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USER'S MANUAL:
MODEL FINANCIAL PRO FORMA
FOR PRIVATE POWER PROJECT

Prepared for

His Majesty's Government of Nepal
Ministry of Water Resources
Electricity Development Center

Under the

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1 General Treatment of Data

Make a copy of the model before making changes or manipulating data Copy the model to a new file and name that new file after the project you are analyzing. The numerous linkages between input and output data, between worksheets in the model, and the level of detail of the macros will be difficult and time-consuming to recreate should the model be corrupted. Also, it may save time to revert back to the original model and begin again if the user encounters numerous errors after changing base data.

Blue data is input data which can be manipulated without interfering with the embedded calculations and which will generate new output data. Blue-colored, input data appears in the first three sheets of the model, Worksheet A "DATA", Worksheet B "COSTS" and Worksheet C "ALLOC FUNDS". If only blue-color data is changed and the model generates error messages, it is most likely because the relative magnitude of certain input data is "off the scale" compared to other data, rather than any calculations and linkages having become corrupted. For example, a project with installed capacity of 200 MW at a cost of US\$100 million may generate errors because the cost is relatively high compared to the size of the project. Therefore, make sure all the input data match relative to one another in terms of the basic costs and technical parameters of a project's size, cost and other parameters.

Black data is either output data or calculation data and cannot be changed without interfering with the embedded calculations and processes and corrupting other output data. Only users who are familiar with manipulation of spreadsheet data should make any changes to black-colored data.

Macros are for sensitivity analysis and generate comparative sensitivity figures based on base-case input data and the scale of sensitivity desired and entered. Each macro must be run individually after any changes to input data have been made to generate an accurate sensitivity analysis, as produced in the worksheet labeled "SENSITIVITY".

Caution Only blue-colored data can be changed without corrupting the output/results of the spreadsheet.

Caution Due to the number of linkages between the nine worksheets of the model, adding or deleting rows or columns may corrupt output/results. Adding or deleting rows or columns in the model should only be done with care and if necessary.

Text that appears in "UPPER CASE" with quotation marks refers to a worksheet. Text that appears in **bold** refers to a grouping of data in a worksheet. Text that appears in *italics* refers to a line item of data entry.

The file described in this manual is a Lotus, Release 4 file, entitled "FINALMDL WK4".

2 Structure and Description of the Model

The model contains nine, connected worksheets. The following is a sequential list of those worksheets and a description of their function. A printout of each worksheet is attached for reference.

DATA

DATA

The worksheet called "DATA" contains basic data available from a given feasibility study (capital costs are entered in next worksheet, labeled "COSTS" and distribution of funds during construction is entered in the worksheet "ALLOC FUNDS"). In the worksheet "DATA", enter the appropriate information in the blue colored cells under categories *Project Data*, *Macroeconomic Data*, *Commercial Data*, *Loan Financing Terms*, *Profit Distribution/ Retained Earnings Distribution* and *Input Data for Sensitivity Analysis*. To complete an input of all project data, refer to "COST" and "ALLOC FUNDS" below for entering data on estimated project capital costs and estimated distribution schedule for debt and equity during construction.

This sheet also contains the information for sensitivity analysis which is calculated with the use of internal macros in the worksheet "SENSITIVITY". This means that some key input data in "DATA" must be entered under the group of figures called **Input Data for Sensitivity Analysis**. Note that the blue-colored, input data under column **Assume** in **Input Data for Sensitivity Analysis** can be changed to generate smaller or larger degrees of sensitivity analysis.

The information entered in these categories in "DATA" combined with the detailed information entered in "COST" and the schedule for distribution of funds entered in "ALLOC FUNDS" results in the following output data:

- ▶ total project cost, including IDC (interest during construction)
- ▶ cost of IDC
- ▶ internal rates of return to equity investors
- ▶ financial ratios
- ▶ the net-present-value of developer and public-sector revenue streams, including profits, taxes, royalties, and income from public ownership over the life of the license
- ▶ NRs-denominated and \$US-denominated dividend streams for local and foreign equity participation in the project

DATA

INPUT/OUTPUT DATA

(US\$ 000 unless otherwise indicated)

Project Data	
Net Generating Energy per annum (GWh)	246
Installed Capacity (MW)	36
Project Cost Before IDC (see Project Cost Estimates)	82 447
Construction Period	3
O&M Escalator	3%

Macroeconomic Data	
NRs/US\$=	55
Nepalese inflation	9%
U S Inflation	3%
Currency Devaluer	6%

Commercial Data	
Base Year Tariff Rate in USD/kWh	0 06000
Price Escalator per annum	3 00%
Debt Percentage of Financing	70%
Equity Percentage of Financing	30%
Tax Rate (1)	23%
Interest Rate on IDC	11 50%
Rate of Debt Expenditure on IDC (% of available debt)	50%

Discount Rate for NPV Calculation	18%
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Loan Terms	
Portion of Debt in Loan A	80%
Interest Rate on A Loan	11 50%
Portion of Debt in Loan B	10%
Interest Rate on B Loan	25 00%
Portion of Debt in Loan C Local Currency	10%
Interest Rate on Loan C Local Currency	20 00%
Sum A B and C = 100%	100%

OUTPUT	
Project Data	
Total Project Cost (incl IDC) US\$	93 769
Interest During Construction US\$	11 323
Total After Tax Income Net Transfer in Year 25 (NPV 228 299 381)	
Base Year Cost O&M (2) US\$	937 693
Installed Cost \$/kW	2 605

NPV of Government Revenues and Costs over 40 Years	
Tax Revenue Through Year 40 US\$	2 691 399
Royalties Through Year 40 US\$	4 051 384
Income/Savings from Transfer in Year 25	18 519 579
NPV of Royalties Taxes Transfer Income/Savings	25 262 362
NPV of Foreign Exchange Cost to HMGN Through Yr	6 281 115

ADDITIONAL INPUT DATA	
Profit Distribution / Retained Earnings Distribution (3)	
US S Dividend Payout Rate	25%
NRs Dividend Payout Rate	75%

NOTES
 (1) Taxes applicable in 16th year of operation
 (2) O&M costs 1% of total project cost
 (3) Check to be sure that the total dividend distribution does not exceed available retained earnings
 Refer to the schedule of distribution of retained earnings at the bottom of the income statement
 If the sum of distribution exceeds available retained earnings ERR will appear in the line Net Retained Earnings

Input Data for Sensitivity Analysis

(see Sensitivity sheet for output after respective macro application)		
Assume	Base Case	New Case
15% Increase in Project Cost Before IDC (US\$)	82 447	94 814
15% Decrease in Annual Generation (GW)	246	209 1
5% Higher Rate on Debt than Input Rate A Loan (%)	11 50%	16 50%
5% Higher Rate on Debt than Input Rate B Loan (%)	25 00%	30 00%
5% Higher Rate on Debt than Input Rate C Loan (%)	20 00%	25 00%
5% Higher Tax Rate than Input Rate (%)	23%	28%
8% Higher NRs Inflation Rate than Input Rate (%)	9%	17%

Financial Performance Output

IRR after tax in year 15	19 16%
NPV in Year 15 after taxes	551
Debt Coverage Ratio in Year 1	1 32
Avg Debt Coverage Ratio to Year 12	1 78
Gross Revenue to Debt Service in Year 1	1 45
Avg Gross Revenue to Debt Service to Year 12	1 95
Derivation of Key Ratios	
Debt Coverage Ratio is After Tax Income before Interest Charge/Total Debt Service	
Revenue to Debt Service is Total Operating Revenue/Total Debt Service	

Tariff in First Year of Operation

Year	Price
5	\$0 06000
-4	\$0 06180
3	\$0 06365
2	\$0 06556
1	\$0 06753
0	\$0 06956

O&M Cost in First Year of Operation

Year	Cost
5	\$937 693
-4	\$965 824
3	\$994 799
2	\$1 024 643
1	\$1 055 382
0	\$1 087 043

COST

COST Contains line-item information on the estimated project costs. Enter detailed, before interest during construction (IDC) cost information, if it is available. Cost estimates can be adjusted here to match assumptions made by developers or additional assumptions made by the EDC. For example, the EDC may have more accurate information on contingency percentages to generate a more accurate cost estimate before IDC.

The total cost estimate before IDC is calculated on the basis of individual cost items and then entered automatically into the sheet "DATA" under the group **Input Data for Sensitivity Analysis** as the base-case cost of the project.

Note This model assumes capitalization of IDC. IDC is therefore calculated on the basis of the estimated cost figure before IDC and distribution of debt and equity during construction. The distribution of debt and equity during construction is entered in the worksheet "ALLOC FUNDS", as explained below. Information on project costs before IDC and the distribution of funds entered in the worksheet "ALLOC FUNDS" generates the total IDC automatically and adds that amount to derive the total project cost which appears in the worksheet "DATA" under **Output Data, Total Project Cost**.

IDC therefore becomes part of the overall debt requirement of the project. The cost estimates before IDC entered in the worksheet "COST" are a variable along with *Construction Period, Interest Rate on IDC, and Rate of Debt Expenditure on IDC* which generate total IDC in the worksheet "ALLOC FUNDS".

Note To enter total estimated project cost without any other detailed cost information, follow these steps:

- (1) Enter the distribution of funds during construction in the worksheet "ALLOC FUNDS" (see "ALLOC FUNDS" below) based on available information and reasonable assumptions for the length of the construction period.
- (2) Go to the worksheet "COST" and enter best guesses at total cost before IDC (start with ca. 25% less than estimated total project cost) in the line item *Total Cost Before IDC* until the amount generated in the line item *Total Project Cost* equals the desired total estimated project cost.

Following these two steps allows the user to run the model without detailed information on project costs. At the same time, however, the model will generate its own estimated IDC costs.

PROJECT COST ESTIMATES

	1000 \$US	% total	% constr
Construction Costs			
Preliminary Investigations	720	0.77%	1.24%
Land Acquisition	195	0.21%	0.34%
Access Road	311	0.33%	0.53%
Civil Works	26,059	27.79%	44.82%
Equipment	17,867	19.05%	30.73%
Step-up Sub and Trans Line	4,930	5.26%	8.48%
Spare Parts and O&M Startup	1,000	1.07%	1.72%
Engineering and Administration	7,062	7.53%	12.15%
 Subtotal Construction	 58,144	 62.01%	 100.00%
Contingency	12,792	13.64%	22.00%
 Total Construction	 70,936	 75.65%	
Development Costs			
Developer's Advisory	3,415	3.64%	
Project Company Operations	1,000	1.07%	
Financial Advisory (3% of total debt)	1,998	2.13%	
Lender's Costs during Construction	500	0.53%	
Loan Commitment Fee (3% of total debt)	1,998	2.13%	
Insurance and Legal	1,000	1.07%	
Working Capital and Reserve	1,600	1.71%	
 Subtotal Development Costs	 11,511	 12.28%	
 Total Before IDC	 82,447	 87.93%	
 IDC	 11,323	 12.07%	
 Total Project Cost	 93,769	 100.00%	

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DEBT

DEBT Contains three loans to which all or part of the total debt financing requirement can be assigned. The first two loans "A" and "B" are US\$-denominated loans, with 12 and 7 year maturities, respectively. The third loan "C" is a NRs-denominated loan with a 10 year maturity. The interest and principle payment schedules of these three loans will be generated automatically on the basis of the interest rate figures entered in the worksheet "DATA" under the category **Input Data for Sensitivity Analysis**. The interest rates for each can be changed in the respective base-case assumptions for loans A, B and C in **Input Data for Sensitivity Analysis**. All loan payment periods are scheduled on an annual basis.

Principal and interest payments on the "C" loan are devalued by the *Currency Devaluer* derived from input data in the worksheet "DATA". This accounts for the dollar-equivalent reduction in the cost of the NRs-denominated loan over time. As a result, the lower cost of interest and principle repayment of the NRs-denominated loan is reflected in the higher net income generated by the project, (the line item *Net Income* in the income statement will rise with a higher portion of total debt allocated to NRs-financing).

Note The model does not allow for automatic adjustment of changes in maturity terms of the loans. Maturity terms of each loan can only be changed manually in the worksheet "DEBT" (see "Guidelines for Entering and Manipulating Data"). Any changes made to the maturity terms of the debt schedule as entered in "DEBT" will be entered automatically into the income, cash flow and balance sheet statements.

LOAN TERMS AND AMOUNTS

Total Debt 65 639

	Percent Total	Loan Amounts
A" Loan	80%	52 511
B" Loan	10%	6 564
C Loan	10%	6 564

"A" Loan 15 year maturity, three year grace period

Amount	52 511	Period	1	2	3	4	5	6	7	8	9	10	11	12
Interest Rate	11 50%	Interest	6 039	5 781	5 493	5 173	4 815	4 416	3 972	3 476	2 923	2 307	1 620	854
Term/Maturity*	12	Principal	2 243	2 501	2 789	3 109	3 467	3 865	4 310	4 806	5 358	5 974	6 661	7 428
Payment	8 282	Total	8 282	8 282	8 282	8 282	8 282	8 282	8 282	8 282	8 282	8 282	8 282	8 282

"B" Loan 7 year maturity

Amount	6 564	Period	1	2	3	4	5	6	7
Interest Rate	25 00%	Interest	1 641	1 532	1 396	1 226	1 013	748	415
Term/Maturity	7	Principal	435	544	680	851	1 063	1 329	1 661
Payment	2 076	Total	2 076	2 076	2 076	2 076	2 076	2 076	2 076

"C" Loan 10 year maturity, local currency

Amount in US\$	6 564	Period	1	2	3	4	5	6	7	8	9	10
Interest Rate	20%	Interest, US\$	1 313	1 262	1 202	1 129	1 041	936	811	660	478	261
Term/Maturity*	10	Adj Interest	1 234	1 186	1 129	1 061	979	880	762	620	450	245
Payment in US\$	1 566	Principal US\$	253	303	364	437	524	629	755	906	1 087	1 305
Payment Adjusted	1 472	Adj Principal	238	285	342	411	493	591	710	852	1 022	1 226
		Total US\$	1 566	1 566	1 566	1,566	1 566	1 566	1,566	1 566	1 566	1 566
		Adj Total	1 472	1 472	1 472	1 472	1 472	1 472	1 472	1 472	1 472	1 472

Aggregated Debt Schedule, US\$

Combined Interest Payments	8 914	8 499	8 019	7 459	6 807	6 044	5 149	4 096	3 373	2 553	1 620	854
Combined Principal Payments	2 916	3 330	3 811	4 370	5 023	5 786	6 681	5 657	6 380	7 201	6 661	7 428
Total Debt Service	11 830	11 830	11 830	11 830	11 830	11 830	11 830	9 753	9 753	9 753	8 282	8 282

ALLOCATION OF FUNDS

ALLOC FUNDS Allocation of debt and equity funds during the development phase is broken out in the worksheet "ALLOC FUNDS" This worksheet allows the user to breakdown the distribution of debt and equity over an assumed construction period, illustrating how funds will be distributed during the years preceding operation of the facility In this model, allocation of debt and equity expenditures over the construction period must be entered according to percentages of total debt and/or total equity disbursed in each year The maximum length of the construction period of any given project is 14 years IDC is generated automatically

ALLOCATION OF FUNDS DURING CONSTRUCTION AND IDC

US\$ 000

Interest Rate on IDC	11 50%
Annual Generation (MWh)	246
Debt	70%
Equity	30%
Rate of IDC drawdown	50%

3 to 14 Years with Irregular Distribution of Debt and Equity	Total	-14	-13	12	11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	
Allocation of Equity	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	33%	33%
Allocation of Debt	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	33%	33%
Allocation of Equity and Debt	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	33%	33%
BASE COST 000 \$	82 447	0	0	0	0	0	0	0	0	0	0	0	0	29 998	27 482	24 966
IDC	11 323	0	0	0	0	0	0	0	0	0	0	0	0	1 258	3 774	6 290
COST INCL IDC	93 769	0	0	0	0	0	0	0	0	0	0	0	0	31 256	31 256	31 256
EQUITY	28 131	0	0	0	0	0	0	0	0	0	0	0	0	9 377	9 377	9 377
DEBT	65 639	0	0	0	0	0	0	0	0	0	0	0	0	21 880	21 880	21 880

CASH, INCOME AND BALANCE STATEMENTS

CASH INC BAL The income, cash flow, and balance sheet statements contained in this worksheet are projected out over 50 years, according to the maximum allowable term of a production license. An accounting of the affects of taxes, royalties and transfer to partial-NEA ownership is made in the income statement, as prescribed by existing laws and licensing terms. Any changes in the existing laws, such as tax holiday provisions, depreciation schedules, formulas for royalty calculation, and timing of transfer to public sector ownership must to be entered manually in the income statement of this worksheet.

The cash flow statement presented here is the basis for calculation of IRR and NPV of the project. It is important to adjust the IRR and NPV calculations according to the time period desired (i.e. NPV over 10, 15, or 25 years). The IRR and NPV calculations appear immediately after the cash flow statement in this worksheet. Note that the discount rate used in the NPV calculation is entered in "DATA" under *Discount Rate for NPV Calculation*.

The balance sheet statement contains basic information on the assets and liabilities of the project, which are automatically adjusted for an changes in the distribution of retained earnings (dividends paid). Immediately below the balance sheet are the key financial ratios on an annual basis.

INCOME STATEMENT**(US\$'000)**

	Year	(14)	(2)	(1)	0	1	2
Totals	OPERATING REVENUES US\$'000						
	MWh Sold				246	246	246
	Energy Charge - \$/kWh				0 06956	0 07164	0 07379
	Capacity Charge - \$/year						
17 111	Total Operating Revenue				17,111	17,624	18,153
	OPERATING COSTS, US\$'000						
81 964	Operations and Maintenance				(1 087)	(1,120)	(1 153)
120 904	Royalties/Fees (2)				(408)	(418)	(429)
	Depreciation (per "Balance")				(5,496)	(5,496)	(5,496)
	Recovery of IDC				(755)	(755)	(755)
	Total Operating Costs				(7,746)	(7,789)	(7 833)
993 544	Net Operating Income				9,365	9,835	10,320
	Term Loan Interest				(8,914)	(8,499)	(8,019)
	Before Tax Income				451	1,336	2,301
183 226	Taxes				0	0	0
746 931	Net Income				451	1,336	2,301
221 756	After Tax Income Accruing to NEA						
	Schedule of Retained Earnings						
	Gross Retained Earnings				451	1 787	4 088
	Retained Earnings Net of Transfer in Year 25				451	1,787	4 088
	U S Dividend (\$US)				113	447	1,022
	NRs Dividend (\$US)				338	1,340	3 066
	Net Retained Earnings				0	0	0

Cash Flow	(14)	(4)	(3)	(2)	(1)	0	1	2
Cash Flow from Operations								
Net Income						451	1,336	2,301
Depreciation (Fixed Assets and IDC)						6,251	6,251	6,251
Capital Expenditures	0	0	(31,256)	(31,256)	(31,256)	0	0	0
Cash Reserve								
Working Capital								
Net Cash Flow from Operations	0	0	(31,256)	(31,256)	(31,256)	6,702	7,587	8,553
Cash Flow from Financing								
Loan Disbursement	0	0	21,880	21,880	21,880			
Repayment of Loans - Principal (8)						(2,916)	(3,330)	(3,811)
Net Cash Flow from Financing	0	0	21,880	21,880	21,880	(2,916)	(3,330)	(3,811)
Net Cash Flow	0	0	(9,377)	(9,377)	(9,377)	3,786	4,257	4,741
Net Cash Flow, without tax	0	0	(9,377)	(9,377)	(9,377)	3,786	4,257	4,741
IRR after tax in year 15	19.16%							
NPV in year 15	551.34							

Balance Sheet					
	Year	(14)	0	1	2
ASSETS					
Current Assets (7)			6,251	9,586	12,507
Fixed Assets in Operation			82,447	82,447	82,447
Cumulative Depreciation			(5,496)	(10,993)	(16,489)
Net Fixed Assets in Operation			76,950	71,454	65,957
Other Assets (IDC)			11,323	11,323	11,323
Amortization of IDC (15 years)			(755)	(1,510)	(2,265)
Total Other Assets			10,568	9,813	9,058
Total Assets			93,769	90,853	87,523
LIABILITIES AND EQUITY					
Short-Term Liabilities					
Current Debt Maturity			2,916	3,330	3,811
Long-Term Liabilities					
Long-Term Debt			65,639	62,722	59,392
Debt Service			(2,916)	(3,330)	(3,811)
Total Long-Term Liabilities			62,722	59,392	55,581
Total Liabilities			65,639	62,722	59,392
Equity					
Paid-In Capital			28,131	28,131	28,131
Retained Earnings			0	0	0
Total Equity			28,131	28,131	28,131
Total Liabilities and Equity			93,769	90,853	87,523
<i>Balance Sheet Check</i>			0	0	0
	Year		0	1	2
RATIOS					
Debt-Coverage Ratio (4)			1.32	1.36	1.40
Revenue to Debt Service (5)			1.45	1.49	1.53
Debt % of Debt + Equity			70%	69%	68%
Debt/Equity Ratio			2.33	2.23	2.11
ROE (Net Inc/Equity)			2%	5%	8%
Return on Net Fixed Assets in Operation (%) (6)			11.36%	11.93%	12.52%

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CHARTS

CHARTS

The following charts are generated automatically in this spreadsheet

- ▶ Select Financial and Economic Revenues over 40 Year Period
- ▶ NPV of Select Revenue Streams over 40 Year Period
- ▶ NPV of FX (Foreign Exchange) Cost over 40 Years

Note This sheet also contains the data used for generating the charts and selected output data on revenues and costs accruing to the private and public sector. This data is located to the right of the charts. If the user wishes to analyze other revenue or costs to the project, it is recommended that they be done in this worksheet to protect the integrity of the other worksheets which are linked to generation of output data. For example, line items of costs and revenues can be copied from the cash flow and income statements, including retained earnings and dividends, into the worksheet "CHARTS" for further analysis or for graphical presentation.

Note The NPV of income revenue streams and costs of the project -- as they appear in the worksheet "DATA" under **OUTPUT** -- are calculated in this worksheet "CHARTS" in columns and rows of data to the right of the actual charts and graphs. To change the period of calculating the NPV of the output data in question, locate that data here in "CHARTS" and adjust the range of the NPV calculation to reflect a shorter or longer NPV period.

NPV over 40 yrs	Totals over 40 yrs		Year	0	1
		Data on Revenue Streams			
229,521,293	11,062,371,261	Gross After Tax Income		451	1,787
228,299,381	10,840,615,370	Net Retained Earnings Net of Transfer in Year 25		451	1,787
57,074,845	2,710,153,842	Distribution of Dividends to \$US Equity		113	447
171,224,536	8,130,461,527	Distribution of Dividends to NRs Equity (\$US value)		338	1,340
4,051,384	120,904,175	Royalties		408	418
2,691,399	183,225,895	Tax Revenue		0	0
18,519,579	4,008,323,800	HMGN Income/Savings After Year 25, US\$		408	418
6,742,783	304,130,070	Royalties and Taxes		408	418
25,262,362	4,312,453,870	Sum of Royalties, Taxes, Income/Savings after 25		408	418
		Data on Project Costs			
		O&M		1,087	1,120
		Foreign Exchange Cost to HMGN			
57,074,845	2,710,153,842	Distribution of Dividends to \$US Equity		113	447
47,610,398	113,915,378	US\$-Denominated Debt Service Payments		10,358	10,358
104,685,243	2,824,069,221	Total \$US-Denominated Costs		10,471	10,805
6,281,115	169,444,153	'Input' Devaluer FX Cost		628	648
14,655,934	395,369,691	"Sensitivity" Devaluer FX Cost		1,466	1,513

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SENSITIVITY

SENSITIVITY This worksheet contains a table comparing the output of base-case/new-case sensitivity analysis using the parameters entered in "DATA" under the category **Input Data for Sensitivity Analysis**. With the use of the macros provided, this comparison of base case and new case data for sensitivity analysis must be updated every time the base data is changed. The sensitivity analysis is derived from a set of macros, one macro for each line-item in the sensitivity analysis. Therefore, to update the sensitivity analysis, each corresponding macro must be executed individually after the base data has been changed.

Assume	Value	IRR	Total-After Tax Income Net Transfer in Year 25 (NPV)
15% Increase in Project Cost Before IDC (US\$)			
Base Case	82,447	19.16%	228,299,381
New Case	94,814	13.94%	39,743,469
15% Decrease in Annual Generation (MW)			
Base Case	246	19.16%	228,299,381
New Case	209.1	13.11%	31,048,434
5% Higher Rate on Debt than Input Rate, "A" Loan (%)			
Base Case	11.50%	19.16%	228,299,381
New Case	16.50%	15.27%	38,910,845
5% Higher Rate on Debt than Input Rate, "B" Loan (%)			
Base Case	25.00%	19.16%	228,299,381
New Case	30.00%	18.75%	55,294,916
5% Higher Rate on Debt than Input Rate, "C" Loan (%)			
Base Case	20.00%	19.16%	228,299,381
New Case	25.00%	18.69%	55,012,663
5% Higher Tax Rate than Input Rate (% after tax income)			
Base Case	23%	19.16%	228,299,381
New Case	28%	19.16%	56,209,515
8% Higher NRs Inflation Rate than Input Rate			
Base Case	9%	19.16%	228,299,381
New Case	17%	19.39%	57,692,626

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TARIFF

TARIFF

Installed cost, capacity charge, and energy charge data is generated here for future use in tariff rate agreements based on this kind of two-part power purchase agreement. Besides the cost per installed kW figure, this spreadsheet is not generating information which is immediately relevant.

Capacity Charge Calculation			
Project Cost	\$93,769,326		
Installed Capacity, MW	36	Escalation of Demand Charge	
Installed Cost \$/kW	\$2,604.70	-5	23.91
term	25	-4	24.63
discount	0.1	-3	25.37
\$/kW/year	\$286.96	-2	26.13
\$/kW/month	\$23.91	-1	26.91
		0	27.72
Energy Charge Calculation			
O&M costs per year/Output per year			
BK used 1% of investment cost for O&M			
	=		

MACROS

MACROS Contains the macros that generate the comparative data for presentation in "SENSITIVITY". A distinct macro for each line-item in the sensitivity analysis makes finding errors and correcting errors easier during use of the spreadsheet.

Note Adding or deleting columns in other worksheets which contain information relevant to generating the sensitivity analysis will corrupt the macros, disable the macros, and require correction of the macros in the worksheet "MACROS".

Increase Cost	Decrease Generation
{SELECT DATA J7}	{SELECT DATA J8}
{EDIT-COPY}	{EDIT-COPY}
{SELECT DATA C7}	{SELECT DATA C5}
{EDIT-PASTE-SPECIAL , "VALUES"}	{EDIT-PASTE-SPECIAL , "VALUES"}
{EDIT-COPY}	{EDIT-COPY}
{EDIT-GOTO SENSITIVITY E5}	{EDIT-GOTO SENSITIVITY E8}
{EDIT-PASTE-SPECIAL , "VALUES"}	{EDIT-PASTE-SPECIAL , "VALUES"}
{SELECT DATA H16}	{EDIT-GOTO DATA H16}

3 Guidelines on Entering and Manipulating Data

Before making any changes to the model, copy the model to a separate file to ensure the original model is not corrupted. Follow the rule that blue-colored data is input data. No other data should be manipulated unless the user is familiar with spreadsheet pro forma modeling.

The following instructions on entering input-data follows generally the sequence of input data categories as they appear in the "DATA", "COST" and "ALLOC FUNDS" worksheets. These instructions also follow the general sequence in which data should be entered. The sequence of data entry is not crucial to the functioning of the model. However, following this sequence will allow the user to check all the data systematically.

Project Data

Project Data	
Net Generating Capacity per annum (MWh)	246
Installed Capacity (MW)	36
Project Cost before IDC (See "Project Cost Estimates")	82,447
Construction period	3
O&M Escalator	3%

Net Generating Capacity per annum (MWh) is one of several base-case values entered under **Input Data for Sensitivity Analysis** in the worksheet "DATA".

Input Data for Sensitivity Analysis		
(see "Sensitivity" sheet for output after respective macro application)		
Assume	Base Case	New Case
15% Increase in Project Cost Before IDC (US\$)	82,447	94,814
15% Decrease in Annual Generation (MW)	246	209.1
5% Higher Rate on Debt than Input Rate, "A" Loan (%)	11.50%	16.50%
5% Higher Rate on Debt than Input Rate, "B" Loan (%)	25.00%	30.00%
5% Higher Rate on Debt than Input Rate, "C" Loan (%)	20.00%	25.00%
5% Higher Tax Rate than Input Rate (%)	23%	28%
8% Higher NRs Inflation Rate than Input Rate (%)	9%	17%

The base-case project data entered in the group **Input Data for Sensitivity Analysis** in the sheet "DATA" contains both base-case and new-case data and as a group generates the base values and the new values which are used for the sensitivity analysis. This explains why some of the individual items in **Project Data**, **Macroeconomic Data**, **Commercial Data** and **Loan Terms** appear to the left side of the worksheet in black-colored text -- this data is entered to the right under **Input Data for Sensitivity Analysis**. The base-input data entered in the blue-colored cells under **Input Data for Sensitivity Analysis** will therefore appear again to the

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left in the corresponding list of project data exactly as it is entered. For example, when you enter the base value for *Decrease in Annual Generation (MW)* in the blue-colored cell under the group **Input Data for Sensitivity Analysis**, it appears again as black-colored data under the category *Net Generating Capacity per annum (MW)*

The value for *Installed Capacity* should be entered according to the given feasibility study

The line item *Project Cost Before IDC* is derived from the worksheet "COST" and therefore appears in black-colored text in the sheet "DATA". The worksheet "COST" contains a detailed breakout of capital cost items which are summed to generate the total cost before IDC. The total figure then appears in the worksheet "DATA" as *Project Cost Before IDC*. It is also entered automatically under as the base case in the group **Input Data for Sensitivity Analysis** in the worksheet "DATA". These individual cost items can be changed and updated to reflect other methods of cost estimation or updated cost estimates according to any more current information that is available.

Note that in the absence of estimated costs broken down as they appear in the worksheet "COST", the model can be run using an estimated total project cost. To operate the model on an estimated total cost basis, enter a rough estimate of total project cost before IDC directly in the cell containing the value *Total Cost before IDC*. For example, start with an estimate of total cost before IDC that is 25% less than total cost. Then, adjust the figure until the total project cost figure generated equals the total project cost estimate desired. At the same time, be sure that the distribution of debt and equity during the construction period in "ALLOC FUNDS" is reasonable and spread out over the number of years assumed for construction.

Construction Period is not an input-data figure. It appears here merely for reference. The actual construction period should be entered in "ALLOC FUNDS" according to the distribution of debt and equity in percentage terms over the assumed number of years required for construction. For example, assuming a four-year construction period means, equity may be disbursed as 70% in Year (4), 15% in Year (3), 10% in Year (2) and 5% in Year (1), debt may be disbursed as 10% in Year (4), 20% in Year (3), 35% in Year (2) and 35% in Year (1). Note that the length of the construction period will also affect the cost of IDC and therefore total project costs.

O&M Escalator is the projected increase in O&M costs over time based on the inflation rate of the currency in which the O&M costs are paid. Because this model is denominated in US\$, the assumed O&M escalator is 3%. If the O&M costs were denominated in NRs, the cost of O&M escalator would most likely be an estimated rate of inflation in Nepal.

Macroeconomic Data

Macroeconomic Data	
NRs/US\$=	55
Nepalese inflation	9%
U S Inflation	3%
Currency Devaluer	6%

NRs/US\$ is not crucial to the functioning of the model. It is the exchange rate which can be used for calculation of the costs and revenues of the project in NRs-terms, including the NRs-denominated loan ("Loan C"), royalties, and taxes accruing to the public sector. This exchange rate could also be used to convert to NRs-denominated

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dividends in the **Schedule of Retained Earnings** at the bottom of the income statement in the worksheet "CASH INC BAL" This is not done automatically in the model because the entire model is denominated in \$US, including dollar-equivalency figures for Loan "C" and NRs-denominated dividends

Nepalese Inflation is the value used for calculation of the *Currency Devaluer* vis a vis the figure entered for *US Inflation* Note that the value for *US Inflation* can be substituted with the inflation rate of any other foreign currency in which the project feasibility study may be denominated

Commercial Data

Commercial Data	
Base Year Tariff Rate in US-cents/kWh	0 06000
Price Escalator per annum	3 00%
Debt Percentage of Financing	70%
Equity Percentage of Financing	30%
Tax Rate (1)	23%
Interest Rate on IDC	11 50%
Rate of Debt Expenditure on IDC (% of available debt)	50%
Discount Rate for NPV Calculation	18%

Concerning *Base Year Tariff Rate in US-cents/kWh*, note that the base price per kWh -- according to any assumptions, agreements in a given preliminary PPA, or other document -- must be escalated from the agreed start date to the date of commissioning The price is escalated by the agreed escalator, which is entered under *Price Escalator per Annum* The value derived in the "0" year is the price which is used for calculating *Total Operating Income* in the first year and following consecutive years of the project's operation as they appear in the worksheet "CASH INC BAL" In this model, the price per kWh in the first year of operation is calculated under **Tariff in First Year of Operation** in the worksheet "DATA" and is derived from a five-year project development cycle, according to reasonable assumptions Double-check the price per kWh as it is calculated in the group **Tariff in First Year of Operation** and adjust this calculation according to the lead-time of the project under consideration

Tariff in First Year of Operation	
Year	Price
-5	\$0 06000
-4	\$0 06180
-3	\$0 06365
-2	\$0 06556
-1	\$0 06753
0	\$0 06956

Note This projected price per kWh for the first year of operation is linked to the income and cash flow statements and will have a significant impact on the financial performance indicators of the project

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Debt Percentage of Financing should be entered here, enabling the model to determine the debt/equity ratio of the project financing and thereby the cost of IDC, debt servicing, and other key factors affecting the estimated cash flow. Note that the debt percentage is blue colored and the equity percentage is black colored because the equity percentage derived automatically from the debt percentage value entered.

Tax Rate is the percentage of income paid to HMG/N after O&M and other operating costs. The model is set up to begin tax payments after the 15th year of operation, per the tax-holiday incentive currently in place.

Note If the year in which taxes apply to project income is changed, this must be entered manually in the worksheet "CASH INC BAL" in the income statement.

Interest Rate on IDC is the percentage charged on debt which is drawn down during the construction phase. *Rate of Debt Expenditure on IDC (% of available debt)* is the amount of available debt which is actually utilized. This is a model for estimating IDC taken from a spreadsheet analysis of a hydropower project in El Salvador which received IFC financing and as such is considered a reasonable method for deriving the cost of IDC. Note that by changing the interest rate on debt during construction and the draw-down rate of interest during construction, the total amount of IDC will be changed by small increments. This is essentially a tool for "fine-tuning" the model's internal calculation of IDC.

Discount Rate on NPV Calculation is the assumed risk-adjusted, opportunity cost of capital to the developer for doing a project in Nepal. The value can be changed according to different estimations of risk. By definition, the risk-adjusted opportunity cost of capital to the developer is open to interpretation. As a guide, the discount rate here is used to derive the project's NPV from the cash flows generated in the worksheet "CASH INC BAL" over a 40-year period. To change the period of NPV calculation, refer to the red-colored IRR and NPV calculations in the worksheet "CASH INC BAL" immediately below the cash flow statement. Adjust the range of cash flow years that are entered in the IRR and NPV calculations to reflect differing periods for those calculations.

Sound financial management of the developer's assets indicates that the project will be pursued if the NPV is positive at the assumed discount rate. Conversely, the value generated for IRR is based on the same cash flows and indicates the discount rate at which the value of invested capital would be zero. Therefore, if the IRR is higher than the discount rate and the NPV is greater than zero, and no other factors are influencing the developer's decision-making process, the project should be pursued.

Loan Terms

Loan Terms	
Portion of Debt in Loan "A"	80%
Interest Rate on "A" Loan	11.50%
Portion of Debt in Loan "B"	10%
Interest Rate on "B" Loan	25.00%
Portion of Debt in Loan "C", Local Currency	10%
Interest Rate on Loan "C", Local Currency	20.00%
Sum "A", "B" and "C" = 100%	100%

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Portion of Debt in Loan A, B, C is the percentage of total project debt broken down among the terms of loans A, B, and C. Loan A is a twelve year loan denominated in US\$, Loan B is a seven year loan denominated in US\$, and Loan C is a ten year loan denominated in NRs

The interest rate on each loan can be altered according to figures entered under *Interest Rate on Loan A, (B), (C)* in the worksheet "DATA" under the group **Input Data for Sensitivity Analysis**

Input Data for Sensitivity Analysis (see "Sensitivity" sheet for output after respective macro application)		
Assume	<u>Base Case</u>	<u>New Case</u>
15% Increase in Project Cost before IDC (US\$)	82,447	94,814
15% Decrease in annual Generation (MW)	246	209.1
5% Higher Rate on debt than Input Rate, "A" Loan (%)	11.50%	16.50%
5% Higher Rate on Debt than Input Rate, "B" Loan (%)	25.00%	30.00%
5% Higher Rate on Debt than Input Rate, "C" Loan (%)	20.00%	25.00%
5% Higher Tax Rate than Input Rate (%)	23%	28%
8% Higher NRs Inflation Rate than Input Rate (%)	9%	17%

Note that the sum of the portions of debt covered by Loans A, B, and C must total 100%, as calculated immediately below the data on the three loans. Use this value to check that the percentages of total debt covered by A, B, and C are correct.

Note The maturity terms of Loans A, B, and C are only adjustable by directly manipulating the data calculations in the worksheet "DEBT". To change maturity terms, enter the new number of years to maturity in the corresponding cell for each of the loans labeled *Term/Maturity* in the worksheet "DEBT". Then, select all of the cells in the last column of the payment and amortization schedule of the given loan and extend the block of cells as a row until the correct number of new years for loan maturity is reached. Do not extend the calculation of payment and amortization beyond this point. The new loan data (interest and principle payment schedules) will be entered automatically into the income, cashflow, and balance sheets.

Note that the interest and principal payment schedules in the local currency denominated Loan C are devalued by the Devaluer, which is already derived in the worksheet "DATA". The devaluer is the difference between local and US inflation rates as they are entered into "DATA". In this model, devaluing the principal and interest payment schedules of debt denominated in local currency accounts for their effect on the income and cash flow statement of the project.

Input Data for Sensitivity Analysis

Enter here the base-case data and corresponding value of change (percentage) for sensitivity analysis for each item listed. Except for the base value of project cost before IDC -- which is calculated in the next worksheet labeled "COST" -- all of the pertinent base-case data should be entered under the column heading **Base Case**. Enter also the values to generate smaller or larger degrees of change of sensitivity analysis for each factor under the column heading **Assume**. As mentioned above, the blue-colored, base-case data entered here in this group will reappear in the left side of the worksheet as black-colored data, corresponding to the given line item for the model's assumptions.

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Input Data for Sensitivity Analysis
(see "Sensitivity" sheet for output after respective macro application)

Assume	<u>Base Case</u>	<u>New Case</u>
15% Increase in Project Cost before IDC (US\$)	82,447	94,814
15% Decrease in annual Generation (MW)	246	209 1
5% Higher Rate on debt than Input Rate, "A" Loan (%)	11 50%	16 50%
5% Higher Rate on Debt than Input Rate, "B" Loan (%)	25 00%	30 00%
5% Higher Rate on Debt than Input Rate, "C" Loan (%)	20 00%	25 00%
5% Higher Tax Rate than Input Rate (%)	23%	28%
8% Higher NRs Inflation Rate than Input Rate (%)	9%	17%

4 Output Data

Project Data

OUTPUT Project Data	
Total project cost (incl IDC), US\$ x 1,000	93,769
Interest During Construction, US\$ x 1,000	11,323
Total-After Tax Income net Transfer in year 25 (NPV)	228,299,381
Base Year Cost O&M (2), US\$	937,693
Installed Cost, \$/kW	2,605

As mentioned above, the *Total Project Cost (incl IDC) US\$ '000* is an output figure rather than an input figure. This model calculates IDC on the basis of construction and capital cost estimates and then adds the IDC to these base costs. The figures entered for *Interest Rate on IDC* and *Rate of Debt Expenditure on IDC (% of available debt)* will affect the total output figure *Interest During Construction US\$*. Any change in the disbursement of debt and equity over any number of years for construction (1-14) -- as entered in the worksheet "ALLOC FUNDS" will also affect the value generated for *Interest During Construction, US\$*.

Total After-Tax Income Net Transfer in Year 25 (NPV) is an illustrative figure. It is the net-present-value of total income generated by the project over 40 years at the assumed discount rate entered in *Discount Rate for NPV Calculation*. This figure is derived from the difference in the line items in the income statement, **Net Income** and **After Tax Income Accruing to NEA** starting in year 25. This figure is calculated in the worksheet "CHARTS", which contains numerous other gross and NPV calculations from the project. To change the number of years calculated for this NPV figure and others, go to the column labeled **NPV over 40 Years** to the right of the charts in the worksheet "CHARTS".

Base Year Cost O&M (2) is the base-year estimated costs of O&M, as derived by the assumption that O&M costs are 1% of total project costs. This figure is then adjusted in the group **O&M Cost in First Year of Operation** by the escalator entered in **Project Data** as the *O&M Escalator*. The O&M cost derived here is linked automatically to the income statement as the first year O&M cost.

Installed Cost, \$/kW is the US\$ cost per installed kW of generating capacity. The figure is calculated in the worksheet "TARIFF".

NPV of Government Revenues and Costs Over 40 Year	
Tax Revenue Through year 40, US\$	2,691,399
Royalties through year 40, US\$	4,051,384
Income/Saving from Transfer in year 25	18,519,579
NPV of Royalties, Taxes, Transfer Income/Savings	25,262,362
NPV of Foreign Exchange Cost to HMGN Through Yr 40	6,281,115

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Tax Revenue Through Year 40 is the net-present-value of total tax revenue generated by the project over 40 years. This figure is based on the respective line items of the income statement. Note, however, that the NPV and other gross figures for revenues and costs are generated in the worksheet "CHARTS" in columns and rows to the right of the actual charts and graphs. To change the period of NPV calculation (the model assumes 40 years), go to the worksheet "CHARTS" and change the NPV calculation in question under the column heading **NPV over 40 Years**.

This also applies to the following output data:

- ▶ *Royalties Through Year 40, US\$*
- ▶ *Income/Savings from Transfer in Year 25*
- ▶ *NPV of Royalties, Taxes, Transfer Income/Savings*
- ▶ *NPV of Foreign Exchange Cost to HMG/N Through Year 40*

The figure for *NPV of Foreign Exchange Cost to HMG/N Through Year 40* is based on the sum of US\$ denominated cash flows, including debt servicing and dividends paid to foreign equity investors. Note that this figure will rise or fall with amount of retained earnings paid out to NRs-denominated equity.

Additional Input Data

Profit Distribution/Retained Earnings Distribution (3)

ADDITIONAL INPUT DATA	
Profit Distribution/Retained Earnings Distribution (3)	
\$US Dividend Payout Rate	25%
NRs Dividend Payout Rate	75%

\$US Dividend Payout Rate is the assumed payout rate of in \$US of retained earnings, as calculated in the **Schedule of Retained Earnings** in the income statement, which appears immediately below the income statement and before the cash flow statement in the worksheet "CASH INC BAL". Because the *\$US Dividend Payout Rate* complements the *NRs Dividend Payout Rate* in the same schedule, it is only necessary to enter the \$US percentage of retained earnings which will be paid out, the NRs figure will be the remainder. Note that this assumes all retained earnings will be distributed as dividends. Note also that if \$US dividends are 0% and NRs are 100%, the cost of foreign exchange coverage falls. If the combined total of dividends distributed from retained earnings exceeds available retained earnings, an ERR signal will appear in the line item *Net Retained Earnings*.

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5 Executing the Sensitivity Analysis

Executing the sensitivity analysis is a two-part process. First, check to make sure the range of sensitivity desired is correctly entered in the worksheet "DATA" under the group **Input Data for Sensitivity Analysis** as it appears in the column "Assume". Second, each macro for each line item of the sensitivity analysis must be run after any input data has been changed in the project assumptions.

To run the macros, go to the pull down menu "Tools" at the top of the screen and select "Macro" and "Run". A box-window will appear with the macro commands corresponding to the line items of the sensitivity analysis. Select the macro corresponding to the line-item of the sensitivity analysis in question and click "OK" or simply double-click with the mouse. It is advisable to run all of the macros each time any input data is changed to avoid any confusion.

The worksheet "SENSITIVITY" contains the output of the sensitivity analysis in a table format. Individual line-items in the table are updated each time the macro is run, meaning that the entire table will be updated only by running each macro that corresponds to the line-item in question. After completing the macro process, each macro will automatically return to the worksheet "SENSITIVITY" and the row containing the information on that specific line-item.

FOR SENSITIVITY ANALYSIS table, please see disk labeled FINALMDL WK4, "Sensitivity"