PN-ACD 776

Hungary Deliverable: Energy Organization Training – Training on Fiscal and Cash Flow Analysis

Prepared by

Electrotek Concepts, Inc
Arlington, Virginia USA

Prepared for

United States Agency for International Development
Budapest, Hungary and Washington, DC
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Overview

The Fiscal and Cash Flow Analysis Training was given at Budapest Technical University on March 20, 1998 There were 18 participants, mainly from the Hungary AEE Chapter The seminar was geared to give energy engineers an introduction to cash flow analysis to assist them when designing energy efficiency projects Please find attached the program (in Hungarian), the list of participants (in Hungarian) the three presentations that were in English by Jennifer Fagan of Electrotek Concepts, Inc , Katrina Ferreyra also of Electrotek Concepts, Inc , and Attila Bogdan of Unicbank, and two faxes received as feedback by Katrina Ferreyra and Jennifer Fagan The spreadsheets used will be forwarded to USAID Washington and USAID Budapest by email

The program consisted of five presentations Dr Janos Zselev first gave a discussion on constructing defining the baseline for an energy efficiency project Dr Zselev's presentation included a discussion of data and examples on excel of methods for collecting and presenting data Mr Geza Bakoss then followed with a discussion on energy savings alternatives His talk also included information about fuel switching alternatives Jennifer Fagan from Electrotek Concepts, Inc finished the morning with an introduction to financial analysis and the quantitative tools necessary for cash flow analysis

Katrina Ferreyra of Electrotek Concepts, Inc led a workshop in cash flow analysis in the afternoon Ms Ferreyra gave the participants three spreadsheets The first, an oversimplified cash flow, was designed as an introduction to excel and the quantitative tools of net present value, internal rate of return, and simple paybacks The second spreadsheet gave the trainees the opportunity to construct the cash flows for the Berzsenyi Daniel School project, sponsored by USAID This more complex spreadsheet was also used to discuss the issues of interaction of the energy savings measures and sensitivity analysis The third spreadsheet presented a cement plant and was used to discuss private projects and the need to account for taxes and financing in the cash flows The third spreadsheet was not discussed due to time, but the participants were given it to work with on their own

There were some technical difficulties because the teaching computer (with overhead projection) had Excel in English, while the student computers had the Hungarian version Although fairly minor, this problem did contribute to the time pressure

Following Ms Ferreyra, Mr Attila Bogdan of Raiffeisen Unicbank gave a talk on financing energy efficiency projects A lively discussion followed his talk

The participants' comments on the seminar were extremely positive They felt that the seminar was very complimentary to their engineering work, and that the computer work provided additional training on Excel as well as cash flow analysis

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FISCAL AND CASH FLOW ANALYSIS OF ENERGY EFFICIENCY OPTIONS

szeminárium

1998. március 20.

PROGRAM

9,00 - 9,15	Megnyito
9,15 - 10,00	**Dr Zselev János:** A bazıs energıaıgenyek es a fogyasztas strukturajanak meghatarozasa
10,15 - 11,00	**Bakoss Géza·** Enegrıa- es koltsegmegtakarítas lehetősegeı
Kozben	Kaveszunet
11,15 - 12,00	**Jennıfer Fagan.** Fınancıal Analysıs of Energy of Efficıecy Projects
12,00 - 13,00	Ebed
13,00 - 15,00	**Katrın Ferreyra·** Cash Flow Analysıs Usıng Excel
Kozben	Kaveszunet
15,45 - 16,15	**Bogdán Attila.** Energıahatekonysagı projektek finanszırozası lehetősegeı ("Puha" hıtelek allamı tamogatassal, projekt strukturalas, tapasztalatok)

FISCAL AND CASH FLOW ANALYSIS OF ENERGY EFFICIENCY OPTIONS

Szeminárium

1998. március 20.

Résztvevők

Bajkone Erden Masra	MOL Rt US UCS HTTU Banyaszati Uzem, Szeged
Bakoss Geza	EGI
Dr Balıko Sandor	BME Rendszer es Iranyıtastechnıka Tanszek
Bogdan Attıla	Raffeısen UB Leasıng
Dr Csoknyaı Istvan	BME I Epuletgepeszetı Tanszek
Fagan, Jennıfer	ELECRTOTEK (USA)
Ferreyra, Katrın	ELECRTOTEK (USA)
Gellert Mıklos C E M	Gellert Innovacıos Mernokı Iroda Bt
Dr Jaszay Tamas	BME Energetıka Tanszek
Jona Imre	MOL Rt US UCS HTTU Banyaszatı Üzem, Szeged
Laszlo Tamas	Laszlo Tamas Egyenı Vallalkozo
Morenth Andras	Energetıkaı Mernokok Egyesulete Magyar Tagozat
Sıtku Gyorgy	BME Rendszer es Iranyıtastechnıka Tanszek
Soos Laszlo	Magyar Termelekenysegı Kozpont
Stevensne Szaday Edıt	BME I Epuletgepeszetı Tanszek
Dr Szanıszlo Mıhaly	Rendszertechnıka Fefjeszto Kft
Toth Csaba	MOL Rt US UCS HTTU Banyaszatı Uzem, Szeged
Tomcsanyı Laszlo	CENTECH
Weores Laszlone dr	OTP Bank Center
Dr Zsebık Albın	BME Rendszer es Iranyıtastechnıka Tanszek
Dr Zselev Janos	CENTECH
Laszlo Tamas	BME egyetemı hallgato
Meggyesı Zoltan	BME egyetemı hallgato

ELECTROTEK
CONCEPTS

Fiscal and Cash Flow Analysis Training

20 March 1998

Jennifer Fagan
Electrotek Concepts, Inc.
2111 Wilson Boulevard, Suite 323
Arlington, Virginia 22201 U.S.A.

Phone/fax (608) 423-3339

E-mail jennifer@smallbytes.net

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FINANCIAL ANALYSIS OF ENERGY EFFICIENCY PROJECTS

- Goal – To select among competing alternatives the project that will provide the maximum financial benefit over its economic life

- Issues to consider

  - The economic life of the project versus alternatives

  - The magnitude and timing of project costs

  - The magnitude and timing of project benefits

  - The time value of money

  - The appropriate interest rate to convert future years' costs and benefits to a present value basis

LIFECYCLE COST ANALYSIS
Project Costs and Benefits

- COSTS:
  - *"First" costs – costs of engineering, design, purchase and installation of equipment*
  - *Salvage value of equipment*
  - *Ongoing expenses such as fuel and maintenance costs*
  - *Taxes, interest on debt, etc.*
- BENEFITS:
  - *Energy cost savings*
  - *Reduction in operation and maintenance expenses, if any*

METRICS FOR COMPARING ALTERNATIVE PROJECTS

- Net Present Value
- Internal Rate of Return
- Simple or Discounted Payback Period
- Benefit-Cost Ratio
- Levelized Energy Cost per GJ

ENERGY EFFICIENCY PROJECT FINANCING

Sources of Capital:

- ***Institutional funds***
  - ***Company profits***
  - ***Energy or capital budgets***

- ***Grants from international organizations (examples – EU-PHARE or USAID)***

- ***Third party financing (example – through Energy Services Companies)***

- ***Direct borrowing from banks***

SOURCES OF FUNDS

- Equity: Provided by the owners of the project. Typically 20% – 40% of the project cost.

- Debt: Funds loaned by financial institutions (such as banks). Sources include:
    - Commercial banks
    - International and regional development banks (large projects)
    - Specialized energy funds
    - Loans guaranteed by the government

OBJECTIVES OF BUSINESS PLAN

- Describe proposed energy efficiency project to funding sources, such as banks
- Focus on banks' criteria for providing loans
- Provide detailed information regarding: the borrower's:
    - Creditworthiness
    - Assets and liabilities
    - Business environment (market)
    - Proposed energy savings project

KEY COMPONENTS OF BUSINESS PLAN

1. Description of Borrower
   - Background
   - Ownership
   - Management
   - Financial Resources

2. Scope of Project
   - Detailed project design
   - Types/sources of equipment
   - Staff development issues
   - Land ownership issues

3. Environmental Impacts
   - Compliance with local and regional laws
   - Demonstration of environmental soundness and sustainability

KEY COMPONENTS OF BUSINESS PLAN (continued)

4. Project Implementation Approach
   - Use of competitive bid process to award work
   - Imported vs. domestic equipment
   - Payment approach & completion guarantees

5. Market Analysis and Strategy
   - Projections of energy use/costs with and without project
   - Project Cash Flows and Payback
   - Risk analysis of key variables
   - Technological obsolescence

6. Project Management Approach
   - Management team structure
   - Relationship to rest of organization
   - Legal, financial risks

KEY COMPONENTS OF BUSINESS PLAN (continued)

7. Project Costs
   - In local and hard currency (such as U.S. dollars)
   - Cost projections by quarter for capital and operating costs

8. Financing Plan
   - Financing sources and allocation

9. Financial Projections
   - Income statement
   - Project cash flows
   - Sources and Uses of Funds
   - Risk analysis

PROCESS FOR EVALUATING PROJECT ECONOMICS

1. Estimate project costs

2. Estimate cash flows of project

3. Assess riskiness

4. Determine appropriate cost of capital, given riskiness

5. Convert project cash flows to present value basis

6. Compare discounted cash flows (benefits) with costs of project.

NET PRESENT VALUE (NPV)

Formula:

- Relies on discounted cash flow methodology
- Project cash flows are discounted at the project's cost of capital (k)
- If NPV is zero or positive, the project is favorable and should be developed.
- If more than one project is being considered, the project with the highest NPV should be developed.

INTERNAL RATE OF RETURN (IRR)

Formula:

- IRR is the discount rate (r) which equates project costs to project benefits over the project's life
- Decision makers can then compare r with the company's cost of capital or hurdle rate
- Hurdle rate is minimum cost of capital required
- If r is greater than the cost of capital or hurdle rate, the project is favorable
- IRR formula is the same as NPV formula, solved for NPV = 0

BENEFIT/COST RATIO

Formula:

- Ratio of one or greater indicates project is cost-effective
- Lifecycle benefits and costs used
- B/C ratio typically used by policymakers to support decisions on new supply-side or demand-side resources, etc.
- Project benefits may include those which are hard to quantify –
  - Environmental externalities
  - Job creation

LEVELIZED ENERGY COST

Formula:

- Allows for comparison of different energy resources
- Focus only on cost of resource, not benefits
- Typically used to compare electricity resources:
  - New generation technologies
  - Transmission capacity additions
  - Power purchased from IPPs
  - Renewables
  - Demand-side management

DISCOUNT RATE ISSUES

- Discount rate represents opportunity cost of capital
- Represents the return foregone by investing in the energy efficiency project, rather than securities
- Should use long-term rather than short-term outlook
- Risk premium included for projects with greater risk, uncertainty

Fiscal and Cash Flow Computer Training

Katrina Ferreyra

Electrotek Concepts, Inc.

Outline

- Steps in Financial Analysis
- Project Specific Issues
- Using Excel and A Simplified Cash Flow
- Berzsenyi Daniel High School Project
  - Issues of Interdependence
  - Sensitivity and Switching Value Analysis
- Romanian Cement Plant
  - Issues in Private Sector Projects

Steps in Financial Analysis

- Determine Costs/Benefits Without Project
- Determine Costs/Benefits With Project
- Construct the Incremental Cash Flow
- Determine NPV, IRR, Payback
- What is Wrong?
  - Sensitivity and Switching Value Analysis

Project Specific Issues

- Costs and Benefits Vary by Type of Project
- Private Sector Projects
  - Cost of Capital
  - Taxes
  - Depreciation
  - Exchange Rate Risk
- Municipal Projects
  - Determining the Discount Rate

Berzsenyi Daniel Project

Measures Considered:

- Heating Controls
- Boiler Installation
- Radiator Valves
- Weatherstripping

BD Project Assumptions

- School Heating Requirement=3660 GJ/Yr
- Savings from:
  - Heating Controls=21.1%
  - Radiator Valves=10%
  - Weatherstripping=8%

Assumptions Continued

- Without Boiler Costs from DH System:
  - MW of Capacity=.79
  - Fixed Cost = MW * Base Fee
  - Maintenance costs=450, 2% increase per yr
  - Cost of Heat = GJ used * Usage Fee
- With Boiler Costs:
  - Maintenance costs remain the same
  - Boiler efficiency = 80%

Sensitivity Analysis

- The change in the IRR as a result of the change in a given variable.
  - For example, if a 10% change in a variable leads to a 25% change in the IRR, the project is sensitive to that variable. If a 10% change leads to a 5% change in the IRR, the project is not very sensitive.

Switching Value Analysis

- The extent of a change in a parameter needed to make the project *switch* from being acceptable to unacceptable.
- To calculate:
  - NPV of Project ÷ PV of Variable = %

Summary of Paybacks

Measures Considered	Cost w/ Contingencies Installed	Operating Cost Savings	Payback
A Clinker Cooler Heat Recovery			
Scenario 2 Heat Recovery Only	$896,405	$147,750	6 1
B Preheater Heat Recovery/New Core Separator			
Scenario 1 New Core Separator	$1,561,545	$147,750	10 6
C Replace Compressor/Motor Sets	$124,024	$8,986	13 8
D New Dynamic Separator	$688,568	$56,390	12 2
E High-Efficiency Motors			
800-kW Motors (2 preheater induced draft fans)	$126,990	$50,518	2 5
400-kW Motors (2 electrostatic filter exh fans)	$91,210	$24,114	3 8
F Kiln Seals	$447,400	$156,865	2 9
G Kiln Burners	$58,925	$22,912	2 6
H Motor Generator Units (2 x 920 kW)	$1,479,870	$485,044	3 1
TOTAL (All but B)	$3,913,392	$952,579	4 1
TOTAL (E-H)	$2,204,395	$739,453	3 0

RAIFFEISEN
UNICBANK

Energy Efficiency Financing

March 20, 1998 / Budapest

Attila Bogdan

E-mail: bbogdan@raiffeisen.unicbank.hu

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Raiffeisen Unicbank Ltd.

Shareholders: Raiffeisen Banking Group (95%) & ICH (5%)

Established: in 1987 **TB-BREE: IC-A/B & LC-1**

Total Assets: USD 800 million (1997)

Net earnings: USD 30 million (1997)

Euromoney: Best Local Bank in Hungary in 1995 & 1996

Raiffeisen Unic-Lizing Ltd.

Shareholders: Raiffeisen Unicbank (50%) & RZB (50%)

Established: in 1993 **Total portfolio: USD 50 million**

Business Lines: Real Estate / Vehicles / Equipment (ESCO)

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Difficulties of Financing

- The concept of energy efficiency improvement as money-saving instrument is not widely recognized
- Limited expertise and know-how in the banking sector as far as assessment of energy conservation projects
- Scarcity of medium- and long term funds and high interest rate level environment
- End-users are out of the banking industry's attention
- No exact measuring methods for the energy savings
- Privatisation is not finished yet
- Energy prices are lower than world prices

RAIFFEISEN UNICBANK

Facilities in Hungary

- **EIB "Financial Sector Global Loan"**
  Tenure: 5 years / Interest: 22% p.a. / Equity: 50%
- **Loan for the "Hungarian Energy Saving Program"**
  Tenure: 8 years / Interest 12% p.a. / Equity: 10 %
- **Building Renovation Loan**
  Tenure: 10 years / Interest: 8% p.a. / Equity: 25%
- **PHARE Loan**
  Tenure: 8 years / Interest: 16% p.a. / Equity: 10%
- **IFC - Guarantee Facility Agreement**
  Guarantee Fund & Technical Assistance (pre-PS)

Materials of Applications

Private Sector Companies:

- **Balance Sheet (1996-97)**
- **Income Statement (1996-97)**
- **Special Call Report (1998)**

Municipalities:

- **Yearly Report (1997)**
- **Yearly Budget (1998)**
- **Special Call Report (1998)**

Energy Efficiency Projects

- **Heating System Rationalisation (70% of all projects)**
  - **energy source changing**
  - **boiler upgrade or change**
  - **meters, controls, weather-stripping**
- **Lighting System Rationalisation (25% of all projects)**
  - **street-lighting**
  - **indoor lighting**
- **Others (5% of all projects) (Solar or geothermal energy)**
- **Project models: 1./ Direct Financing**
  2./ ESCO Financing

Relations / References / Savings

- **Business Relations on EE projects:**
  (Suppliers, Control System, Constructors, Specialists)
- **References:**
  1./ Boiler upgrade (Direct Financing)
  (Municipalities, Companies - 5 pc - USD 1 million)
  2./ Change of energy source (Direct Financing)
  (Companies, Budgetary Ins. - 5 pc - USD 1 million)
  3./ Change of energy sources (ESCO financing)
  (Municipalities, Budgetary Ins. - 10 pc - USD 1,5 m)
- **Savings:**
  1./ Energy Savings: 10% - 30%
  2./ Energy Cost Savings: 35% - 40%

Thank You for your Attention

Attila Bogdan / Energy Efficiency project manager

Raiffeisen Unicbank Ltd.

Raiffeisen Unic-Lízing Ltd.

Address: H-1052 Budapest

Váci utca 19-21.

Phone: (361)-266-9166

Fax: (361)-266-9167

RAIFFEISEN UNICBANK

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IPARTERV

ÉPÜLETTERVEZŐ R

TELEFAX

Cím / To: ELECTROTEC Concept Inc

Feladó / From: László Emhő

Név / Attention: Ms Katrina Ferreyra

Dátum / Date: March 23 1998

Telefax szám / Telefax Nr: ++(1-703)351-4495

Lapok száma / Number of pages: 01

Tárgy / Reference: Cash Flow Seminar and Renewable Energy

Szöveg / Message:

Dear Katrina

It was a pleasure to enjoy your dynamic presentation on the seminar last week It fits well into my efforts to improve my skill in the profession as much as possible, especially after two of my recent ASHRAE courses on similar topics (Energy Performance Contracting Projects /Steven Schiller/, Life Cycle Cost Calculation /Gene M Meyer/)

It was exciting to realize the fact that your company is active in renewable energy, too Thank you for having given valuable generic information about it The topic is important as there will be a boom here soon, starting with large scale pilot projects So, more and more detailed descriptions and data would be highly appreciated

Thank you in advance

Truly yours

László Emhő

H 1052 Budapest V Türr István u 9 • Telefon (36 1) 118 6900 • Telefax (36 1) 118-5205 • Telex 22 4396

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23/03 98 10 16 FAX 36111734 40 IPARTERV KI IG

To Katrina

IPARTERV
ÉPÜLETTERVEZŐ RT

TELEFAX

Cím / To: ELECTROTEC Concept Inc

Feladó / From: László Emhő

Név / Attention: Ms Jennifer Fagan

Dátum / Date: March 23 1998

Telefax szám / Telefax Nr: ++(1-703)351 4495

Lapok száma / Number of pages: 01

Tárgy / Reference: Cash Flow Seminar and Frank Lloyd Wright Building

Szöveg / Message:

Dear Jennifer

We enjoyed very well your presentation on the seminar last week Thanks for your perfect organizing / supporting activity too

The seminar itself was a convenient continuation to my recent ASHRAE courses on similar topics (Energy Performance Contracting Projects /Steven Schiller/, Life Cycle Cost Calculations /Gene M Meyer/) All of these serve very well my intention to improve my skill in the profession as much as possible

As I am a Bank Lloyd Wright admirer as well please, send some information, description photos etc on his new building in Madison

Thank you in advance!
I hope real spring will reach you soon, as well!

Truly yours

Laszlo Emhő

H 1052 Budapest V Türr István u 9 • Telefon (36 1) 118 6800 • Telefax (36 1) 118 5205 • Telex 22 4395