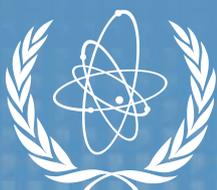


COMPUTER MANUAL SERIES No. 20

# PLEXFIN

## A Computer Model for the Economic Assessment of Nuclear Power Plant Life Extension

User's Manual



**IAEA**

International Atomic Energy Agency

COMPUTER MANUAL SERIES No. 20

**PLEXFIN**  
**A Computer Model for the**  
**Economic Assessment of**  
**Nuclear Power Plant**  
**Life Extension**

User's Manual

INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 2007

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PLEXFIN  
A COMPUTER MODEL FOR THE ECONOMIC ASSESSMENT OF  
NUCLEAR POWER PLANT LIFE EXTENSION

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## FOREWORD

The IAEA developed PLEXFIN, a computer model analysis tool aimed to assist decision makers in the assessment of the economic viability of a nuclear power plant life/licence extension. This user's manual was produced to facilitate the application of the PLEXFIN computer model.

It is widely accepted in the industry that the operational life of a nuclear power plant is not limited to a pre-determined number of years, sometimes established on non-technical grounds, but by the capability of the plant to comply with the nuclear safety and technical requirements in a cost effective manner. The decision to extend the license/life of a nuclear power plant involves a number of political, technical and economic issues. The economic viability is a cornerstone of the decision-making process. In a liberalized electricity market, the economics to justify a nuclear power plant life/license extension decision requires a more complex evaluation.

This user's manual was elaborated in the framework of the IAEA's programmes on *Continuous process improvement of NPP operating performance*, and on *Models for analysis and capacity building for sustainable energy development*, with the support of four consultants meetings. The IAEA wishes to express gratitude to the experts who provided contributions and to all those participating in development and testing of the software, and in drafting and reviewing the users' manual. In particular, appreciation is due to J. De Mella for his collaboration and role as chairman of all the meetings held on the subject. The IAEA officers responsible for this publication were M. Condu and A. Jalal of the Department of Nuclear Energy.

### **EDITORIAL NOTE**

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*The IAEA makes no claims regarding the usefulness of the PLEXFIN Model and assumes no liability arising from its use for any purposes.*

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## 1. INTRODUCTION

An increasing part of the total installed nuclear capacity in the world has over 20 years of operation. As nuclear power plants (NPPs) were initially designed for 30–40 years of operation, utilities operating these plants consider whether they should shut down, decommission, and replace the plants reaching the end of their plant life, or refurbish the plants and extend their original design life.

Nuclear power generating assets face increased competition as the electricity business moves toward deregulation. In the increasingly competitive environment, the traditional “Cost + Profit = Price” approach, where profit is regulated independently of cost, is replaced with the one based on “Price (market) – Costs = Profit”, where price, cost and profit will require balancing to meet market conditions.

The existing fleet of NPPs is of special interest because with the exception perhaps of hydroelectric, well-managed NPPs with their low fuel costs and steadily declining operation and maintenance costs are often among the least expensive base load power plants to operate. The decision to extend the license/life of a NPP involves a number of political, technical and economic issues.

Under deregulation, the economics to justify a nuclear plant life extension decision requires a complex evaluation of not only production cost but additionally, of other key economic and financial variables including return on investment, return on equity, bus bar cost, revenues, net earnings, etc. Economics should be evaluated on a unit-by-unit basis, not only with respect to current and projected nuclear performance, but additionally by careful comparison to other non-nuclear generation alternatives [1, 2].

To assist decision makers addressing the economic viability of plant life/licence extension (PLEX), the IAEA developed PLEXFIN, a computer analysis tool that is aimed to assist in the assessment of the economic performance of PLEX including a generic comparison with alternative generation options, in regulated or deregulated electricity markets.<sup>1</sup> This user’s manual has been produced to facilitate the application of the PLEXFIN computer model.

## 2. OVERVIEW OF PLEX EVALUATION PROCESS AND PLEXFIN

### 2.1. Overview of PLEX evaluation process

An NPP owner or utility facing the end of plant life needs to address the following main questions:

- What level of nuclear performance is required to become and remain competitive in the electricity generation market?
- What are the risks, and what measures are available (financial and economic) to mitigate risk?

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<sup>1</sup> The PLEXFIN software is available upon request to the Department of Nuclear Energy, International Atomic Energy Agency.

- How does NPP life extension compare with other electricity generation alternatives, from an economic point of view?
- What would be the impact on return on investment if, additionally, power up-rate is considered?

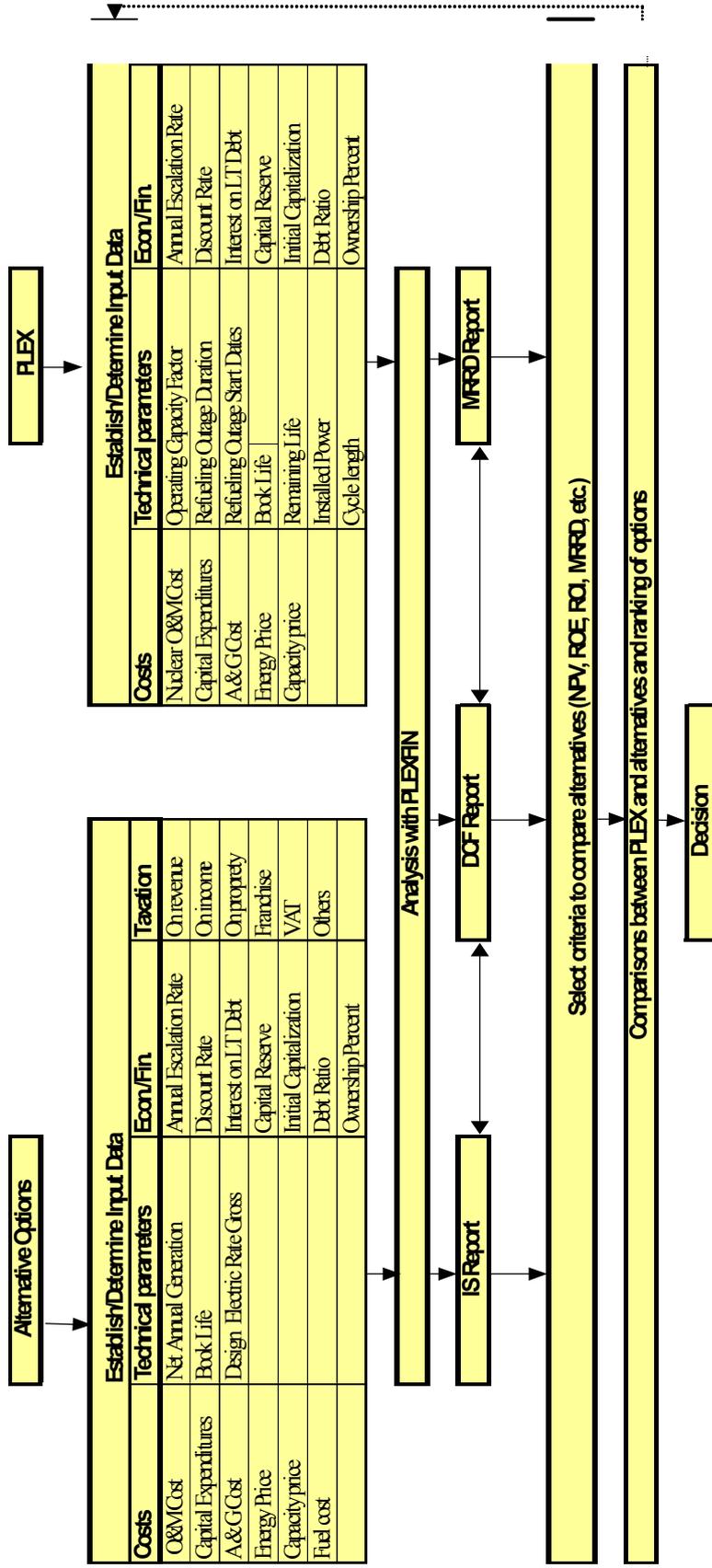
In order to find the appropriate answers to these questions, it is recommendable to do a comprehensive evaluation, based on an economic and financial analysis that compares the economic performance of PLEX against other electricity generation alternatives, considering all legal aspects regarding the electricity market, taxation, nuclear safety, environment, etc. as applicable for each specific case.

Figure 1 shows a suggested process for how to carry out an economic assessment of PLEX and includes the following main stages:

- Data collection for both PLEX and other alternatives<sup>2</sup>
  - Economic data, e.g. investment, project life, cost of capital, etc.
  - Operation data, e.g. estimated production costs, inventory, capacity factors, maintenance, etc.
  - Taxation
- Analysis
  - Determine the net present value of nuclear plant investment (PLEX Refurbishment Cost) that gives a satisfactory return on investment based on a selected interest rate (discount rate) and prescribed levels nuclear performance
  - Define, calculate and evaluate economic value in regulated/unregulated electric market
  - Rank and tabulate data - where the results of the analysis are made available to compare the various generation alternatives.
- Evaluation and reports
  - Selection of appropriate economic/financial criteria to rank generation alternatives
  - Preparation of relevant reports to facilitate review and decision by decision makers

---

<sup>2</sup> As this program is mainly intended for PLEX assessment more focus is on input data for NPPs.



- Legend**
- IS= Income Statement
  - DCF= Discounted Cash Flow
  - MRRD= Minimum Revenue Requirements Discipline
  - LT= Long Term
  - A&G= Administrative & General
  - O&M= Operation & Maintenance
  - VAT= Value Added Tax

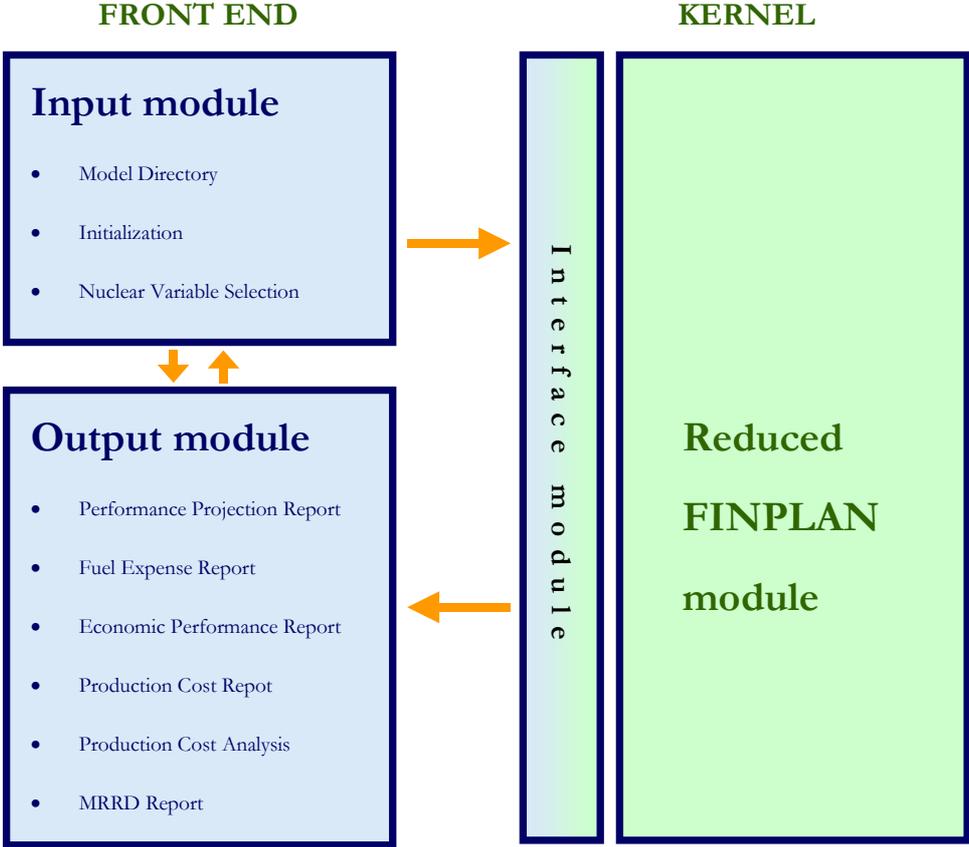
Figure 1. A process for the economic assessment of PLEX.

**2.2. Overview of PLEXFIN**

PLEXFIN was developed with the aim to assist performing a PLEX economic assessment in the framework of the process described above.

The model could handle, in a single run, up to a maximum of 4 nuclear units and one alternative generation option (coal, oil, gas, etc.). It considers each of the nuclear units as both individual profit centres and one single plant. The alternative option as considered separately only for generic comparison purposes. A bigger number of units could handle through multiple runs of PLEXFIN.

PLEXFIN was built using Microsoft Excel software as platform and the financial and economic calculations developed for the IAEA’s FINPLAN<sup>3</sup> [2]. It consists of a set of Microsoft Excel workbooks and has two major parts: a kernel and a front end. The kernel is the part that does calculations and is based on FINPLAN. The front end, or user interface, is the part that handles interaction with the user and consists of an input module and an output module, which were specially developed for this application. Figure 2 illustrates the structure of the application.



*Figure 2. Scheme of PLEXFIN.*

---

<sup>3</sup> FINPLAN model has been developed to carry out a financial planning analysis of a power expansion programme and to determine whether such a programme is a viable one for the utility and the country involved.

The input module provides a friendly and easy way to input the data. In this module the user is allowed to develop multiple PLEX and alternative generation scenarios through the quick selection and input of independent operating and financial variables.

The output module contains the projection (forecasted) performance reports. This module enables users and management to view and print a number of standard, pre-formatted graphical and tabular output reports for different scenarios.

The PLEXFIN kernel performs all necessary calculations in the PLEXFIN model such as income statement, depreciation and taxes calculations, decommissioning, yearly investment, discounted cash flow analysis and financial performances. Also, the kernel computes sales, costs, depreciation and tax on a yearly basis. Dividends are computed and paid in the limits provided by user as input data. No dividends are paid when losses occur. For shareholders, as financial parameter *FINPLAN* computes rate of return. The PLEXFIN kernel is a stripped down version of the IAEA tool *FINPLAN* with a special interface to the PLEXFIN input and output modules.

The *Interface* consists in some routines that ensure the interconnection between *Input/Output Modules* and *FINPLAN Module*.

### 3. HARDWARE/SOFTWARE REQUIREMENTS

**(a) Operating system:**

Microsoft Windows 98, 2000, XP, or NT 4.0 or later version

**(b) Application software:**

Microsoft Excel 2000 or later version

**(c) Computer hardware:**

- Processor – Pentium III, 700 MHz or equivalent
- RAM – Minimum 128 MB
- Hard Drive – Minimum 50 MB Free
- CD ROM Drive
- Recommended monitor: 17–20”, with high resolution

## 4. INSTALLATION

PLEXFIN is delivered as a compressed zip archive containing four files:

- PLEXInput.xls
- PLEX2FIN.xls
- FINCORE.xls
- Results.xls

In order to install PLEXFIN the user has to proceed as follow:

- Step 1: Create a folder called PLEXFIN.
- Step 2: Extract the files from the archive and store them within the PLEXFIN folder.
- Step 3: Make a copy of all the files, name them with the suffix “master” and store it separately.

Having done this, the program is ready for use.

## 5. GETTING STARTED

To get started with PLEXFIN, and to analyse your first scenario, follow the main steps described below:

Step 1: Start the PLEXFIN application

Open the PLEXInput.xls workbook in Microsoft Excel. If a message warns you about some macros (programs) that exist in the workbook (Figure 3), click *Enable Macros*. Another message related to the links updated will appear. You should ignore the message by clicking *Don't Update* (Figure 4).

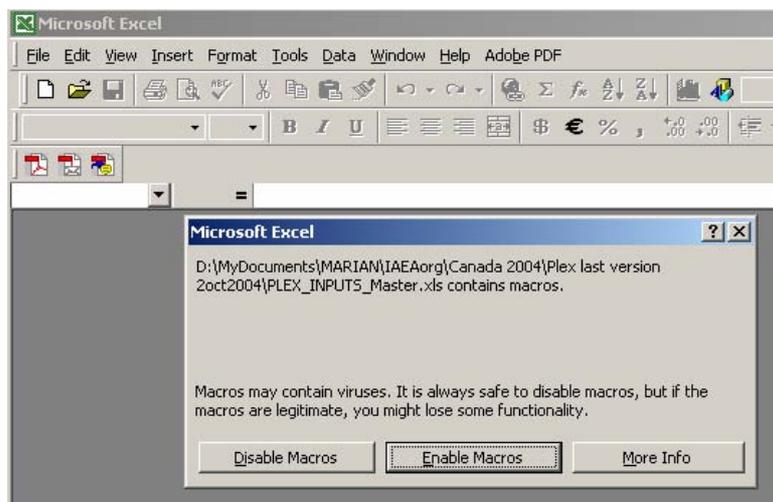


Figure 3. Warning message.

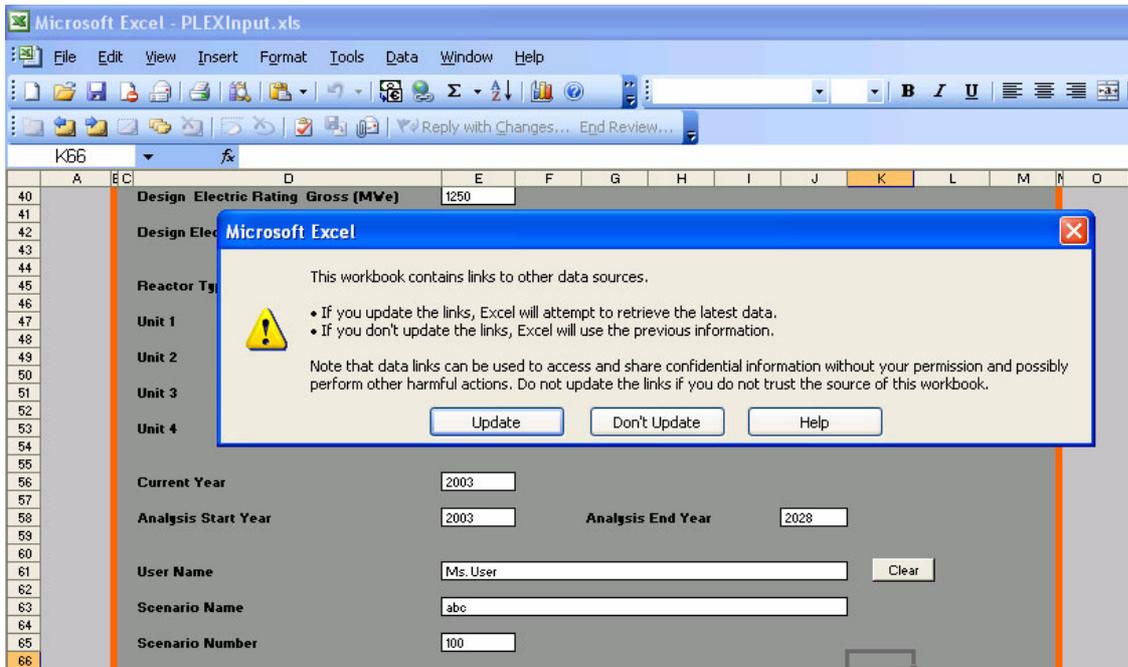


Figure 4. Warning message.

## Step 2: Input data

Activate the *Model directory worksheet*, the main worksheet from which all other input module worksheets may be accessed one by one, in the appropriate order, by clicking their respective buttons.

Begin inputting data, starting with the *Initialization worksheet*.

When beginning with a new scenario, you may use the “*Clear All*” or “*Clear*” buttons to delete any previously entered data if desired (Figure 5).

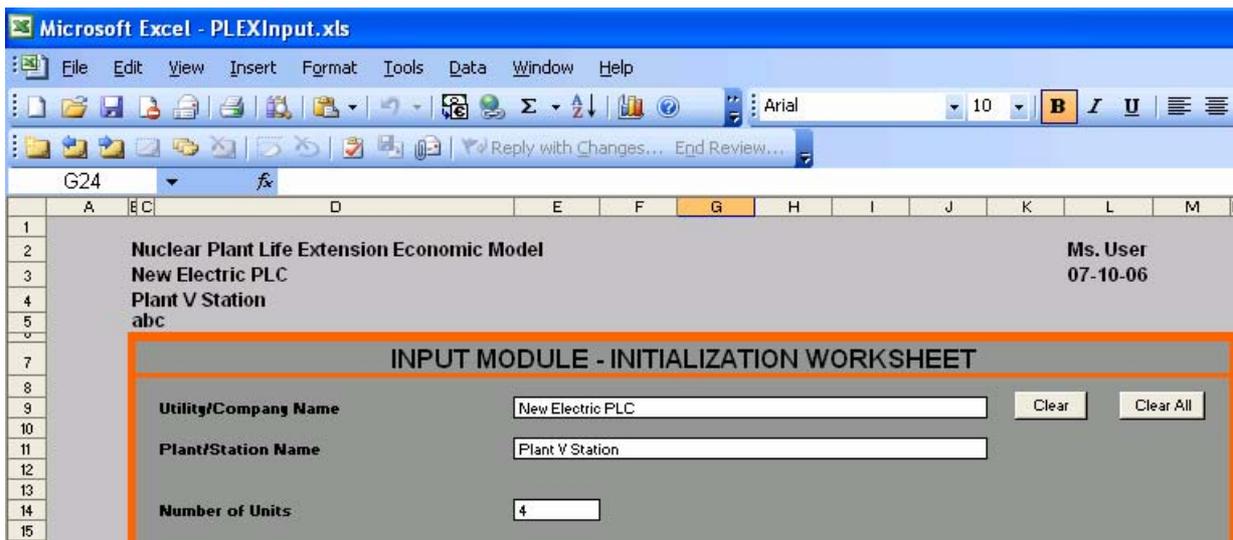


Figure 5. Using the “*Clear All*” or “*Clear*” button.

On the *Initialization worksheet*, under *Comments*, you may enter a brief description of the scenario, which you intend to create (Figure 6). Enter all necessary input data in accordance with the instructions in chapter 6.

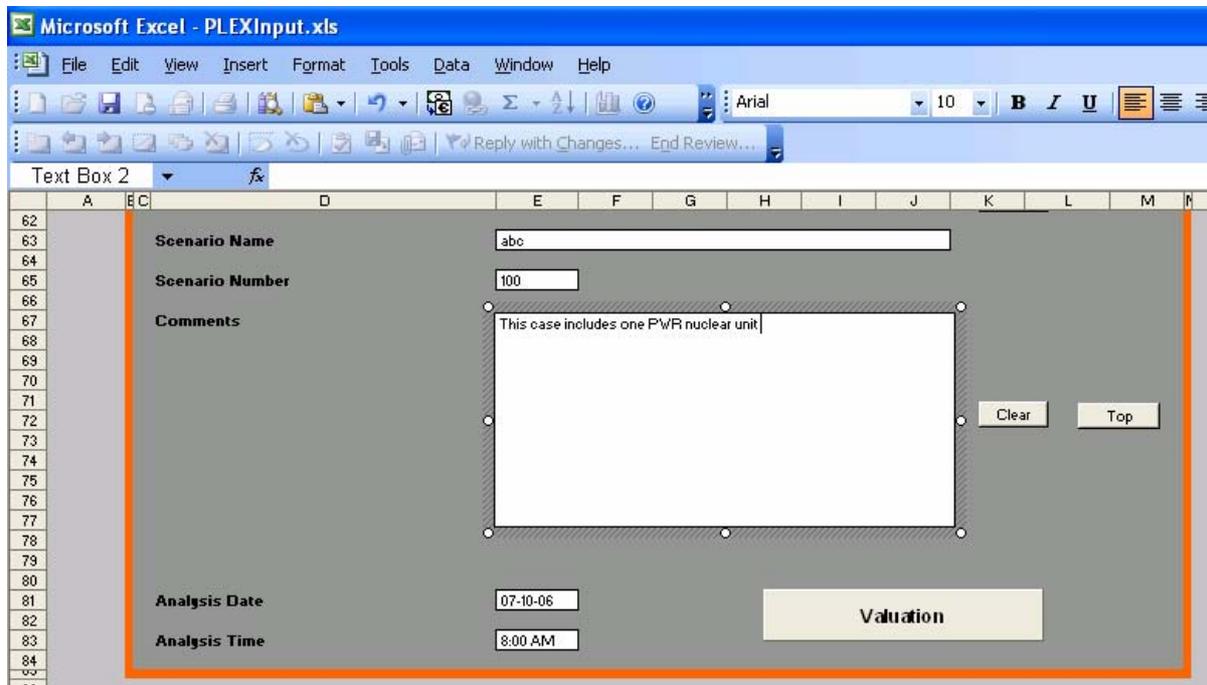


Figure 6. Using the *Comments* section and *Valuation* button.

Step 3: Perform calculations:

After inputting all desired data, click the *Valuation* button on the *Initialization worksheet* to perform the calculations. Depending on the calculation power of the machine, the calculations will take from half to about one minute. The calculation results will be transferred to the *Results workbook* and saved in a file named after the created scenario (i.e. *Scenario abc*).

Step 4: Read the results

At the end of the calculations the results workbook is opened and a message informs you about the results having been saved (see step 3).

You can now access the various output worksheets containing the results and/or reports prepared by PLEXFIN.

Note: To save a scenario, after inputting the data, you should save the spreadsheet PLEXInput.xls under a different name. It is recommended to include the name and number of the scenario in the file name, and to store it in a different folder.

## 6. INPUT MODULE – DESCRIPTIONS AND INSTRUCTIONS

The Input Module is the only part of the program where the user may input data. The required input data needed by the program is as follows:

Technical data including: operating capacity factor, installed power, remaining life for the NPP with and without PLEX implementation, maintenance outage duration, maintenance outage start date, planned operating cycle length.

Economic data such as: O&M cost for nuclear and for alternatives including the costs related to the utilities, administrative & general cost, fuel cost, capital expenditure, gross and net assets, depreciation.

Financial data including: escalation rates, discount rate, interest on debt, dividend rate, debt ratio, retained earnings, taxes, etc.

The Input module contains a main worksheet, five data input worksheets (WSs), and a storage and processing WS:

(a) Main WS:

— Model directory WS

(b) Input data WS:

— Initialization WS

— Nuclear variable selection WS

— Alternative generation selection WS

— Fuel input WS

— Taxes input WS

(c) Storage and processing worksheet:

— Scenario option & calculation WS

The user is allowed to input data only in the input worksheets (listed under “b” above). As detailed below, the user may also input data into the pre-programmed cells, but should note that formulas will be lost. The formula could be restored clicking on the appropriate *Restore* button.

In order to avoid user intervention in cells where calculation formulas exist, a colour-coded is used. The colour coding is as follows (Figure 7):

Yellow cells – the user is not allowed to access the cells.

Blue cells – the data contained in the cells are calculated using predefined macros and data inputted by the user. If the user wishes to input data in these cells by hand he may do this. If the user wishes to restore the formula he can do this by clicking on the appropriate “*Restore*” button. When a blue cell is accessed by the user, a message reminds the user about the possibility to restore the previous formula and how this can be done;

Green cells – the user must input data by hand.

Microsoft Excel - PLEXInput.xls

Nuclear Plant Life Extension Economic Model  
 New Electric PLC  
 Plant V Station  
 abc

Nuclear Performance Level: **MEDIAN**  
 Electricity Price Forecast: **FORECAST A**

**INPUT MODULE - NUCLEAR VARIABLE SELECTION WORKSHEET**

NUCLEAR PERFORMANCE VARIABLES		MEDIAN	Restore	Top Decile	Top Quartile	
<b>Nuclear O&amp;M Cost (\$M)</b>		Average Year 1-5	2003	2004	2005	2006
Plant V-1		85.6	89.1	91.8	81.6	82.4
Plant V-2		85.6	89.1	91.8	81.6	82.4
Plant V-3		85.6	89.1	91.8	81.6	82.4
Plant V-4		85.6	89.1	91.8	81.6	82.4
<b>Capital Expenditures (\$M)</b>		Average Year 1-5	2003	2004	2005	2006
Plant V-1		12.2	12.0	12.1	12.2	12.4
Plant V-2		12.2	12.0	12.1	12.2	12.4
Plant V-3		12.2	12.0	12.1	12.2	12.4
Plant V-4		12.2	12.0	12.1	12.2	12.4
<b>Administrative &amp; General (A&amp;G) Cost (\$M)</b>		Average Year 1-5	2003	2004	2005	2006
Plant V-1		25.5	25.0	25.3	25.5	25.8
Plant V-2		25.5	25.0	25.3	25.5	25.8
Plant V-3		25.5	25.0	25.3	25.5	25.8

Microsoft Excel - PLEXInput.xls

**OTHER OUTAGE VARIABLES**

		OPTION A	Option A	Option B	Option
<b>Refuel/Maintenance Outage Start Date (ddmmm/yy)</b>		First Outage Dates	2003	2004	2005
Plant V-1		15-Dec-03	15-Dec-03	-	-
Plant V-2		15-Dec-03	15-Dec-03	-	-
Plant V-3		15-Dec-03	15-Dec-03	-	-
Plant V-4		15-Dec-03	15-Dec-03	-	-
<b>Planned Operating Cycle Length (Days)</b>		Plant V-1	Plant V-2	Plant V-3	Plant V-4
PHWR Reactors					
Light Water Reactors		547			

Figure 7. Colour coded cells.

## 6.1. Model directory worksheet

The model directory worksheet (MDWS) is the main WS of the program and enables users to view and access the input data worksheets in the input module. Each of the input data WSs can be accessed either by clicking on the corresponding button (Figure 8) or by clicking their tabs at the bottom of the Excel window.

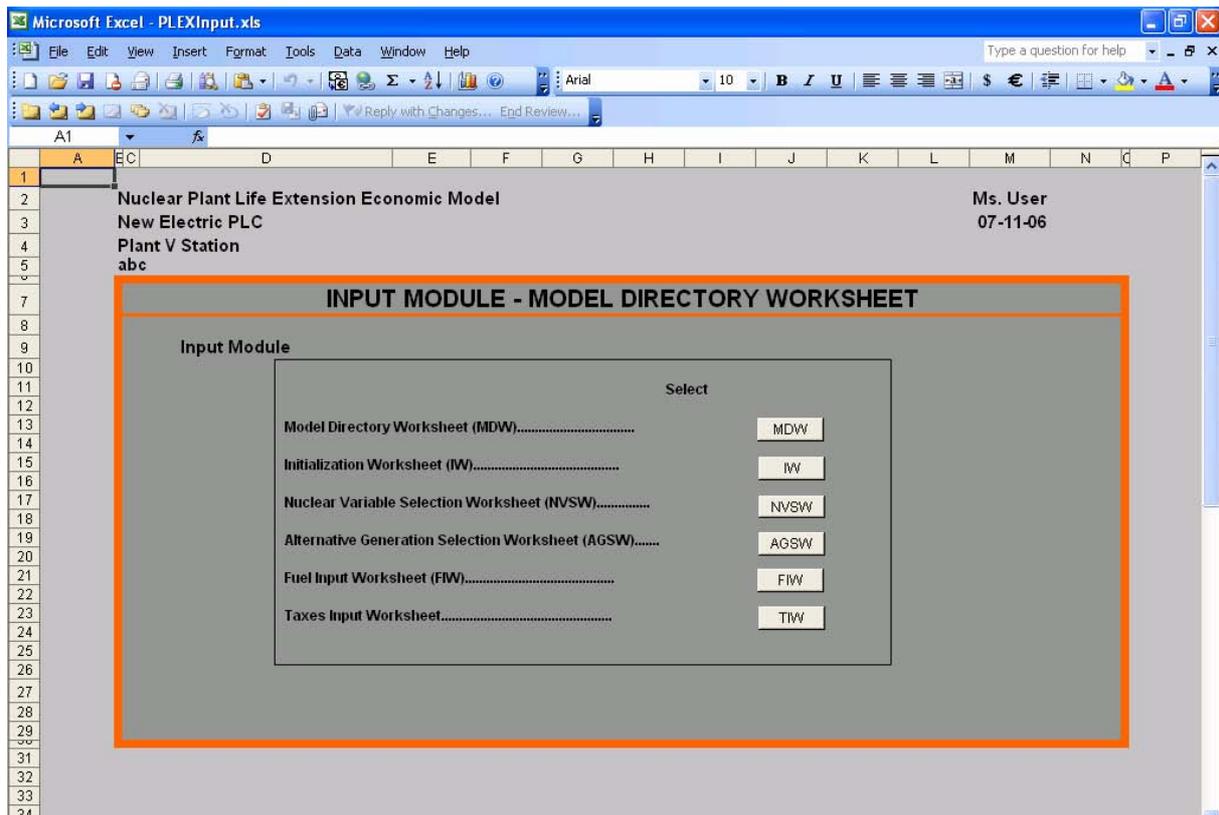


Figure 8. Input worksheets available within input module.

## 6.2. Initialization worksheet

The initialization worksheet (IW) allows the user to define the framework for the analysed scenario (Figure 9). Within the IW the user may define:

- Utility/Company name
- Plant/Station name
- Number of units (\*)
- Unit gross design electric rating
- Unit net design electric rating
- Reactor type/design
- Current year
- Analysis start and end year
- User name
- Scenario name
- Scenario number
- Comments

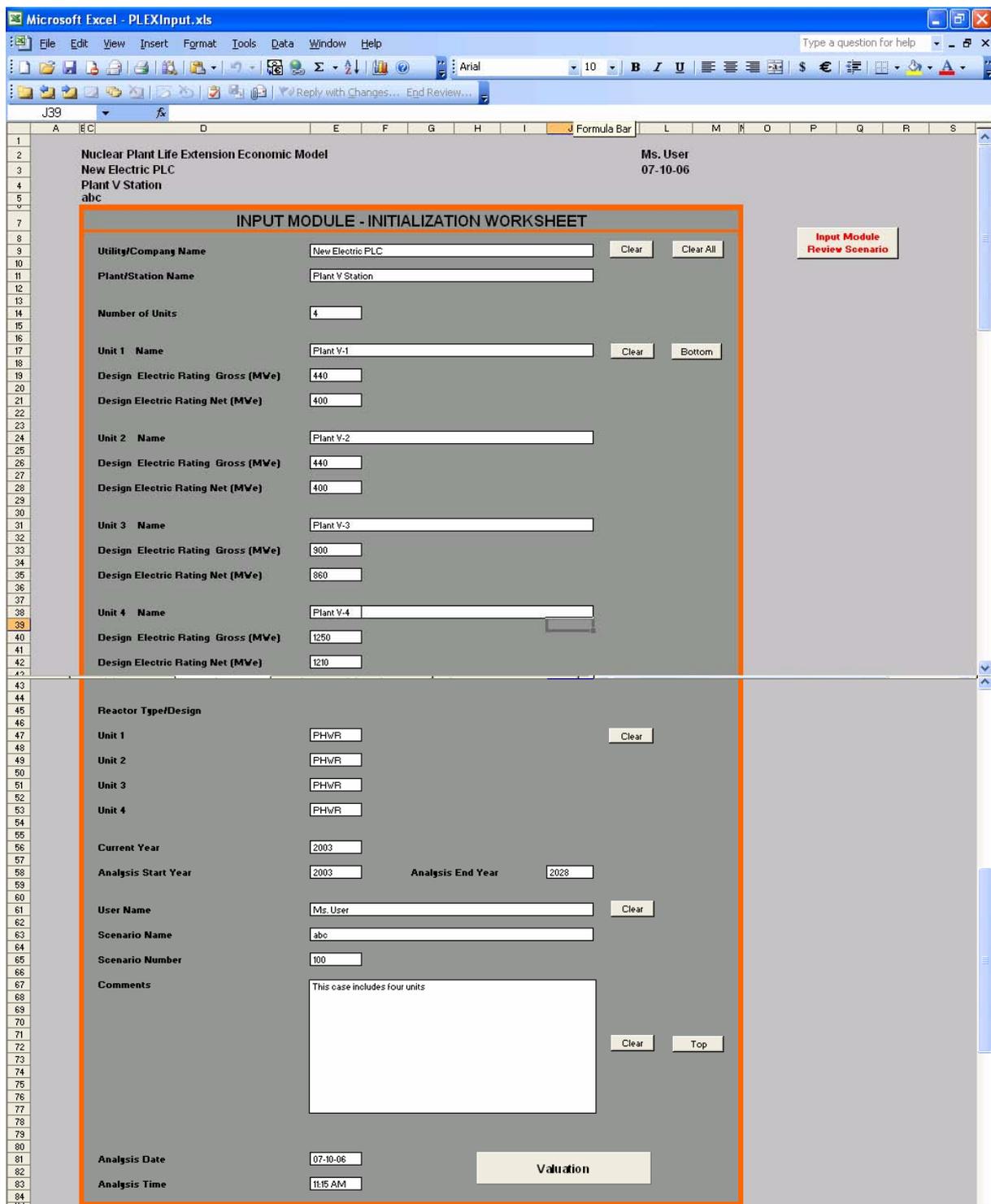


Figure 9. Initialization worksheet.

(\* ) The model can consider up to 4 nuclear power plant (NPP) units at a time.

On the IW there are also located some buttons that give the user the possibility to:

- “Clear” cells with previously inputted data on the IW
- “Clear All” cells from previously inputted data on the IW (useful when creating a new scenario)

- Launch the ”*Valuation*” for a defined scenario
- Quick navigation to the “*Top*” and “*Bottom*” of the IW.

### 6.3. Nuclear variable selection worksheet

The nuclear variable selection worksheet (NVSW) allows the user to define and display, on a nuclear unit basis, key operational and financial variables, organized into the following sections:

- Nuclear performance variables (NPV), including:
  - Nuclear O&M cost
  - Capital expenditures
  - Administrative & general cost
  - Operating capacity factor
  - Refuelling outage duration
- Other outage variables
  - Refuel/maintenance outage start date
  - Planned operating cycle length
- Inventory variables
  - Inventory level
- Business/financial assumptions
  - Annual escalation rate
  - Inventory carrying cost
  - Depreciation period for original investment and for PLEX
  - Depreciation method
  - Ownership share
  - Remaining life without PLEX and including PLEX
  - Capital structure
  - Decommissioning
  - Plant life extension
- Electricity price
- Other revenue sources

To input data on this worksheet the user can access the appropriate section of the worksheet and input the data in accordance with the detailed instructions in the following sections.

#### 6.3.1. Nuclear performance variables

In order to assess the economic performance of PLEX for a specific plant taking into account electricity market context, the user must input plant data based on real operation and economic conditions at the time when the analysis is performed. The information, i.e. nuclear performance variables, that must be inputted in this section are:

- Nuclear O&M costs — which include materials and equipment for maintenance, testing and monitoring, spare parts, labour including payroll tax, other direct and indirect costs related to NPP safety operation. In this cost category should also be included any replacement makeup cost. Nuclear O&M costs have to be inputted for two specific years of NPP operation: for a non-outage year, when the NPP is operated full year and for an outage year, when the NPP is shutdown for refuel/maintenance works. The user should pay attention to the PLEX period when the nuclear O&M cost might be the same as for a non-outage operating year. The value should be inputted in millions of USD (US\$M).
- Capital expenditures — which include all costs associated with improvements and modifications made during the year. These costs should include design, installation, removal and salvage that occur during the year, other miscellaneous investment/capital additions such as facilities, computer equipment, moveable equipment and vehicles, but excluding interest. The value should be inputted in US\$M.
- Administration & general costs (A&G costs) — which include plant management, nuclear information services, emergency planning, stores, housekeeping and other costs. In this category of costs will be included also the commitment fee related to the line of credit (if any). The value should be included in US\$M.
- Operating capacity factor
- Refuel/maintenance outage duration — which in the case of offline fuelling it refers to the period necessary for refuelling, and in the case of online fuelling it refers to the period for maintenance works.

When inputting the nuclear performance variables, the user may enter alternative sets of data, out of which only one can be activate, i.e. used, in a single scenario. The alternative sets might include worldwide or proprietary data, based on in house experience. For each nuclear variable, different datasets, or options, may be entered. They have been given the following predefined names: top quartile, top decile, option A, etc. The different options are equivalent as far as PLEXFIN is concerned — the predefined names have been chosen for user convenience. The user may enter the alternative sets of data by using the Scenario Manager located in the Tools menu.

(a) Inputting data using *Scenario manager*

The following steps have to be followed in order to set up the scenarios mentioned above:

Step – 1: Go to line 212, *Performance level option* section (Figure 10)

PERFORMANCE LEVEL OPTION	SELECTION MEDIAN
<b>NUCLEAR INDUSTRY PERFORMANCE DATA</b>	
<b>NUCLEAR PERFORMANCE VARIABLES</b>	
<b>Nuclear O&amp;M Cost (Current Year \$M)</b>	
Outage Year	100.0
Non-Outage Year	80.0
<b>Capital Expenditures (Current Year \$M)</b>	12.0
<b>A&amp;G Cost (Current Year \$M)</b>	25.0
<b>Operating Capacity Factor (%)</b>	90.0
<b>Refuel/Maintenance Outage Duration (Days)</b>	35.0

Figure 10. Performance level option section.

Step – 2: In the Excel menu bar, select Tools/scenarios

Step – 3: Under *Scenarios*, select an appropriate *Performance level* as shown in Figure 11

**Scenario Manager**

Scenarios:

- Performance Level Median
- Performance Level Top Decile**
- Performance Level Top Quartile
- Performance Level Clear
- Performance Level Bottom Quartil
- Performance Level Option A
- Performance Level Option B
- First Outage Dates Option A
- First Outage Dates Option B
- First Outage Dates Option C

Changing cells:  
\$F\$212:\$F\$221

Comment:  
Created by John R. DeMella on 1/15/2003  
Modified by JALAL on 9/29/2004

Buttons: Show, Close, Add..., Delete, Edit..., Merge..., Summary...

Figure 11. User's defined scenarios.

Step – 4: Click *Edit* and *OK* and input cell by cell the corresponding data for the option selected (Figure 12)

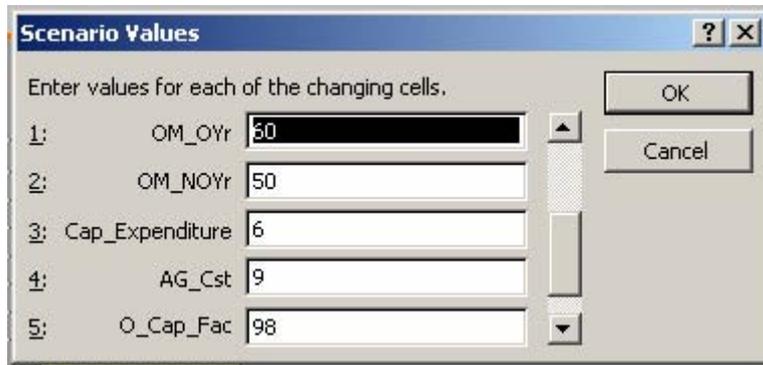


Figure 12. User's scenario values.

Step – 5: Click *OK* and return to the base sheet.

Repeat the steps above for each set of data.

Step – 6: Go to line 9, *Nuclear performance variable* section, and select a desired button in accordance with the available options and set of data inputted as shown above (Figure 13).



Figure 13. User's options proceeding.

When an option is selected by clicking on the appropriate button, the user provided data for the selected option will appear in the *Performance level option* Cells F212 – F221 (Figure 11) and from here the model will use them in order to calculate and show the projected data in section *Nuclear performance variables* (Figure 14).

NUCLEAR PERFORMANCE VARIABLES		TOP DECILE	Restore
Nuclear O&M Cost (\$M)		Average Year 1-5	2003
Plant V-1		53.0	58.0
Plant V-2		53.0	50.0
Plant V-3		53.0	60.0
Plant V-4		53.0	50.0
Capital Expenditures (\$M)		Average Year 1-5	2003
Plant V-1		6.1	6.0
Plant V-2		6.1	6.0
Plant V-3		6.1	6.0
Plant V-4		6.1	6.0
Administrative & General (A&G) Cost (\$M)		Average Year 1-5	2003
Plant V-1		9.2	9.0
Plant V-2		9.2	9.0
Plant V-3		9.2	9.0
Plant V-4		9.2	9.0
Operating Capacity Factor (%)		Average Year 1-5	2003
Plant V-1		98.0	98.0
Plant V-2		98.0	98.0
Plant V-3		98.0	98.0
Plant V-4		98.0	98.0
Refuel/Maintenance Outage Duration (Days)		Average Year 1-5	2003
Plant V-1		20	20

Figure 14. Performance variable.

(b) Inputting data manually

In this section the user may input data manually in the blue cells. He can click on the “Clear” button (Figure 13) to input data manually year by year. Also a “Restore” button is available to restore any lost formulas. However, when a new scenario is created, it is recommended to click the “Restore” button in order to avoid the transfer of changed formulas from a previous scenario.

If a formula is inadvertently deleted in NVSW, the user has the possibility to restore the formula clicking on “Restore” button.

### 6.3.2. Other outage variables

In the *Other outage variables* section is defined the user’s *Options* for the first outage date for the NPP. There are provisions for three options: A, B and C.

To set up an option using the *Scenario manager*, the user has to go through the following steps:

Step – 1: Go to line 226, *First outage start date option* section (Figure 15)

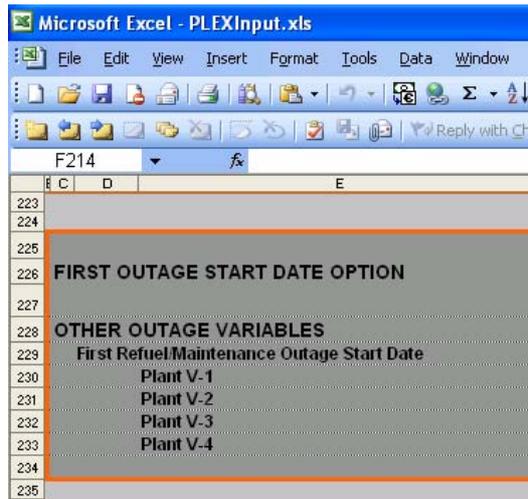


Figure 15. Outage variables section.

Step – 2: In the Excel menu bar, select *Tools/scenarios*

Step – 3: Under *Scenarios*, select *First outage dates option* (A, B, or C) –Figure 16

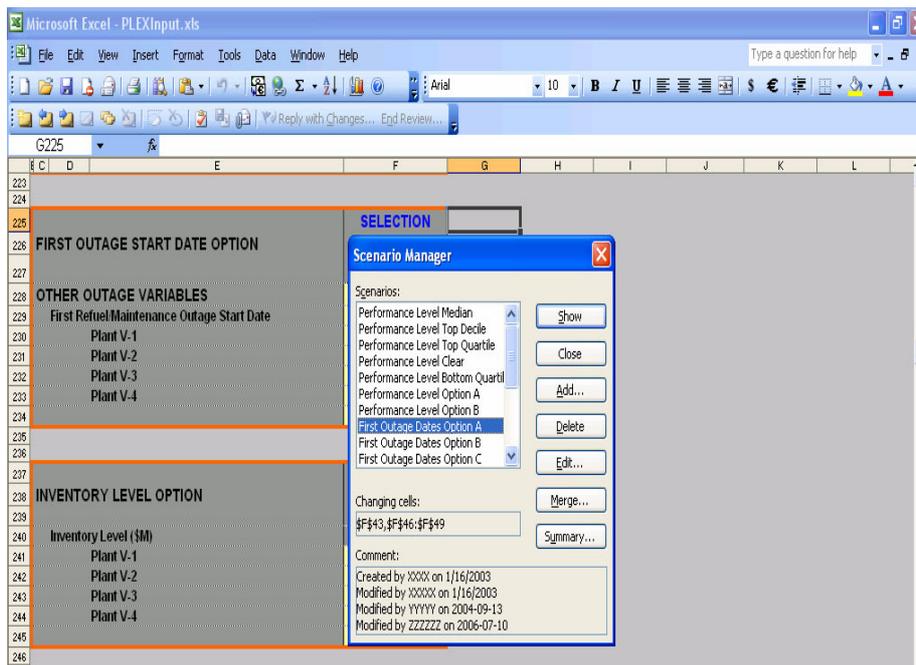


Figure 16. First outage dates definition.

Step – 4: Click *Edit* and *OK* and input cell by cell the corresponding data for the selected option. The format of the date depends on the user’s computer date format (e.g. *mm/dd/yy*) – Figure 17.

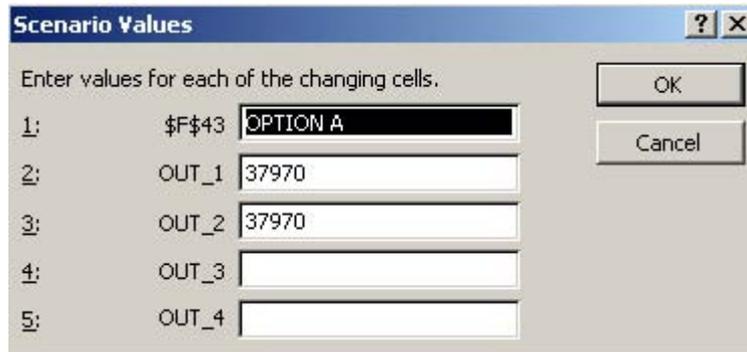


Figure 17. Scenario values for first outage date.

Step – 5: Click *OK* and return to the base sheet.

Repeat the steps above for each set of data.

Step – 6: Go to the line 43, *Other outage variables* section (Figure 18), and select the desired button in accordance with the available options and the set of data inputted as shown above.

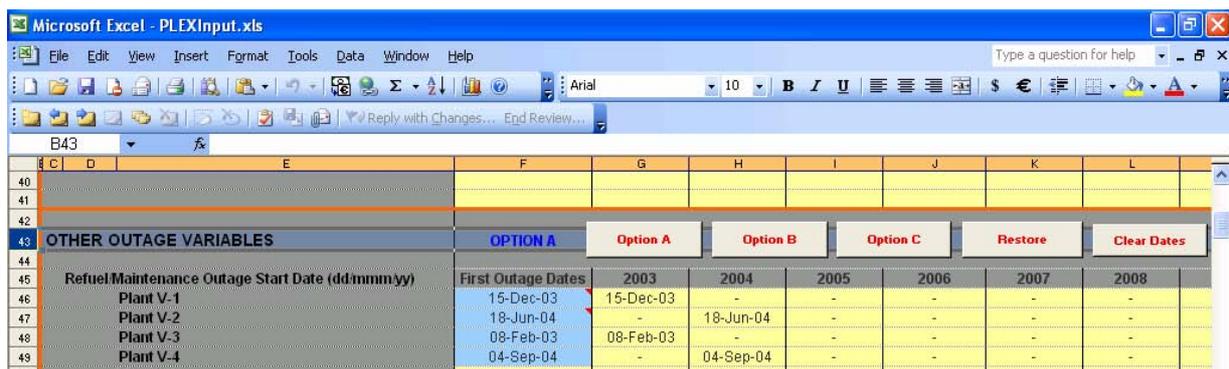


Figure 18. Other outage variables options proceeding.

When an option is selected by clicking on the appropriate button, the data provided by the user under the selected option appears in the *First outage start date option* Cells F226 – F233 (Figure 19) and from here the model use them in calculations as needed. Selected data are shown in the section *Other outage variables*” (Figure 19). The user has to check that the inputted outage date does not occur within the PLEX period. If this is the case, and this cell is accessed, a warning message will appear.

In this section the user may *“Clear dates”* by clicking on the appropriate button (Figure 18) and input data manually in the pale blue cells. The dates year by year will be automatically calculated. To return to the automatic mode just click *Option (A, B, C)*. Also, the user has the possibility to input data manually year by year. In this case the *“Restore”* button can be used to restore any lost formulas. When a new scenario is created, it is recommended to click the *“Restore”* button in order to avoid the transfer of any the changed formulas from the previously created scenario.

	C	D	E	F
224				
225				SELECTION OPTION A
226			FIRST OUTAGE START DATE OPTION	
227				
228			OTHER OUTAGE VARIABLES	
229			First Refuel Maintenance Outage Start Date	
230			Plant V-1	15-Dec-03
231			Plant V-2	18-Jun-04
232			Plant V-3	08-Feb-03
233			Plant V-4	04-Sep-04
234				
235				
236				

Figure 19. Other outage variables.

### 6.3.3. Inventory variables

In this section the user's options regarding inventory variables for NPP are to be defined. There are provisions for three options: A, B and C.

To define an option, using the *Scenario manager*, the user has to go through the following steps:

Step – 1: Go to line 238, *Inventory level option* section (Figure 20)

	C	D	E
236			
237			
238			INVENTORY LEVEL OPTION
239			Inventory Level (\$M)
240			Plant V-1
241			Plant V-2
242			Plant V-3
243			Plant V-4
244			
245			

Figure 20. Inventory level option section.

Step – 2: In the Excel menu, select *Tools/scenarios*

Step – 3: Under *Scenarios*, select Inventory level option (A, B, or C) – Figure 21.

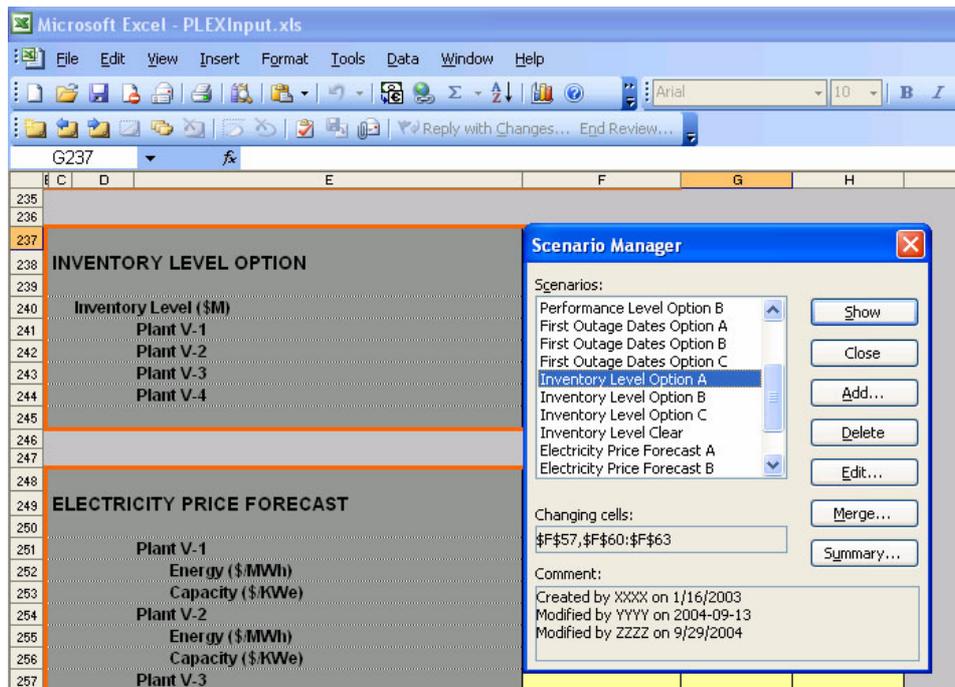


Figure 21. Inventory level definition.

Step – 4: Click *Edit* and *OK* (Figure 21) and input cell by cell the appropriate data for the selected option (Figure 22)

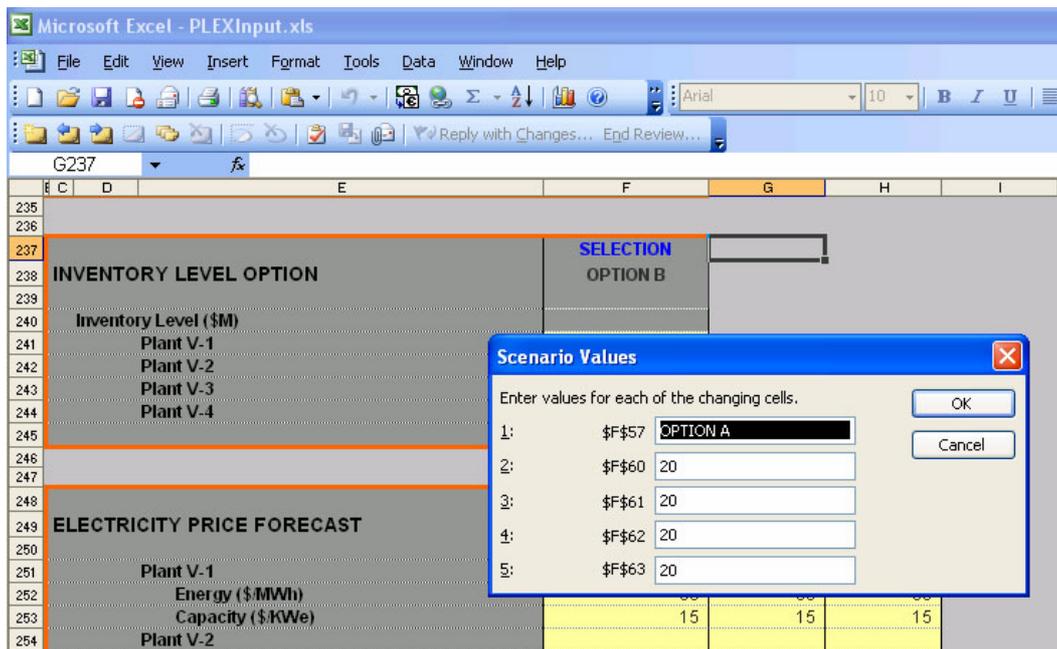


Figure 22. Scenario values for inventory level.

Step – 5: Click *OK* and return to the base sheet.

Repeat the steps above for each set of data.

Step – 6: Go to the line 57, *Inventory variables* section, and select the button desired according to available options created in the previous steps (Figure 23).

INVENTORY VARIABLES		OPTION A	Option A	Option B	Option C	Restore	Clear Inventory
Inventory Level (\$M)	Current Year Value	2003	2004	2005	2006	2007	2008
Plant V-1	20.0	20.0	20.2	20.4	20.6	20.8	21.0
Plant V-2	20.0	20.0	20.2	20.4	20.6	20.8	21.0
Plant V-3	20.0	20.0	20.2	20.4	20.6	20.8	21.0
Plant V-4	20.0	20.0	20.2	20.4	20.6	20.8	21.0

Figure 23. Inventory variables options proceeding.

When an option is selected by clicking on the appropriate button, the user provided data for that option appears in the *Inventory level option* Cells F238 – F244 (Figure 23) and from there, the model uses them in calculations as needed. Selected data are shown in the section called *Inventory variables* (Figure 24).

INVENTORY LEVEL OPTION		SELECTION
		OPTION A
Inventory Level (\$M)		
Plant V-1		20.0
Plant V-2		0.0
Plant V-3		0.0
Plant V-4		0.0

Figure 24. Inventory level option.

Like in the previous ones, in this section the user may “*Clear inventory*” by clicking on the appropriate button (Figure 24) and input data manually in the pale blue cells. The data year by year will be automatically calculated. To return to the automatic mode just click *Option (A, B, C)*. Also, the user has the possibility to input data manually year by year. In this case the “*Restore*” button can be used to restore any lost formulas. However, when a new scenario is created, it is recommended to click the “*Restore*” button in order to avoid the transfer of changed formulas from a previous scenario.

#### 6.3.4. Business/financial assumptions

In this section of the NVSW the user must input the following elements regarding the business and financing conditions:

- (a) *Annual escalation rate (%)* for all years. The escalation rate has to be inputted separately for costs and for electricity price as shown in Figure 25.
- (b) *Inventory carrying cost (%)*. This variable should be inputted once for all units.
- (c) *Depreciation method*. There are 4 depreciation methods available: straight line, sum of the year digits, declining balance, declining balance to straight line. The user has the possibility to choose the depreciation method that he wishes to apply for each unit by inputting the specific serial number of the method chosen (Figure 25a). Short descriptions of these methods are presented below:

*Straight-line* – In the Straight Line method, the annual depreciation allowance is equal to the difference between the original cost or basis and the estimated salvage value divided by the useful life of the asset. Consequently the annual amount remains constant and the method is designed to distribute the depreciable cost of an asset in equal amounts over its useful life.

*Sum of the years digits* – Using this method, the annual depreciation expense is equal to the difference between the original cost and the estimated salvage value multiplied by a fraction. The numerator of the fraction is equal to the number of years remaining in the depreciation period and the denominator is equal to the sum of the digits of each year of the depreciation period. The general formula used is the following:

$$D(k) = I \times [n - (k - 1)] / (1 + 2 + \dots + n), \text{ where:}$$

D(k) – depreciation for year k

I – investment value

n – lifetime of the project

*Declining balance* – Using this method the annual depreciation expense is equal to the current adjusted basis of the asset multiplied by a constant percentage. The constant percentage is equal to the annual rate, if the Straight Line methods were used, multiplied by a constant. The general formula for this type of depreciation is the following:

$$D(k) = [I - \sum_1^k D(k-1)] \times d, \text{ where:}$$

D(k) – depreciation for year k

I – investment value

d – constant percentage

*Declining balance switching to straight line* - is a depreciation method whereby a company is entitled to choose the method, which provides, every year, the maximum depreciation allowance. In the first years, declining balance method is more efficient and in the last years, straight line is the best option in this regard.

The program needs two parameters, to determine automatically when to switch from:

- declining to straight:
- % of declining method
- number of years

The following general formula is used in order to determine the value of depreciation year by year:

$$D(n) = \max(NI(n-1) \times d; NI(n-1)/(N + nd - n), \text{ where:}$$

$D(n)$  – depreciation for year  $n$

$NI(n)$  - net investment of year  $n$

$N$  - year of commissioning

$nd$  – number of years of depreciation

$d$  – declining percentage

As a comment, if  $d < 1/nd$ , then the straight line method is applied immediately.

- (d) *Depreciation period* (years) has to be inputted if the depreciation method 1 or 3 is chosen. Depreciation rate has to be inputted if the depreciation method 2 is chosen, and both depreciation period and depreciation rate has to be inputted if depreciation method 4 is chosen (Figure 25a).

	F	G	H	I	J
<b>BUSINESS/FINANCIAL ASSUMPTIONS</b>		2003	2004	2005	2006
Annual Escalation Rate - All Years (%)					
<b>Costs</b>					
Electricity Price (Capacity, Energy)	1.0				
Inventory Carrying Cost (%)	0.5				
	5.0				
<b>Depreciation Method PLEX Investments</b>		Plant V-1	Plant V-2	Plant V-3	Plant V-4
1 Straight Line	1				
2 Sum of the Years Digits					
3 Declining Balance					
4 Declining Balance to Straight Line					
Depreciation Period (Number of Years)	20				
Depreciation Rate %					
<b>Depreciation for Original Investments and other capital expenditures</b>					
Rate (%)	10				

In the cells above, please input the serial No. of the method chosen for each unit  
 For methods # 1 and # 3, the depreciation period (years) is the only input needed  
 For method # 2, the depreciation rate (%) is the only input needed  
 For method # 4, the depreciation period (years) and rate (%), both are needed

Figure 25a. Business/financial assumptions.

- (e) *Depreciation for original investments and other capital expenditures* (%). The user has to input the depreciation rate in accordance with his records for the original investments and other capital expenditures for each unit (Figure 25a).
- (f) *Ownership share* (%) – data inputted for each unit (Figure 25b).

(g) *Remaining life as of the analysis date (years)*. The user has to input here two types of data (Figure 25b):

- Remaining life, for each unit, without PLEX

	F	G	H	I	J	K	L
84							
85	Plant V-1	Plant V-2	Plant V-3	Plant V-4			
86	Ownership Share (%)	100	100	100	100		
87							
88	Remaining Life (number of years) As Of:						
89	2003-01-01						
90	Without PLEX (Original)	5	20	20	20		
91	Including PLEX	25	20	20	20		
92	PLEX Period (Plant Life Extension)	20					
93							
94	Capital Structure - @ 100% Ownership As Of:	Plant V-1	Plant V-2	Plant V-3	Plant V-4		
95	2003-01-01						
96	Gross Assets (\$M)	0.0					
97	Accumulated Depreciation (\$M)	0.0					
98	Net Assets (\$M)	0.0					
99	Work in Progress (\$M)	0.0					
100	Short Term Deposits (\$M)	0.0					
101	Retained Earnings (\$M)	0.0					
102	Existing Long Term Loans Outstanding (\$M)	0.0					
103	Existing Short Term Loans Outstanding (\$M)	0.0					
104		Plant V-1	Plant V-2	Plant V-3	Plant V-4		
105	Line of Credit (\$M)						
106	Working Capital (\$M)						
107	Previous Losses Carried Forward (\$M)	0.0					
108	Interest Rate on Long Term Debt (%)	8.0					
109	Interest Rate on Short Term Debt (%)	3.0					
110	Planned Dividend Rate (%)	10.0					
111	New Loans as %age of PLEX Investments	50					
112	New Equity as %age of PLEX Investments	50					
113	Period (Term) for repayment (Years)	1.0					
114	Repayment of existing long-term Loans (\$M)		2003	2004	2005	2006	2007
115	Plant V-1						
116	Plant V-2						
117	Plant V-3						

Figure 25b. Business/financial assumptions.

(h) *Capital structure* for each unit of the NPP in US\$M (Figure 25b), including:

- Gross assets
- Accumulated depreciation
- Work in progress
- Short term deposits
- Retained earnings
- Long term and short term loans outstanding
- Working capital
- Line of credit (please note that the commitment fee for the line of credit if any, will be included in the general expenses of NPP)
- Previous losses carried forward
- Interest rate for long term and short term loans
- Planned dividend rate
- New loans as percentage of PLEX investment

- New equity as percentage of PLEX investment. If the equity inputted does not cover the required part of PLEX cost, the model will automatically consider a loan to complete the total cost.
- Period for repayment of the new loans (years)
- Debt payment schedule for existing long term loan. The user has to provide the schedule for debt repayment, for each unit on a year-by-year base.
- Interest rate for deposits

(i) *Data regarding decommissioning process for each unit (Figure 25c), respectively:*

- Cost estimate
- Cost estimate date
- Accumulated decommissioning fund
- Annual decommissioning contribution

(j) *Data regarding the PLEX for each unit (Figure 25c), respectively:*

- PLEX outage - start date and end date. The date has to be inputted in accordance with the date format settings in the settings menu on the user's computer (e.g. dd/mmm/yy)
- PLEX investment in service date (see the comment above regarding the date format)
- PLEX investment schedule year by year. The value for PLEX investment will be provided without value added tax (VAT) or other refundable taxes (MUS\$).
- Discount rate (%)

(k) *Data for PLEX investment valuation and for Minimum revenue requirement discipline (MRRD) analysis.* When inputting data for PLEX investment valuation and for MRRD analysis in this section of the NVSW, the user should input the discount rate, weighted average cost of capital and the analysis period in years. These data will be inputted for each analysed unit (Figure 25d). It is recommended that the discount rate for MRRD analysis be the same as for discounted cash flow analysis.

**Note:** All the rates have to be inputted as numbers (i.e. if the annual escalation rate is 1%, the user should input the number 1 in the specified cell).

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	C	D	E	F	G	H	I	J
120			<b>Decommisioning</b>	Plant V-1	Plant V-2	Plant V-3	Plant V-4	
121			Decommisioning Cost Estimate (\$M)	0.0	0.0	0.0	0.0	
122			Cost Estimate Date (yyyy)					
123			Accumulated Decommisioning Fund (\$M) As Of:					
124			2003-01-01	0.0	0.0	0.0	0.0	
125			Annual Decommisioning Contribution (\$M)	0.0	0.0	0.0	0.0	
126								
127								
128			<b>Plant Life Extension (PLEX)</b>	Plant V-1	Plant V-2	Plant V-3	Plant V-4	
129			PLEX Outage - Start Date (dd/mm/yy)	01-Jan-06				
130			End Date (dd/mm/yy)	31-Dec-06				
131			Duration (days)	364	0	0	0	
132								
133			PLEX Investment In Service Date (dd/mm/yy)					
134								
135			<b>PLEX Investment Schedule (\$M)</b>	Total	2003	2004	2005	2006
136			Plant V-1	300.0		100.0	100.0	100.0
137			Plant V-2	0.0				
138			Plant V-3	0.0				
139			Plant V-4	0.0				
140								

Figure 25c. Business/financial assumptions.

Microsoft Excel - PLEXInput.xls

	C	D	E	F	G	H	I
141							
142			<b>PLEX Investment Valuation</b>				
143			Discounted Cash Flow Analysis	Plant V-1	Plant V-2	Plant V-3	Plant V-4
144			Discount Rate (%)	8.0			
145			Model Calculated PLEX Investment (\$M)				
146			(\$KWe)	0	0	0	0
147			ROI Average Years 1-10 (%)				
148			Net Present Value (\$M)				
149							
150			<b>PLEX Investment Input Analysis</b>	Plant V-1	Plant V-2	Plant V-3	Plant V-4
151			User Input PLEX Investment (\$M)	300.0	0.0	0.0	0.0
152			(\$KWe)	682	0	0	0
153			ROI Average Years 1-10 (%)				
154							
155			<b>MRRD Analysis</b>	Plant V-1	Plant V-2	Plant V-3	Plant V-4
156			Discount Rate (%)	8.0			
157			Weighted Average Cost of Capital (%)	8.0			
158			User Input PLEX Investment (\$M)	300.0	0.0		
159			Analysis Years (Number)				
160							
161							
162							
163							
164							

Figure 25d. Business/financial assumptions.

### 6.3.5. Electricity price forecast

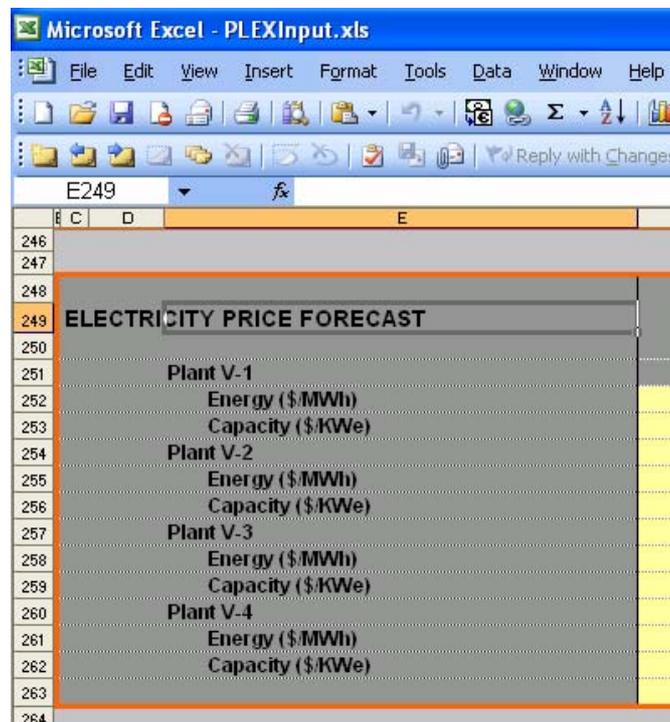
Electricity price forecasts for NPPs should be inputted in this section. The electricity price will be composed of maximum two components, depending on the applicable rules in the user's country, respectively:

- One component for energy (US\$/MWh)
- One component for capacity (US\$/KWe)

There are provisions for three forecasts: A, B and C.

To define an option using the Scenario Manager, the user has to run through the following steps:

Step – 1: Go to line 249, *Electricity price forecast* section (Figure 26)



	C	D	E
246			
247			
248			
249			<b>ELECTRICITY PRICE FORECAST</b>
250			
251			<b>Plant V-1</b>
252			Energy (\$/MWh)
253			Capacity (\$/KWe)
254			<b>Plant V-2</b>
255			Energy (\$/MWh)
256			Capacity (\$/KWe)
257			<b>Plant V-3</b>
258			Energy (\$/MWh)
259			Capacity (\$/KWe)
260			<b>Plant V-4</b>
261			Energy (\$/MWh)
262			Capacity (\$/KWe)
263			
264			

Figure 26. Electricity price forecast section.

Step – 2: In the Excel menu, select *Tools/scenarios*

Step – 3: Under *Scenarios*, select *Electricity price forecast* (A, B, or C) – Figure 27

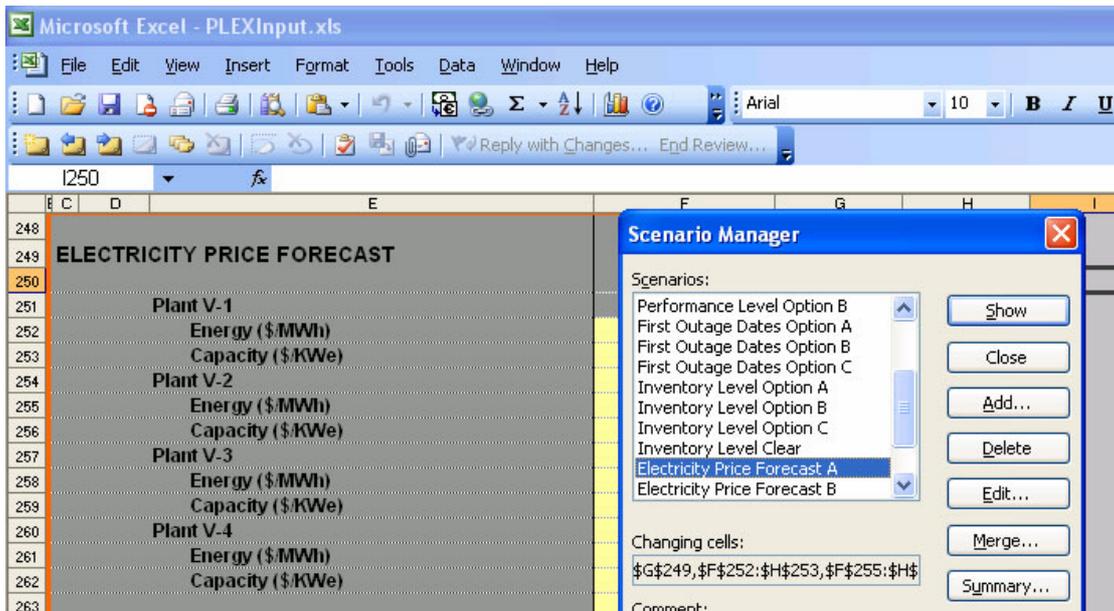


Figure 27. Electricity price forecast definition.

Step – 4: Click *Edit* and *OK* and input cell by cell the appropriate data for the selected forecast (Fig 28)

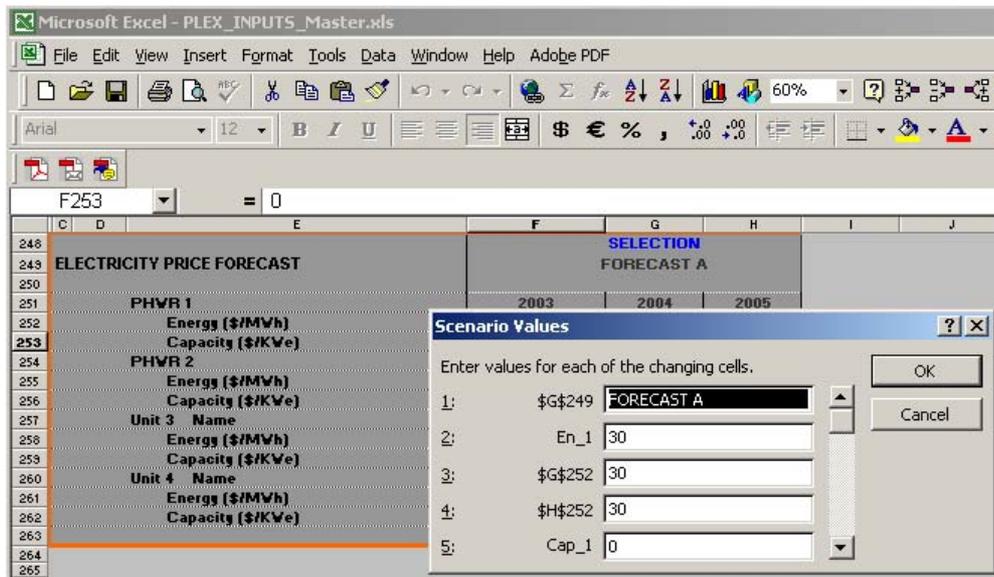


Figure 28. Scenario values for electricity price forecast.

Step – 5: Click *OK* and return to the base sheet.

Repeat the steps above for each set of data.

Step – 6: Go to line 169, *Electricity price* section, and click a forecast button for which data has been inputted, see Figure 29.

ELECTRICITY PRICE		FORECAST A	Forecast A	Forecast B	Forecast C	Restore	Clear Price	
169	Plant V-1	Average Year 1-5	2003	2004	2005	2006	2007	2008
172	Energy (\$/MWh)	30.1	30.0	30.0	30.0	30.2	30.3	30.5
173	Capacity (\$/KWe)		0.0	0.0	0.0	0.0	0.0	0.0
174	Plant V-2	Average Year 1-5	2003	2004	2005	2006	2007	2008
176	Energy (\$/MWh)	30.1	30.0	30.0	30.0	30.2	30.3	30.5
177	Capacity (\$/KWe)	15.0	15.0	15.0	15.0	15.1	15.2	15.2

Figure 29. Electricity price forecasts proceeding.

When a forecast is selected by clicking on the appropriate button, the user provided data for that forecast appears in the *Electricity price forecast* Cells F251 – H262 and from there, the model uses the data in calculations as needed. Selected data are shown in the section *Electricity price*.

In addition, like in the previous cases, the user is allowed also to manually input data in the pale blue coloured cells. He may use the “Clear Price” button (Figure 29) and input data manually year by year. Also, a “Restore” button is available to restore any lost formulas. In any case, when a new scenario is created, it is recommended to click the “Restore” button in order to avoid the transfer of any changed formulas from a previously created scenario.

**6.3.6. Other revenue sources**

In this section the user may define other revenue sources. If these revenue sources are available for the NPP, the user should input this data year by year.

## 6.4. Alternative generation selection worksheet

Within this worksheet the user can define alternative generation options for evaluation and economic comparison with PLEX.

The Alternative generation selection worksheet contains the following sections:

- Generation alternative selections
- Performance variables
- Business/financial assumptions

- (a) *Generation alternative selections.* In this section the name of the alternative generation option (e.g. coal, natural gas, hydro, etc.) and the design electricity rating for that option should be entered. The user must input data manually (Figure 30) for all the analysis period. It should be noted that if the name of the alternative generation option were not inputted, in the *Results worksheet* the alternative generation would not be recognized.
- (b) *Performance variables.* In this section data such as O&M cost, capital expenditures, A&G cost, fuel expenses, annual capacity factor and inventory level for the chosen alternative generation (see Figure 30) should be entered. Within A&G cost the user should include commitment fee and other costs related to lines of credit, if applicable. The user will input data year by year in US\$M for all the analysis period.

	F	G	H	I	J
		2003	2004	2005	2006
<b>BUSINESS/FINANCIAL ASSUMPTIONS</b>					
Annual Escalation Rate - All Years (%)					
Fuel Cost	2.0				
O&M and Other Costs	1.0				
Inventory Carrying Cost (%)	5.0				
Depreciation Method PLEX Investments	1				
1 Straight Line	In the cell above, please input the serial No. of the method chosen for each unit				
2 Sum of the Years Digits	For methods # 1 and # 3, the depreciation period (years) is the only input needed				
3 Declining Balance	For method # 2, the depreciation rate (%) is the only input needed				
4 Declining Balance to Straight Line	For method # 4, the depreciation period (years) and rate (%), both are needed				
Depreciation Period (Number of Years)	20				
Depreciation Rate %					
Depreciation for Original Investments and other capital expenditures	5				
Rate (%)					
Ownership Share (%)	100				
Plant Life (years)	30				
Capital Structure - @ 100% Ownership As Of:		2003	2004	2005	2006

Figure 30. Alternative generation – performance variables.

- (c) *Business/financial assumptions section.* In this section the following elements related to the alternative generation option should be entered (Figs. 31a and b):

- Annual escalation rate – the annual escalation rate must be inputted by the user separately for fuel cost, O&M and other costs. The model will use the escalation rates for calculating the fuel cost, O&M and other cost year by year for the entire analysis period.
- Inventory carrying cost – the user must input the value once in accordance with the real inventory carrying cost for the selected alternative generation. The model will calculate the yearly value for the analysis period.
- Depreciation period (number of years) – must be inputted by the user once in accordance with the book life for the selected alternative.
- Depreciation method – the user has the possibility to choose between four available depreciation methods: straight line, sum of the years digits, declining balance, declining balance to straight line. The name of the method should be entered in the appropriate cell.
- Ownership share – the user must input the ownership share within the project.
- Plant life – the user must input the lifetime of the selected alternative.

BUSINESS/FINANCIAL ASSUMPTIONS		2003	2004	2005	2006
Annual Escalation Rate - All Years (%)					
Fuel Cost	2.0				
O&M and Other Costs	1.0				
Inventory Carrying Cost (%)	5.0				
Depreciation Method PLEX Investments	1				
1 Straight Line	In the cell above, please input the serial No. of the method chosen for each unit For methods # 1 and # 3, the depreciation period (years) is the only input needed For method # 2, the depreciation rate (%) is the only input needed For method # 4, the depreciation period (years) and rate (%), both are needed				
2 Sum of the Years Digits					
3 Declining Balance					
4 Declining Balance to Straight Line					
Depreciation Period (Number of Years)	20				
Depreciation Rate %					
Depreciation for Original Investments and other capital expenditures Rate (%)	5				
Ownership Share (%)	100				
Plant Life (years)	30				

Figure 31a. Business/financial assumptions for the alternative generation.

- Capital structure (Figure 31b) – the user must input data such as gross assets, accumulated depreciation, work in progress, short term deposits, retaining earnings, long term loan outstanding, short term loans outstanding, line of credit, working capital, previous losses carried forward, debt payment schedule for long term loan, for the existing power plant and interest rate on long term loan, interest rate on short term debt, planned dividend rate, investment schedule for the new project (selected alternative).

- MRRD analysis – the user must input discount rate, weighted average cost of capital, analysis period (number of years) needed by PLEXFIN in order to do a *Minimum revenues requirements discipline* analysis.

Microsoft Excel - PLEXInput.xls						
File Edit View Insert Format Tools Data Window Help						
F11						
C	D	E	F	G	H	I
55	<b>Capital Structure - @ 100% Ownership As Of:</b>			2003	2004	2005
56		2003-01-01				
57		Gross Assets (\$M)	0.0			
58		Accumulated Depreciation (\$M)	0.0			
59		Net Assets (\$M)	0.0			
60		Work in Progress (\$M)	0.0			
61		Short Term Deposits (\$M)	0.0			
62		Retained Earnings (\$M)	0.0			
63		Existing Long Term Loans Outstanding (\$M)	0.0			
64		Existing Short Term Loans Outstanding (\$M)	0.0			
65		Line of Credit (\$M)	50.0			
66		Working Capital (\$M)	20.0			
67		Previous Losses Carried Forward (\$M)	0.0			
68		Interest Rate on Long Term Debt (%)				
69		Interest Rate on Short Term Debt (%)	8.0			
70		Planned Dividend Rate (%)	3.0			
71		New Loans as %age of PLEX Investments	5.0			
72		New Equity as %age of PLEX Investments	25.0			
73		Period (Term) for repayment (Years)	10			
74		Repayment of existing long-term Loans (\$M)		2003	2004	2005
75		Alternative Plant				
76		Interest rate for deposits (%)				
77						
78						
79						
80						
81						
82						
83						
84						
85						
86						
87						
88						
89						
90						
91						
92						
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99						
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102						
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104						
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108						
109						

Figure 31b. Business/financial assumptions - Capital structure and MRRD analysis input data for alternative generation.

- (d) *Electricity price section*. In this section the user can input the electricity price for the selected alternative generation. The electricity price has two components: one for energy and another for capacity. The user has to input each component year by year (Figure 32).

Microsoft Excel - PLEXInput.xls						
File Edit View Insert Format Tools Data Window Help						
F11						
C	D	E	F	G	H	I
113						
114						
115		<b>Electricity Price</b>	Average Year 1-5	2003	2004	2005
116		Energy (\$/MWh)		40.0	40.0	40.0
117		Capacity (\$/KWe)		15.0	15.0	15.0
118						

Figure 32. Electricity price for alternative generation.

## 6.5. Fuel input worksheet

This *Fuel input worksheet* (FIW) contains the following input sections:

- Reference annual nuclear fuel expense
- Direct fuel cost
- Indirect fuel (financing) cost
- Regulatory fuel cost
- Reference fuel cost operating assumptions
- Reference fuel cost financial assumptions
- Reference fuel cost operating calculations

All user inputs in this worksheet serve as reference data for the reactor type defined in the IW. PLEXFIN will use this data in order to adjust the fuel cost in the specific operating conditions of the NPP, as defined by the user in the NVSW.

### 6.5.1. Reference annual nuclear fuel expense

This section allows the user to specify the components of the annual fuel costs for various reactor types according to their technical specification. The components are listed below, and are grouped as direct, indirect and regulatory fuel cost on the worksheet. They should be specified directly by the user year by year (Figure 33):

- Amortized cost of fuel assemblies
- Net salvage of Uranium & By-Products
- Fuel lease cost
- Ancillary steam facilities
- Intermediate S/F cost
- Interest (for fuel lease)
- Spent fuel disposal (including Decommissioning & Decontamination - D&D)
- Amortization of final core
- Others (if any)

All these data must be inputted in thousands of US\$ (US\$K).

INPUT MODULE - NUCLEAR FUEL INPUT WORKSHEET					
Plant V-1	2003	2004	2005	2006	2007
<b>Reference Annual Nuclear Fuel Expense (\$x1000)</b>					
<b>Direct Fuel Cost</b>	6 641	6 641	6 641	6 641	6 641
<b>Amortized Cost of Fuel Assemblies</b>	6 641	6 641	6 641	6 641	6 641
<b>Net Salvage of Uranium &amp; By-Products</b>					
<b>Fuel Lease Cost</b>					
<b>Ancillary Steam Facilities</b>					
<b>Other</b>					
	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Indirect Fuel (Financing) Cost</b>	2 500	2 500	2 500	2 500	2 500
<b>Intermediate SF Cost</b>	2 500	2 500	2 500	2 500	2 500
<b>Interest</b>					
<b>Other</b>					
	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Regulatory Fuel Cost</b>	5 000	5 000	5 000	5 000	5 000
<b>Spent Fuel Disposal</b>	5 000	5 000	5 000	5 000	5 000
<b>Amortization of Final Core</b>					
<b>Other</b>					
<b>Total Fuel Expense</b>	14 141	14 282	14 425	14 569	14 715
<b>Total Fuel Expense @ Ownership Share</b>	14 141	14 282	14 425	14 569	14 715

Figure 33. Reference annual nuclear fuel expense section.

If there are fuel expense components that do not apply to the user's specific case, a "0" has to be entered for these components. And inversely, if the user accounts for expenses that are not specified on this worksheet, he may input them as *Other*.

Based on data specified by the user the model will calculate the *Total fuel expense* and *Total fuel expense/ownership share*

### 6.5.2. Reference fuel cost operating assumptions

This section of the FIW (Figure 34) holds reference-operating assumptions data such as:

- Design electric rating (MWe)
- Operating capacity factor (%)
- Refuel/maintenance outage duration (days)
- Refuel/maintenance start date (dd/mm/yy)
- Cycle length (days)
- Other (if any)

The data in this section is linked with the IW and the NVSW for some data. The user may specify *Operating capacity factor (%)*, *Cycle length* (days) and *Other* if available.

	E	F	G	H
34	<b>Reference Fuel Cost Operating Assumptions</b>			
	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
35	400	400	400	400
36	98.0	98.0	98.0	98.0
37	30	30	30	30
38				
39				
40				

Figure 34. Reference fuel cost operating assumptions section.

### 6.5.3. Reference fuel cost financial assumptions

This section contains the *Ownership share* for the project, and its data is directly linked with the NVSW. The user is not supposed to input any data here (Figure 35).

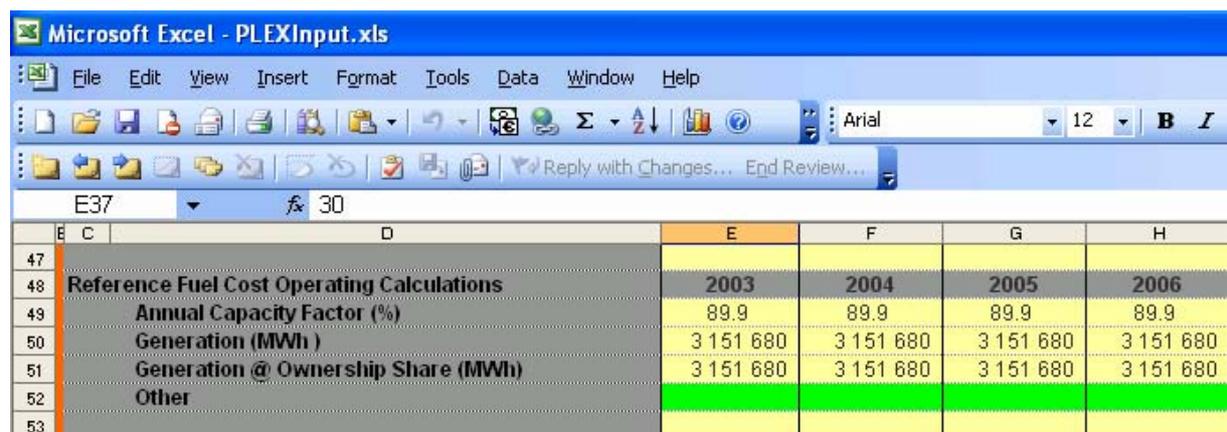
	E	F	G	H	I
41					
42	<b>Reference Fuel Cost Financial Assumptions</b>				
43	100	100	100	100	100
44					
45					
46					

Figure 35. Reference fuel cost financial assumptions section.

#### 6.5.4. Reference fuel cost operating calculations

Based on data previously inputted by the user, the following elements are calculated in this section (Figure 36):

- Annual capacity factor (%)
- Net electricity generation (MWe)
- Generation and ownership share (MWh)
- Other, if any



	2003	2004	2005	2006
Reference Fuel Cost Operating Calculations				
Annual Capacity Factor (%)	89.9	89.9	89.9	89.9
Generation (MWh)	3 151 680	3 151 680	3 151 680	3 151 680
Generation @ Ownership Share (MWh)	3 151 680	3 151 680	3 151 680	3 151 680
Other				

Figure 36. Reference fuel cost operating calculation section.

#### 6.6. Taxes input worksheet

This worksheet allows the user to input various taxes and their specific rates. The following taxes are taken into consideration:

- Income taxes – which could be federal, state or municipal
- Franchise taxes
- Property taxes
- Revenue taxes
- Value added tax (VAT)

Taxes are carrying charges asked by the Governments (local, federal or central). What comprises a certain tax may vary from country to country. Here are some typical examples:

- Income tax is a tax that is paid as a percentage of the taxable income. The taxable income is the difference between gross income or revenue and deduction. The deduction represents all the costs related to plant operation (O&M, A&G, fuel cost, others), debt interest, financing cost related to short or long term loans. The user should input the percentage for income tax on the Taxes Input Worksheet (Figure 37) in accordance with the local rules and regulations. The percentage value should be inputted in number format.

- Revenue tax – which is a tax that is paid as a percentage of the gross income or revenue. The user should input the percentage value in number format (Figure 37).
- Property tax is a tax that is calculated as a rate or percentage of the value of property including real estate, tangible and intangible property. Due to the large diversity of applied formulas for calculating this tax worldwide, the user should input the property tax (in US\$M) year by year, in accordance with the rules applicable to his country/region.
- Franchise tax is usually imposed on a utility at the city or state level for the privilege of having an exclusive franchise to provide the utility service in a particular region. The user should input the franchise tax value (in US\$M) if applicable.
- Value added tax (VAT)- is imposed by the state on all traded goods and services as a percentage of their value. PLEXFIN calculates VAT for PLEX investment based on two inputted values that must be provided by the user: a) PLEX investment subject to VAT year by year as percent (in number format) of the total PLEX investment and b) the VAT tax rate applied. If, in the user country, the VAT related to the investment could be recovered during the same year as it was paid, the user should input 0 for PLEX investment subject to VAT.

Nuclear Plant Life Extension Economic Model				
New Electric PLC				
Plant V Station				
abc				
INPUT MODULE - NUCLEAR TAXES INPUT WORKSHEET				
Plant V-1	2003	2004	2005	
<b>INCOME TAXES - Tax Rate (%)</b>				
Federal	25.0	25.0	25.0	
State Provincial	0.0	0.0	0.0	
Municipal Local	2.0	2.0	2.0	
<b>FRANCHISE TAXES (\$M)</b>				
<b>PROPERTY TAXES (\$M)</b>				
Other Taxes (\$M)				
	2003	2004	2005	
<b>REVENUE TAXES - Tax Rate (%)</b>				
	0.0	0.0	0.0	
<b>VALUE ADDED TAX (VAT)</b>				
PLEX Subject to VAT (%)	0.0	0.0	0.0	
Tax Rate (%)	20.0	20.0	20.0	

Figure 37. Taxes input worksheet.

The user should pay special attention to this worksheet and be careful when entering its data, as the laws and tax regulations vary substantially from country to country. In addition, privately owned utilities are not treated in the same way as public or Government owned

utilities. It is also worth noting that taxes may be deferred or shifted to other parts of the organization or to other plants to optimise the cost at the organization level. A standard approach used consistently for all options under consideration will allow for a fair evaluation of each business case.

Having entered all necessary input data, the user may initiate the calculations by clicking the “*Valuation*” button on the Initialization Worksheet.

## 7. OUTPUT MODULE

The *Output module* provides a number of standard, pre-formatted graphical and tabular reports that are updated (within the 'results.xls' file) after input values are changed within the PLEX model and *Valuation* is launched. The reports enable the user to interactively view and/or print reports for several key economic and nuclear performance variables.

Each report is located on a separate worksheet and is identified on the worksheet tab by its specific report name. Pre-formatted copies of individual reports can be printed by clicking the "Print Report" button located at the top of each report worksheet, or the user can customize their format by using the standard Microsoft Excel print features. To print all reports in standard format, a "Print All Reports" button is provided at the top of each report worksheet.

The Output Module provides the following reports:

- Performance projection report (PPR)
- Fuel expense report (FER)
- Economic performance report (EPR)
- Production cost report (PCR)
- Production cost analysis (PCA)
- MRRD report (MRRDR)
- MRRD analysis (MRRDA)
- Going forward cost report (GFCR)
- Going forward cost analysis (GFCA)
- Operating account (OA)
- Cash flow (CF)
- Income statement report (ISR)
- Balance sheet
- Returns

### 7.1. Performance projection report

The PPR displays, in tabular format, the annual "Performance projections" for key operation input variables and variable derivatives throughout the analysis period, including:

- O&M cost
- Capital expenditures
- A&G cost
- Fuel expense
- Production cost
- Going forward cost
- Inventory level
- Operating capacity factor
- Maintenance outage duration
- Maintenance outage start dates
- Annual capacity factor
- Net generation

- Energy price
- Capacity price.

The report shows the projected performance for each nuclear unit and also for the entire NPP (Figure 38).

**OUTPUT MODULE - PERFORMANCE PROJECTION REPORT**

	2003	2004	2005	2006	2007	2008	2009
<b>NUCLEAR O&amp;M COST (\$M)</b>							
Plant V-1	58.0	52.5	51.0	51.5	52.0	52.6	53.1
Plant V-2	50.0	60.6	51.0	51.5	52.0	52.6	53.1
Plant V-3	60.0	50.5	51.0	51.5	52.0	52.6	53.1
Plant V-4	50.0	60.6	51.0	51.5	52.0	52.6	53.1
<b>Plant V Station</b>	<b>218.0</b>	<b>224.2</b>	<b>204.0</b>	<b>206.1</b>	<b>208.1</b>	<b>210.2</b>	<b>212.3</b>
<b>CAPITAL EXPENDITURES (\$M)</b>							
Plant V-1	6.0	6.1	6.1	6.2	6.2	6.3	6.4
Plant V-2	6.0	6.1	6.1	6.2	6.2	6.3	6.4
Plant V-3	6.0	6.1	6.1	6.2	6.2	6.3	6.4
Plant V-4	6.0	6.1	6.1	6.2	6.2	6.3	6.4
<b>Plant V Station</b>	<b>24.0</b>	<b>24.2</b>	<b>24.5</b>	<b>24.7</b>	<b>25.0</b>	<b>25.2</b>	<b>25.5</b>
<b>ADMINISTRATIVE &amp; GENERAL (A&amp;G) COST (\$M)</b>							
Plant V-1	9.0	9.1	9.2	9.3	9.4	9.5	9.6
Plant V-2	9.0	9.1	9.2	9.3	9.4	9.5	9.6
Plant V-3	9.0	9.1	9.2	9.3	9.4	9.5	9.6
Plant V-4	9.0	9.1	9.2	9.3	9.4	9.5	9.6
<b>Plant V Station</b>	<b>36.0</b>	<b>36.4</b>	<b>36.7</b>	<b>37.1</b>	<b>37.5</b>	<b>37.8</b>	<b>38.2</b>
<b>NUCLEAR FUEL EXPENSE (\$M)</b>							
Plant V-1	14.6	15.0	15.2	15.5	15.5	15.5	15.5
Plant V-2	14.8	14.8	15.5	15.5	15.5	15.5	15.5
Plant V-3	14.8	15.5	15.5	15.5	15.5	15.5	15.5
Plant V-4	15.5	14.8	15.5	15.5	15.5	15.5	15.5

Figure 38. Output module — Performance projection report (screenshot).

## 7.2. Fuel expense report

FER displays in tabular format the total fuel expenses throughout the analysis period, including the following categories:

- Direct fuel cost
- Indirect fuel cost
- Regulatory fuel cost
- Total fuel expense

Figure 39 shows the format of this report for one nuclear unit where the detailed list of fuel expenses grouped by expense category can be seen. The fuel expenses are displayed for each nuclear unit and also for the entire NPP.

OUTPUT MODULE - NUCLEAR FUEL EXPENSE REPORT				
Plant V-1				
	2003	2004	2005	2006
<b>Annual Nuclear Fuel Expense (\$x1000)</b>				
<b>Direct Fuel Cost</b>				
Amortized Cost of Fuel Assemblies	6 919	7 156	7 236	0
Net Salvage of Uranium & By-Products	6 641	6 641	6 641	6 641
Fuel Lease Cost	0	0	0	0
Ancillary Steam Facilities	0	0	0	0
Other	0	0	0	0
	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Indirect Fuel (Financing) Cost</b>				
Intermediate S/F Cost	2 500	2 500	2 500	2 500
Interest	0	0	0	0
Other	0	0	0	0
	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Regulatory Fuel Cost</b>				
Spent Fuel Disposal	5 209	5 388	5 448	0
Amortization of Final Core	0	0	0	0
Other	0	0	0	0

Figure 39. Output module — Fuel expense report (screenshot).

### 7.3. Economic performance report

EPR displays, in graphical format (line graph), the calculated annual economic performance parameters for each nuclear unit and alternative generation over a ten year period, including:

- Total expenses
- Operating revenues
- Net earnings
- Return on equity (ROE)
- Return on total assets (ROA)
- Revenue/direct expenses ratio.

The worksheet presents graphical reports for each nuclear unit, for NPP and for alternative generation (Figure 40).

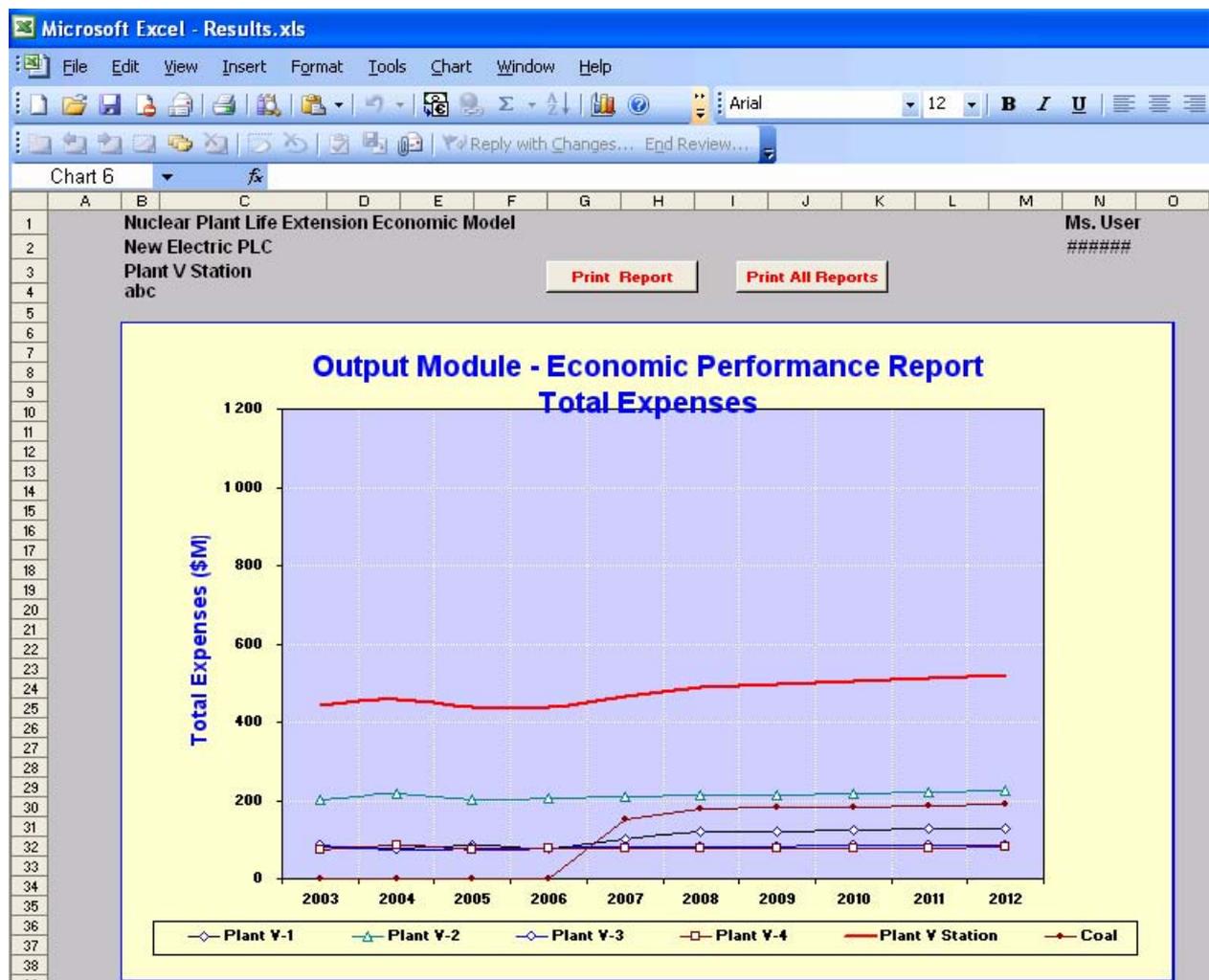


Figure 40. Output module — Economic performance report (screenshot).

## 7.4. Production cost report

The PCR displays, in graphical format (line graph), the annual production cost (defined as O&M cost plus fuel expense divided by net generation) versus average annual price of electricity over a ten-year period.

Figure 41 shows a PCR with the production cost for two nuclear units and a coal fired alternative plant.

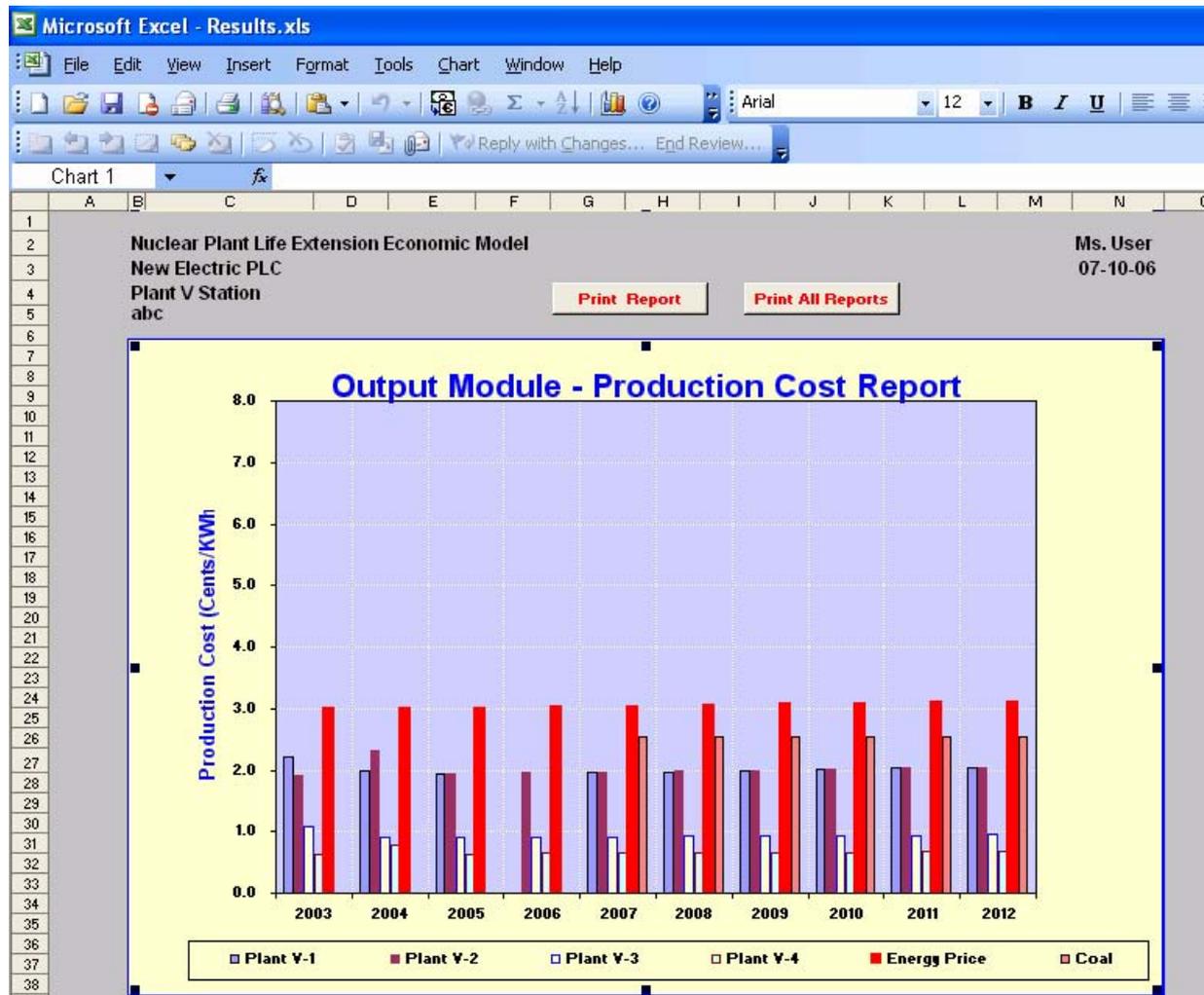


Figure 41. Output module — Production cost report (screenshot).

## 7.5. Production cost analysis

The PCA displays, in tabular format, the production cost for each nuclear unit and generation alternative. Here the user can see a summary of all the elements that contribute to the total production cost, like for example O&M cost, fuel expense and net generation, for nuclear units and for generation alternatives.

Figure 42 shows the PCA worksheet for a coal fired generation alternative. The worksheet is displayed with the same format for nuclear units

The screenshot shows a Microsoft Excel spreadsheet titled "Results.xls". The active window displays a table with the following data:

OUTPUT MODULE - PRODUCTION COST REPORT ANALYSIS		Alternative Power Plant				
Coal	2003	2004	2005	2006	2007	
FUEL EXPENSE (\$M)	0.0	0.0	0.0	0.0	116.5	
O&M COST (\$M)	0.0	0.0	0.0	0.0	2.8	
NET GENERATION (GWh)	0.0	0.0	0.0	0.0	4 691.0	
PRODUCTION COST (Cents.kWh)	-	-	-	-	2.5	

Figure 42. Output module — Production cost analysis (screenshot).

## 7.6. MRRD report

The MRRDR displays, in graphical format (line graph), the annual revenue requirements for each nuclear unit and generation alternative over a ten-year period (Figure 43).

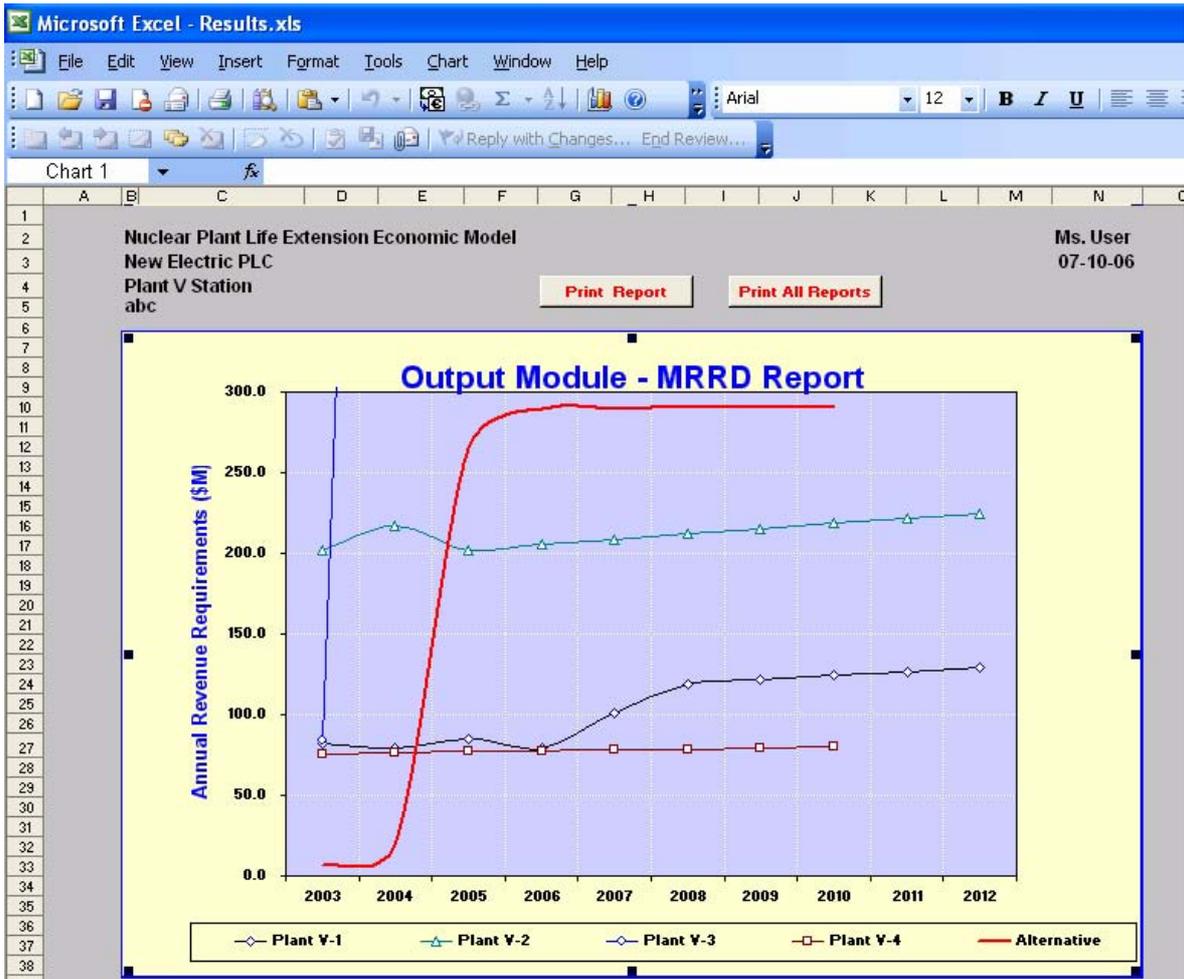


Figure 43. Output module — MRRD report (screenshot).

## 7.7. MRRD analysis

The MRRDA worksheet presents in tabular format the minimum revenue requirements discipline for each nuclear unit and generation alternative on a yearly basis. On this worksheet the user can see the various elements that contribute to the annual revenue requirements calculation:

General expenses including O&M cost, A&G cost, fuel cost, other costs

Capital carrying charges including depreciation, return on capital (interest), taxes, other capital costs.

Figure 44 shows the MRRDA worksheet for a coal fired generation alternative. The worksheet is displayed with the same format for nuclear units.

The screenshot shows the following data in the MRRD analysis worksheet:

Alternative Generation Option	2003	2004	2005	2006	2007	2008	2009	2010
<b>ANNUAL REVENUE REQUIREMENTS (\$M)</b>								
<b>EXPENSES</b>								
O&M Cost	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0
Administrative & General (A&G) Cost	0.0	0.0	0.0	0.0	116.5	116.5	116.5	116.5
Fuel Expense	0.0	0.0	0.0	0.0	85.0	85.0	85.0	85.0
Other								
<b>CAPITAL CARRYING CHARGES</b>								
Depreciation Expense	0.0	0.0	0.0	0.0	0.0	21.5	21.5	21.5
Return On Capital	0.0	0.0	6.2	19.0	29.2	27.2	25.2	23.0
Taxes	0.0	0.0	0.0	0.0	33.4	38.4	40.8	43.3
Other								
<b>TOTAL REVENUE REQUIREMENTS</b>	0.0	0.0	6.2	19.0	265.1	289.6	290.0	290.3
<b>Weighted Average Cost of Capital (%)</b>	8.0							
<b>Present Value Factor (Discount Factor)</b>	0.92593	0.85734	0.79383	0.73503	0.68058	0.63017	0.58349	0.54027
	1	2	3	4	5	6	7	8
	0	0	6	19	265	290	290	290
<b>ANNUAL LEVELIZED PREMIUM (\$)</b>	190.1							
<b>PRESENT VALUE OF REVENUE REQUIREMENTS (\$)</b>	2 325.8							

Figure 44. Output module — MRRD analysis (screenshot).

## 7.8. Going forward cost report

The GFCR displays in graphical format (line graph) the calculated annual going forward cost versus average annual price of electricity over a ten year period.

Figure 45 shows a GFCR displayed for two nuclear units and a coal fired alternative.



Figure 45. Output module — Going forward cost report (screenshot).

## 7.9. Going forward cost analysis

The GFCA worksheet presents in tabular format the going forward cost for each nuclear unit and for alternative generation on yearly basis. In this worksheet the user can see the elements that contribute to the annual going forward cost calculation:

- O&M cost, A&G cost, fuel cost
- Depreciation, interest on debt, taxes, decommissioning
- Inventory cost
- Net generation

Figure 46 shows the GFCA worksheet for a coal fired alternative generation. The worksheet is displayed with the same format for nuclear units.

The screenshot shows a Microsoft Excel spreadsheet titled "Results.xls". The active window displays a table titled "OUTPUT MODULE - GOING FORWARD COST REPORT ANALYSIS". The table lists various cost categories and their values for the years 2003, 2004, 2005, and 2006. The rows are numbered 125 through 140 in the spreadsheet grid.

	2003	2004	2005	2006
O&M COST (M\$)	0.0	0.0	0.0	0.0
ADMIN & GEN COST (M\$)	0.0	0.0	0.0	0.0
FUEL EXPENSES (M\$)	0.0	0.0	0.0	0.0
INVENTORY CARRYING COST (M\$)				
DEPERCIATION EXPENSE (M\$)	0.0	0.0	0.0	0.0
FEDERAL INCOME TAX (M\$)	0.0	0.0	0.0	0.0
STATE INCOME TAX (M\$)	0.0	0.0	0.0	0.0
MUNICIPAL INCOME YAX (M\$)	0.0	0.0	0.0	0.0
VALUE ADDED TAX (M\$)				
OTHER TAXES (M\$)				
INTEREST ON DEBT (M\$)	0.0	0.0	6.2	19.0
NET GENERATION (GWh)	0.0	0.0	0.0	0.0
GOING FORWARD COST (Cents KWh)	-	-	-	-

Figure 46. Output module — Going forward cost analysis.

### 7.10. Operating account

The OA worksheet presents in tabular format the operating account for each nuclear unit, entire NPP and alternative generation, on a yearly basis.

Figure 47 shows the OA worksheet for a coal fired alternative generation. The worksheet is displayed with the same format for nuclear units.

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Alternative Power Plant</b>	<b>Operating Account</b>										
<b>Coal</b>											
FIXED REVENUES	M US\$	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL SALES	M US\$	0.00	0.00	0.00	0.00	0.00	198.07	199.07	200.06	201.06	202.07
INTEREST EARNINGS	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>TOTAL REVENUES</b>	<b>M US\$</b>	<b>1.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>198.07</b>	<b>199.07</b>	<b>200.06</b>	<b>201.06</b>	<b>202.07</b>
GENERAL EXPENSES	M US\$	1.00	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	10.00
PURCHASE FROM IPP	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOCAL FUEL COST	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FOREIGN FUEL COST	M US\$	0.00	0.00	0.00	0.00	0.00	116.50	116.50	116.50	116.50	116.50
LOCAL O&M COST	M US\$	0.00	0.00	0.00	0.00	0.00	2.75	2.75	2.75	2.75	2.75
INTEREST CHARGE	M US\$	0.00	0.00	0.00	6.16	18.97	25.99	24.04	21.99	19.77	17.36
FOREIGN EXCHANGE LO:	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEPRECIATION	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	21.46	21.51	21.56	21.60
TAXES & ROYALTIES	M US\$	0.00	0.00	0.00	0.00	0.00	12.01	13.83	14.68	15.57	16.52
<b>TOTAL EXPENSES</b>	<b>M US\$</b>	<b>1.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6.16</b>	<b>18.97</b>	<b>167.25</b>	<b>188.58</b>	<b>187.43</b>	<b>186.14</b>	<b>184.72</b>
<b>PROFIT/LOSS</b>	<b>M US\$</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>-6.16</b>	<b>-18.97</b>	<b>30.82</b>	<b>10.48</b>	<b>12.63</b>	<b>14.92</b>	<b>17.34</b>
DIVIDENDS	M US\$	0.00	0.00	0.00	0.00	0.00	3.21	3.21	3.21	3.21	3.21
RETAINED EARNINGS	M US\$	0.00	0.00	0.00	-6.16	-18.97	27.61	7.27	9.42	11.71	14.13

Figure 47. Output module — Operating account (screenshot).

## 7.11. Cash flow

The CF worksheet presents in tabular format the cash flow statement for alternative generation, for each nuclear unit as well as for NPP. In this worksheet the user can see the cash inflows, cash outflows and the cash available for each analysed unit and for NPP, as well as for alternative generation on yearly basis.

Figure 48 shows the CF worksheet for a coal fired alternative. The worksheet is displayed with the same format for nuclear units.

Microsoft Excel - Scenario\_TRIAL.xls

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	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
181															
182	<b>CASH FLOW STATEMENT</b>	<b>Alternative Power Plant</b>													
183		<b>Coal</b>													
184			2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
185	<b>INFLOWS</b>														
186	Revenues	M US\$	0.00	0.00	0.00	0.00	198.07	199.07	200.06	201.06	202.07	203.08	204.09		
187	Fixed revenues	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
188	Sales	M US\$	0.00	0.00	0.00	0.00	198.07	199.07	200.06	201.06	202.07	203.08	204.09		
189	Others	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
190	Interest Earned	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
191	New Equity	M US\$	0.00	27.50	55.00	24.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
192	Bonds Issue	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
193	Loans Drawdown	M US\$	0.00	5.50	11.00	4.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
194	Standby Facility Drawdown	M US\$	0.00	77.00	160.16	87.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
195	<b>TOTAL INFLOWS</b>	M US\$	0.00	110.00	226.16	117.25	198.07	199.07	200.06	201.06	202.07	203.08	204.09		
196															
197	Cash Available in Short-term Deposits	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
198	<b>TOTAL CASH AVAILABLE</b>	M US\$	0.00	110.00	226.16	117.25	198.07	199.07	200.06	201.06	202.07	203.08	204.09		
199															
200															
201	<b>OUT FLOWS</b>														
202	Investments	M US\$	0.00	110.00	220.00	98.28	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
203	O&M Costs	M US\$	0.00	0.00	0.00	0.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75		
204	Fuel Expenses	M US\$	0.00	0.00	0.00	0.00	116.50	116.50	116.50	116.50	116.50	116.50	116.50		
205	A&G Costs	M US\$	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00		
206	Others	M US\$	0	0	0	0	0	0	0	0	0	0	0		
207	Interest Paid	M US\$	0.00	0.00	6.16	18.97	25.99	24.04	21.99	19.77	17.36	14.75	11.93		
208	Repayments of Loans and Bonds	M US\$	0.00	0.00	0.00	0.00	2.14	2.14	2.14	2.14	2.14	2.14	2.14		
209	Repayments of Standby Facility	M US\$	0.00	0.00	0.00	0.00	24.47	25.59	27.79	30.12	32.59	35.20	37.97		
210	Equity Repayments	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
211	Taxes	M US\$	0.00	0.00	0.00	0.00	12.01	13.83	14.68	15.57	16.52	17.52	18.58		
212	Dividends	M US\$	0.00	0.00	0.00	0.00	3.21	3.21	3.21	3.21	3.21	3.21	3.21		
213	<b>TOTAL OUTFLOWS</b>	M US\$	0.00	110.00	226.16	117.25	198.07	199.07	200.06	201.06	202.07	203.08	204.09		
214															
215	<b>CASH AVAILABLE</b>	M US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Figure 48. Output module — Cash flow statement (screenshot).

## 7.12. Income statement report

The ISR displays, in tabular format, the income statements for alternative generation, for each nuclear unit and for NPP, including: energy revenue; capacity revenue; other revenue; total operating (gross) revenue; operating expenses; earnings before income tax, depreciation and amortisation (EBITDA); depreciation; taxes; operating income; interest expenses; and net earnings.

Figure 49 shows the ISR for a coal alternative. The worksheet is displayed with the same format for nuclear units.

OUTPUT MODULE - INCOME STATEMENT REPORT		Alternative Power Plant					Coal	
(Thousands of Dollars)		2003	2004	2005	2006	2007	2008	2009
<b>ENERGY REVENUE</b>		0	0	0	0	188 577	189 520	190 468
Net Generation (GWh)		0.0	0.0	0.0	0.0	4 691.0	4 691.0	4 691.0
Electricity Price (\$/MWh)		40.0	40.0	40.0	40.0	40.2	40.4	40.6
<b>CAPACITY REVENUE</b>		0	0	0	0	807 266	811 303	815 359
Installed Capacity (MWe)		630	630	630	630	630	630	630
Capacity Price (\$/KWe)		15.0	15.0	15.0	15.0	15.1	15.2	15.2
<b>OTHER REVENUE</b>								
<b>TOTAL OPERATING REVENUE</b>		0	0	0	0	995 844	1 000 823	1 005 827
<b>OPERATING EXPENSES</b>								
O&M		0	0	0	0	119 250	119 250	119 250
Administrative & General		0	0	0	0	2 750	2 750	2 750
Fuel		0	0	0	0	116 500	116 500	116 500
Purchased Power								
Other								
<b>EBITDA</b>		0	0	0	0	876 594	881 573	886 577
<b>DEPRECIATION</b>								
Income Taxes								
Federal		0	0	0	0	11 119	12 806	13 589
State		0	0	0	0	11 119	12 806	13 589
Municipal		0	0	0	0	11 119	12 806	13 589
Property Tax								
Value Added Tax (VAT)								
Other								

Figure 49. Output module — Income statement report (screenshot).

## 7.13. Balance sheet report

The balance sheet report (BSR) report displays, in tabular format, the balance for alternative generation, for each nuclear unit and for NPP. The user can see the assets accounts and the equity and liabilities accounts on this worksheet.

Figure 50 shows the BSR for a coal alternative. The worksheet is displayed with the same format for nuclear units

Alternative Power Plant		Coal	2002	2003	2004	2005	2006	2007	2008	2009
<b>BALANCE SHEET</b>										
<b>Assets:-</b>										
Gross fixed assets	M US\$		0.00	0.00	0.00	0.00	0.00	429.28	430.28	431.28
less:acc.depreciation	M US\$		0.00	0.00	0.00	0.00	0.00	0.00	21.46	42.98
less bal.consumer.contribution.	M US\$		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net fixed assets	M US\$		0.00	0.00	0.00	0.00	0.00	429.28	408.82	388.30
Work in progress	M US\$		0.00	0.00	110.00	330.00	428.28	0.00	0.00	0.00
Receivables	M US\$		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Short term deposits and cash	M US\$		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>total</b>	MUS\$		0.00	0.00	110.00	330.00	428.28	429.28	408.82	388.30
<b>Equity and Liabilities:-</b>										
Stockholders' Equity	M US\$		0.00	0.00	27.50	82.50	107.07	107.07	107.07	107.07
Retained earnings(+)/Accum. Losses	M US\$		0.00	0.00	0.00	-6.16	-25.13	2.48	9.75	19.17
Bonds outstanding	M US\$		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net loans outstanding	M US\$		0.00	0.00	5.50	16.50	19.27	17.13	14.99	12.85
Consumers deposits	M US\$		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Current portion of long term debt and c	M US\$		0.00	0.00	77.00	237.16	327.07	302.60	277.01	249.22
<b>total</b>	MUS\$		0.00	0.00	110.00	330.00	428.28	429.28	408.82	388.30

Figure 50. Output module — Balance sheet report (screenshot).

#### 7.14. Returns report

On the returns report worksheet there are displayed the annual and the overall return on equity (ROE) and return on assets (ROA) rates for each of the nuclear units and for the alternative one.

Figure 51 shows the Returns worksheet for the case of alternative generation. The worksheet is displayed with the same format for nuclear units.

Return on Equity and Assets		Coal	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Return on Equity	%		n.a	n.a	0.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Return on Assets	%		n.a	0.0	0.0	0.0	13.3	8.2	8.7	9.2	9.7	10.3
<b>Overall Return on Equity over the analysis period</b>			n.a.									

Figure 51. Output module — Rates of return.

## 8. GLOSSARY OF BUSINESS LITERACY TERMS

**A&G costs:** Administrative and General costs — Corporate overhead costs (indirect costs) covering items such as pensions, benefits, legal, human resources, tuition refunds, transportation, and similar costs.

**Above-the-line:** Expenses borne by a rate-payer.

**Accelerated depreciation:** Any depreciation method resulting in greater amounts of depreciation expense in the early years of a plant asset's life and lesser amounts in later years. Examples are double-declining-balance and sum-of-the-years'-digits methods.

**Accounting entity:** Business unit for which financial statements are being prepared. An accounting entity may be a complete business, such as a partnership or a corporation, or a smaller unit of business, such as a subsidiary or division.

**Accounting equation:** The equation reflected in the balance sheet:

**Accrual:** Recognition of an expense (or revenue) and the related liability (or asset) that is caused by an accounting event, frequently by the passage of time, and that is not signalled by an explicit cash transaction. For example, the recognition of interest expense or revenue (or wages, salaries, or rent) at the end of a period even though no explicit cash transaction is made at that time.

**Accumulated depreciation:** The cumulative amount of depreciation recorded against an asset or group of assets during the entire period of time the asset or assets have been owned.

**Allowance for funds used during construction (AFUDC):** A non-cash item representing the estimated composite interest costs of debt and a return on equity funds used to finance construction. The allowance is included in the property accounts; the contra credit is included in income. This portion of the carrying value of property (along with the rest) is included in a utility company's rate base and is recovered through revenues over its useful life.

**Allowed (allowable) rate of return:** The rate of return (to be determined to rate base) which the regulatory commission sets to determine rates.

**Amortization:** The general process of allocating acquisition cost of assets to either the periods of benefit as expenses or to inventory accounts as product costs. Called depreciation for plant assets, depletion for wasting assets (natural resources), and amortization for intangibles. Also used for the process of allocating premium or discount on bonds and other liabilities to the periods during which the liability is outstanding.

**Amortize:** To periodically write off as an expense a share of the cost of an asset, usually an intangible asset.

**Asset allocation:** The allocation of investment funds to different assets or groups of assets.

**Asset management:** A process for making resource allocation and risk management decisions at all levels of a business to maximize profitability and value to all stakeholders.

**Asset:** A property or economic resource owned by an individual or enterprise.

**Availability:** The percentage of time in a period that a power plant is available to operate if called upon.

**Balance sheet:** The financial statement of a firm that lists the assets and liabilities at a point in time.

**Basic income taxes:** Taxes consisting of the annual income taxes levied upon the company by Federal and State governments. Revenues received for payment of operating and maintenance expenses are not subject to income tax since, in computing taxable income, they are recognized as deductions. Depreciation is also a recognized deduction. The portion of the return element attributable to interest on debt also is deductible. On the other hand, the portion of the return element attributable to earnings on preferred and common stock is not deductible and therefore is subject to income tax. Since the income tax element is a function of the return element, it is a variable—being greatest initially and then declining over the years as the return element declines. The tax element, like the return element, is re-expressed in terms of an equivalent level annual amount.

**Basis:** In general, the cost of a purchased asset less any depreciation previously allowed or allowable for tax purposes.

**Below-the-line:** Expenses borne by a stockholder.

**Benchmarking:** Process of identifying best practices by comparing one's own performance to the best in the industry. Comparisons include process performance (cycle time and efficiency), cost measures as well as other indirect measures of performance. Benchmarking strives to improve one's own practices by implementing change. To be more like those of top performers.

**Betterment:** The replacement of an existing asset portion with an improved or superior asset portion.

**Book costs:** Original cost of property, as reflected in utility company records.

**Book depreciation:** The amount of money that must be set aside annually to recover the capital cost over the anticipated life of the facility. There are several methods of depreciation; emphasis will be upon the "straight line" method. Using the straight-line system of depreciation, this component is constant each year.

**Book value:** The carrying amount for an item in the accounting records. When applied to a plant asset, it is the cost of the asset minus its accumulated depreciation.

**Break-even-point:** The point at which you are no longer losing money or gaining money.

**Budget:** A formal plan for the approval and coordination of resources.

**Busbar cost:** The total cost associated with supplying electricity at a generating station. Components include Operations and Maintenance costs, Fuel Expense, capital carrying costs, decommissioning costs and Administrative and General (A&G) Costs. These costs are usually expressed in cents per Kilowatt-hour.

**Business improvement:** Processes incorporated into a business in order to improve the results and efficiencies of the business operations.

**Business literacy:** Understanding and awareness of business/financial terminology and the application of this understanding to daily processes.

**Business plan:** A document linking overall company strategic goals and objectives to everyday work processes, including major steps about how to achieve them.

**Capacity factor:** The power produced in a period expressed as a percentage of the maximum power a generating unit is capable of producing in that period.

**Capacity:** The load for which a generating unit, generating station, or other electrical apparatus is rated either by the user or by the manufacturer. The ratio of the actual output divided by the ideal output is called the capacity factor. Primary capacity factors are Maximum Dependable Capacity (MDC), based on a reference test of the unit and Design Engineering Reference (DER), based on nominal plant design rating.

**Capital asset:** Any item of property except (1) inventories, (2) trade notes and accounts receivable, (3) real property and depreciable property used in a trade or business, (4) copyrights or similar property, and (5) any government obligation derived within one year and issued at a discount.

**Capital budgeting:** The plan for the coordination of resources and expenditures that will determine the projects a firm should undertake.

**Capital expenditure:** An expenditure that increases net assets and provides value to consumers for a period in excess of one year.

**Capital intensive:** A term used to designate a condition in which a relatively large dollar investment is required to produce a dollar of revenue. The electric industry, for example, has an investment of about \$4.00 for each dollar of revenue generated annually.

**Capital structure:** The mix of different securities issued by a firm.

**Capital:** The costs associated with an investment in a facility, that is usually financed, and can be depreciated. The Capital return on investment and depreciation, return of investment are amortized over the life of the investment as an expense.

**Capital-intensive business:** An enterprise that requires a significantly greater investment in facilities than do other businesses.

**Capitalization:** Long-term debt, preferred stock, and owners' equity.

**Carrying costs:** The annual cost to maintain inventory and service the cost of capital investment.

**Cash flow statement:** A financial statement consisting of cash receipts and disbursements, summarizing the organization's net cash position. It reveals the sources and uses of a company's cash.

**Cash flow:** The difference between cash receipts and cash disbursements over a specified period of time.

**Common capital stock or common stock:** Shares of stock issued and stated at par value, stated value, or the cash value of the consideration received for such no par stock; none of which is limited nor preferred as to distribution of earnings or assets.

**Common dividends:** A payment to common stockholders.

**Competition:** Freedom of economic choice in buying, selling, or exchange of goods and services.

**Competitive business intelligence:** The review and analysis of publicly available information which, when assessed and disseminated to management, may create value for the business.

**Competitive drivers:** Factors that may impact, either directly or indirectly, a strategy or business plan. These could include such items as changes in the law, innovation, the entrance of new competitors and mergers or acquisitions within the industry.

**Complete market:** Market in which investors can buy or sell combinations of securities and/or commodities that pay off in all desired states, i.e., in all desired circumstances.

**Composite depreciation:** Group depreciation of dissimilar items.

**Composite life method:** Group depreciation for items of unlike kind. The term may be used when a single item, such as a crane, which consists of separate units with differing service lives, such as the chassis, the motor, the lifting mechanism, and so on, is depreciated as a whole rather than treating each of the components separately.

**Confiscatory return:** A return so low as to deprive a utility company of its lawful property rights.

**Consolidated financial statement:** Combined balance sheets, income statements, and statements of cash flows of a parent company and its subsidiaries.

**Consolidated tax savings:** Savings achieved by corporations who are members of an affiliated group who may file a single consolidated income tax return.

**Construction work in progress (CWIP):** Plant or assets not yet operational, which may or may not be included in a utility's rate base.

**Controllable costs or expenses:** Costs over which the manager has control as to the amounts incurred.

**Cost management:** Controlling and being acutely aware of the expenses incurred in and/or required to operate a business.

**Cost of capital (net):** The return asked, or being asked, by investors for the use of their money, expressed as percentages of the capital funds.

**Cost of capital:** The composite rate of cost for debt interest, preferred stock dividends and common stockholder earnings requirements. It is the composite of the cost of the various capital sources used to provide the facilities utilized in supplying utility service.

**Cost of removal:** The cost of demolishing, dismantling, tearing down or otherwise removing electric plant, including the cost of transportation and handling.

**Cost of service (often referred to as “revenue requirements):** Operation and maintenance expenses, depreciation and amortization expenses, and income and other taxes found just and reasonable by the regulatory agency of rate-making purposes plus, in the case of public utilities, and allowance for capital (usually computed by applying a rate of return to the rate base).

**Cost-benefit analysis:** A financial model used to determine if a project will be profitable by comparing the estimated project cost with the estimated project benefit.

**Current asset:** An asset whose useful life is less than one year, such as cash, securities and accounts receivable.

**Current period:** The present accounting period.

**Debt capital:** Funds secured for a business by borrowing, such as through the sale of bonds.

**Debt expense:** All expenses in connection with the issuance and initial sale of evidences of debt, such as fees for drafting mortgages and trust deeds; fees and taxes for issuing or recording evidences of debt; cost of engraving and printing bonds and certificates of indebtedness; fees paid trustees; specific costs of obtaining governmental authority; fees for legal services; fees and commissions paid underwriters, brokers, and salesmen for marketing such evidences of debt; fees and expenses of listing on exchanges; and other like costs.

**Debt, long-term:** Borrowed funds with a maturity (repayment date) occurring far in the future.

**Debt:** An instrument of finance; all debt instruments provide fixed, regular repayments to the lender by the lender borrower, regardless of the lender's borrower's business performance.

**Debt-to-equity ratio:** The total dollar value of business debt financing divided by the total dollar value of equity financing.

**Debt to total assets ratio:** Long-term loans plus current liabilities expressed as a percentage of total assets

**Decision analysis:** A systematic process for making decisions and understanding risk exposure in situations of uncertainty or imperfect information; relies heavily on mathematical tools such as systems analysis and operations research.

**Decision support:** Determination of whether a project or expenditure is a profitable endeavour to pursue. It is the process of providing risk-based analysis where several options may exist.

**Declining-balance depreciation:** A depreciation method in which up to twice the straight-line rate of depreciation, without considering salvage value, is applied to the remaining book value of a plant asset to arrive at the asset's annual depreciation charge.

**Decommissioning fund:** For a nuclear power plant, a regular, annual set-aside of funds generated from operations, to support the eventual decommissioning of the plant when it is retired.

**Decommissioning:** The costs presently being accrued for the end of life decommissioning of the nuclear units.

**Deferred charges:** An expense that has been incurred but whose payment, for whatever reasons, has been put off until some time in the future.

**Deferred income tax:** Amounts of income tax the incurrence of which is delayed or put off until later years due to accelerated depreciation or other cause.

**Depletion:** Closely related to depreciation, this refers to the actual physical consumption of property (e.g. a coal deposit).

**Depreciable life:** For an asset, the time period or units of activity (such as miles driven for a truck) over which depreciable cost is to be allocated. For tax returns, depreciable life may be shorter than estimated service life.

**Depreciation:** The wearing out or loss of service value of property used in business operations.

**Depreciation expense:** The annual allowance for the depreciation of property representing that portion that has been “used up” during the previous twelve months.

**Depreciation reserve:** the paper account that represents the accumulation of yearly allowances for depreciation expense. The reserve is viewed as an asset and indicates that funds are (in theory) being set aside.

**Derated operation:** Power plant operation at less than its full rated capacity.

**Deregulation:** The relaxation of government controls over business operations.

**Direct costs or expenses:** Costs that are easily traced to or associated with a cost object, for example, costs incurred by a department for the sole benefit of the department.

**Direct labour:** Employees directly involved in the making of a product or in the rendering of a service. This payroll falls into the category of direct costs.

**Direct materials:** A synonym for raw materials.

**Disbursement:** A cash amount paid out by the company.

**Discount rate:** An interest rate, measured as a percentage, used to convert future dollars into present dollars (discounting) and vice versa (interest compounding), according to standard net present value formulas.

**Discounted cash flow (DCF):** Analysis technique used in business to convert future cash flow estimates to their present (i.e. today's) value, using a discount rate. Related to the term net present value.

**Discounted cash flows:** The present values of a stream of future cash flows from an investment, based on an interest rate that gives a satisfactory return on investment.

**Divestiture:** The compulsory transfer or disposal of interests (such as stock or asset in a corporation) by government order.

**Dividend:** A taxable payment, declared by the board of directors and given to its shareholders out of the company's current or retained earnings.

**Dividend rate:** The percentage of earnings paid to shareholders in dividends.

**Earnings before interest and taxes (EBIT):** A standard measure of business performance; calculated as annual total earnings, before subtracting out tax payments and payments to debt holders. Also known as net operating income.

**Earnings before interest, taxes, depreciation and amortization (EBITDA):** Similar to EBIT, calculated by subtracting only cash expenses from revenues. Depreciation and amortization are not subtracted out, as in the EBIT calculation.

**Earnings per share:** Net income available to shareholders divided by the number of shares of stock outstanding.

**Earnings:** Annual revenues minus annual operating expenses (including non-cash expenses such as depreciation and amortization).

**Economic life:** The time span over, which the benefits of an asset are expected to be received. The economic life of a patent, copyright, or franchise may be less than the legal or service life.

**Economies of scale:** The principle that increased size of operations yields increased efficiency, as well as greater output.

**Effective tax rate:** the average tax rate paid on all taxable income.

**Energy export tax:** State taxes imposed on utilities that export energy to consumers in another state.

**Environmental credit:** For a power plant, the right to generate a standard quantity of air emissions.

**Equity:** Financial value of ownership or partial ownership of a company.

**Escapable expenses:** Costs that would end with an unprofitable department's elimination.

**Estimated life depreciation:** Depreciation determined on the basis of the estimate service life of the asset.

**Excise tax:** Taxes imposed in the manufacture, sale, or consumption of commodities and services.

**Expected rate of return:** The rate of return expected on an asset.

**Expense:** The consumption of assets for the purpose of generating revenue.

**Extraordinary repairs:** Major repairs that extend the life of a plant asset beyond the number of years originally estimated.

**Fair return:** A legal concept of the amount of earnings to be allowed a utility company.

**Fair value:** A legal concept of the value of a utility's property for rate-making or other purposes.

**FASB:** The U.S. Financial Accounting Standards Board. An independent board responsible, since 1973, for establishing generally accepted accounting principles. Its official pronouncements are called "Statements of Financial Accounting Standards" and "Interpretations of Financial Accounting Standards."

**Federal income tax:** Income tax levied by the U.S. government on individuals and corporations.

**Federal unemployment tax:** A tax levied by the U.S. federal government and used to pay a portion of the costs of the joint federal-state unemployment programs.

**FERC form I:** A data collection instrument used by the U.S. Federal Energy Regulatory Commission (FERC) that documents operating information from all U.S. electric generators.

**FICA taxes:** U.S. Federal Insurance Contributions Act Taxes, otherwise known as social security taxes.

**Financial reporting:** Development and issuance of required fiscal reports to meet government and other standards.

**Financial risk:** The risk posed by the heavy use of debt support by creditors.

**Firm value:** A company's assets less debt.

**Fiscal period:** A Financial reporting period that may cover a year (fiscal year) or a quarter (fiscal quarter).

**Fiscal policy:** Government spending and taxation policy.

**Fixed asset:** An asset whose useful life is greater than one year, such as a manufacturing plant, an office building, or heavy equipment.

**Fixed cost:** A cost that remains unchanged in total amount over a wide range of production levels.

**Fixed expenses:** Expenses that do not vary with levels of production, such as plant costs and salaries.

**Fixed O&M costs:** O&M cost categories that are independent of the amount of energy generated by the plant.

**Forced outage:** A power plant outage brought about when something unanticipated breaks down or goes wrong (see outage).

**Forward price:** Price of a commodity on offer today, at which a buyer can contract for delivery at some specified time in the future. For example, if the forward price of electricity for January 2003 is \$75/MWh, a buyer can contract for that price today and be assured of getting electricity at that price on 1/1/2003, regardless of what the "spot" price is on that day.

**Franchise tax:** A local tax imposed for the privilege of providing utility service within city limits.

**Franchise:** A grant of authority from a municipality to a public utility authorizing it to operate within the municipality's boundary.

**Functional depreciation:** Loss of service usefulness or obsolescence due to technological advances or social requirements.

**Funded debt:** Long term debt securities.

**Future capital requirement:** An estimate of a power plant's future capital investment needs; an indicator of long-term operating health and cash flow generation potential.

**General and administrative expenses:** The general office, accounting, personnel, and credit and collection expenses.

**Generation, electric:** Process of transforming other forms of energy into electric energy, or to the amounts of electric energy so produced, generally expressed in megawatt-hours.

**Going forward cost:** Represents the minimum price for electricity sold (cent/kWh) that covers all the operating expenses and carrying charges related to investment including taxes

**Government ownership:** Utility or other business services that are owed and operated by a government agency, federal, state or local.

**Gross assets:** The value of total assets at the plant commissioning.

**Gross income:** All revenues collected; the starting point for all income tax calculations.

**Gross profit (margin):** Sales less cost of sales.

**Heat rate:** Amount of heat required to generate a kilowatt-hour of electricity; a measure of power plant efficiency, i.e. a lower heat rate means a more efficient plant.

**Historical cost:** Total sum paid to purchase an asset and get it ready for use.

**Holding company:** An organization not directly engaged in the operation of any business, but which owns the stock of other companies.

**Improvement:** An expenditure to extend the useful life of an asset or to improve its performance (rate of output, cost) over that of the original asset. Such expenditures are capitalized as part of the asset's cost. Contrast with maintenance and repair.

**Inadequacy:** The situation where a plant asset does not produce enough product to meet current needs.

**Income (profit and loss) statement (P&L):** A financial statement showing a company's net income — the profit after deducting all expenses — over a period. Provides investors and creditors with information that helps predict the amount, timing and uncertainty of future cash flows. Accurate predictions of future cash flows help investors assess the economic value the company and creditors determine the probability of repayment of their claims against the company.

***Income from continuing operations:*** After-tax income of the portion of the business that is continuing.

***Income risk:*** The risk of having insufficient income to carry on operations.

***Income tax rules:*** Rules governing how income for tax purposes and income taxes are to be calculated.

***Income tax:*** An annual tax levied by the federal and other governments on the income of an entity. An expense. If not yet paid, a liability.

***Income:*** Revenues received from sales and other operations of a business.

***Incremental cost:*** An additional cost resulting from a particular course of action.

***Indirect costs:*** Costs of production not easily associated with the production of specific goods and services; overhead costs. May be allocated on some arbitrary basis to specific products or departments (A&G costs).

***Indirect personnel (labour):*** Employees who are necessary for running a business but who are not directly involved in production or service. Indirect labour wages and salaries are indirect costs.

***Industry norms:*** For every industry, there is a set of normal ratios, which reflect the average value for the given type of business.

***Inescapable expenses:*** Expenses that would continue even though the department were eliminated.

***Innovation:*** Process improvement using new ideas, concepts and technology.

***Intangible asset:*** A non-physical, non-current asset such as a copyright, patent, trademark, goodwill, organization costs, capitalized advertising cost, computer programs, licenses for any other preceding, government licenses (e.g., broadcasting or the right to sell liquor), leases, franchises, mailing lists, exploration permits, marketing quotas, and other rights that give a firm an exclusive or preferred position in the marketplace.

***Interest:*** Regular payments (usually semi-annually) remitted by bond issuers to bond holders for the use of borrowed money. Annual interest payments will be equal to the face value of the bond times its coupon.

***Internal rate of return (IRR):*** Discount rate for which the present value of a company's or project's expected cash inflows equals the present value of the company's or project's cost; this rate gives an NPV of zero.

***Internal revenue code:*** Collectively, the statutes dealing with taxation that have been adopted by U.S. Congress.

***Inventory:*** Goods owned by the corporation, in the form of raw materials, work in process, or finished goods.

***Investor-owned utility:*** A utility company owned and operated by investors to serve the public.

**Joint cost:** A single cost incurred to secure two or more essentially different products.

**Kilowatt-hour (kWh):** The basic unit of electric energy equal to one thousand watts of power supplied to or taken from an electric circuit steadily for one hour.

**Liabilities:** A firm's obligations to pay its creditors sometime in the future.

**License renewal:** The formal process undertaken by a nuclear power plant to extend the term of its operating license, typically from 40 to 60 years in the U.S.; the Nuclear Regulatory Commission grants such renewed licenses in the U.S.

**Life cycle management (LCM):** The process by which nuclear power plants integrate operations, maintenance, engineering, regulatory and business activities to manage plant condition, optimize operating life, and maximize plant value while maintaining plant safety.

**Line of sight:** The ability to view how a company's corporate goals and objectives are being implemented throughout the organization.

**Load:** The amount of energy delivered or required at any specified point or points on a system. Load originates primarily at the consuming equipment of the customers.

**Loan:** An arrangement in which a lender gives money or property to a borrower, and the borrower agrees to return the property or repay the money, usually along with interest, at some future point(s) in time.

**Long-lived (term) asset:** An asset whose benefits are expected to be received over several years. A non-current asset usually includes investment, plant assets, and intangibles.

**Manufacturing overhead:** A synonym for factory overhead. Also called manufacturing burden.

**Marginal tax rate:** The rate that applies to the next dollar of income to be earned.

**Market price:** Price at which a security or commodity is traded in the market. Electricity is traded at both the wholesale level and retail level as a commodity in a deregulated environment.

**Market rate of bond interest:** The current bond interest rate that borrowers are willing to pay and lenders are willing to take for the use of their money.

**Marketable security:** A security or commodity that is easily traded, such as a stock or bond or megawatt-hour contract.

**Matching:** The principle that helps accountants determine how to fairly record a production cost as expense. Costs directly associated with producing revenue should be expensed in the same period that the revenue is recorded. Costs that benefit more than one period should be expensed over the periods benefited.

**Materiality:** Concept of relative importance. An item is material if it can influence a decision made by a user of the financial statements. When an item is material, it must be accounted for within the measurement and reporting principles — Generally Accepted Accounting Principles.

**Merger:** A combination of two or more firms in which the assets and liabilities of the selling firm(s) are absorbed by the buying firm. Mergers are usually accomplished by either exchanging stock, cash purchase of assets or payment of debt or by some combination of these methods.

**Minimum revenue requirement:** The least revenue for a company that just cover the annual costs registered by the company. The annual amount of every cost component becomes the minimum revenue requirement in that year for the company

**Municipal ownership:** A term applied when a business enterprise is owned and operated by a municipal government.

**Natural monopoly:** An activity such as the provision of gas, water, and electrical service characterized by economies of scale wherein cost of service is minimized if a single enterprise is the only seller in the market.

**Natural resources:** Timberland, oil, and gas wells, ore deposits, and other products of nature that have economic value. The cost of natural resources is subject to depletion. Often called “wasting assets.”

**Net asset value:** The outstanding (investment less cumulative depreciation) value of a utility asset. It is also, the current price of a share of stock.

**Net assets:** Assets minus liabilities. Net assets are equal to owner’s equity.

**Net fixed assets:** Fixed assets less accumulative depreciation.

**Net generation:** Gross generation less power consumed for station use.

**Net income:** Earnings or profits of an enterprise.

**Net loss:** Negative cash flow of an enterprise.

**Net original cost:** Original cost less accumulated depreciation.

**Net present value method:** Annual revenue less all expenses including taxes but not book depreciation and return, discounted at an assumed rate of return (cost of money) to determine a present worth of incoming cash flow for comparison with the initial capital expenditure (an outgoing cash flow). Often used to determine a “go or no-go” decision for project implementation.

**Net present value:** Present (i.e. discounted) value of the cumulative future net cash flow generated by a company, plant, or project.

**Net salvage:** The difference between gross salvage and cost of removal resulting from the removal, abandonment or other disposition of retired plant. Positive net salvage results when gross salvage value exceeds removal costs. Negative net salvage results when removal costs exceed salvage value. Positive net salvage decreases the cost to be recovered through depreciation expense and negative net salvage increases it.

**Net salvage value:** The salvage value of property retired less the cost of removal.

**Net utility plant:** The investment in utility plant less depreciation.

**Net worth:** Record of a business showing the net investment or net ownership (equity) interest in the business remaining after liability obligations are balanced against assets.

**Nominal rate of return:** The rate of return of an investment where the purchase price and payoffs are measured in units of currency.

**Non-current liability:** Any debt of the business that is not expected to be paid for at least one year from the date of the balance sheet.

**Normalization:** A regulatory practice in which a utility is permitted to compute its taxes or other expenditures on a periodically averaged basis rather than actual payments for a given year, in order to gain deduction advantages earlier than would otherwise accrue, thereby resulting in tax-free revenue availability not “flowed through” to ratepayers.

**Nuclear asset management:** A process for making resource allocation and risk management decisions at all levels of a nuclear generation business to maximize profitability and value to all stakeholders while maintaining plant safety.

**O&M cost:** Operating and Maintenance costs. Those expenses needed to operate and maintain a facility.

**Observed depreciation:** Depreciation determined by physical observation and appraisal of the condition of depreciable property.

**Obsolescence:** Depreciation caused by technological improvements.

**Occupational tax:** A tax imposed on businesses in return for the privilege of doing business locally.

**Oligopoly:** A market where there is very limited competition.

**Operating costs:** Expenses incurred in a business arising from or directly related to producing the service.

**Operating income:** Sales less cost of sales (direct costs) and operating (indirect) expenses. It excludes peripheral income, such as interest on investments, and non-operating expenses, such as taxes.

**Operating margin:** Difference between operating revenue per kWh (i.e., market price) and operating cost per kWh; a measure of how much cash can be generated to retire debt and cover related capital costs.

**Operating revenues:** Income received in transacting the normal course of business.

**Operating risk:** The probability that through operations, themselves, conditions can be created that threaten continued operation and cash flow of a business enterprise; can include such issues as waste storage uncertainty, equipment breakdown, cooling water degradation, and accidents.

**Opportunity cost:** A sacrifice made to gain some benefits; that is, in choosing one course of action, the lost benefit associated with an alternative course of action.

**Option value:** Increment in net present value due to the right-not the obligation-to retire a plant before expiration of the original licensed term or to operate during a license renewal term; option value is always positive because an option will be exercised only if future conditions are favourable.

**Ordinary repairs:** Repairs made to keep a plant asset in its normal good operating condition.

**Original cost:** As a measure of fair value, is the amount of investment made to build or buy a given plant when first devoted to public service.

**Other direct costs (ODC):** Costs, other than labour or materials, that are directly attributable to the making of the company product, e.g. factory-related expenses.

**Other indirect costs (OIC):** Expenses that cannot be attributed to the making of a specific product. Examples are depreciation on a plant in which many products are made, utility and heating expenses, or delivery fleet lease payments and maintenance costs.

**Outage costs:** Expenses solely related to a periodic refuelling outage.

**Outage:** For a power plant, a period during which it is off-line and not producing electricity.

**Out-of-pocket cost:** A cost requiring a current outlay of funds.

**Over-applied overhead:** The amount by which overhead applied on the basis of a predetermined overhead application rate exceeds overhead actually incurred.

**Overhead:** The costs associated with support from non-electricity producing organizations.

**Owner's equity:** The ownership interest in a business enterprise.

**Parent company:** A company that owns the stock of one or more subsidiaries and may be either a holding company or hybrid company.

**Payback period:** Annual revenue less all expenses including taxes (but not book depreciation or return), divided into the initial capital expenditure to determine the number of years required to equal or pay back the initial capital expenditure.

**Payroll tax:** A tax levied on the amount of payroll or on the amount of an employee's gross pay.

**Performance measurement:** The process of measuring results against the desired state.

**Phantom tax:** A regulatory Issue arising from the use of accelerated depreciation methods, which reduces taxable income and makes greater capital available for construction.

**Physical depreciation:** Loss of service usefulness or life due to wear and tear from use or other causes, such as rust or rot.

**Planned outage:** The period during which a power plant it is taken off-line to perform refuelling and planned maintenance (see outage).

**Plant assets:** Buildings, machinery, equipment, land and natural resources. The phrase “property, plant and equipment” is, therefore, a redundancy. In this context, “plant” means buildings.

**Plant phase-in:** The gradual inclusion of a new plant in rate base over a period of time to avoid sudden large rate increases.

**Plant:** Plant assets.

**Power pool:** A regional organization of electric companies interconnected for the sharing of reserve generating capacity and power production coordination.

**Predetermined overhead application rate:** A rate that is used to charge overhead cost to production; calculated by relating estimated overhead cost for a period to another variable such as estimated direct labor cost.

**Present value:** The discounted value of future cash flows.

**Pre-tax earnings:** Earnings left after addition operating income to non-operating income (e.g. interest earned on loads), and then deducting non-operating expenses such as extraordinary costs, but not taxes.

**Price cap regulation:** A rate-setting process whereby a ceiling is placed on the price of service instead of limiting the allowable rate or return.

**Price earnings multiples (P/E):** Standard family of financial indicators of business performance. The ratio of the stock price (as determined by the market) to earnings as represented by typical accounting measures of income, usually EBIT or EBIDA. Also known as price/earnings ratios. It is Wall Street's valuation of profitability.

**Price earnings ratio:** The market common stock price divided by the annual earnings per share of common stock. The market price used may be a spot price, or an average of closing or the high and low prices for a period and the earnings are for the corresponding period.

**Prior period:** A preceding accounting period.

**Pro forma statement:** Financial statement prepared on the basis of some assumed future events; usually consists of an income statement, balance sheets and cash flow statement.

**Production cost:** Costs assigned directly to the production of electricity. Electric generation production cost equals O&M cost plus fuel expense. It is normally expressed in cents per Kilowatt-hour.

**Production expense:** An expense incurred in the operation of a plant.

**Production method:** The depreciable asset is given a depreciable life measured, not in elapsed time, but in units of output or perhaps in units of time of actual use. Then the depreciation charge for the period is a portion of depreciable cost equal to a fraction determined by dividing the actual output produced during the period by the expected total output to be produced over the life of the asset. Sometimes called the “units of production” (or output) “method.”

**Productivity:** Amount of output generated per unit of input. In a power plant capacity factor (i.e. MWh generated per unit of MW capacity) is a measure of productivity.

**Profit margin:** Difference between revenue per kWh (market price) and total cost per kWh (includes operating costs, debt payments, taxes and other corporate costs), a measure of cash generated for stockholders.

**Profit:** Remaining income after business expenses are paid.

**Prudent investment:** As a measure of fair value, is a reasonable investment that should have been invested in a given plant.

**Public ownership:** see “Government ownership”.

**Public service (utilities) commission:** State regulatory body governing the rates and practices of utilities.

**Public utility district:** Political subdivisions that are independent of city and county government and are voted into existence by residents for the specific purpose of rendering a utility service.

**Public utility:** A business enterprise rendering a service considered essential to the public and, as such, subject to regulation in the public interest, usually by statutory law.

**Rate base:** Value of property upon which a utility is given the opportunity to earn a specified rate of return as established by a regulatory authority.

**Rate case:** A proceeding, usually before a regulatory commission, involving the rates to be charged for a public utility service.

**Rate of return on average investment:** The annual, after-tax income from the sale of an asset’s product divided by the investment in the asset.

**Rate of return on common stockholder’s equity:** Net income after taxes and dividends on preferred stock divided by average common stockholder’s equity.

**Rate of return on total assets employed:** Net income after taxes, plus interest expense, expressed as a percentage of total assets employed during the period.

**Rate of return:** The return earned or allowed to be earned by a utility enterprise calculated as a percentage of its fair value or rate base.

**Ratio:** A numerical relationship that compares one magnitude with another in the form of a multiple, such as 2:1. The multiple may also be expressed as a fraction (2/1), percentage (200%), or rate (2 per 1).

**Receipt:** A cash amount received by the company.

**Recovery property:** Property eligible for write-off under the accelerated cost recovery system.

**Regulation:** A process whereby governmental powers are used to direct or control some phase or unit of economic activity.

**Regulatory agency:** A Government body that regulates enterprises in certain specified industries.

**Regulatory assets and liabilities:** Assets and liabilities that result from rate actions of regulatory agencies.

**Regulatory compliance:** Power plant operation within the scope of regulatory rules (i.e. EPA environmental regulations, NRC safety regulations).

**Remaining life:** Under this method of determining depreciation allowance, when the estimated useful life is revised, the annual depreciation rate is re-determined for future years. Also, the remaining design or license life of an electric generating facility.

**Replacing or replacement:** The construction or installation of electric plant in place of property retired, together with the removal of the property retired.

**Reproduction cost:** As a measure of fair value, is the amount which would be required to build a given plant today.

**Reserve theory of depreciation:** Presumes replacement of assets through the establishment of a separate fund, which will be sufficient to cover replacement costs when the old asset is retired.

**Reserve:** Amounts recorded in accounting records as earmarked for or credited to certain purposes, but not necessarily physically segregated in special accounts. Thus, a reserve for depreciation or a reserve for contingencies may be simply bookkeeping records for such a fund.

**Retained earnings:** The dollar amount of assets furnished by earnings of the company that were not distributed as dividends.

**Retirement theory of depreciation:** Presumes gradual retirement of an asset at a given cost.

**Return allowance:** The rate of return designated by a regulatory commission for testing the reasonableness of rates.

**Return on assets (ROA):** Earnings as a percentage of total assets; ratio of net income to total assets.

**Return on equity (ROE):** Earnings as a percentage of stockholder equity; ratio of net income to common equity; measures the rate of return on common stockholders' investment. The profit earned for each dollar of shareholders equity.

**Return on investment (ROI):** Annual revenue less all expenses including taxes and book depreciation but not return, divided by investment required.

**Return on net assets:** The profit earned on each dollar invested in assets.

**Return:** Represents the money required annually to compensate security holders for the funds provided as invested capital for the plant facilities. It consists of interest on debt, dividends on preferred stock and earnings on common equity. The return element is variable, being greatest initially and then declining over the years because a fixed cost of money, or rate of

return, is applied annually to the net plant (total plant less accumulated depreciation). To adjust for the variability of this component, present worth techniques are employed to obtain an equivalent constant, annual return.

**Revenue bond:** A bond upon which the company promised to pay interest only if earned, sometimes called an income bond.

**Revenue recognition:** Revenue is reported in the fiscal period in which the sale is made (or the service is provided) regardless of whether cash is collected from the customer or the customer still owes for the merchandise (service).

**Revenue requirement:** That amount a utility must collect to pay expenses and provide a fair return to investors.

**Revenue tax:** Taxes imposed on business gross receipts or otherwise based on revenue, sometimes in place of, or in addition to, property taxes.

**Revenue:** Receipts from the sale of goods and services.

**Risk premium:** Extra compensation paid to an employee or extra interest paid to a lender, over amounts usually considered to be normal, in return for their undertaking to engage in activities more risky than normal.

**Risk:** The measure of the variability of the return on investment. For a given amount of return, most people prefer less risk to more risk. Therefore, in rational markets, investments with more risk usually promise, or are expected to yield, a higher rate of return than investments with lower risk. Most people use “risk” and “uncertainty” as synonyms. In technical language, however, these terms have different meanings. “Risk” is used when the probabilities attached to the various outcomes are known, such as the probabilities of heads or tails in the flip of a fair coin. “Uncertainty” refers to an event where the probabilities of the outcome, such as winning or losing a lawsuit, can only be estimated.

**ROI:** Return on investment, but usually used to refer to a single project and expressed as a ratio: income divided by average cost of assets devoted to the project.

**Salvage value:** The estimated dollar amount that would be received upon a sale of property after that property has become worn out or unproductive.

**Scrap value:** Salvage value assuming item is to be junked. Residual value.

**Self-assessment:** A periodic review conducted by the site or company to compare overall results with expected results. Sources of information included in a self-assessment may be management comments, employee interviews, reviews of plant events and trends, external assessments of other companies, independent assessments and benchmarking. The goal of self-assessment is to evaluate present direction of the business with regard to nuclear safety, shareholder value and corporate stewardship.

**Semi-variable cost:** A cost that changes with production volume but not in the same proportion.

**Service area:** The territory in which a utility company has the right to supply or make available its utility service.

**Service departments:** Departments that do not produce revenue but which supply other departments with essential services.

**Service life depreciation:** Depreciation determined on the basis of estimated service of the asset.

**Service life:** The period of time a plant asset is used in the production and sale of other assets or services.

**Service obligation:** A term used to mean the obligations, which are among the duties a public utility, is to perform. They usually are considered to include the duty: to serve all; to provide adequate service; and to render safe, efficient, and nondiscriminatory service.

**Service value:** The difference between original cost and net salvage value of electric plant.

**Short-term debt:** Bank borrowings or bonds with less than the traditional 20- to 30-year maturities.

**Sinking fund method of depreciation:** The periodic charge is an amount so that when the charges are considered to be an annuity, the value of the annuity at the end of depreciable life is equal to the acquisition cost of the asset. In theory, the charge for a period should also include interest on the accumulated depreciation at the start of the period. A fund of cash is not necessarily, or even usually, accumulated. This method is rarely used.

**SOYD:** Sum-of-the-years'-digits depreciation.

**Spot market:** Commodity transactions whereby participants make buy-and-sell commitments of relatively short duration, in contrast to the contract market in which transactions are long-term.

**Spot price:** Price of a commodity for immediate exchange at a specific point in time.

**State unemployment tax:** A payroll tax levied by a state, the proceeds from which are used to pay benefits to unemployed workers.

**Statement of cash flows:** Statement that reports all the changes that have occurred in the balance sheet during the fiscal period, either providing or using cash.

**Station use (generating):** The kilowatt-hours used internally at an electric generating station for purposes other than sale. Station use includes electric energy supplied from house generators, main generators, the transmission system, and any other sources for this purpose. The quantity of energy used is the difference between the gross generation plus any supply from outside the station and the net output of the station.

**Straight-line depreciation:** A depreciation method that allocates an equal share of the total estimated amount a plant asset will be depreciated during its service life to each accounting period in that life.

**Stranded cost recovery:** Ability of an electric utility to recover stranded costs through surcharges or other means, as allowed by a regulatory authority.

**Stranded costs:** Costs incurred in the past that have been rendered non-economic and or “stranded” due to the onset of competition or by other changing economic or business conditions.

**Stranded investment:** Net plant investment held by owners of a facility at the time when de-regulation (restructuring) takes place. “Stranded” implies an inability to recover the investment over the original amortization period.

**Strategy and planning:** Strategy identifies future business direction and goals. The key objectives in strategy are to employ company strengths to take advantage of business opportunities, while avoiding business threats created by company weaknesses. Planning refers to business planning or the objectives and methods anticipated to implement the strategies.

**Sum-of-the-year’s-digits-depreciation:** A depreciation method that allocates depreciation to each year in a plant asset’s life on a fractional basis. The denominator of the fractions used is the sum-of-the-year’s-digits in the estimated service life of the asset, and the numerators are the years’ digits in reverse order.

**Sunk costs:** Costs incurred (i.e. funds spent or committed) in the past that cannot be affected by any present or future course of action.

**Tax avoidance:** A legal means of preventing a tax liability from coming into existence.

**Tax credit:** A direct, dollar for dollar, reduction in the amount of tax liability.

**Tax:** A non-penal, but compulsory, charge levied by a government on income, consumption, wealth, or other bases for the benefit of all those governed. The term does not include fines or specific charges for benefits accruing only to those paying the charges, such as licenses, permits, special assessments, admissions fees and tolls.

**Technical leverage:** Using the relationship available among various informational tools (i.e. Intranet, MS Access, etc.) to gain and/or communicate valuable insights into a business.

**Test period:** Also referred to as test year, this is an historic period of time selected and used as a proxy for the future in the electric rate-setting process.

**Thermal performance:** Amount of fuel energy converted into thermal (heat) energy (which is subsequently converted into electrical energy).

**Total sales:** Total sales less allowances for returns and bad debt. Same as sales.

**Transaction cost:** Cost associated with buying or selling assets.

**Unbundling of rates:** A pricing structure which charges separately for the individual components of providing various utility services.

**Uncontrollable cost:** A cost the amount of which a specific a manager cannot control within a given period of time.

**Under-applied overhead:** The amount by which actual overhead incurred exceeds the overhead applied to production, based on a predetermined application rate and evidenced by a debit balance in the overhead account.

**Uniform system of accounts:** A system of accounts prescribed by The U.S. Federal Energy Regulatory Commission (FERC) for use by the utility companies under its jurisdiction.

**Unit capability factor:** Ratio of available energy generation (energy that could have been produced considering only limitations under plant management control) to reference energy generation.

**Units-of-production depreciation:** A depreciation method that allocates depreciation a plant asset based on the units of product produced by the asset during a given period to the total units the asset is expected to produce during its entire life.

**Unplanned capability loss factor (UCLF):** For a nuclear power plant, total off-line time annually caused by factors not under the plant operator's control.

**Used and useful rule:** A principle of electric utility financial regulation in which a utility is entitled to earn a return on all its property used and useful to consumers in the provision of utility service.

**Useful life:** The period of time over which property is depreciated; the length of time that property or equipment is expected to last before replacement.

**Utility plant accounts:** The accounts in which the records of investment in plant and equipment are kept.

**Valuation:** A process by which the value of an asset or resource is assessed.

**Variable costs:** Those expenses of a business enterprise that vary with changes in volume of output, such as outlays for fuel to generate electric power.

**Variable expenses:** Expenses that fluctuate with the level of production.

**Variable O&M costs:** O&M cost categories that depend at least partially on the amount of energy generated by the plant, excluding fixed costs that are incurred regardless of whether the resource is operating.

**WATT:** The electrical unit of power or rate of doing work. The rate of energy transfer equivalent to one ampere flowing under a pressure of one volt at unity power factor. It is analogous to horsepower or foot-pounds per minute of mechanical power. One horsepower is equivalent to approximately 746 watts. 1000 watts delivered for one hour equals one KWh. Similarly, one million watts delivered for one hour equals one MWh.

**Weighted average cost of capital:** A weighted average of the component costs of debt, preferred stock, and common equity. Also called the “composite cost of capital.”

**Windfalls profits tax:** Tax designed to limit corporate profits following a sudden increase in prices.

**Working capital:** The amount of cash or other liquid assets that a company must have on hand to meet the current costs of operations until such a time as its customers reimburse it. Sometimes it is used in the narrow sense to mean the difference between current and accrued assets and current and accrued liabilities.

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## ABBREVIATIONS

<b>A&amp;G</b>	Administrative and general
<b>BSR</b>	Balance sheet report
<b>CF</b>	Cash flow
<b>DCF</b>	Discounted cash flow
<b>EBITDA</b>	Earnings before income tax, depreciation and amortisation
<b>EPR</b>	Economic performance report
<b>FER</b>	Fuel expense report
<b>FIW</b>	Fuel input worksheet
<b>GFCA</b>	Going forward cost analysis
<b>GFCR</b>	Going forward cost report
<b>IS</b>	Income statement
<b>ISR</b>	Income statement report
<b>IW</b>	Initialization worksheet
<b>LT</b>	Long term
<b>MDWS</b>	Model directory worksheet
<b>MRRD</b>	Minimum revenue requirements discipline
<b>MRRDA</b>	MRRD analysis
<b>MRRDR</b>	MDDR report
<b>NPP</b>	Nuclear power plant
<b>NPV</b>	Nuclear performance variable
<b>NVSW</b>	Nuclear variable selection worksheet
<b>O&amp;M</b>	Operation and maintenance
<b>OA</b>	Operating account
<b>PCA</b>	Production cost analysis
<b>PCR</b>	Production cost report
<b>PLEX</b>	Plant life/license extension
<b>PPR</b>	Performance projection report
<b>ROA</b>	Return on total assets
<b>ROE</b>	Return on equity
<b>S/F</b>	Spent fuel
<b>US\$K</b>	Thousands of US dollars
<b>US\$M</b>	Millions of US dollars
<b>VAT</b>	Value added tax
<b>WS</b>	Worksheet



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