

The Nerken School of Engineering, Cooper Union

Report I

GLOBETECH - 7

(Also final report for Globetech-6 activities)

Spring/Summer 2001 activities

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1. Project Overview:

The Global Technology Management Simulation (GLOBETECH) is an original Curriculum Innovation and Development (CID) project developed for the past six years at Cooper Union (CU) under the auspices of the Gateway Engineering Education Coalition. Its main purpose is to **familiarize the undergraduate engineering students with the practical aspects of the global technology management principles**, by using an **Internet based International Joint-Venture Project Negotiation Simulation** as the main learning tool.

The general subject of the sixth simulation, GLOBETECH-6 (Fall 2000), was: "Alternative Energy Source Joint-venture Projects in China, France, and India", and dealt with fuel cell equipped buses in China and wind power generation in France and India. GLOBETECH-6 was a very successful simulation and experienced large and varied student participation, from domestic and foreign schools. Eighty-three (83) students, in thirteen (13) teams, from three schools in two countries, USA and France, participated in the GLOBETECH-6 simulation. (For further details please see the GLOBETECH-6 phase II report, dated March 26, 2001).

The preparation of **GLOBETECH-7**, which took place in the fall '01 semester is the main subject of this report. The simulation was prepared during the spring and summer of 2001. Its subject was: "**New Energy Joint Venture Projects in Poland, Taiwan, and the USA**". For a detailed view of the Scenario and Schedule of the simulation, please log on the simulation web site at: www.cooper.edu/GTK-7 and look under Resources/ Scenario and Schedule.

The Globetech project was inspired by the very positive "hands-on" experience gained by the EID-372 (Global Perspectives in Technology Management Course) students and this professor in the fall 1994 semester, while participating in the "ICONS" (International Communication and Negotiation Simulations) project. Globetech was conceived as a **major component of an interdisciplinary undergraduate engineering course in Global Technology Management such as EID-372**. Participation in a Global Technology Management course is not absolutely necessary in order to participate in Globetech. The simulation deals with issues such as: trends in and ways to economic growth in various parts of the world, sustainable development, global competitiveness strategies, international negotiations, technology transfer, operations optimization, global environmental issues, etc., and it can benefit students from many engineering, economics, and management courses. As a matter of fact, for the past two years we had the participation of many MBA student teams from the prestigious business school ESC Toulouse, France.

The main purpose of GLOBETECH is to familiarize the engineering students with the real and very complex political, economic, social, and technical issues influencing global technology management decisions, thus better preparing them for a future of increased globalization.

2. Gateway Year 9 ('00-'01)- GLOBETECH-6 Project Phases:

The Gateway year 9 work for this project had three main phases as follows:

2.A. Phase I - GLOBETECH-6 infrastructure development (Spring/Summer '00):

GLOBETECH-6 simulation infrastructure such as: background information, computer interface protocol, computer communication software, feedback questionnaires, etc., were developed during the spring/summer of 2000. For details see please the status report, dated September 2000.

2.B. Phase II - GLOBETECH-6 Simulation (Fall 2000):

The sixth GLOBETECH simulation started in October and finished in December 2000. Besides the computer-based communications (e-mail and Internet Chat) between the participating student teams, the simulation also included two "on-line" conferences. The Phase II Report (dated March 2001) discusses in detail the phase II GLOBETECH-6 work and results.

2.C. Phase I GLOBETECH-7 and Phase III GLOBETECH-6 work (Spring/Summer 2001):

This report discusses the spring and Summer 2001 work, the preparation of the GLOBETECH-7 simulation, and additional GLOBETECH-6 related activities.

3. GLOBETECH' s Major Benefits:

GLOBETECH is an innovative, "hands-on" learning tool. Its main benefits are:

3.1 Develops students' multi-cultural awareness:

In the simulation students might portray United States or foreign decision makers, such as private company managers or government representatives. They have to negotiate, solve technology and management issues, and get agreements in the political, economic, and cultural context of various countries, quite different from the United States.

3.2 Emphasizes the cross-disciplinary nature of global technology management:

Through the technical, economic, political, and social background research to write and negotiate RFP's and Proposals, students have to resolve issues related to many technical, economic, and social sciences fields.

3.3 Disseminates new learning methods and tools based on the use of modern information technology:

By using the Internet extensively the simulation helps students and faculty get familiar with state of the art communications technologies and programs.

3.4 Develops familiarity with research and collaborative work via the Internet:

By the very essence of the project, and the way its activities are constructed.

3.5 Develops students' essential working skills such as: verbal and written communication, leadership, teamwork, and negotiating skills through the interactive negotiation simulation process, and all the work required for this project.

3.6 GLOBETECH-7 familiarized the students with critical issues related to environmental protection and sustainable development:

Such as practical applications of new energy sources: wind mill farms for electricity generation, and use of fuel cells motors in scooters.

3.7 Opens the door toward greater domestic and international collaboration in engineering education:

Through direct faculty and student contact via the Internet, with various domestic and foreign universities that participate in this project. Besides several teams of Cooper Union students, GLOBETECH-7 had participation from NCAT, North Carolina, ESC Toulouse, France, and the Milan Polytechnic, Italy.

4. GLOBETECH-7 Phase I Status Report (Spring/summer 2001):

In the spring/summer of 2001 our team: students Alexander Lin, Keith Yeager, Allen Irwin, and myself concentrated our efforts on the developmental work for the GLOBETECH-7 simulation to be held in the fall of 2001. Our activities focused on the following three main areas:

4.a) Development of student team participation:

I actively pursued all possible contacts with other domestic and foreign engineering schools in order to enroll as many student teams as possible in the GLOBETECH-7 simulation. Since the simulation will had a theme related to new energy sources, we contacted Engineering Management, Environmental Engineering, Mechanical, and Electrical Engineering Departments, as well as the Deans and International Relations officers at many US and foreign colleges. We wrote more than 200 e-mails, expecting a good participation in Globetech-7.

4.b) Creation of the GLOBETECH-7 simulation database:

The subjects to be discussed in the simulation, fuel cell equipped scooters in Taiwan, and wind power farms in the USA and Poland were quite complex, encompassing several different geographical areas, new technologies, the economics of new energy sources, etc. As such, a substantial amount of research and work was required to develop a comprehensive background information database for this project. Although demanding and time consuming, this effort was in the same time very interesting and rewarding. Allen Irwin and Alexander Lin had a great contribution in this area researching for and creating the database.

4.c) Improve and expand the project computer software capability to further facilitate the GLOBETECH-7 research and communications:

We reviewed and upgraded all the Globetech-6 Internet related software in order to provide a better, easier to handle communication platform for the Globetech-7 simulation.

A detailed discussion of the above three activities follows:

4.a) Development of student team participation:

The Globetech-6 simulation was quite successful, having 83 participating students in 13 teams, from three domestic and foreign engineering schools (Cooper Union, NCAT and ESC Toulouse, France). For GLOBETECH-7 (Fall '01) we were intent to continue our success in the recruiting area and do everything possible to attract student teams from other schools. The following measures were implemented starting in the spring of 2001:

1) More than two hundred (200) e-mail invitation letters were sent to professors at the various engineering departments, as above mentioned, from various domestic and foreign schools. This was done based on thorough, time-consuming research via the Internet to locate Environmental, Mechanical Engineering, and Engineering Management programs at various engineering schools which could have affinities with this project. The letter described the GLOBETECH project and asked for support in disseminating the information to the various faculty members at their schools.

2) We also contacted some of the faculty we thought might be interested in this project, which I met at the 2001 Gateway Coalition Conference in Clemson, South Carolina.

3) I also discussed in great detail the GLOBETECH project at every engineering school I visited in East Asia during a six countries trip I undertook in the Summer of 2001, with the help of an NSF grant (China, S. Korea, Taiwan, the Philippines, Thailand, and Singapore).

The results of this exhaustive work were promising. Although some of the teams, which participated in previous years declined to participate this year due to schedule conflicts and other reasons, we hoped to have more than ten domestic and foreign teams participate in the fall '01 simulation.

4.b) Create the GLOBETECH-7 simulation database:

As previously mentioned, a great deal of research and effort was required to gather and process the new data for the GLOBETECH-7 simulation background information, and create the simulation Internet site. Relevant environmental and new energy Internet sites had to be located and linked with our site. Other important data had to be scanned in and transformed into html/gif computer language. At the end of August we found out that faculty and students from the Milan Polytechnic were participating in the simulation, and wanted to discuss a new, completely different project, a joint venture in interactive television in Italy. The database for this project and its scenario had to be developed and added hastily to our web site. This task proved again the flexibility and dedication of our students responsible for web design.

We are confident that our site contains high quality data and links that will enable successful information transfer to all the participating teams, and a meaningful simulation. Alexander Lin had a great contribution in this area, researching the database and implementing on schedule all required changes and additions.

4.c) Upgrade and expand project's computer software:

A new web site was created for GLOBETECH-7. Substantial thought and work were dedicated to the upgrade of the GLOBETECH-6 software in order to:

- Improve the Internet access tools for this project,
- Facilitate the research via the Internet (i.e., the creation of many new links),
- Facilitate communications among the teams via the Internet and teleconference,

The web address of the GLOBETECH-7 Home Page is: www.cooper.edu/GTK-7/ (see please attachment 7.a). The main characteristics of the GLOBETECH-7 Home Page are:

- Provides easy access to all project resources,
- Communications among the various student teams and faculty can be readily available via Internet Chat on the project community site and e-mail,
- Links to various project relevant data sources are provided, and
- A specific Yahoo environmental search engine is provided to facilitate the Internet research of the various teams.
- Our support team can be easily accessed for immediate support with any technical or communication related problem.

We believe that the developed software will provide an efficient and flexible platform for the smooth development of the project.

5. GLOBETECH-6 Phase III Status Report (spring/summer 2001):

Based on the GLOBETECH-6 scope of work in the Gateway year 9 proposal, the following additional activity was undertaken for this project in the spring/summer of 2001:

In order to increase faculty's familiarity with the this project and future participation in the simulation, this professor presented a related paper and conducted a workshop at the 2001 Gateway Conference, in Clemson, S. Carolina.

6. Conclusions:

We were well prepared to start as scheduled the seventh GLOBETECH simulation, GLOBETECH-7, on October 04, 2001. Our project development team looked forward to the participation of student teams from other US colleges, as well as teams from France and Italy.

The key to further growth and development of this project in the future lies, in my opinion, in a stronger, more focused marketing to other Gateway schools, and the wider spread of Global Technology Management oriented courses. Gateway Central's suggestions and help regarding this subject would be most useful and welcome.

The multimedia packages that were developed in previous years and delivered to Gateway Central might also be an important dissemination tool to other Gateway schools.

Global Technology Management training for engineers is a timely and important topic; the same can be said for international business negotiation training. Major companies' executives, engineering education round tables and conferences continuously address this pressing need. And yet, when a new, state of the art, educational tool is developed for this training, we seem to have difficulty raising interest within our own coalition. Instead, we find more interest in far away places, such as France, Italy, Japan, Russia, Romania and other countries.

In 2001 and beyond we plan to concentrate all our efforts to be able to institutionalize this project, and develop GLOBETECH into a main stream, widely recognized project, for the betterment of engineering education at Cooper Union and all the participating schools.

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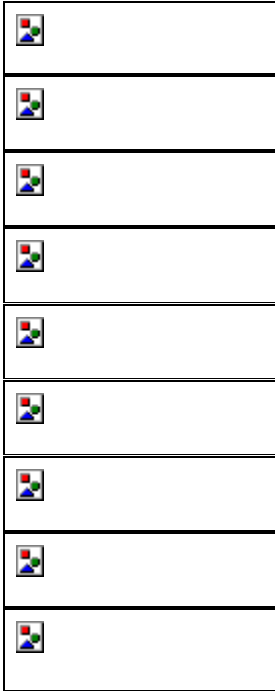
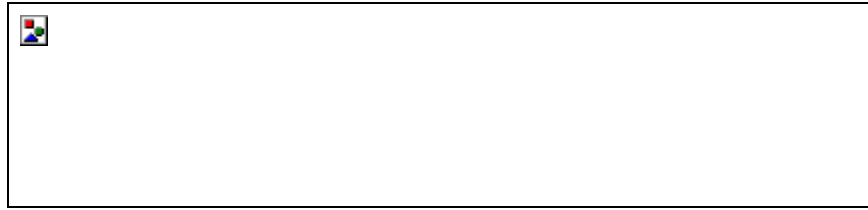
Dept. of Mechanical Engineering,

The Nerken School of Engineering

Cooper Union

ATTACHMENTS 7.a through 7.c

Attachment 7.a: The GLOBETECH-7 Home Page:

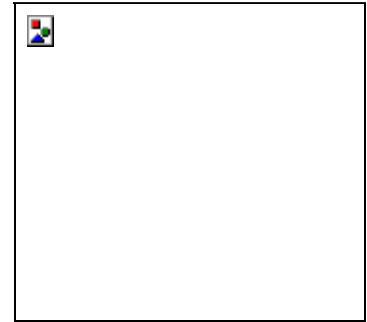


Simulation Subject: Course [EID-372](#), FALL 2001

New Energy Joint Venture Projects in Poland, Taiwan, and the USA

Globetech is conceived as a major component of an undergraduate interdisciplinary engineering course of Global Technology Management. The simulation deals with alternative energy sources, sustainable development, aspects of air pollution control, global competitiveness strategies, international negotiations, technology transfer, operations' optimization, etc.

This project aims to familiarize the engineering students with the real and very complex political, economic, social, and technical issues influencing global technology decisions.



Attachment 7.b: Content of the Resources Page:

- [Welcome Letter and Project Description](#)
 - [Simulation Overview](#)
- [Simulation Scenario and Schedule](#)
- [Interactive Television Co. \(preliminary Info\)](#)
 - [Faculty Information](#)
 - [EID-372 Course Description](#)
 - [Teleconferencing Help](#)

Student Teams Information:

- [Sharing Information](#)
- [Requests for Proposals](#)
- [Project Proposals](#)
- [Contract Awards](#)

General Project Information:

- [Negotiation Principles](#)
- [Project Joint Venture Info](#)
- [Project Financial Evaluation Forms](#)

Technical Resources:

- Please look at the [links](#) page

Simulation Feedback:

- [Student Evaluation Form](#)
- [Faculty Evaluation Form](#)

Previous Simulations:

- [GlobeTech-6 \(Fall 2000\)](#)
- [Globetech-V \(Fall 1999\)](#)
- [Globetech-IV \(Fall 1998\)](#)
- [Globetech-III \(Fall 1997\)](#)
 - [Pictures](#)
- [Globetech-II \(Fall 1996\)](#)
- [Globetech-I \(Fall 1995\)](#)
 - [Overview](#)
 - [Background](#)

Attachment 7.c: Content of the Links Page:

- CIA's [WorldFactbook](#)
- [EPA](#)
- [Thomas Register](#)
- [Center for International Environmental Law](#)
- PCL [Map Collection](#)
- [Financial Times](#)
- [Renewable Energy](#)
- [The Future of Renewable Energy](#)
- [Edison Electric Institute](#)
- [EvWorld](#)

Countries Information

- Poland Sites
 - [Energy and Natural Resources](#)
 - [Lonely Planet Guide to Poland](#)
 - [Poland Wind Energy](#)
 - [Polish Official Statistics](#)
- Taiwan Sites
 - [Industrial Technology Research Institute](#)
 - [Lonely Planet Guide to Taiwan](#)
 - [Taiwan Motorcycle Industry](#)
- USA Sites
 - [Energy Web Directory](#)
 - [EREN US Dept of Energy](#)
 - [US Wind Energy](#)

[Interactive Television Links Page](#)

[Wind Power Sites](#)

- [Wind Map of Western Europe & Northern Poland](#)
- [Wind Map of USA](#)
- [British Wind Energy Association](#)
- [Minnesota Wind Energy Resources](#)
- [Danish Wind Turbine Manufacturers Association](#)
- [Department of Energy](#)
- [American Wind Energy Association](#)
- [National Wind Technology Center](#)
- [Sandia National Laboratory: Wind](#)
- [Wind Farm in Upstate NY](#)
- [European Wind Energy Association](#)
- [Wind Energy Incentives](#)
- [Wind Turbines](#)
- [Siting and Permitting for Wind Turbines](#)
- [Ecomall](#)
- [Companies:](#)
 - [Enron Wind Company](#)
 - [Vestas Wind Systems](#)
 - [Nordex Wind Turbines](#)

[CNN: Wind Power on Midwest Farms](#)

Renewable Energy

- [EREN](#)
- [UN General Assembly on Sustainable Development](#)
- [IEA Greenhouse Gas R&D Programme](#)
- [Scientific American: Renewable Energy](#)
- [National Center for Remanufacturing & Resource Recovery](#)

[Green Engineering Web Links](#)

[Sustainable Development Sites](#)

- [National Town Meeting for a Sustainable America](#)
- [Communications for a Sustainable Future](#)
- [Arcosanti Prototype Community](#)
- [LEAD International, Inc.](#)
- [Companies:](#)
 - [The Cygnus Group](#)
 - [E7 Network](#)
 - [Ecos Corporation](#)
 - [The Limnoterra Group](#)
 - [Sustainable Business Insider](#)
 - [Sustainable Operating Strategies](#)

[United States Environmental Training Institute](#)

[Fuel Cell](#)

- [Fuel Cells 2000](#)
- [Advanced Vehicle Development Program](#)
- [Hydrogen Fuel Cell and Letter](#)
- [Awesome Library](#)
- [Companies:](#)
 - [Ballard Power Systems](#)
 - [ElectroChem, Inc.](#)
 - [Calstart Advanced Transportation](#)
 - [Zevco](#)
- Scientific American: [Fuel Cells](#)
- [E-sources: fuel cells](#)
- [Fuel Cell FAQ](#)

Scooter Companies

- [Uber Scooters](#)
- [UK Motorcycles](#)
- [Manhattan Scientifics, Inc](#)
- [CPI Motor Co.](#)
- [Kwang Yang Motor Co, Ltd](#)
- [Her Chee Industrial](#)

Search Engines

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 - [Environment and Nature](#)
 - [Environmental Companies](#)
 - [Renewable Energy Companies](#)
- [About.com: The Environment](#)
- [Google.com](#)
- [EPA Publications](#)

Computer Related

- [PkZip](#)
- [WinZip](#)

Sustainable Development Sites (continued)

- Organizations:
 - [The Collective Heritage Institute](#)
 - [The Earth Council](#)
 - [Earth Share](#)
 - [International Institute for Sustainable Development](#)
 - [The Natural Step](#)
 - [World Resources Institute](#)
 - [Center for Renewable Energy and Sustainable technology](#)