independence Day Concert by the Knoxville Symphony Orchestra. Polish delegation invited guests of Conductor Kirk Trevor.</td>
<td><strong>13.00</strong> Tour of Hodges Library. Hosts: Aubrey Mitchell, Assoc. Dean, UT Libraries and JFDP Scholars</td>
</tr>
<tr>
<td><strong>9:00</strong> Fireworks Display</td>
<td><strong>14.00</strong> Center for Clean Products. Host: Gary Davis, director</td>
</tr>
<tr>
<td>Walk back to the hotel.</td>
<td><strong>18.00</strong> Reception at the University Club, Welcome by Knoxville Mayor Victor Ashe</td>
</tr>
<tr>
<td>SUNDAY, JULY 5</td>
<td></td>
</tr>
</tbody>
</table>
TUESDAY, JULY 7
9.00 Group presentations of Assessment Reports by Polish faculty.
12.00 Depart for Lunch--Cafe Chameleon Great Hall, Knoxville Museum of Art
15.00 Briefing on the Tennessee Valley Authority at the TVA Towers
18.00 dinner at the Marina near TVA's Fort Loudon Dam on the Tennessee River

WEDNESDAY, JULY 8
11.00 Briefings at UT-Energy Resources Center-EERC Overview, Jack Barkenbus, Executive Director
11.30 The Solid Waste Management Program, Kim Davis, Director, Waste Management Research and Education Institute.
13.30 Oak Ridge National Lab Visit
   ORNL Overview
   Visit to Buildings Technology Center
   Visit to High Temperatures Materials Laboratory
   Visit to Graphite Reactor

THURSDAY, JULY 9
9.00 Tour American Museum of Atomic Energy --TAKE YOUR PASSPORT
10.30 Oak Ridge National Laboratory (manufacturing facilities) Y-12 Overview
11.15 Lunch in Oak Ridge
12.30 Visit Y-12
15.00 Oak Ridge Centers for Manufacturing Technology
   Display Room
   Skills Demo
   Skills Campus
   Hospital in a Box
   Motor Test Facility

FRIDAY, JULY 10
All day - Middlesboro Plant Industrial Assessment
Lunch and Supper on the road.
Return late to hotel

SATURDAY, JULY 11
9.00 Travel to Nashville, Tennessee
13.00 Tour of Opryland Hotel and Convention Center power plant-- David Krebs, Assistant Manager of Engineering. Opryland Hotel/Convention Center is the largest hotel-convention center complex under one roof in the world. Their energy efficiency and environmental management programs are among the best practices in the U.S.
15.00 Tour of Gardens--Hollis Malone, Horticulturist
21.00 Cultural visit - Grand Ole Opry
SUNDAY, JULY 12
8.30 travel to Chattanooga
11.30 tour of Jack Daniels Distillery
15.30 Check into Chattanooga's Reed House

MONDAY, JULY 13
9.00 tour and executive briefings on the Electric Transit Vehicle Institute
10.30 Orange Grove Recycling Center
13.30 IMAX Theater--L5--City 100 years into the future.
15.30 AWMS presentation on ISO-14000
19.00 group supper at Chattanooga Choo Choo

TUESDAY, JULY 14
9.00 tour and briefing on TVA Raccoon Mountain Pumped Storage Hydroelectric Plant
13.00 executive briefings at the Chattanooga Institute for Sustainability
17.00 depart Chattanooga--Supper on the road--Return to Radisson Hotel in Knoxville

WEDNESDAY, JULY 15
Case Study Feedback--UT faculty meet individually with
10.00 Warsaw University
10.30 Silesian Tech.
11.00 AGH
11.30 Krakow Tech
2.00 depart for Narrow Ridge Environmental Center - an experiment and laboratory in energy efficiency, environmental management and sustainable living. Dinner and lodging in their dormitory. Briefings by their leadership.

THURSDAY, JULY 16
9.00 Return to Radisson Hotel
11:30 Depart for UT
12.00 final working session and review at the UT Agriculture Extension Solar House on Alcoa Hwy.
18.00 final party, Highland Point Club House

FRIDAY, JULY 17
Polish participants depart.

Phase 4 Summary

The final work session before departure in Phase 4 was the Participant Review and Feedback Session. It was held the afternoon of Thursday, July 16 at the UT Agricultural Extension Solar Homes Conference Room. In addition to completing the Participant Evaluation Forms
(Appendix C) summarized below, the Polish faculty formed work groups by university to develop responses to the following questions suggested by the UT team:

1. What have we learned?
2. What of this is relevant to our situation in Poland?
3. What are we going to do about it? (What are our intentions toward implementation?)

Responses to questions 1 and 2 have been transcribed from overhead transparencies used for presentation and discussion with the group (Appendix D). As these are also reflected to some extent in the responses on the Participant Evaluation Form, they will not be further described here. Responses to question 3 are included in their entirety in the last section of this report entitled “Project Summary”.

Participant Evaluation
Polish faculty were asked to rate the overall relevance of Phase 4. As the data indicates, the overall response to both Phase 4 and the entire project was highly positive:

* 92 percent or eleven participants strongly agreed with the statement: "The content of this phase was appropriate and clear."
One participant agreed with the statement.

* 100 percent of the participants indicated strong agreement with the statement: "This phase was well organized."

* 75 percent of the participants strongly agreed, and 25 percent agreed with the statement: "Overall, this project provided information that will be useful to the energy curriculum at my university."

Detailed Responses
Detailed participant responses were also solicited for each of the 25 individual Phase 4 content modules listed above (Appendix C).

* At least two-thirds of the participants (eight or more) indicated they would use "much" or "almost all" of the content in 17, or 68%, of the modules in the curriculum at their universities.

* As a further measure of the value of specific modules, ten or more participants (83 %) indicated that two-thirds of the modules should "definitely be retained in future programs" of this type.

Responses to selected modules are presented below. Detail is given which indicate responses of the participants toward relevance of content and also the value of the module in Phase 4.
Monday, July 6 - UT Center for Clean Products
Content:
   2 - I will use almost all of this content
   8 - I will use much content
   2 - I will use some content
   0 - this was mostly irrelevant
Value:
   12 - definitely retain this module in future programs
   0 - enjoyable and interesting but peripheral
   0 - should probably eliminate

Wednesday, July 8 - tour & briefing at Oak Ridge National Laboratory Buildings Technology Center, High Temperature Materials Lab and Biofuels Feedstock Program
Content:
   4 - I will use almost all of this content
   5 - I will use much content
   3 - I will use some content
   0 - this was mostly irrelevant
Value:
   12 - definitely retain this module in future programs
   0 - enjoyable and interesting but peripheral
   0 - should probably eliminate

Thursday, July 9 - tour & overview of Y-12 manufacturing facility at Oak Ridge National Lab
Content:
   1 - I will use almost all of this content
   7 - I will use much content
   3 - I will use some content
   1 - this was mostly irrelevant
Value:
   12 - definitely retain this module in future programs
   0 - enjoyable and interesting but peripheral
   0 - should probably eliminate

Friday, July 10 - industrial plant energy/environmental management assessment (Greenville, Tennessee) (morning and afternoon)
Content:
   9 - I will use almost all of this content
   3 - I will use much content
   0 - I will use some content
   0 - this was mostly irrelevant
Value:
  12 - definitely retain this module in future programs
  0 - enjoyable and interesting but peripheral
  0 - should probably eliminate

Saturday, July 11 - Opryland Hotel (Nashville) power plant and environmental control center tour and briefing
Content:
  7 - I will use almost all of this content
  4 - I will use much content
  1 - I will use some content
  0 - this was mostly irrelevant
Value:
  12 - definitely retain this module in future programs
  0 - enjoyable and interesting but peripheral
  0 - should probably eliminate

Monday, July 13 - Electric Transit Vehicle Institute (Chattanooga)
Content:
  5 - I will use almost all of this content
  3 - I will use much content
  3 - I will use some content
  0 - this was mostly irrelevant
Value:
  8 - definitely retain this module in future programs
  3 - enjoyable and interesting but peripheral
  0 - should probably eliminate

Tuesday, July 14 - tour and briefing at Tennessee Valley Authority's Racoon Mountain Hydroelectric Plant
  7 - I will use almost all of this content
  3 - I will use much content
  2 - I will use some content
  0 - this was mostly irrelevant
Value:
  12 - definitely retain this module in future programs
  0 - enjoyable and interesting but peripheral
  0 - should probably eliminate

Tuesday, July 14 - Smart Park presentation at the Chattanooga Institute for Sustainability
Content:
  5 - I will use almost all of this content
  5 - I will use much content
2 - I will use some content
0 - this was mostly irrelevant

Value:
11 - definitely retain this module in future programs
1 - enjoyable and interesting but peripheral
0 - should probably eliminate

Wednesday, July 15 - case study feedback sessions with the UT project team for each Polish university faculty group
Content:
8 - I will use almost all of this content
3 - I will use much content
1 - I will use some content
0 - this was mostly irrelevant

Value:
12 - definitely retain this module in future programs
0 - enjoyable and interesting but peripheral
0 - should probably eliminate

Wednesday, July 15 - afternoon and overnight tour & briefings at the Narrow Ridge Center for energy and environmental alternatives
Content:
4 - I will use almost all of this content
4 - I will use much content
2 - I will use some content
0 - this was mostly irrelevant

Value:
10 - definitely retain this module in future programs
2 - enjoyable and interesting but peripheral
0 - should probably eliminate

Wednesday, July 15 - case study feedback sessions with the UT project team for each Polish university faculty group
Content:
8 - I will use almost all of this content
3 - I will use much content
1 - I will use some content
0 - this was mostly irrelevant

Value:
12 - definitely retain this module in future programs
0 - enjoyable and interesting but peripheral
0 - should probably eliminate
PHASE 5 - PARTICIPATION IN NITRA AUDEM CONFERENCE

A final phase of the project was made possible based on savings realized in the original project budget. Two faculty from each Polish university were invited to participate on the program of the ninth Annual Conference of the Alliance of Universities for Democracy in Nitra, Slovakia, November 8-11, 1998. (Conference Program is included in Appendix E). Several UT faculty also participated in this phase. Their names and affiliations of Polish and UT faculty participants are included in the following session detail from the Nitra Conference. Both sessions were on Monday, November 9.

14.00-15.30  **SESSION 9C -- Energy Efficiency and Environmental Management I - Overview and Observations**

**Presiding:** Adam GULA, Professor, University of Mining and Metallurgy, Krakow and Director of the Polish Foundation for Energy Efficiency, Krakow

**Project Overview and Observations from Technical Perspective**

Richard JENDRUCKO, Professor, Department of Mechanical Engineering and Director, Industrial Assessment Center, College of Engineering, University of Tennessee, Knoxville

**Observations from An Environmental Management Perspective**

Thomas DEAN, Associate Professor of Management, University of Tennessee, Knoxville

**Curriculum and Experience With Energy Assessment Center at Czech Technical University**

Karel KABELE, Assistant Professor, Department of Building Services Engineering, Czech Technical University in Prague, Czech Republic

**Efforts to Reduce Greenhouse Gases Emissions in the Czech Republic**

Jiri KRATOCHVIL, Professor and Head, Department of Power Engineering, Technical University of Liberec, Liberec, Czech Republic

15.45-17.15  **SESSION 10C -- Energy Efficiency and Environmental Management II - Curriculum Development in Polish and Slovak Universities**

**Presiding:** Richard JENDRUCKO, Professor, Department of Mechanical Engineering, University of Tennessee, Knoxville, Tennessee

**Energy/Environment Issues at the University of Mining and Metallurgy, Krakow**

Adam GULA, Professor, and Jerzy JANCZYSZYN, Professor, University of Mining and Metallurgy, Krakow

**Energy/Environment Issues at Technical University of Krakow**

Tomas KISILEWICZ and Jacek SCHNOTALE, Professors, Technical University of Krakow, Krakow, Poland

**From Learning to Application: Curricula Related to Energy Efficiency and Environment at Warsaw University of Technology**

Jerzy SOWA, and Krzysztof WOJNYGA, Professors, Environmental Engineering, Warsaw University of Technology, Warsaw, Poland

**Energy/Environment Issues at Silesian Technical University**

Josef HABER, Professor, and Edward SIWY, Assistant Professor, Silesian Technical University, Katowice, Poland

**Energy Efficiency and Environmental Management Education at the Faculty of Metallurgy of TU Kosice**

Magdalenka REPASOVA, Associate Professor, Faculty of Metallurgy, Technical University of Kosice, Kosice, Slovakia

A highlight of the sessions on the Polish project was the reporting by each Polish university team on current activities at their universities related to the subject training topics emphasized in the AID-sponsored project. It was clear that all groups had begun to formulate assessment programs
involving students modeled after the UT program. Several of the case studies were being planned for specific use in future engineering course work. Also, progress was being made on other Polish participant stated goals as a result of the project. These medium and long range goals are reported in the next and final section of this report.

PROJECT SUMMARY

One measure of project impact is the extent to which change occurs in the curriculum and pedagogy at the participating universities. Changes in curriculum relate to changes in institutional priorities and changes in faculty attitudes, not simply of the specific faculty that participate in the project, but also of their other faculty colleagues. A major change in universities perceptions and procedures is increased collaboration among different faculties. The UT team included management, engineering, environment, and education staff. Interdisciplinary collaboration for assessments (especially between business and engineering faculty) and pedagogy was encouraged at the Polish and Czech universities, and we could see the beginnings of such joint activities.

Sufficient time has lapsed since the Czech university project 1996-97 for some of the changes to have resulted in curriculum impact and also to be documented. Activity at two Czech universities follows.

Technical University of Liberec, Liberec, Czech Republic
Reported by Prof. Jiri Kratochvil, Head, Department of Power Engineering at the Technical University of Liberec:
- One of the experiential exercises employed during the Czech project was the "Commons Game." This has been used several times during 1998 with the students of the Power Engineering department in their undergraduate curriculum.
- Several of the faculty made a presentation on their use of the "Commons Game" as a teaching pedagogy at the Tempus-Workshop in Patras, Greece, June 1998.
- ISO 14001 was applied in a layout of basic applications for ATESO, an industrial plant in the neighboring city of Jablonec, Czech Republic.
- A student and faculty group visited a local plant to study issues involved in ISO 14000 in a production line application.
- The faculty and students working together developed a solid waste management program for the whole University at the request of the chancellor's office.

Czech Technical University in Prague
This USAID program also inspired establishment of an industrial assessment center at Czech Technical University in Prague. The following paragraphs are adapted from a report on this activity by Prof. Karel Kabele, a participant in the Czech project and also a member of the UT team on the Polish project. The complete report is included as Appendix F.

In 1998 the Center for Diagnostic and Optimization of Energy Building Systems (CDOEBS) was
established at the Department of Building Services Engineering, Faculty of Civil Engineering. Main objectives and benefits of this center are:

a) For the students and their professors:
   - integrated approach to the energy flow in the building (company),
   - experience with group activity since the students work in teams;
   - improvement of communication skills;
   - contact with "real life."

b) For the investigated company:
   - energy efficiency improvement for small and medium size companies without professional energy management staff;
   - results of student work could or used directly for improving energy efficiency in the company or could be the basis for a further professional energy audit.

c) For the state:
   - improvement of energy efficiency of small and medium size companies;
   - establishing concrete cooperation between the university and industrial companies;
   - direct application of new methods and research results in practice;
   - contribution to the knowledge database of the energy savings potential in the country.

During Spring and Fall academic terms in 1998, as part of a credit course, three student energy audits were performed in small and medium size industrial companies: a plastic pipe production firm, a company specializing in plastic material processing and a machinery manufacturer. Ten selected students in their last year of master's level course in the Faculty of Civil Engineering were engaged in the assessment under supervision of two professors. Cooperation with investigated companies was excellent. One of the assessment's recommendations involved annual energy savings totaling 1.5 million Czech Koruna. Good news travels fast. Several other Czech companies have already asked to be included as clients of the CDOEBS student industrial assessment program in 1999.

This course has generated much interest among students to become a member of the student assessment team of the CDOEBS. Project influence is also reaching other faculty. Prof. Kabele, from the Department of Building Services Engineering has been joined in CDOEBS activity by faculty from the Department of Energetics and Department of Building Construction.

Professor Kabele's further observations on the overall USAID project conclude with these comments:

"The major benefits from this project, which I found, are:
- restarting cooperation between engineering professors in Czech Republic and Poland;
- focusing of technical teaching on to the wider view of energy, business, management and environmental issues;
- transfer of experience from US teaching methods to Poland and Czech Republic;
- forming new cooperating teams of faculty from different universities within Czech Republic and within Poland;
- aiding internationalization of university education level; and
- establishing good grounds for future cooperation."

1997-98 Project Impacts in Polish Universities
Participants from each of the four Polish universities collaborated to develop responses to the question posed by the UT team:

"What are we going to do as a result of this project?"

Responses to this question from the faculty participants at each Polish university follow:

Technical University of Krakow (PK)
- attempt to follow Chattanooga's example for Krakow's marketing strategy
- will seek regional cooperation bringing Ukrainian energy/environment assessment faculty and professionals to Krakow for collaboration and training
- initiate cooperation with faculty and other professional in this area from Slovakia.
- develop and publish booklets on aspects learned during this project.

Krakow University of Mining and Metallurgy (AGH)
- PK and AGH will work together to create a joint Krakow Energy Assessment Center
- arrange future placement of Polish graduate student in UT College of Engineering
- develop publications and articles based on the study-tour to be submitted to Polish journals including AURA, an environmental monthly, and WSPOLNOTA, a municipal government weekly.
- develop materials for possible seminar for "Energie Cities" (PNEC) about Smart Park ideas and Orange Grove initiatives.
- explore a possible tour of "Energie City" Mayors to Chattanooga
- develop additional case studies based on FEWE and PNEC experiences.
- pursue Polish publication of case studies
- replicate the Narrow Ridge idea somewhere in Poland.

Warsaw University of Technology
- further development of the Power and Environmental Protection Center at the university
- implementation of new teaching methods: case studies, energy audits.
- develop new course in environmental management incorporating ISO 14000
- spread information about energy conservation, environmental protection and waste management gained during this project among faculty and professional colleagues and other specialists through papers, articles and presentations.
- and a very long term goal to change the structure of Warsaw University of Technology.

Silesian Technical University
- improvement of case study developed as part of this project on Orzel Bialy (battery recycling company) using remarks made by the UT team.
- implementation of the case into teaching
- modernization of teaching programs to be more focused on energy efficiency
- select senior students as possible members of energy assessment teams from the university
- seek financial resources to aid implementation of above ideas from State Committee of Scientific Research and area companies.

Concluding Comment
There is nothing more to say. The list of goals speaks for itself. We can but applaud the ambitions of the Polish participants and the goals they have set for themselves stimulated, at least in part, by this USAID project. Some listed goals were also project goals, such as establishment of university based energy-environment assessment centers and use of experiential pedagogies in the classroom. However, goals the Polish faculty set for themselves extend well beyond explicit project targets to what could be termed, project hopes - faculty goals such as seeking reform in the overall university structure, and especially, the goal to extend regional cooperation with faculty and energy efficiency practitioners in Ukraine.

Implications for the future are limited only by the imaginations of these obviously energetic and highly creative Polish faculty and broaden to include their reach to faculty and practitioner colleagues as well as future generations of energy/environment students. As we can see in these goals and early project accomplishments, ramifications for energy efficiency/environmental reform extend from the departmental level to the faculty and university level, to the national level and, gratifyingly, also to the regional and international level.

Finally, the greatest change in perception and long term impact during this project was the influence of our Czech and Polish colleagues upon the Americans on the UT team.

*From all my teachers I learned,*
*and from my students more than anyone else.*

*The Talmud*
APPENDIX A
PROGRAM EVALUATION
Content Modules

Please indicate how effective you believe the following sessions were in terms of their relevance in terms of content and pedagogy.

<table>
<thead>
<tr>
<th>CONTENT SESSIONS</th>
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<tbody>
<tr>
<td><strong>Friday, Feb. 13th Module V</strong></td>
</tr>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>[Jendrucko]</td>
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<tr>
<td><strong>Sat, Feb. 14th Module I</strong></td>
</tr>
<tr>
<td>Overview of linkages/Learning objectives and pedagogy</td>
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<tr>
<td>[Jendrucko/Fryxell]</td>
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<tr>
<td><strong>Sat, Feb. 14th Module II</strong></td>
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<tr>
<td>Commons Simulation [Fryxell]</td>
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<tr>
<td><strong>Sat, Feb. 14th Module III</strong></td>
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<tr>
<td>Env. economics and regulation</td>
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<tr>
<td>[Dean]</td>
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<tr>
<td><strong>Sat, Feb. 14th Module IV</strong></td>
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<tr>
<td>Internet session</td>
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<tr>
<td>[Kabele]</td>
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<tr>
<td><strong>Sun, Feb. 15th Module I</strong></td>
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<tr>
<td>Electric power and mfg. plants</td>
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<tr>
<td>[Jendrucko]</td>
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<tr>
<td><strong>Sun, Feb. 15th Module II</strong></td>
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<tr>
<td>The &quot;Green Lights&quot; Case study</td>
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<tr>
<td>[Dean]</td>
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<tr>
<td><strong>Sun, Feb. 15th Module III</strong></td>
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<tr>
<td>The &quot;Powerhouse&quot; Simulation</td>
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<tr>
<td>[Dean &amp; Fryxell]</td>
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<tr>
<td><strong>Sun, Feb. 15th Module IV</strong></td>
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<tr>
<td>Residential energy use and software</td>
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<tr>
<td>[Kabele]</td>
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<tr>
<td><strong>Mon, Feb. 16th Module I</strong></td>
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<tr>
<td>The Assessment Center Model</td>
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<tr>
<td>[Jendrucko]</td>
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<tr>
<td><strong>Mon, Feb. 16th Module II</strong></td>
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<tr>
<td>The &quot;Carlsbad Highlands&quot; Case</td>
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<tr>
<td>[Fryxell]</td>
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<tr>
<td><strong>Mon, Feb. 16th Module III</strong></td>
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<tr>
<td>Group decision making exercise</td>
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<tr>
<td>[Fryxell]</td>
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<tr>
<td>Date</td>
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<tr>
<td>Mon, Feb. 16th</td>
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<td>Tues, Feb. 17th</td>
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<td>Tues, Feb. 17th</td>
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<tr>
<td>Wed, Feb. 18th</td>
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</tbody>
</table>
PROGRAM EVALUATION
General Questions

1) I am from:
   - Warsaw Tech 6
   - A.G.H. 3
   - Krakow Tech 5
   - Silesian Tech 4
   - Other 0

2) Overall, this program provided information that will be useful to the energy curriculum at my university
   - Strongly Agree
   - Agree
   - Neither
   - Disagree
   - Strongly Disagree

3) The content of this program was appropriate and clear
   - Strongly Agree
   - Agree
   - Neither
   - Disagree
   - Strongly Disagree

4) This program was well organized
   - Strongly Agree
   - Agree
   - Neither
   - Disagree
   - Strongly Disagree
APPENDIX C
**PROGRAM EVALUATION**

**General Questions**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The content of this phase (Phase 4) was appropriate and clear.</td>
<td>11</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2. This phase was well organized.</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Overall, this project provided information that will be useful to the</td>
<td>9</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>energy curriculum at my university.</td>
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<tr>
<td>Day</td>
<td>Event</td>
<td>Evaluation scores</td>
<td>Notes</td>
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<tr>
<td>Monday, July 6</td>
<td>UT Center for Clean Products</td>
<td>0 2 8 2 12 0 0</td>
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<tr>
<td>Tuesday, July 7</td>
<td>AM - Group presentation of assessment reports</td>
<td>0 3 5 3 10 0 0</td>
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<tr>
<td></td>
<td>PM - Briefing on the TVA</td>
<td>0 6 4 1 5 6 0</td>
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<tr>
<td>Wednesday, July 8</td>
<td>AM - briefing/tour Knoxville's Waste Water Treatment Plant and integrated water, electric &amp; gas services</td>
<td>0 5 5 1 11 1 0</td>
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<td>Overview of UT Energy Environment Resources Center and Solid Waste Management Briefing</td>
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<td>PM - at Oak Ridge National Labs - Buildings Technology Center, High Temp. Materials Lab, Biofuels Feedstock Program</td>
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<td>Overview of Y-12/NSPO</td>
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<td>9737 Display Room, Skills Campus, Hospital in a Box</td>
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<td>Opryland Hotel Steamplant &amp; Control Center tour/briefing</td>
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<td>Opryland Hotel Botanical Garden Environmental briefing</td>
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<td>Jack Daniels Distillery energy efficiency tour</td>
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<td>Monday, July 13</td>
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<td>Electric Transit Vehicle Institute/AVS</td>
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<td>Orange Grove recycling Center</td>
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<td>AWMS ISO-14000 Presentation</td>
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<td>Tuesday, July 14</td>
<td>TVA Raccoon Mountain Hydroelectric Plant</td>
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<td>Eco-Bloc presentation</td>
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<td>Case Study Development Session</td>
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<td>Narrow Ridge Center - energy &amp; environmental alternatives</td>
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<td>Thursday, July 16</td>
<td>Participant Review &amp; Feedback Session</td>
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APPENDIX D
A. What have we learned?

1. Environmental/Energy Issues
   The idea of Industrial Energy Assessment
   a) pedagogical aspect (university perspective)
   b) practical aspect (company perspective)
   The significance of the “reader’s” experience (field experience)

2. New Concepts
   ISO 14001--developed and extended information
   Extended Producer Responsibility
   Life Cycle concept and approach
   “Smart Park” idea of minimizing environmental impact of industrial production

   Educational Concepts
   Waste separations--Orange Grove Center
   AWSE, Aquarium--educational efforts
   Reception rooms at each facility
   Narrow Ridge

3. New Technologies
   Biotechnologies in waste treatment--EERC
   Trips to “advanced” XXI century: Opryland Hotel
   Racoon Mountain Hydro
   Library Facilities

   Electric Cable installation

B. What is relevant to Poland?

   1. Industrial Energy Assessment Centers (adopted to Polish conditions) based at technical universities as:
      business supports (recommendations)
      pedagogical support (cases studies support)
   2. Smart Park’s idea
   3. More outreach effort of business companies institutes (reception and presentation facilities)
   4. Chattanooga Orange Grove initiative
   5. Extended Producer’s Responsibility (adopted)
   6. Oak Ridge Centers for manufacturing technologies
   7. Biotechnologies in waste treatment
I. Technical Aspects
   1. Energy audit in Greenville
      Comprehensive questionnaire
      auditor as a leader and "prosecutor"
      tough job
      there is always place for improvement
      team should be interdisciplinary
      audited plants should be smaller

   2. Boiler room in Opry Hotel

   3. Oak Ridge Laboratories
      positive integration between state and industry
      controversial in case of TVA

II. Environmental Aspects
   1. Level of State: Oak Ridge, TVA

   2. Level of City: Chattanooga

   3. NGO Level: Narrow Ridge

III. Human Aspects
   1. Verifications of expectations
      hospitality of hosts and organizers
      level of involvement

   2. Patriotism of American Society

   3. Roots: Appalachian Museum, Narrow Ridge, Opry House

   4. Differences between Americans and Poles
      icy drinks
      cold rooms
WARSAW UNIVERSITY OF TECHNOLOGY

What have we learned?

UT: the structure of the university
organization of projects, logistics, etc
methods of collecting information from the plant managers

Oak Ridge: how to keep asleep the great potential of military laboratonium and conduct great
variety of projects (including energy conservation and environment protection) at
the same time.

Nashville: the visit allowed us to get practical information about energy management systems
for large facilities.

Chattanooga: Very good example how the local authorities together with business can
implement the idea of sustainability in middle scale town.

Narrow Ridge: Return to nature and traditional way of living is one of the option how to
implement the idea of sustainability in practice.

General: New methods of teaching
We got a lot of materials (brochures and photos for utilization during our lectures
.........to be optimistic

What of this is relevant to our situation?

UT: the idea of Energy, Environment and Resources Center
methods of collecting data during energy assessments
methods of presentations

Oak Ridge: methods of testing both HVAC components and systems and building elements
education center for academic staff

Nashville: cogeneration units and central system for cool water distribution

Chattanooga: utilization of meltdown from the landfields
recycling plants
I. What we have learned?
   new approach to the case study elaboration
   including senior students into assessment team
   pluridisciplinary work on the project
   large area of the research on Energy Efficiency Project
   visits in different American institutions and companies enlarged our knowledge on the
   American research and economy
   enlarged knowledge on the project management (example: Chattanooga Institute)
   comprehensive practical approach to the sustainable development
   conversion of the mainly military research into civil service (Oak Ridge)

II. What’s relevant to Poland?
   new approach to the case study elaboration
   implementation of senior students into Assessment Team
   comprehensive approach to energy efficiency projects
   necessity of sustainable development
APPENDIX E
Program for
The NINTH ANNUAL CONFERENCE

ALLIANCE OF UNIVERSITIES FOR DEMOCRACY

November 8 - 11, 1998
Nitra, Slovakia

HOST UNIVERSITY
Slovak Agricultural University

SUNDAY, NOVEMBER 8

11.00 Registration at the Agroinštitút Nitra*  
[footnote* The Conference Hotel is the Agroinštitút Nitra, Akademická ul. č. 4 / 949 01 Nitra, Slovak Republic. Central Office Tel: +421(87)534-851, Fax: +421(87)329-73. Reception Tel +421(87)533-361 Email: <agronst@uniag.sk>.

NOTE: Post-Conference transportation assistance to Vienna International Airport, Bratislava Airport or Train Station can be arranged during the Conference through the AUDEM Conference Desk. Please request the Post-Conference Travel Request Form. Departure times will be posted.

6.00 Depart from Agroinstitute for the short walk to the Opening Session at the Aula.

16.30 OPENING SESSION: Aula, Rectorate of the Slovak Agricultural University**  
[footnote** Rectorate address: Trieda A. Hlinku 2. The Aula of the Rectorate is in shape of a mushroom]  
- Presiding: Miroslav ZIMA, Rector, Slovak Agricultural University of Nitra, Member, Board of Directors, Alliance of Universities for Democracy  
- Vocal Concert by Close Harmony Friends, Mario FANCOVIC, Director  
- Official Welcomes:  
  - City of Nitra -- Vladimir LIBANT, Mayor  
  - Slovak Agricultural University of Nitra -- Miroslav ZIMA, Rector  
  - Ministry of Education, The Slovak Republic -- Lubomir HARACH, Minister  
  - Council of Europe -- Robert FICO, Representative of the Slovak Republic to the Council of Europe  
  - Embassy of the United States -- Ralph JOHNSON, U.S. Ambassador to The Slovak Republic  
  - Alliance of Universities for Democracy -- David HAKE, President  
- Introducing New Member Universities:  
  - Evans ROTH, Vice President-U.S., Alliance of Universities for Democracy and Chair, Alliance Membership Committee  
- Keynote Addresses:  
  - Democracy, Autonomy, Academic Freedom - What Do They Mean?  
    - Igor HUDOBA, President, Association of Slovak Rectors and Rector, Slovak Technical University, Bratislava  
  - Globalization of Education: Community Outreach and Collaboration with New Partners  
    - Ocean WALKER, Lieutenant Governor, State of Utah

18.30 RECEPTION AND BUFFET SUPPER: Rectorate of the Slovak Agricultural University  
Entertainment by Slovak Agricultural University Folklore Group  
"The Reception is sponsored by The Ministry of Education of The Slovak Republic plus twenty agricultural and food processing companies in Slovakia."

20.30 Delegates are on their own for return to Agroinstitute.
MONDAY, NOVEMBER 9 / AGROINSTITUTE

PROGRAM PLANNING GUIDE:

The OVERALL THEME for the Conference is GLOBALIZATION OF EDUCATION - The increasingly global economy is driving an increasingly global society. Ramifications for higher education are profound. The Conference offers 94 titled presentations in 27 sessions, three Panel sessions, two Workshops and six Internet Exploration and Exercise Labs. In addition, the Town Meeting and Annual Alliance Business Meeting are open to all participants.

Within the Globalization of Education overall theme, Conference content is further categorized in three broad tracks in an attempt to articulate the Alliance goal: to enhance the role of education in promoting democratic institutions, economic development and common moral and social values. Based on content of scheduled presentations, each session is assigned to one or more of three tracks as indicated behind each session title.

TRACK A - University and Society - sessions predominantly dealing with values and motivations in democracies, the role of higher education institutions in the regional, national and local communities and stimulating or linking with Non-Governmental Organizations.

TRACK B - Infrastructural Reform - sessions predominantly dealing with improving organizational effectiveness including national legal, regulatory or financial reform, higher education restructure; assessment and accreditation; and information access and technology and technology utilization.

TRACK C - Curriculum Reform - sessions dealing with problems and innovations in curricula for education in diverse and multidisciplinary fields including philosophy and applied ethics, engineering, business, education, medicine, journalism and environment.

ROOM LOCATIONS - meeting room for each session follows the Track designation:

- Congress Hall - second floor From entry foyer, enter Blok B, stairs to 2nd floor. Corridor to right Congress Hall on left
- Congress Club - second floor, straight ahead at top of stairwell Dining areas for breakfasts and luncheons
- Green Salon - second floor, opposite Congress Hall
- Room S3 - second floor, opposite Congress Hall, to right of Green Salon
- Room P - second floor, opposite Congress Hall but at far end of the wide corridor
- PC Room - second floor. Left at corridor past the Congress Hall. PC Room straight ahead, at end of that corridor
- Room A2 - on first floor, (same level as AUDEM Desk and Hotel Reception). Enter Blok D Room A2 is on left side of corridor

8.30-10.00  **SESSION 1 -- Human Values and Motivations in Democracies**  [Track A - Congress Hall]
- Presiding: Miroslav ZIMA, Rector, Slovak Agricultural University

The Death of Distance - Will The Information Technology Revolution Produce A Better World?
- Michael THOMAS, Professor of Marketing, Strathclyde University, Glasgow, United Kingdom

The British Open University and Supported Distance Learning - Worldwide
- Eion FARMER, Country Manager for Czech and Slovak Republics, British Open University, Milton Keynes, United Kingdom

10.00-10.20 BREAK

10.20-11.50  **SESSION 2 -- Strategies for International Cooperation: Capabilities and Challenges**  [Track B - Congress Hall]
- Presiding: Ken NASH, Director, Office of International Partnerships, Rochester Institute of Technology, Rochester, New York

The Pursuit of Peace Through Understanding and Determination
- Isabell Sunny WIRTH, Chair, Board of Directors, People to People International, White Plains, New York

MirNET and Globalization of Education
- Natasha BULASHOVA, President, Friends and Partners Foundation-Russia, Moscow and Manager, Office of Grants, Pushchino State University, Pushchino, Russia; and Greg COLE, Director, Center for International Networking Initiatives, University of Tennessee, Knoxville, Tennessee

The Internet and AUDEM: A Proposal and An Experience
- Jake KUYKENDALL, President, Zenwa, Inc., Sudbury, Massachusetts and Julia WATKINS, President, American University in Bulgaria, Blagoevgrad, Bulgaria

12.00  **LUNCHEON - CONGRESS CLUB**

3.00-14.15  **SESSION 3A -- Higher Education and Society in Transition - I**  [Track A - Room A2]
- Presiding: Marian VESELY, Vice Rector, Slovak Technical University, Bratislava, Slovakia
Reform of the State: Problems, Expectations and First Results  
Tadeusz GRABOWIECKI, Lecturer, Institute of Electronics, Silesian Technical University and Chairman, Gliwice City Council, Gliwice, Poland

The Influence of the Economic Crisis in Ukraine on Higher Education  
Myron BABYAK, Dean, Management and Marketing Faculty, Drobobych Ivan Franko State Pedagogical University, Drobobych, Ukraine

First Results of Humanization of Education in a Russian Technical University  
Gennady Degtiarev, President and Viatcheslav NAOUMOV, Professor & Dean, College of Aircraft Engines, Kazan State Technical University, Kazan, Tartarstan, Russia

Romanian Higher Education Into the Global Free-Market System  
Emil MICU, President, North University of Baia Mare, Baia Mare, Romania

Credit Transferability and Dynamics of Study Programs in the Framework of University Curriculum Reform  
Florea VOICULESCU, Vice Rector and Manuella KADAR, Head, Department of Foreign Relations, both at "1 December 1918" University of Alba Ulia, Alba Ulia, Romania

Quality Assessment and Accreditation  
Dusan MAGIC, Rector, University of Veterinary Medicine, Kosice, Slovakia

University International Cooperation as a Communication Bridge of Society  
Jozef BALLA, Vice Rector for International Relations and Professor, Slovak Agricultural University in Nitra, Nitra, Slovakia

The Multi Institution Teaching Center: Sharing Scarce Higher Education Resources  
Donald COERS, Associate Vice President for Academic Affairs, Sam Houston State University, Huntsville, Texas

Problems and Opportunities Teaching Business Ethics  
Lidmila NEMCOVA, Economics University of Prague, and Fred MILLER, Professor of Marketing, Director, Global Studies Program, Murray State University, Murray, Kentucky

The Experience of International Team-Teaching in Management Education  
Sergey Mokchev, Dean, Irina NAOUMOVA, Professor & Head, Department of Management and Barbara STUART, Fullbright Professor, Department of Management, Kazan State University, Kazan, Tartarstan, Russia

Hollywood Contracting: 'Risky Business'  
Dorothy DAVIS, Assistant Professor of Accounting, Jacqueline O'Neal, Associate Professor of Law, Carole Cheatham, Professor of Accounting, Leo Cheatham, Professor of Finance, Northeast Louisiana University, Monroe, Louisiana

Keys to Understanding Americans and American Ways of Doing Business  
Winifred ILIC, Coordinator, Language & World Business Program and Associate Director, Center for International Networking Initiatives, University of Tennessee, Knoxville

Labs are open to Conference participants at six times during the Conference for assisted or independent experimentation, discovery and consultation. One or more of these Conference participants, volunteering their time, will be there to assist you and/or discuss issues related to technological aspects presented in various sessions on the Globalization of Education theme

Natasha BULASHOVA, Pushchino State University, Pushchino, Russia
Conkling BUCKLEY, Emporia State University, Emporia, Kansas
Greg COLE, University of Tennessee, Knoxville
Angie CROFT, University of Tennessee
Margot EMERY, University of Tennessee
Manuella KADAR, University of Alba Ulia, Alba Ulia, Romania
Jake KUYKENDALL, Zenwa Inc., Sudbury, Massachusetts
Krassimir SIMONSKY, American University in Bulgaria, Blagoevgrad, Bulgaria

14.15 BREAK

4.30-6.00 SESSION 4A -- Christmas Box Houses International and Foundation: University-Community Partnership  
[ Track A - Room A2 ]
Presiding: Kay DEA, Dean, Graduate School of Social Work, University of Utah, Salt Lake City, Utah
Panelists:
David EVANS, President, Christmas Box Foundation, Salt Lake City, Utah
James ANDERSON, Director, Christmas Box Houses International, Salt Lake City, Utah
Janet HANSON, Assistant Professor of Social Work, University of Utah
Diana MONTOYA, Graduate Student, Graduate School of Social Work, University of Utah
Cory VIRGIN, Graduate Student, Graduate School of Social Work, University of Utah

4.30-16.00 SESSION 4B -- SESSION - Aspects of INTERNET and Connectivity - I  [ Track B - Room P ]
Presiding: Alexandru NICHICI, Professor, Scientific Secretary, Technical University of Timisoara, Timisoara, Romania
Technical and Cost Issues of the Internet-AUDEM Proposal to CEE Universities
Jake KUYKENDALL, President, Zenwa, Inc., Sudbury, Massachusetts
Collaborative Research Opportunities with Leading International Universities Made Possible Through the National Science Foundation-vBNS Network
Elbert TURNER, Senior Systems Developer, Western Development Laboratories, Lockheed Martin Corp., San Jose, California
The Satellite Based Telecommunications Infrastructure That Exists in CEE to Support University Programs
Gabor DAVID, President, Banmet, Kft., Budapest, Hungary
Specifics on the Internet Connection at The American University in Bulgaria
Krassimir SIMONSKY, Director of Communications and Computing, American University in Bulgaria, Blagoevgrad, Bulgaria

4.30-16.00 SESSION 4C -- WORKSHOP: Active Learning in the Classroom.  [ Track C - Green Salon ]
This interactive and experiential workshop will provide techniques and methods for constructing an active learning environment in the classroom.
Coordinator: Barbara STUART, Fulbright Professor, Department of Management, Kazan State University, Kazan, Tartarstan, Russia

16 00  BREAK

16.15-17.30 SESSION 5A -- Strengthening the Civil Society  [ Track A - Room A2 ]
Presiding: Tadeusz GRABOWIECKI, Lecturer, Institute of Electronics, Silesian Technical University and Chairman, Gliwice City Council, Gliwice, Poland
Economic Development and Common Social Values in Transition
Olga NOSOVA, Associate Professor of Economics, Kharkov State Polytechnic University, Kharkov, Ukraine
Transition Economics
Gregory PETRAKIS, Fulbright Professor of Economics, Babes-Bolyai University, Cluj, Romania
Relationship of Technology to Civil Society
Timothy ENGSTROM, Professor of Philosophy, Rochester Institute of Technology, Rochester, New York
Joint Activities of Cities, Utilities, and Businesses: The Polish Network of Energie Cities
Adam GULA, Professor, University of Mining and Metallurgy, Krakow, Poland and Larry MARKEL, Vice President, Electrotek Concepts, Inc., Knoxville, Tennessee
Education In Ukraine As Guarantee Of Its Independence
Anatoliy RUBCHYK, Head, Department of Economics, Drohobych Ivan Franko State Pedagogical University, Drohobych, Ukraine

6.15-17.30 SESSION 5B -- Aspects of INTERNET and Connectivity -II  [ Track B - Green Salon ]
Presiding: Peter CENEK, Professor, Faculty of Management Science and Informatics, The University of Zilina, Zilina, Slovakia
Russian Civic Networking: An Update
Natasha, BULASHOVA, President, Friends and Partners Foundation-Russia, Moscow
The Next Generation Internet: Technical Information on MirNET
Joe GIPSON, Manager, Network Services, University of Tennessee, Knoxville
Networking and Common Values: More Than Connectivity
Greg COLE, Director, Center for International Networking Initiatives, University of Tennessee, Knoxville

8.15 SUPPER  CONGRESS CLUB

20.00-21.15 SESSION 6 -- Town Meeting  [ Congress Hall ]
An open discussion: questions and comments are invited from all participants, visitors and guests.

**Moderator:** Michael THOMAS, Emeritus Professor of Marketing, Strathclyde University, Glasgow

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**TUESDAY, NOVEMBER 10 / AGROINSTITUTE**

**00-7.50**  
**EARLY BIRD -- Internet Exploration and Exercise Lab - II**  
[PC Room]

**8.00-9.15**  
**SESSION 7A -- SESSION -- Non-Governmental Organizations and Universities: International Cooperation**  
[Track A - Room S3]

- Presidng: Beth CIESIELSKI, Executive Director and Founder, Bridges for Education, Buffalo, New York
- **English Summer School at the Poznan University of Technology - Present and Future**  
  Jerzy RAKOWSKI, Prorector for Research and International Relations, Poznan University of Technology, Poznan, Poland
- **Building Cultures for Peace and Justice: University-NGO Cooperation Internationally**  
  Ray RUSSELL, International Relations Consultant, Deubach, Germany

**Presidng:** Beth CIESIELSKI, Executive Director and Founder, Bridges for Education, Buffalo, New York

**Observations On the BFE Program in Timisoara**  
Alexandru NICHICI, Professor, Scientific Secretary, Polytechnic University of Timisoara, Timisoara, Romania

**8.00-9.15**  
**SESSION 7B -- Aspects of Reform in Technological Higher Education**  
[Track B - Green Salon]

- Presidng: Lazlo HUNYADI, Vice Rector, Lajos Kossuth University, Debrecen, Hungary
- **Strategic Planning as a Component of Higher Education Reform in Romania**  
  Ioan JURCA, Professor and Alexandru NICHICI, Professor, Polytechnical University of Timisoara, Timisoara, Romania
- **A New Flexible Three-Stage System of Studies at Warsaw University of Technology**  
  Andrzej KRASNIEWSKI, Professor, Warsaw University of Technology, Warsaw, Poland
- **Project Tech Com Hungary: Commercialization of Information and Environmental Technology**  
  Ken NASH, Director, Office of International Partnershps, Rochester Institute of Technology, Rochester, New York
- **Ecocampus Project - Students' Involvement in Energy Management of the University**  
  Adam GULA, Professor, University of Mining and Metallurgy, Krakow, Poland

**9.00-9.15**  
**SESSION 7C -- Aspects of Internet and Connectivity - III**  
[Track B - Room P]

- Presidng: Jozef BALLA, Vice Rector, Slovak Agricultural University, Nitra
- **Information Technology: Supporting Global Collaboration Efforts in a Virtual Work World**  
  Susan YAGER, Assistant Professor of Computer Information Systems, Northeast Louisiana University, Monroe, Louisiana
- **New Developments in Internet Access and Utilization**  
  Vasile IANCU, Vice-Rector, Ioan-Adrian VIOREL, Professor, Technical University of Cluj, Cluj, Romania
- **Linking Science and Education through Distance Learning**  
  Jan BRINDZA, Vice Rector for Science and Research and Ivan MICHALIK, Dean. Faculty of Agronomy, Slovak Agricultural University in Nitra, Nitra, Slovakia
- **University Information and Communication System - How To Do It**  
  Anton LAVRIN, Vice Rector and Ladislav SAMUELIS, Professor, Technical University in Kosice, Kosice, Slovakia

15 **BREAK**

**30-11.00**  
**SESSION 8A -- Roundtable - The Communist Manifesto: One Hundred & Fifty Years On**  
[Track A - Room S3]

- Moderator: Henry STECK, Professor of Political Science, International Studies Program, State University of New York College at Cortland, Cortland, New York
- Panel:
  - Igor HANZEL, Professor, Comenius University, Bratislava, Slovakia
  - John RYDER, Dean, College of Arts and Sciences, State University of New York College at Cortland, Cortland, New York
  - Yang ZHONG, Associate Professor of Political Science, University of Tennessee, Knoxville, Tennessee

**9.30-11.00**  
**SESSION 8B -- Higher Education and Society in Transition - II**  
[Track B - Room P]

- Presidng: Sandor FRIDLI, Professor, Eotvos Lorand University, Budapest, Hungary
- **Reorganization of College Infrastructure or Third Millennium Education**  
  Imrich OKENKA, Dean, Faculty of Economics and Peter FANDEL, Vice Dean, Faculty of Economics, Slovak Agricultural University in Nitra
The Polish Educational System in a Time of Transformation
Jacek GRODZICKI, Head, Polish-American Center for Dispute Resolution, University of Gdansk, Gdansk, Poland

Kharkov State Polytechnic University and a Transforming Society
Yuri KOSTENKO, Professor, Kharkov State Polytechnic University, Kharkov, Ukraine

Thoughts on Change in a University Setting
David PAYNE, Vice President of Academic Affairs, Sam Houston State University, Huntsville, Texas

SESSION 8C -- Innovations in Business and Management Education
Jerry WALL, Professor of Management and Director, Center for Business and Economic Research, Northeast Louisiana University, Monroe, Louisiana.

Promoting Entrepreneurship Through A Family Business Assistance Program
Tammy RAPP, Assistant Professor of Economics, Northeast Louisiana University, Monroe, Louisiana.

Prospects for Development of Distance Learning Programs: The Case of The Academy of Economic Studies
Iacob CATOIU, Professor of Marketing and Dean, Faculty of Commerce, Calin VEGHES, Assistant Professor of Marketing, Academy of Economic Studies, Bucharest, Romania

Marketplace - A Global Competition: International Adoption Update and Description of Artificial Intelligence Version for Use in Distance Education
Peter MATIS, Assistant Professor, Faculty of Management, University of Zilina, Zilina, Slovakia

Breaking Down the Walls of Compartmentalism: Incorporating Finance in An Integrative Learning Environment
Michael PARKER, Associate Professor of Finance, L. Jauch, Professor of Management, C. McConkey, Professor of Marketing, John Rettenmayer, Professor of Computer Informations Systems; Donna Luse, Professor of Business Communications and Patricia Roshto, Instructor of Accounting, all of Northeast Louisiana University, Monroe, Louisiana

SESSION 8D -- Internet Exploration and Exercise Lab - III
1.15 Busses depart from Agroinstitute for excursion around historic Nitra.

3.00 Luncheon - CONGRESS CLUB

SESSION 9A -- Linking the University and the Community
Presiding: Mary MATESICH, President, Ohio Dominican College, Columbus, Ohio

University Partnerships and Community Impact: The Human-Animal Bond Program
Georgia GRANGER, Director, Human Animal Bond in Colorado, Colorado State University and Ben P GRANGER, Professor and Head, Department of Social Work, Colorado State University, Fort Collins, Colorado

Infrastructural Reform in Connection with Life-Long Education
Marian DZIMKO, Vice Rector; Jan COREJ, Professor; Petr CENEK, Professor; and Milan DADO, Rector, University of Zilina, Zilina, Slovakia

New Skills and Attitudes: Perspectives for Continuing Education in Post-Communist Countries
Larissa CHUPRINA, Graduate Assistant, Office of Vice President, Institute of Statewide Continuing Education, The University of Tennessee, Knoxville

Project Access: A Strategy to Bring Deaf Hungarian Students into the World of Information Technology
Ken NASH, Director, Office of International Partnerships, Rochester Institute of Technology, Rochester, New York

SESSION 9B -- Roundtable - New Directions in Higher Education: The U.S. and JSU/CEE
Moderator: John RYDER, Dean, College of Arts and Sciences, State University of New York College at Cortland, Cortland, New York

Changes in the Czech Higher Education Law During the Last Ten Years and their Consequences
Miroslava VRBOVA, Professor of Applied Physics, Czech Technical University, Prague, Czech Republic

Teaching and Learning: Western Pedagogy and Russian Realities
Barbara Stuart, Fulbright Professor, Department of Management, Kazan State University, Kazan, Tartarstan, Russia

Losing the Franchise?: Troubling Trends in Higher Education in the US
Henry STECK, SUNY Cortland

Economics - A Groundwork for Democracy?
Charles STOWE, Associate Professor, Sam Houston State University, Huntsville, Texas

The New Technology and the Old University: The Challenge of IT
Timothy ENGSTROM, Professor of Philosophy, Rensselaer Polytechnic Institute, New York
4.00-15 30 **SESSION 9C -- Energy Efficiency and Environmental Management I - Overview and Observations**  
 [Track C - Room S3]  
 Presiding: Adam GULA, Professor, University of Mining and Metallurgy, Krakow and Director of the Polish Foundation for Energy Efficiency, Krakow  

**Project Overview and Observations from Technical Perspective**  
Richard JENDRUCKO, Professor, Department of Mechanical Engineering and Director, Industrial Assessment Center, College of Engineering, University of Tennessee, Knoxville  

**Observations from An Environmental Management Perspective**  
Thomas DEAN, Associate Professor of Management, University of Tennessee, Knoxville  

**Curriculum and Experience With Energy Assessment Center at Czech Technical University**  
Karel KABELE, Assistant Professor, Department of Building Services Engineering, Czech Technical University in Prague, Czech Republic  

**Efforts to Reduce Greenhouse Gases Emissions in the Czech Republic**  
Jiri KRATOCHVIL, Professor and Head, Department of Power Engineering, Technical University of Liberec, Liberec, Czech Republic  

15.30 BREAK  

5.45-17 15 **SESSION 10A -- The University in Society**  
[Track A - Green Salon]  
Presiding: Sunny WIRTH, Chair, Board of Directors, People to People International, White Plains, New York  

**Partnerships in Information System Development: Collaboration Between Alba Ulia University and NGOs**  
Manuella KADAR, Head, Department of Foreign Relations and Communications Center, 1 December 1918 University of Alba Ulia, Alba Ulia, Romania  

**Online Community Networks as a Tool for Economic Expansion and Regional Communication: A Bright Future or An Overlooked One?**  
Margot EMERY, Publications Editor, Agricultural Experiment Station, Institute of Agriculture, University of Tennessee, Knoxville  

**Restructuring of Local Government Management System Toward Sustainability: Joint Project of University of Silesia and University of Minnesota**  
Pawel MIGULA, Professor, Director, Center for Studies of Human and Natural Environment, University of Silesia, Katowice, Poland  

**ALUMNITRA - The Slovak Agricultural University Alumni Electronic Newspaper**  
Tibor TOTH, Alumnus of Slovak Agricultural University, Newark, Delaware and Nitra, Slovakia  

15.45-17.15 **SESSION 10B -- Issues in Building a Global Information Infrastructure**  
[Track B - Room P]  
Presiding: Herbert ACHLEITNER, Associate Professor, School of Library and Information Management, Emporia State University, Emporia, Kansas  

**Deconstructing Values: Ethics for the Information Age**  
Jitka HURYCH, Professor and Head, Science, Engineering and Business Department, Founders Memorial Library, Northern Illinois University, DeKalb, Illinois  

**The Development of An Information Economy in Central European Libraries**  
Maria JANKOWSKA, Associate Professor and Network Resources Librarian, University of Idaho, Moscow, Idaho  

**Into the Dustbin of History? The Evaluation and Preservation of Slavic Collections**  
Bradley SCHAFFNER, Head, Library Slavic Department, University of Kansas, Lawrence, Kansas  

**Multimedia Technology and Distance Learning: Global Conversations for Librarians**  
James VanROEKEL, Assistant Professor, Electronic Resources Librarian, Western Illinois University, Macomb, Illinois  

15.45-17.15 **SESSION 10C -- Energy Efficiency and Environmental Management II - Curriculum Development in Polish and Slovak Universities**  
[Track C - Room S3]  
Presiding: Richard JENDRUCKO, Professor, Department of Mechanical Engineering, University of Tennessee, Knoxville, Tennessee  

**Energy/Environment Issues at the University of Mining and Metallurgy, Krakow**  
Adam GULA, Professor, and Jerzy JANCZYSZYN, Professor, University of Mining and Metallurgy, Krakow  

**Energy/Environment Issues at Technical University of Krakow**  
Tomas KISLEWICZ and Jacek SCHNOTALE, Professors, Technical University of Krakow, Krakow, Poland  

**From Learning to Application: Curricula Related to Energy Efficiency and Environment at Warsaw University of Technology**  
Jerzy SOWA, and Krzysztof WOJODYGA, Professors, Environmental Engineering, Warsaw University of Technology,
Warsaw, Poland

Energy/Environment Issues at Silesian Technical University
Josef HABER, Professor, and Edward SIWY, Assistant Professor, Silesian Technical University, Katowice, Poland

Energy Efficiency and Environmental Management Education at the Faculty of Metallurgy of TU Kosice
Magdelena REPASOVA, Associate Professor, Faculty of Metallurgy, Technical University of Kosice, Kosice, Slovakia

15:45-17:15 SESSION 10D -- Internet Exploration and Exercise Lab - IV [PC Room]

8:00 Busses depart Agroinstitute and travel to Bratislava

9:00 Reception and Banquet at the Primate's Palace
Host: Honorable Peter KRESANEK, Lord-Mayor of Bratislava

Busses return to Agroinstitute

WEDNESDAY, NOVEMBER 11 / AGROINSTITUTE

7:00-7:50 EARLY BIRD -- Internet Exploration and Exercise Lab - V

8:00-8:45 SESSION 11 -- Annual AUDEM Business Meeting [Room A2]
Open to all participants and visitors
Presiding: David HAKE, President, AUDEM
Agenda
- Membership Report
- Conference Reports - 1998 Annual Conference, Future Annual Conference Sites
- Nominating Committee Report - election of new members of Board of Directors
- Other Business
- Adjourn

9:00-10:30 SESSION 12A -- Curriculum and Infrastructure Development - I [Track B - Green Salon]
Presiding: Jin KRATOCHVIL, Professor and Head, Department of Power Engineering, Technical University of Liberec, Liberec, Czech Republic

Elements of Pharmacy Privatization in Hungary
Krisztina MAJOROS, Assistant Professor, Department of Economic Theory, University of Miskolc, Miskolc, Hungary

A University Advisory Council Model and Its Transferability from the U.S. to CEE: Formation, Implementation and Evaluation
Myrna CORNETT-DeVITO, Associate Professor of Communication and Raffaele DeVITO, Professor of Management both at Emporia State University, Emporia, Kansas

Recognizing and Reducing Work Stress in the Global Environment
Jerry WALL, Professor of Management and Director, Center for Business and Economic Research, Northeast Louisiana University, Monroe, Louisiana.

9:00-10:30 SESSION 12B -- Roundtable - Resources for Faculty: Using the Internet for Teaching, Research and Service [Track B - Room P]
Moderators: Margot EMERY, Publications Editor, University of Tennessee Agricultural Experiment Station, and Evans ROTH, Vice President, Alliance of Universities for Democracy, Knoxville, Tennessee

Faculty Use of the Internet at Alba Ulia University
Manuella KADAR, Head, Department of Foreign Relations and Communications Center, 1 December 1918 University of Alba Ulia, Alba Ulia, Romania

Internet Resources for Research
Greg COLE, Director, Center for International Networking Initiatives, University of Tennessee, Knoxville

The Internet in Teaching at American University in Bulgaria
Krassimir SIMONSKY, Director of Communications and Computing, American University in Bulgaria, Blagoevgrad, Bulgaria
Teaching and Service with the Internet at Comenius University
Igor HANZEL, Professor, Comenius University, Bratislava, Slovakia

Report from Warsaw: Webcasting an Academic Conference
Herbert ACHLEITNER, Associate Professor, School of Library and Information Management and Conkling BUCKLEY, Director of Technology Support, School of Library and Information Management, Emporia State University

9.00-10.30 SESSION 12C -- WORKSHOP: Innovations in International Business Program Administration. [Track C - Room S3]
The structure of the Language & World Business program at UT is the subject of this workshop which will include strategies for supervising student services projects.
Coordinators: Winfried ILIC, Associate Director, Center for International Networking Initiatives, and Roxanna SENYSHYN, Graduate Assistant, CINI and LWB Program, University of Tennessee, Knoxville

9.00-10.30 SESSION 12D -- Internet Exploration and Exercise Lab - VI [PC Room]

10.30 BREAK

0.45-12.15 SESSION 13A -- Interuniversity and International Curriculum Cooperations - II [Track B - Green Salon]
Presiding: Irina NAOUMOV, Professor & Head, Department of Management, Kazan State University, Kazan, Tartarstan, Russia

The Structure of Agricultural Education in the United States
Robert LANE, Professor & Chair, Department of Agricultural Sciences, Sam Houston State University, Huntsville, Texas

Contribution of International Contacts to Education
Dusan HUSKA, Dean, Faculty of Gardening and Landscape Engineering, Slovak Agricultural University in Nitra

National Program for the Integration and Preservation of Library Collections in Bulgaria
Alexander DIMCHEV, Research Associate, University Library, St. Kliment Ohridsky University of Sofia, Sofia, Bulgaria

Electronization in Higher Education and University Management: The Experience From KLTE
Laszlo HUNYADI, Vice Dean, Faculty of Arts, Lajos Kossuth University, Debrecen, Hungary

10.45-12.15 SESSION 13B -- Curriculum and Infrastructure Development - II [Track B - Room P]
Presiding: Larry MARTEL, Vice President, Electrotek Concepts, Inc., Knoxville, Tennessee

New Possibilities, Challenges and Problems at New Site For the ELTE Faculty of Sciences: Cooperation with the INFO Park
Andras BENCZUR, Dean, Faculty of Sciences, Eotvos Lorand University, Budapest, Hungary

Internationalizing the University Experience - Some Proposals for Colleges and Universities With Limited Travel Funds
Charles STOWE, Associate Professor, Sam Houston State University, Huntsville, Texas

Improving the Teaching Quality in the Technical University of Cluj
Gheorge Lazea, Rector, Vasil IANCU, Vice Rector and Ioan-Adrian VIOREL, Professor, Technical University in Cluj, Cluj, Romania

0.45-12.15 SESSION 13C -- Issues in Journalism [Room S3]
Presiding: Jan George FRAJKOR, Professor, School of Journalism, Carleton University, Carleton, Canada and Professor of Communication, Comenius University, Bratislava, Slovakia

Slovak Media and Progress Toward Western Ideal
Jan George FRAJKOR, Carleton University and Comenius University

Community Press
Margot EMERY, Publications Editor, Institute of Agriculture, University of Tennessee

Transitions Magazine and its Role in Transforming Media
Jan URBAN, Open Media Research Institute, Prague

Media Training by Foreigners in CEE: Is It Effective?
Edward BAUMEISTER, Centers for Independent Journalism, Bratislava and Budapest

The Role of SME Newspaper in Recent Slovak Elections, In Democracy and Freedom of Press
Karol JÉZIK, Editor in Chief, SME Newspaper, Bratislava

2.30 CONCLUDING LUNCHEON: CONGRESS CLUB

Transportation assistance to Vienna International Airport, Bratislava Airport or Train Station can be arranged during the Conference
at the Conference Desk

[Margot, how about making a plug for the file server here?? Something like...

Did you make a useful connection or get an idea for an initiative at this year's Conference? Help others learn from your experience - email a brief description of the idea or an outcome at any time during the year to <audem.utk.edu>. We'll see that the message gets to others!

Thanks for coming to Nitra this year and have a safe trip home!

(Margot- please highlight stuff at right somehow)

Mark your calendar for
The Tenth Annual AUDEM Conference

November 7-10, 1999
Budapest, Hungary

HOST UNIVERSITY:
Budapest University of Economic Sciences

end.
APPENDIX F
CURRICULUM AND EXPERIENCE WITH ENERGY ASSESSMENT CENTER AT CZECH TECHNICAL UNIVERSITY

Ing.Karel Kabele, CSc.,
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Abstract

Energy audit is not only the tool for investigating of energy savings in the buildings, but also an excellent teaching tool for the technical university. This paper describes experiences with project, targeting at the same time aims of university education, small and medium size industrial companies and the state policy. This project is based on the application of the principle, which is used at the technical universities in the USA.

1. Introduction

In 1996 three Czech universities (Czech Technical University in Prague, Technical University Liberec and Mining University Ostrava) and University of Tennessee (UT) took part in the USAID program Energy Efficiency Training. During one-week workshop in Prague professors from UT Industrial Assessment Center explained basic principles of IAC program and consequently the Czech professors had occasion to visit UT and see the work of UT students and professors during their company visit.

One of the results of this USAID program is establishing of Center for Diagnostic and Optimization of Energy Building Systems (CDOESB) at Czech Technical University.

2. Center for Diagnostic and Optimization of Energy Building Systems

In 1998 was established at the Department of Building Services Engineering, Faculty of Civil Engineering Center for Diagnostic and Optimization of Energy Building Systems. The establishment of the CDOESB was supported by internal grant of Czech Technical University. The CDOESB is based on the experiences of IAC, which are implemented on local conditions. Respecting different economical conditions, the CDOESB is focused on the education in subject Energy audit at the Faculty of Civil Engineering.

2.1 Objectives

Main objectives and benefits of this center are:

a) For the students and their professors:
complex approach to the energy flow in the building (company);
experience with team work in students group
improvement of communication skills;
contact with "real life".

b) For the investigated company:
- support of small and medium size companies without professional energy management staff in the energy efficiency improvement;
- results of student work could or used directly for improving energy efficiency in the company or could be base for following professional energy audit;

c) For the state:
- improvement of energy efficiency of the small and medium size companies;
- cooperation of the university with the companies - direct application of new methods and research results into practice;
- contribution to the knowledge database of the energy savings potential in the country.

2.2 Curriculum

Respecting the time and economical possibilities, the student assessment is processed during one semester (14x2 hours) in following steps.

- Selection of the students, setting of 3-4 members student teams

- searching the company, contact with the management. A detailed questionnaire is sent to the company which covers energy systems of the buildings, building envelope and technology to be completed by responsible company official.

- questionnaire is based on universal one, but modified by student team to the specific conditions of the company

- Processing of data obtained from the questionnaire, selecting of problematic nodes in the company, setting of computer model for simulation of critical nodes, first idea about recommendations for energy savings.

- Set-up of company visit scenario - dividing tasks among the student team members, list of additional questions, list of measurement to be done

- One-day visit of student team with professor in the company - complete data in the questionnaire, investigation of the critical nodes, verification of technical possibility of designed improvements, photo documentation.

- Fixing of the computer model with real data, verification of the model, simulation of critical energy node improvements. Obtain simulation results.
3. Conclusion and perspectives after first year experience

In 1998 three student energy audits were performed in small and medium size industrial companies (plastic pipes production, plastic material processing and machinery production). In this were involved ten selected students of last year master course in the Faculty of Civil Engineering under supervisory of two professors.

The recommended annual savings in the plastic pipes company reached 1,5 mil CZK. According to the inquiry among students, there is interest to become a member of the student assessment team. Response and cooperation with investigated companies was excellent, like the cooperation with other departments at CTU (Department of Energetic, Department of Building Construction). Other companies have asked to be included in this program next year.