

## Model Design Conventions

The model uses several design conventions to make it easier to navigate within the model.

- 1) Color Coding of Title Columns : All rows with blue titles (in columns "B" to "E") contain data and calculations specific to the workbook (see Figure 1).

B	C	D	E
<b>Electrical Energy Demand</b>			
	All sectors		
	Income demand Growth		
	Growth in Captive Demand		
	Energy Efficiency		
	Total Grid plus Captive		
	Total Captive Demand		
	Total Grid Demand		
<b>Electrical Energy Demand by type of Consumer</b>			
	All sectors		
	Agriculture		
	Domestic		

**Figure 1 - Blue Titles**

Rows with green titles (in columns "B" to "E") copy data from other workbooks (Figure 2).

B	C	D	E	F
<b>Electricity Demand</b>				
<b>Memo: Change Data in Start/GDP</b>				
<b>GDP Annual Growth Rate</b>				
<b>Long Run Demand Elasticities for Electricity</b>				
	Income Elasticity			
	Electricity - All sectors			
	Price Elasticity			
	Electricity - All sectors			

**Figure 2 - Green Titles**

- 2) The main year-by-year calculation area in the worksheets is from column "K" to column "AK". Within this area, all cells where data may be manually entered should be colored light blue and all cells that contain formulae are colored light yellow (see Figure 3). This color convention is not respected in those sheets that contain tables with other than year-by-year data to allow flexibility in identifying different data types

1,624	3,518	3,557	3,596
12	12	12	12
0	0	0	0
0.6%	1.4%	2.9%	5.0%

**Figure 3 - Cell Colors**

- 3) Each set of files analyzes two distinct scenarios. The data specific to each scenario is contained in columns “BF” to “CE” for scenario 1 and “CZ” to “DY” for scenario 2. The rows that contain data in these columns are identified by a bright yellow box in column “H”. The sections that have bright yellow boxes in column “H” are identified by a turquoise box in column “H” in the same row as the section header (see Figure 4).

B	C	D	E	F	G	H
<b>Vehicles Sales Mix by Type, Fuel, &amp; Technology</b>						
<b>Type</b>						
			Mopeds		% of Total Sales	
			Scooters		% of Total Sales	
			Motorcycles		% of Total Sales	
			Total			
<b>Subtype</b>						
Mopeds						
	no norms	2 stroke	petrol		% of Moped Sales	
	Euro I	4 stroke	petrol		% of Moped Sales	
	Euro II	4 stroke	petrol		% of Moped Sales	
	Euro IV	4 stroke	petrol		% of Moped Sales	
			Total			

**Figure 4 - Data indicators for Scenarios 1 & 2**

- 4) The model switches between scenarios 1 and 2 by means of a dropdown box in cell “B9” on each sheet. Buttons allow easy navigation to each of these data entry areas and to the main calculation area. An additional “Freeze Titles” button optimizes the use of the computer screens working area (Figure 5).

	A	B	C	D	E
3					
4	Loaded Scenarios				
5	>>>	Scenario 1		Reference Case	
6	>>>	Scenario 2		Planned improvement	
7	>>>	Baseline and Calculation			
8	Current Scenario				
9		Scenario 2 ▾		Planned improvement	
10					
11	2W - Two Wheelers				
12					Freeze Titles
13					
14					

**Figure 5 - Scenario selection drop-down box and navigation buttons**

- 5) General assumptions. All input data and assumptions that are used in more than one sector should be managed in the “General.xls” workbook (Figure 6).

Population	
	Annual Growth (October to October)
	Population on October 1 of this year
Population Density	
	Population Density
Urban / Rural	
	Change in Urban Population per Year
	% Population by type
	Urban
	Rural
	Total Population
	Urban
	Rural
	Growth in Population
	Urban
	Rural
Persons per Household	
	Change in Persons per household per Year
	Urban
	Rural
	Number of People per Household
	Urban
	Rural
Number of households	
	Urban
	Rural

Figure 6 - "General.xls" workbook

- 6) Output or calculated data from one workbook can be linked as input data to another workbook **provided this only happens in the direction of the arrows in Figure 7.** Data links that do not meet this rule should only occur via the "General.xls" workbook. The other allowable option is by using macros to **copy** the data without hard-wired linkages.

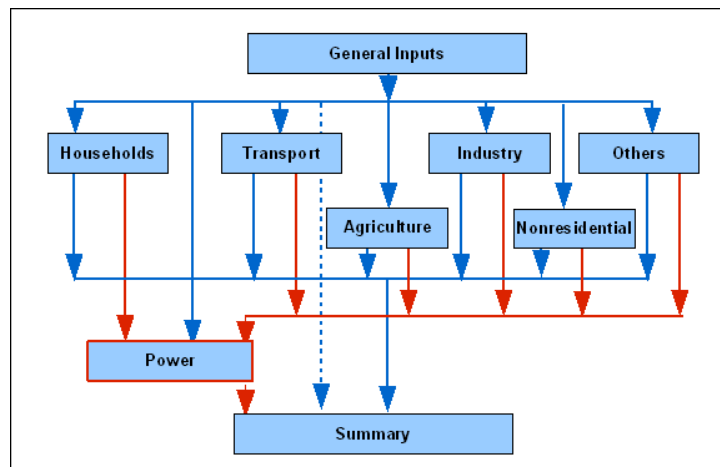


Figure 7 - Direction of Linkages

- 7) To illustrate this, in the following example in Figure 8, the results of calculations in the "Households" workbook (blue titles) can be linked to the "Power.xls" workbook where they will appear with green titles. However the results of calculations in the "Households" workbook **cannot be linked** to the "Nonresidential.xls" workbook. However, a macro can be set up to **copy** data from "Households" to the "Nonresidential.xls" workbook

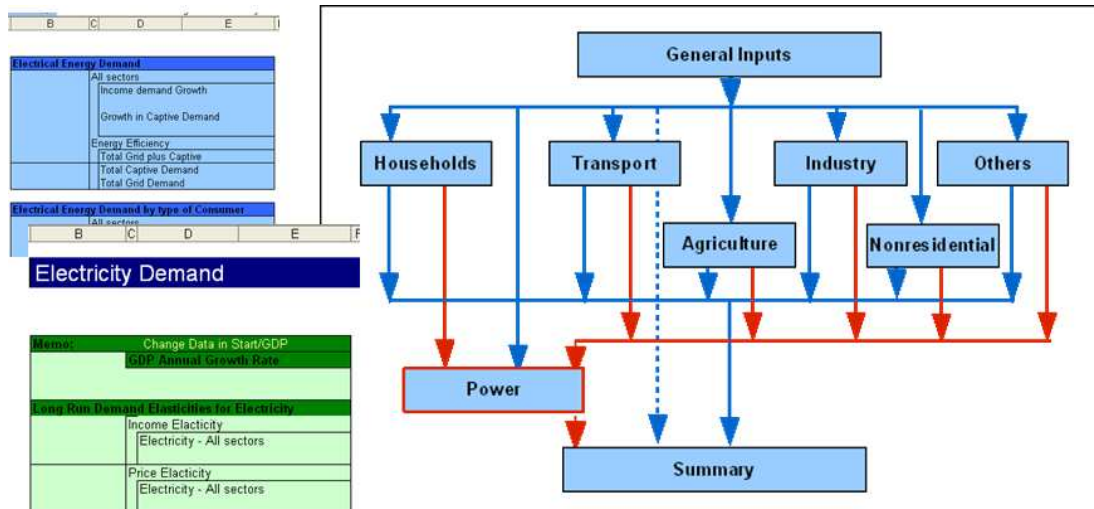


Figure 8 - Linkage Example

- 8) Compacted Data: Many sections of data are compacted. Each section can be opened/closed by clicking in the "+" box on the left hand edge of the spreadsheet (see Figure 9).

1	2	A	B	C	D	E	F
1							
2							
3							
4							
5							
6							
7							
8		#IC	Installed Capacity				
65	+						
66		#MAC	Maximum Available Capacity				
123	+						
124		#AAP	Always available capacity (Planning Purposes)				
181	+						
182		#UEC	Energy Consumption				
239	+						
240		#NINP	Investment Plant Equipment (New)	Amounts in Year of Operation			
297	+						
298		#NINL	Site Accomodation and Land (New)	Amounts in Year of Operation			
355	+						
356		#NINM	Management, Insurance, Spares	Amounts in Year of Operation			
413	+						
414		#NINW	Total Capital Cost (New)	Amounts in Year of Operation			
471	+						

Figure 9 - Compacted Data

- 9) Printed Records: Data in rows marked with a "@" in column "A" are collected into a Run Report on the "PrintSummaryByYear" sheet after the data (see Figure 10). This is an important record of the scenarios and options selected for that run. A "@" can be inserted in column "A" in any row of any sheet in the workbook

	A	B	C	D	E	I
19						
20	@	<b>Supplied Demand</b>				
21	@	#TSD		Supply Shortage		
22	@			Safety Factor reserve for forecast errors		
23	@			Percentage that can be satisfied by lowering frequency		
24	@			Spinning tertiary reserve		
25	@			Total Spinning Reserve		
26						
27				All Sector - Supplied Demand		
28				Shortage		
29						

**Figure 10 - Markers for Printed Records**

- 10) Visual Basic Navigation Guides: All rows and columns marked with a variable name that starts with "#" are used by Visual Basic to locate the data it needs. Do not delete. All text in Red is used by Visual Basic. Do not use red text for other purposes (see Figure 11).

	TYPE	SubType	Installed Capacity	Maximum Available Capacity	Always available capacity (Planning Purposes)
			MW	MW	MW
FIRSTCOL	#Type	#SubType	#IC	#MAC	#AACP
	HYDRO	RunofRiver	5	2.29369063	1.53333333

**Figure 11 - Visual Basic Navigation Guides**