## ANSWERv6-TIMES "Smart" Excel Workbook Manual

version 6.7

October 2011

Noble-Soft Systems Pty Ltd

### ANSWERv6-TIMES "Smart" Excel Workbook Manual (version 6.7)

Acknowledgements	2 2 3
<ol> <li>Worksneet Layout and Philosophy</li></ol>	. 4 . 5 . 6
5. ITEMS Sheet	. 8
6. Time Series Data (TS DATA) Sheet	11
<ol> <li>Time Independent Data (TD DATA)</li> <li>Time Series &amp; Time Independent Data (TS&amp;TID DATA) Sheet</li> </ol>	15
9. Time Series & Time Independent Data (TS&TD DATA) Sheet	16
10. Time Independent Trade Data (TID TRADE) Sheet	18
11. Time Series & Time Independent Trade Data (TS&TID TRADE) Sheet	20
12. Loading a Smart Excel Workbook into ANSWER-TIMES	21
13. Example ANSWER-TIMES Smart Excel Workbook	22
Appendix A: Establishing a New ANSWER-TIMES Smart Workbook	25
A. I - Creating a new (empty) ANSWER-TIMES Smart Workbook	20
A.2 - Making an existing workbook aware of ANSWER-TIMES Smart Workbook facilities	3 27
A.3 - Copying an existing workbook that is already aware of ANSWER-TIMES Smart	
Workbook facilities to create a new workbook	28
A.4 - Updating an existing workbook that is already aware of ANSWER-TIMES Smart	
Workbook facilities when Noble-Soft distributes an updated version of the ANSWER-	~~
TIMES SMART XLS	29
A.5 - Adding a New ANSWER-TIMES Small Sheet to the Current XLS	29 r
Argument (Item) selection form, and [Check Sheet] Parameter checking	32
B.1 - Operation of the Parameter Selection Form, displayed after clicking on [Parameter	r]
button	33
B.2 - Operation of the Parameter Argument (Item) Selection Form, displayed after clicki on [Arg1]-[Arg6] buttons	ng 35
B.3 - [Check Sheet] Checking for a Data Parameter	38

#### Table of Contents

#### Acknowledgements

Aspects of the development of the ANSWER-TIMES "Smart" Excel Workbooks, and the creation of this Manual, were assisted by the existence of the ANSWER-MARKAL "Smart" Load Templates and Manual. The latter were the result of a collaborative effort in 2006 between Gary Goldstein of DecisionWare and Noble-Soft Systems.

But the reader of this Manual who is familiar with the ANSWER-MARKAL "Smart" Load Templates will soon realize that in important respects the ANSWER-TIMES "Smart" Excel Workbooks differ significantly from the ANSWER-MARKAL "Smart" Load Templates. In particular the format and operation of the ANSWER-TIMES "Smart" work<u>sheets</u> differ significantly from those of ANSWER-MARKAL.

The development of the ANSWER-TIMES "Smart" Excel Workbooks has benefited from suggestions made by Dr. Uwe Remme of the International Energy Agency.

Some financial support was provided by ETSAP, and also by the International Energy Agency – the latter in the context of a larger project to create a special Library Region version of ANSWER-TIMES for the TIMES version of the IEA's Energy Technology Perspectives (ETP) Model.

#### 1. Background

The task of assembling data for a TIMES model requires various data preparation steps that are usually performed using the power and flexibility of spreadsheets (Excel). New ANSWER-TIMES "Smart" Excel Workbooks have been developed to allow the analyst to assemble the model data from its sources in a form readily loaded into ANSWER-TIMES. The process is guided by a few rules and supported by "smart" buttons and selection trees or lists, along with quality control checking, to facilitate the direct (and correct) loading of the data.

The "Smart" Excel Workbooks are loaded into an ANSWER-TIMES database by means of the "File, Import, Model Data from Excel" facility. For an overview of the use of this facility see section 12 'Loading a Smart Excel Workbook into ANSWER-TIMES' of this manual, and for a detailed explanation see section 2.10 'Importing Model Data from Excel' in the ANSWERv6-TIMES User Manual.pdf in folder C:\AnswerTIMESv6\UserManuals.

In sections 4-11 that follow each type of worksheet will be presented. The next two sections however describe opening a "smart" workbook and the general layout and philosophy embodied in all the worksheets.

Note that an example Smart Excel Workbook, **SmartDemoMultiRegion.xls**, that demonstrates the specification in its entirety of a multi-region TIMES model is provided as part of the ANSWERv6-TIMES installation files in folder C:\AnswerTIMESv6\Ans\_WrkTI. See section 13 'Example ANSWER-TIMES Smart Excel Workbook' of this manual.

#### 2. Workbook Setup

Anyone wishing to work with an ANSWER-TIMES "Smart" Excel Workbook must create an ANSWER-TIMES Smart Workbook to start. See Appendix A for more information on the various ways in which this can be done. In addition, note that the functioning of some of the macro facilities in the ANSWER-TIMES Excel Workbooks requires that ANSWER-TIMES be installed on your computer.

Upon opening a "Smart" Workbook, depending on your Windows security level setting you may be prompted by the security warning below:



Select "Enable Macros" so that the "smart" buttons are made available.

Once you select "Enable Macros", you will be prompted to specify an ANSWER-TIMES database that will be associated with the workbook:

Specify ANSWER Database
Specify ANSWER database used to provide Parameter, Units and Years information
Browse,
OR
<ul> <li>C:\AnswerTIMESv6\Answer_Databases\EmptyDemoMultiRegion-v6.7.2.mdb</li> <li>C:\AnswerTIMESv6\Answer_Databases\Utopia_Demo_UC_Data.mdb</li> <li>C:\AnswerTIMESv6\Answer_Databases\RetirementOfCapacityDemo.mdb</li> <li>C:\ANSWER-TIMES-SMART-XLS\ANSWERTIMESver66XLS-Library\testing\Example4-v668-Library-Er</li> <li>C:\AnswerV6FlexTS-Library\Answer_Databases\BASE ETP-10.mdb</li> <li>C:\ANSWER-TIMES-SMART-XLS\ANSWERTIMESver66XLS-Library\testing\Example4-v668-Library.mv</li> </ul>
Cancel

You should always specify an ANSWER-TIMES database because the operation of nearly all of the "smart" buttons in the ANSWER-TIMES workbook requires that you do.

Once you have used an ANSWER-TIMES "smart" workbook to load information into an ANSWER-TIMES database, then to derive maximum benefit from the facilities offered by an ANSWER-TIMES "smart" workbook, you should specify this ANSWER-TIMES database (or a copy of it) as the associated database when you subsequently load further information into this database from an ANSWER-TIMES "smart" workbook.

 This is because an ANSWER-TIMES "smart" workbook offers an important new facility (not available in an ANSWER-MARKAL "smart" workbook) – <u>the ability to</u> <u>access Item information that is in the associated database</u>, as well as in the ITEMS sheet. So for example the **[Check Sheet]** button on a TS DATA sheet checks arguments for Time Series Parameters against both Items on the ITEMS sheet and Items in the database.

#### 3. Worksheet Layout and Philosophy

This section briefly indicates each of the eight types of "smart" worksheets currently available in an ANSWER-TIMES Smart Excel Workbook, as presented in Table 1. They are segregated into two types Declare (Declaration) and Data, and are identified by one of the ANSWER-TIMES Indicators REGIONS, ITEMS, TS DATA, TID DATA, TS&TID DATA, TS TRADE, TID TRADE or TS&TID TRADE appearing in cell A1 of the worksheet.

Worksheet	<u>Type</u>	ANSWER Indicator	Description
Regions	Declare	REGIONS	The Internal and External Regions are named and described, and their Set Memberships information is declared. (ANSWER's special _GLOBAL region is pre-defined on the sheet.) See section 4.
Items	Declare	ITEMS	Items whose specification is under user control (TimeSlices, Commodities, Commodity Groups, Processes, User Constraints) are named and described, and (where applicable) their Units and Set Memberships information are declared. See section 5.
Time Series Data	Data	TS DATA	TIMES Time Series Data Parameters that have a single region index are specified. See section 6.
Time Independent Data	Data	TID DATA	TIMES Time Independent Data Parameters that have a single region index are specified. See section 7.
Time Series and Time Independent Data	Data	TS&TID DATA	TIMES Time Series & Time Independent Data Parameters that have a single region index are specified. See section 8.
Time Series Bilateral Trade Data	Data	TS TRADE	TIMES Time Series Data Parameters that have <i>two</i> region indexes are specified. See section 9.
Time Independent Bilateral Trade Data	Data	TID TRADE	TIMES Time Independent Data Parameters that have <i>two</i> region indexes are specified. See section 10.
Time Series and Time Independent Bilateral Trade Data	Data	TS&TID TRADE	TIMES Time Series & Time Independent Data Parameters that have <i>two</i> region indexes are specified. See section 11.

#### NOTES:

- 1. Only one REGIONS sheet may be included in a workbook.
- 2. Only one ITEMS sheet may be included in a workbook.
- 3. Any number of each type of Data sheet is permitted.
- Version 6.7 does not handle the TIMES Stochastic Extension, and hence does not allow Stochastic Items to be declared on the ITEMS sheet, nor does it allow Stochastic Time Series & Time Independent Data to be specified on the TS DATA, TID DATA, TS&TID DATA sheets.

The name given to each worksheet is up to the user, although the ANSWER-TIMES Indicators in cell A1 must match those in Table 1. In addition, a workbook may contain as

many other sheets as desired, but the user is encouraged to leave cell A1, the ANSWER-TIMES Indicator cell, blank.

Each of the ANSWER-TIMES "smart" worksheets is governed by a few formatting guidelines (requirements), and has a fairly rigid format. The top 7 rows of each sheet comprise the "smart" buttons and header area. These rows are non-scrollable.

A row will be ignored if the first character of the cell in column A contains an '\*', or if the row is completely blank.

#### 3.1 – Role and Operation of "smart" buttons on ANSWER-TIMES Smart Worksheets

There are a number of "smart" buttons on each of the ANSWER-TIMES worksheets. You can use these buttons *to assist in the correct specification* of:

- Set Memberships on the REGIONS sheet
- Component, Unit(s) and Set Memberships on the ITEMS sheet
- Parameter, and Parameter Arguments (Arg1, Arg2, ..., Arg6) on each of the 6 types of Data sheet, and also I/E Opt code on the 4 types of Data sheet where Time Series parameters may be specified

The operation of these buttons is context sensitive, that is <u>you must first position the cursor in</u> <u>the appropriate cell (the active cell) below the column in which the "smart" button appears</u>, and then click on the "smart" button to bring up a form, that most often allows you to select from a list of possibilities (e.g. from a list of Parameters, Processes, Commodities etc). When you exit the form, your selection will be transferred into the active cell in **violet**.

# But you should also note that use of these "smart" buttons is entirely at your discretion. So for example on a Data sheet if you know the (name of the) TIMES Parameter that you want to insert in a row, and you also know the (names of the) Items that comprise this Parameter's Arguments then you can directly enter the Parameter and its Arguments into the desired row on the Data sheet, with no need to make use of the **Parameter**, **Arg1**, **Arg2**, ..., **Arg6** "smart" buttons.

#### This is the case because in version 6.7 of the ANSWER-TIMES "Smart" Excel Workbooks, there are <u>no</u> linked references in Data sheets to Names of TimeSlices, Commodities, Commodity Groups, Processes or Constraints that occur on the ITEMS sheet.

Note also that every worksheet has a **Check Sheet** "smart" button that may be clicked at any time to have a standard set of consistency and quality control checks performed.

Version 6.7 does not allow inheritance down columns B, E and F of Component, Units and Set Memberships on the ITEMS sheet. (Component, Units and Set Memberships must be specified in columns B, E and F of each row on the ITEMS sheet.) But it does allow inheritance down column A of the region-list on all sheets, except the TRADE sheets where a single region must be specified in column A of each row, (and also in column B of each row).

In the sections that follow each sheet is presented, with the buttons explained.

#### 4. REGIONS Sheet

The REGIONS sheet is where the Internal and External Regions are named and described, and their Set Memberships information is declared. An example REGIONS sheet is shown below. (ANSWER's special \_GLOBAL region is pre-defined on the sheet in row 8.)

	A	В	C	D
1	REGIONS	GLOBAL, DEMO, UTOPIA, IMPEXP, MINRNW		
2				
З	Check Sheet			
4			Set Memberships	I
6				
7	Region	Description	Set Membershins	Comment
8	GLOBAL	Special region for data parameters with no REG arg	ALL REG	comment
9	DEMO	Demo region	ALL REG.REG	
10	UTOPIA	Utopia region	ALL REG,REG	
11	IMPEXP	IMPEXP region	ALL_REG,REG_EXT	
12	MINRNW	MINRNW region	ALL_REG,REG_EXT	
13				

The information entered on the REGIONS sheet that is directly provided by the user are the Region Names and Descriptions, appearing in columns A and B respectively.

To specify that a Region is an Internal Region, enter **ALL\_REG,REG** in column C; and to specify that a Region is an Internal Region, enter **ALL\_REG,REG\_EXT** in column C.

Or, after positioning the cursor in column C of a row, use the <u>Set Memberships</u> "smart" button to select Internal or External from the Region Set Memberships form, shown below (where the user has selected Internal):

Specify Region Set MemberShips							
To specify Set Memberships, click on the appropriate leaf Additional Characterization as necessary, and then click Set Memberships	f node in the LHS treeview, adjust the RHS on the OK button.						
Region External External	Additional Characterization						
	OK Cancel						

and then click on the [OK] button; the Set Memberships (in this case **ALL\_REG,REG** for Internal) will be entered in column C of the row.

The **Check Sheet** button may be clicked at any time to have a standard set of consistency and quality control checks performed; the results of the checking are presented in a Wordpad file as shown below.



#### 5. ITEMS Sheet

The ITEMS sheet is where all the Items whose specification is under user control (TimeSlices, Commodities, Commodity Groups, Processes, User Constraints) are named and described, and (where applicable) their Units and Set Memberships information are declared. An example ITEMS sheet is shown below.

	A	B C		D	E	F	G	Н
1	ITEMS	_GLOBAL, DEMO, UTOPIA, IMP		PEXP,MINRNW				
2								
	Check Sheet							
3	Check sheet							
4		Component			Unit(s)	Set Memberships		
5			-				1	
브								
4		Comp	Name	Description	Unit(s)	Set Memberships	Comment	
-								
9	* Pre-defined Commod	nty Groups (	Cell A10 shou	id contain comma-delimited list o	r all Internal R	egions)		
10	DEMO,UTOPIA	D	ACTORP	Activity-related Group		COM_GRP,COM_GRPDEF		
12		0	DEIVI	Demand Commodity Type		COM_GRP,COM_GRPDEF		
12		D	EINI	Environmental Commodity Type		COM_GRP,COM_GRPDEF		
11		D	MAT	Material Commodity Type		COM_GRP.COM_GRPDEF		
15		D	NRC	Epergy Commodity Type		COM_GRP.COM_GRPDEF		
16		0	NINO	Energy commonly type		COM_GRF,COM_GRFDEI		
17	* TimeSlice Items for	GLOBAL DE		aione				
18		w	ANNI IAI	Appual				
19	_0200/12,02110,0101111	w	FA	Fall				
20		w	FAD	Fall Day		ALL TS.DAYNITE		
21		W	FAN	Fall Night		ALL TS.DAYNITE		
22		W	SP	Spring		ALL TS.SEASON		
23		w	SPD	Spring Day		ALL_TS,DAYNITE		
24		w	SPN	Spring Night		ALL_TS,DAYNITE		
25		w	SU	Summer		ALL_TS,SEASON		
26		w	SUD	Summer Day		ALL_TS,DAYNITE		
27		W	SUN	Summer Night		ALL_TS,DAYNITE		
28		W	W	Winter		ALL_TS,SEASON		
29		W	WID	Winter Day		ALL_TS,DAYNITE		
30		W	WIN	Winter Night		ALL_TS,DAYNITE		
31								
32	* Commodity Items for	DEMO,UTOF	PIA regions					
33	DEMO,UTOPIA	E	CO2	Carbon Dioxide	kt	COM,ENV,ANNUAL,GHG		
34		E	ELC	Electricity	PJ	COM,NRG,DAYNITE,ELC		
35		E	HYD	Hydro Power	PJ	COM,NRG,ANNUAL,FRERENEW		
36		E	ID .	Industrial Heating	PJ	COM,DEM,ANNUAL,IND		
37		E	RH	Residential Space Heating	PJ	COM,DEM,DAYNITE,RES		
30		E	RL	Residential Lighting	PJ	COM,DEM,ANNUAL,RES		
39		E	IX	Automobile Transportation	РJ	COM, DEM, ANNUAL, TRN		
40	l Commoditu Horse fee	DEMO UTO		giono (ANSWED roguiroo Commo	litu Hama ta k	o openified in External Degicers investi		Evnort'
41	DEMO LITOPIA IMPEVO	E E E E E	DSI	Diesel	Inty items to f	COM NPC ANNUAL FOSSI	ea in import	/Export)
42	DEWO,OTOPIA, IMPEAP	F	GAS	GAS	P J	COM NDC ANNUAL FOSSIL	++	
43		F	083	Geoline	P I	COM NPG ANNUAL FOSSIL	++	
44		F	HCO	Coal	DI	COM NRG ANNUAL FOSSIL		
46		F		Oil	PI	COM NRG ANNUAL FOSSIE		
47		F	LIRM	Natural Uranium	PI	COM URG ANNUAL NUCLE		
48		-					++	
49	* Commodity Group Ite	ms for DEM	0.UTOPIA rea	ions			<u> </u>	
50	DEMO,UTOPIA	D	E41 OUT	E41 OUT		COM GRP,COM GRPTRU		
51	· ·	D	RHG_IN	RHG_IN		COM_GRP,COM_GRPTRU		
52		D	SRE-G	PCG for SRE-G (Oil Refinery)		COM_GRP,COM_GRPTRU		
53								
54	* Process Items for DE	MO,UTOPIA	regions					
55	DEMO,UTOPIA	Т	BITRADE-ELC	Bilateral Trade in Electricity	PJ,GW	PRC,ELE,DAYNITE,IRE		
56		Т	E01	Coal Steam Electric	P J,GW	PRC,ELE,DAYNITE		
57		Т	E21	LVVR Nuclear Plant	PJ,GW	PRC,ELE,SEASON		

Note that when you first create an ITEMS sheet, rows 9-15 are <u>automatically generated</u>, and you must enter into cell A10 a comma-delimited list of the internal regions for your model.

These auto-generated rows specifying pre-defined Commodity Groups are necessary to ensure that data parameters that require pre-defined Commodity Groups as arguments can be specified, and for the correct functioning of "Check Sheet". So you should always retain them.

The remaining information entered on the ITEMS sheet that is directly provided by the user for each Item are the Component, Item Name and Description, appearing in columns B, C and D respectively.

(Initially, the user may need to use the **Component** "smart" button to specify the single character Component Letter in column B:

5	elect Component			×
	Description		Letter	-
			D	
	Commodity		E	
	🖹 Constraint		С	
	🖹 Process		т	
	TimeSlice		W	
		ОК	Cancel	

but rather quickly will come to learn the correspondence between the TimeSlice, Commodity, Commodity Group, Process, User Constraint Components and these 5 Letters.)

Unit(s) In addition, after positioning the cursor in columns E or F of a row the or

Set Memberships "smart" buttons may be used to select the Unit(s) or Set Memberships specifications, respectively.

Unit(s) button when the cursor is positioned in column E, For example, if you click on the for a row in which the Component in column B is T (Process), the form shown below will be displayed, allowing you to specify the Process Activity Unit and Process Capacity Unit that apply for the Process (the form is shown after you have selected PJ, GW respectively):

Specify Process Activity, Process Capacity Units	🔀
Specify the Process Activity Unit in the left treeview, specify the the OK button.	e Process Capacity Unit in the right treeview, and then click on
Poccesstarty	billion-passenger-kilometres/annum (bn-pass-km/a)      billion-tonne-kilometres/annum (bn-t-km/a)      gigawatts (GW)      megawatts (MW)      million tonnes/annum (mt/a)      petajoules/annum (TJ/a)      torusand tonnes/annum (KT/a)      unit of volume for MVOs/annum (uvol/a)      unit of weight for MWTs/annum (uwt/a)
	OK Cancel

Set Memberships

And if you click on the button when the cursor is positioned in column F, for a row in which the Component in column B is T (Process), the form shown below will be displayed, allowing you to specify the Set Memberships that apply for the Process (the form is shown after you have selected ELE, Day-Night Time Slice Level):



The <u>Check Sheet</u> button may be pressed at any time to have a standard set of consistency and quality control checks performed. The results of the checking are presented in a Wordpad file as shown below, and any offending cells are highlighted on the sheet in yellow along with a cell comment indicating the nature of the problem.



#### 6. Time Series Data (TS DATA) Sheet

The TS DATA sheet is where Time Series Data Parameters are specified. An example of a TS DATA sheet is shown below.

	A	В	С	D	E	F	G	Н	1	J	K	L	М
1	TS DATA	DEMO,UTOPIA											
2													
3	Check Sheet												
4		Parameter	Aret	Araz	Ara3	Arat	Aras	Aras	LE Opt				
5		1 41 4110001	7.1.g.	, nge	, Aigo		, Aigo	7.1.50	ar obt				
6													
7		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt				
8													
9	* TS DATA for I	EMO,UTOPIA re	egions										
10	DEMO,UTOPIA	ACT_COST	E01	-	-	-	-	-	0	0.3	0.3	0.3	
11		ACT_COST	E21	-	-	-	-	-	0	1.5	1.5	1.5	
12		ACT_COST	E41	-	-	-	-	-	0	0.4	0.4	0.4	
13		ACT_COST	E70	-	-	-	-	-	0	0.4	0.4	0.4	
14		ACT_COST	SRE	-	-	-	-	-	0	10	10	10	
15		CAP_BND	E31	-	-	-	-	LO	0	0.13	0.13	0.13	
16		CAP_BND	E31	-	-	-	-	UP	0	0.13	0.17	0.21	
17		CAP_BND	E51	-	-	-	-	UP	0	3	3	3	
18		CAP_BND	E52	-	-	-	-	LO	0	0.13	0.13	0.13	
19		CAP_BND	E52	-	-	-	-	UP	0	0.13	0.17	0.21	
20		CAP_BND	SRE	-	-	-	-	LO	0	0.1	0	0	
21		CAP_BND	TXE	-	-	-	-	UP	0 r	ull	4	10	
22		COM_FR	-	RL	-	-	FAD	-	0	0.2	0.2	0.2	
23		COM_FR	-	RL	-	-	FAN	-	0	0.05	0.05	0.05	
24		COM_FR	-	RL	-	-	SPD	-	0	0.12	0.12	0.12	
25		COM_FR	-	RL	-	-	SPN	-	0	0.08	0.08	0.08	
26		COM_FR	-	RL	-	-	SUD	-	0	0.1	0.1	0.1	
27		COM_FR	-	RL	-	-	SUN	-	0	0.03	0.03	0.03	
28		COM_FR	-	RL	-	-	WID	-	0	0.3	0.3	0.3	
29		COM_FR	-	RL	-	-	VMN	-	0	0.12	0.12	0.12	
30		COM_IE	-	DSL	-	-	ANNUAL	-	0	1	1	1	
31		COM_IE	-	ELC	-	-	ANNUAL	-	0	1	1	1	
32		COM_IE	-	GSL	-	-	ANNUAL	-	0	1	1	1	
33		COM_IE	-	HCO	-	-	ANNUAL	-	0	1	1	1	
34		COM_IE	-	HYD	-	-	ANNUAL	-	0	1	1	1	
35		COM_IE	-	OIL	-	-	ANNUAL	-	0	1	1	1	
36		COM_IE	-	URN	-	-	ANNUAL	-	0	1	1	1	
37		COM_PKFLX	-	ELC	-	-	FAD	-	0	0.2	0.2	0.2	
138		COM PKFLX	-	ELC	-	-	ISPD	-	0	0.2	0.2	0.2	

To specify a Time Series Data Parameter, position the cursor in column B of a row below row 7, and press the **Parameter** "smart" button. This brings up a TS Parameter selection list as shown below:

5	Select TS Parameter (Name will be transferred to ActiveCell)										
	Sets Filter: *All Data Parameters										
	Name	Description	TS/TID	Global	Set Memberships	<u>^</u>					
	ACT_BND	Bound on activity of a process	TS								
	ACT_COST	Variable costs associated with activity of a process	TS								
	ACT_EFF	Activity efficiency for a process	TS								
	CAP_BND	Bound on total installed capacity in a period	TS			_					
	CM_EXOFORC	Radiative forcing from exogenous sources	TS	_GLOBAL	Climate						
	CM_LINFOR	Linearized forcing function parameter	TS	_GLOBAL	Climate						
	CM_MAXC	Maximum allowable climatic quantity	TS	_GLOBAL	Climate						
	COM_AGG	Commodity aggregation parameter	TS								
	COM_BNDNET	Net bound on commodity (e.g. emissions)	TS								
	COM_BNDPRD	Limit on production of a commodity	TS								
	COM_CSTNET	Cost on Net of commodity (e.g. emissions tax)	TS								
	COM_CSTPRD	Cost on production of a commodity	TS								
	COM_ELAST	Elasticity of demand	city of demand TS Elastic Der								
	COM_ELASTX	Elasticity shape of demand	TS		Elastic Demand						
	COM_FR	Seasonal distribution of a commodity	TS								
	COM_IE	Seasonal efficiency of a commodity	TS								
	COM_PKFLX	Peaking flux ratio	TS								
	COM_PKRSV	Peaking reserve margin	TS								
	COM_PROJ	Demand baseline projection	TS								
	COM_SUBNET	Subsidy on a commodity net	TS								
	COM_SUBPRD	Subsidy on production of a commodity net	TS			~					
	B COM TAVACT	T	TC		1						
	Only TS Parameters	Parameters Shown, Excluded Sp	ecify Param And Args	Specil Prese	fy Param rve Args Cance	el					

Select the desired TS Parameter and (normally) click on the And Args button.

Then use the Arg1 through to Arg6 buttons, and the IE Op1 button, as appropriate to specify the Arguments and the I/E Opt code for the selected Parameter, followed by specification of the Parameter's numeric values.

See Appendixes B.1 and B.2 respectively for details regarding the operation of the Parameter selection form, and for details regarding the operation of the Item selection form that is

displayed when you click on any of the Argin through to Arg6 buttons to specify the Arguments for the selected Parameter.

The Check Sheet button may be pressed at any time to have a standard set of consistency and quality control checks performed.

See Appendix B.3 for details regarding the checking that is carried out for a Data Parameter.

The results of the checking are presented in a Wordpad file as shown below, and any offending cells are highlighted on the sheet in yellow along with a cell comment indicating the nature of the problem.



#### 7. Time Independent Data (TID DATA)

The TID DATA sheet is where Time Independent Data Parameters are specified. An example of a TID DATA sheet is shown below.

	A	В	С	D	E	F	G	Н		J
1	TID DATA	DEMO,UTOPIA								
2										
3	Check Sheet									
4		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6		
5				-	-	-	1		-	
<u>b</u>		-								
		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	Value	
8		OUTODIA -								
9	* TID DATA for DEM		ns	000	This /					
10	DEMO,UTOPIA	COM_GMAP	-	CO2	ENV	-	-	-	1	
11		COM_GMAP	-	DSL	NRG	-	-	-	1	
12		COM_GMAP	-	DSL	RHG_IN	-	-	-	1	
13		COM_GMAP	-	DSL	SRE-G	-	-	-	1	
14		COM_GMAP	-	ELC	E41_001	-	-	-	1	
10		COM_GMAP	-	ELC	NRG	-	-	-	1	
10		COM_GMAP	-	GAS	NRG	-	-	-	1	
10		COM_GMAP	-	GAS	RHG_IN	-	-	-	1	
10		COM_GMAP	-	GSL	NRG	-	-	-	1	
19		COM_GMAP	-	GSL	SRE-G	-	-	-	1	
20		COM_GMAP	-	HCO	NRG	-	-	-	1	
21		COM_GMAP	-	HYD	NRG	-	-	-	1	
22		COM_GMAP	-	OIL	NRG	-	-	-	1	
23		COM_GMAP	-	RH	DEM	-	-	-	1	
24		COM_GMAP	-	RH	E41_OUT	-	-	-	1	
25		COM_GMAP	-	RL	DEM	-	-	-	1	
26		COM_GMAP	-	TX	DEM	-	-	-	1	
27		COM_GMAP	-	URN	NRG	-	-	-	1	
28		COM_PEAK	-	ELC	-	-	-	-	1	
29		G_YRFR	-	-	-	-	ANNUAL	-	1	
30		G_YRFR	-	-	-	-	FA	-	0.25	
31		G_YRFR	-	-	-	-	FAD	-	0.167	
32		G_YRFR	-	-	-	-	FAN	-	0.083	
33		G_YRFR	-	-	-	-	SP	-	0.25	
34		G_YRFR	-	-	-	-	SPD	-	0.167	
35		G_YRFR	-	-	-	-	SPN	-	0.083	
36		G_YRFR	-	-	-	-	SU	-	0.25	
37		G_YRFR	-	-	-	-	SUD	-	0.18	
38		G_YRFR	-	-	-	-	SUN	-	0.07	

To specify a Time Independent Data Parameter, position the cursor in column B of a row below row 7, and press the **Parameter** "smart" button. This brings up a TID Parameter selection list as shown below:

ame	Description	TS/TID	Global	Set Memberships	
ACT_CUM	Bound on cumulative process activity	TID			
CM_CONST	Climate module constants	TID	_GLOBAL	Climate	
CM_HISTORY	Calibration values for CO2 and forcing	TID	_GLOBAL	Climate	
COM_CUMNET	Cumulative net bound on commodity (e.g. emissions)	TID			
COM_CUMPRD	Cumulative limit on production of a commodity	TID			
COM_GMAP	Commodity and commodity group (Set)	TID			
COM_LIM	List of equation type for balance (Set)	TID			
COM_OFF	Periods for which a commodity is unavailable (Set)	TID			
COM_PEAK	Peaking required flag (Set)	TID			
COM_PKTS	Peak timeslice for a commodity group (Set)	TID			
COM_STEP	Step size for elastic demand	TID		Elastic Demand	
DAM_BQTY	Base quantity of emissions	TID		Damage	
DAM_ELAST	Elasticity of damage cost	TID		Damage	
DAM_STEP	Step number for emissions up to base	TID		Damage	
DAM_VOC	Variance of emissions	TID		Damage	
ETL-CCAP0	Initial cum. capacity (starting point on learning curve)	TID		ETL	
ETL-CCAPM	Maximum cum, capacity (ending point on learning curve)	TID		ETL	
ETL-PRAT	Progress ratio	TID		ETL	
ETL-SC0	Investment cost corresp. to starting point on learning curve	TID		ETL	
ETL-SEG	Number of segments for cumulative cost curve	TID		ETL	
ETL-TEG	Indicates process for which learning curve is specified (Set)	TID		ETL	

	Specify Param	
Select the desired TID Parameter and (normally) click on the	And Args	button
colocities declined the transition and (normally) click of the		buttorn.

Then use the Arg1 through to Arg6 buttons as appropriate to specify the Arguments for the selected Parameter, followed by specification of the Parameter's numeric value.

See Appendixes B.1 and B.2 respectively for details regarding the operation of the Parameter selection form, and for details regarding the operation of the Item selection form that is

displayed when you click on any of the Arg1 through to Arg6 buttons to specify the Arguments for the selected Parameter.

The **Check Sheet** button may be pressed at any time to have a standard set of consistency and quality control checks performed.

See Appendix B.3 for details regarding the checking that is carried out for a Data Parameter.

The results of the checking are presented in a Wordpad file as shown below, and any offending cells are highlighted on the sheet in yellow along with a cell comment indicating the nature of the problem.



#### 8. Time Series & Time Independent Data (TS&TID DATA) Sheet

The TS&TID DATA sheet offers the convenience of allowing both Time Series and Time Independent Data Parameters to be specified on a single sheet. An example of a TS&TID DATA sheet is shown below.

	A	В	C	D	E	F	G	H		J	K	L	M
1	TS&TID DATA	GLOBAL, REG1	I,REG2,REG3	,IMPEXP,MINP	RNAA								
2													
3	Check Sheet												
4		Parameter	Arcri	Ara2	Ara3	Aro4	Ara5	Ara6	I/E Opt				
5						-	-	-					
6													
									I/E Opt				
7		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	or Value				
8													
9	* TS and TID Proc	ess Data for De	mand Devic	es, Groupe:	d by Proces	s - REG1,RE	G2,REG3 reg	ions					
10													
11	* TS and TID Data	for RHE											
12	REG1,REG2,REG3	ACT_EFF	RHE	-	ELC	-	ANNUAL	-	0	1	1	1	1
13		FLO_FR	RHE	RH	-	-	FAD	FX	0	0.18	0.18	0.18	0.18
14		FLO_FR	RHE	RH	-	-	FAN	FX	0	0.12	0.12	0.12	0.12
15		FLO_FR	RHE	RH	-	-	SPD	FX	0	0.06	0.06	0.06	0.06
16		FLO_FR	RHE	RH	-	-	SPN	FX	0	0.04	0.04	0.04	0.04
17		FLO_FR	RHE	RH	-	-	SUD	FX	0	0	0	0	0
18		FLO_FR	RHE	RH	-	-	SUN	FX	0	0	0	0	0
19		FLO_FR	RHE	RH	-	-	VMD	FX	0	0.4	0.4	0.4	0.4
20		FLO_FR	RHE	RH	-	-	VMN	FX	0	0.2	0.2	0.2	0.2
21		NCAP_AF	RHE	-	-	-	ANNUAL	UP	0	1	1	1	1
22		NCAP_BND	RHE	-	-	-	-	UP	0	0	null	null	null r
23		NCAP_COST	RHE	-	-	-	-	-	0	12	12	12	12
24		NCAP_TLIFE	RHE	-	-	-	-	-	0	30	30	30	30
25		PRC_ACTUNT	RHE	-	RH	-	-	-	1				
26		PRC_CAPACT	RHE	-	-	-	-	-	1				
27		TOP-IN	RHE	ELC	-	-	-	-	1				
28		TOP-OUT	RHE	RH	-	-	-	-	1				
29	* TS and TID Data	for RHG											
30		ACT_EFF	RHG	-	RHG_IN	-	ANNUAL	-	0	0.7	0.7	0.7	0.7
31		FLO_EMIS	RHG	CO2	DSL	-	ANNUAL	-	0	75	75	75	75
32		FLO_EMIS	RHG	CO2	GAS	-	ANNUAL	-	0	56	56	56	56
33		FLO_FR	RHG	RH	-	-	FAD	FX	0	0.18	0.18	0.18	0.18
34		FLO_FR	RHG	RH	-	-	FAN	FX	0	0.12	0.12	0.12	0.12

To specify a Time Series or Time Independent Data Parameter on a TS&TID DATA sheet,

position the cursor in column B of a row below row 7, and press the **Parameter** "smart" button. This brings up a TS and TID Parameter selection list as shown below:

5	elect TS or TID Parame	ter (Name will be transferred to ActiveCell)			×
	Sets Filter: *All Data P	arameters			<b>-</b>
	, [		[ ]		_
	Name		TS/TID   Glo	obal   Set Memberships	<u>-</u>
	ACT_BND	Bound on activity of a process	TS		=
	ACT_COST	Variable costs associated with activity of a process	TS		
	ACT_CUM	Bound on cumulative process activity	TID		
	ACT_EFF	Activity efficiency for a process	TS		
	CAP_BND	Bound on total installed capacity in a period	TS		
	CM_CONST	Climate module constants	TID _G	iLOBAL Climate	
	CM_EXOFORC	Radiative forcing from exogenous sources	TS _G	iLOBAL Climate	
	CM_HISTORY	Calibration values for CO2 and forcing	TID _G	iLOBAL Climate	
	CM_LINFOR	Linearized forcing function parameter	TS _G	iLOBAL Climate	
	CM_MAXC	Maximum allowable climatic quantity	TS _G	iLOBAL Climate	
	COM_AGG	Commodity aggregation parameter	TS		
	COM_BNDNET	Net bound on commodity (e.g. emissions)	TS		
	COM_BNDPRD	Limit on production of a commodity	TS		
	COM_CSTNET	Cost on Net of commodity (e.g. emissions tax)	TS		
	COM_CSTPRD	Cost on production of a commodity	TS		
	COM_CUMNET	Cumulative net bound on commodity (e.g. emissions)	TID		
	COM_CUMPRD	Cumulative limit on production of a commodity	TID		
	COM_ELAST	Elasticity of demand	TS	Elastic Demand	
	COM_ELASTX	Elasticity shape of demand	TS	Elastic Demand	
	COM_FR	Seasonal distribution of a commodity	TS		
	COM GMAP	Commodity and commodity group (Set)	TID		_
	Brown	C	τc		<u>×</u>
	Both TS and TID Pa	arameters Shown, Excluded	Specify Param And Args	Specify Param Preserve Args Cancel	

The mechanics of selecting the desired Parameter and specifying its Arguments, and the operation of the **Check Sheet** button are exactly the same as for the TS DATA and TID DATA sheets.

#### 9. Time Series Trade Data (TS TRADE) Sheet

The TS TRADE sheet is where Time Series Trade Data Parameters are specified. These are TS Parameters that have *two* region indexes. An example of a TS TRADE sheet is shown below.

ſ		A	В	C	D	E	F	G	Н		J	K	L	M	
	1	TS TRADE	GLOBAL, REG1	,REG2,REG3,IMP	EXP, MINRNW										
Γ	2		-												
	3	Check Sheet													
F	4			Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt				_
ł	6														
ł	7	Region	Region2	Parameter	Ara1	Ara2	Ara3	Ara4	Ara5	Ara6	I/E Opt				
h	8				/	/ g_									-
t	9	* On TS TRADE	sheet, a single	region must be	specified in	n column A (	a comma-se	eparated rea	aion-list is n	ot allowed)					
ľ	10			Ŭ	· ·			· · ·	Ĩ	l í					
l	11	REG1	IMPEXP	IRE PRICE	IMPDSL1	DSL	ANNUAL	-	IMP	-	0	10	10	10	
l	12	REG1	IMPEXP	IRE_PRICE	IMPGAS1	GAS	ANNUAL	-	IMP	-	0	6.4	6.4	6.4	
ľ	13	REG1	IMPEXP	IRE_PRICE	IMPGSL1	GSL	ANNUAL	-	IMP	-	0	15	15	15	
ľ	14	REG1	IMPEXP	IRE_PRICE	IMPHCO1	HCO	ANNUAL	-	IMP	-	0	2	2	2	
I	15	REG1	IMPEXP	IRE_PRICE	IMPOIL1	OIL	ANNUAL	-	IMP	-	0	8	8	8	
Γ	16	REG1	IMPEXP	IRE_PRICE	IMPURN1	URN	ANNUAL	-	IMP	-	0	2	2	2	
	17	*													
L	18	REG2	IMPEXP	IRE_PRICE	IMPDSL1	DSL	ANNUAL	-	IMP	-	0	10	10	10	
L	19	REG2	IMPEXP	IRE_PRICE	IMPGAS1	GAS	ANNUAL	-	IMP	-	0	6.4	6.4	6.4	
L	20	REG2	IMPEXP	IRE_PRICE	IMPGSL1	GSL	ANNUAL	-	IMP	-	0	15	15	15	
L	21	REG2	IMPEXP	IRE_PRICE	IMPHCO1	HCO	ANNUAL	-	IMP	-	0	2	2	2	
L	22	REG2	IMPEXP	IRE_PRICE	IMPOIL1	OIL	ANNUAL	-	IMP	-	0	8	8	8	
ŀ	23	REG2	IMPEXP	IRE_PRICE	IMPURN1	URN	ANNUAL	-	IMP	-	0	2	2	2	
ŀ	24	*													
ŀ	25	REG3	IMPEXP	IRE_PRICE	IMPDSL1	DSL	ANNUAL	-	IMP	-	0	10	10	10	
ŀ	26	REG3	IMPEXP	IRE_PRICE	IMPGAS1	GAS	ANNUAL	-	IMP	-	0	6.4	6.4	6.4	
ŀ	27	REG3	IMPEXP	IRE_PRICE	IMPGSL1	GSL	ANNUAL	-	IMP	-	0	15	15	15	
ŀ	28	REG3	IMPEXP	IRE_PRICE	IMPHCO1	HCO	ANNUAL	-	IMP	-	0	2	2	2	_
	29	REG3	IMPEXP	IRE_PRICE	IMPOIL1	OIL	ANNUAL	-	IMP	-	0	8	8	8	-
ŀ	30	REG3	IMPEXP	IRE_PRICE	IMPURN1	URN	ANNUAL	-	IMP	-	0	2	2	2	-
		1 X													

To specify a Time Series Trade Data Parameter, select an (empty) row below row 7 and *enter the regions involved in the trade in the Region and Region2 columns* (columns A,

B) of this row. Then position the cursor in column **C** of this row, and press the **Parameter** "smart" button. This brings up a TS Trade Data Parameter selection list as shown below:

Sets Filter:   *All Data Pa				
Name	Description		TS/TID Glob	al Set Memberships
IRE_BND	Limit on inter-regional exchang	e of commodity	TS	
IRE_FLO	Efficiency of exchange for inte	r-regional transfer	TS	
IRE_PRICE	Price of import/export		TS	

Then use the Arg1 through to Arg6 buttons, and the IE Op1 button, as appropriate to specify the Arguments and the I/E Opt code for the selected Parameter, followed by specification of the Parameter's numeric values.

See Appendixes B.1 and B.2 respectively for details regarding the operation of the Parameter selection form, and for details regarding the operation of the Item selection form that is

displayed when you click on any of the Argin through to Arg6 buttons to specify the Arguments for the selected Parameter.

The **Check Sheet** button may be pressed at any time to have a standard set of consistency and quality control checks performed.

See Appendix B.3 for details regarding the checking that is carried out for a Data Parameter.

The results of the checking are presented in a Wordpad file as shown below, and any offending cells are highlighted on the sheet in yellow along with a cell comment indicating the nature of the problem. Suppose for example you specify parameter IRE\_PRICE in row 32 but forget to specify Region and Region2 in cells A32 and B32. Then the Wordpad file will be as follows:



and the TS TRADE worksheet will have cells A32 and B32 highlighted in yellow as follows:

	A	В	С	D	E	F	G	Н		J	K
1	TS TRADE	_GLOBAL,REG1	,REG2,REG3,IMP	EXP,MINRN/V							
2											
3	Check Sheet										
4			Parameter	Arat	Ara2	Ara3	Aro4	Ara5	Ara6	L/E Opt	
5					,		7.1.91	7.1.30			
6											
7	Region	Region2	Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt	
31	*										
32		1 1	IRE_PRICE	IMPURN1	URN	ANNUAL	-	IMP	-	0	
33											

#### 10. Time Independent Trade Data (TID TRADE) Sheet

The TID TRADE sheet is where Time Independent Trade Data Parameters are specified. These are TID Parameters that have two region indexes. An example of a TID TRADE sheet is shown below.

	A	В	С	D	E	F	G	Н		J	K	L
1	TID TRADE	GLOBAL,REC	1,REG2,REG3,IN	PEXP, MINRN/	v							
2												
3	Check Sheet											
3	Check sheet				-	1	1		1			
5			Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6			
ā										_		-
7	Region	Region?	Parameter	Arat	Ara2	Ara3	Ara4	Ara5	Ara6	Value		
18	Region	Regionz	rarameter	Aigi	A192	Al go	A194	Aigs	Aige	Value		
9	* On TID TRADE •	sheet, a single	e region must l	be specified	in column A	(a comma-	separated re	eaion-list is	not allowed	d)		
10		litera, a chingit	logioninaeei	, o opeenieu				- gion not io		,		
11	IMPEXP	REG1	TOP IRE	IMPDSL1	DSL	-	-	-	DSL	1		
12	IMPEXP	REG1	TOP IRE	IMPGAS1	GAS	-	-	-	GAS	1		
13	IMPEXP	REG1	TOP IRE	IMPGSL1	GSL	-	-	-	GSL	1		
14	IMPEXP	REG1	TOP IRE	IMPHCO1	нсо	-	-	-	HCO	1		
15	IMPEXP	REG1	TOP_IRE	IMPOIL1	OIL	-	-	-	OIL	1		
16	IMPEXP	REG1	TOP_IRE	IMPURN1	URN	-	-	-	URN	1		
17	*											
18	IMPEXP	REG2	TOP_IRE	IMPDSL1	DSL	-	-	-	DSL	1		
19	IMPEXP	REG2	TOP_IRE	IMPGAS1	GAS	-	-	-	GAS	1		
20	IMPEXP	REG2	TOP_IRE	IMPGSL1	GSL	-	-	-	GSL	1		
21	IMPEXP	REG2	TOP_IRE	IMPHCO1	HCO	-	-	-	HCO	1		
22	IMPEXP	REG2	TOP_IRE	IMPOIL1	OIL	-	-	-	OIL	1		
23	IMPEXP	REG2	TOP_IRE	IMPURN1	URN	-	-	-	URN	1		
24	*											
25	IMPEXP	REG3	TOP_IRE	IMPDSL1	DSL	-	-	-	DSL	1		
26	IMPEXP	REG3	TOP_IRE	IMPGAS1	GAS	-	-	-	GAS	1		
27	IMPEXP	REG3	TOP_IRE	IMPGSL1	GSL	-	-	-	GSL	1		
28	IMPEXP	REG3	TOP_IRE	IMPHC01	HCO	-	-	-	HCO	1		
29	IMPEXP	REG3	TOP_IRE	IMPOIL1	OIL	-	-	-	OIL	1		
30	IMPEXP	REG3	TOP_IRE	IMPURN1	URN	-	-	-	URN	1		
14 -			1		1							

To specify a Time Independent Trade Data Parameter, select an (empty) row below row 7 and enter the regions involved in the trade in the Region and Region2 columns (columns A, B) of this row. Then position the cursor in column C of this row, and press the

Parameter "smart" button. This brings up a TID Trade Data Parameter selection list as shown below:



Select the desired TID Trade Parameter and (normally) click on the

Then use the Arg1 through to Arg6 buttons as appropriate to specify the Arguments for the selected Parameter, followed by specification of the Parameter's numeric value.

See Appendixes B.1 and B.2 respectively for details regarding the operation of the Parameter selection form, and for details regarding the operation of the Item selection form that is

displayed when you click on any of the Arg1 through to Arg6 buttons to specify the Arguments for the selected Parameter.

The **Check Sheet** button may be pressed at any time to have a standard set of consistency and quality control checks performed.

See Appendix B.3 for details regarding the checking that is carried out for a Data Parameter.

The results of the checking are presented in a Wordpad file as shown below, and any offending cells are highlighted on the sheet in yellow along with a cell comment indicating the nature of the problem. Suppose for example that while specifying parameter TOP\_IRE in row 30 you press the **Check Sheet** button before replacing Commodity in the Arg6 column by the desired commodity name (URN in this case). Then the Wordpad file will be as follows:



	A	В	C	D	E	F	G	Н		J	K	
1	TID TRADE	_GLOBAL,REG	G1,REG2,REG3,IM	PEXP,MINRNA	1							
2												
3	Check Sheet											
4			Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6			
5										-		_
6												
7	Region	Region2	Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	Value		
25	IMPEXP	REG3	TOP_IRE	IMPDSL1	DSL	-	-	-	DSL	1		
26	IMPEXP	REG3	TOP_IRE	IMPGAS1	GAS	-	-	-	GAS	1		
27	IMPEXP	REG3	TOP_IRE	IMPGSL1	GSL	-	-	-	GSL	1		
28	IMPEXP	REG3	TOP_IRE	IMPHCO1	HCO	-	-	-	HCO	1		
29	IMPEXP	REG3	TOP_IRE	IMPOIL1	OIL	-	-	-	OIL		ITY' is not a	-
30	IMPEXP	REG3	TOP_IRE	IMPURN1	URN	].	-	-	Cor podity	valid Com	modity Item	
31	*									Name for	Region(s)	
32										REG3.		

and the TID TRADE worksheet will have cell I30 highlighted in yellow as follows:

The comment associated with the highlighted cell I30 indicates that the commodity name in the Arg6 column must be a valid Commodity Item Name for Region REG3, where REG3 is the region specified in the Region2 column (cell B30).

#### 11. Time Series & Time Independent Trade Data (TS&TID TRADE) Sheet

The TS&TID TRADE sheet offers the convenience of allowing both Time Series and Time Independent Trade Data Parameters to be specified on a single sheet. An example of a TS&TID TRADE sheet is shown below.

	A	В	С	D	E	F	G	Н		J	K	L	M
1	TS&TID TRADE	GLOBAL,	REG1,REG2,REG3	,IMPEXP,MINF	NWV								
2		1											
3	Check Sheet												
4			Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt			
5													
6													
-	L .									I/E Opt			
Ľ.	Region	Region2	Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	or Value			
8		ADC alt a st			a sidi a di incan					- Herrie d			
10	° UN IS&IID IR	ADE sneet,	a single region	must be sp	ecinea in co	Siumn A (a c	omma-sepa	irated regio	n-list is not	allowed)			
11	IMPEXP	REG1	TOP IRE	IMPDSI 1	DSI				DSI	1			
12	IMPEXP	REG1	TOP IRE	IMPGAS1	GAS	-	-		GAS	1			
13	IMPEXP	REG1	TOP IRE	IMPGSL1	GSL	-	-	-	GSL	1			
14	IMPEXP	REG1	TOP_IRE	IMPHCO1	HCO	-	-	-	HCO	1			
15	IMPEXP	REG1	TOP_IRE	IMPOIL1	OIL	-	-	-	OIL	1			
16	IMPEXP	REG1	TOP_IRE	IMPURN1	URN	-	-	-	URN	1			
17	*												
18	REG1	IMPEXP	IRE_PRICE	IMPDSL1	DSL	ANNUAL	-	IMP	-	0	10	10	10
19	REG1	IMPEXP	IRE_PRICE	IMPGAS1	GAS	ANNUAL	-	IMP	-	0	6.4	6.4	6.4
20	REG1	IMPEXP	IRE_PRICE	IMPGSL1	GSL	ANNUAL	-	IMP	-	0	15	15	15
21	REG1	IMPEXP	IRE_PRICE	IMPHCO1	HCO	ANNUAL	-	IMP	-	0	2	2	2
22	REG1	IMPEXP	IRE_PRICE	IMPOIL1	OIL	ANNUAL	-	IMP	-	0	8	8	8
23	REG1	IMPEXP	IRE_PRICE	IMPURN1	URN	ANNUAL	-	IMP	-	0	2	2	2
24		0500	TOD IDD	B 4D D OL 4	DOL				DOI				
25	IMPEXP	REG2	TOP_IRE	IMPOSE1	DSL	-	-	-	DSL	1			
20		REG2	TOP_IRE	IMPGAST IMPOSL4	GAS	-	-	-	GAS	4			
28	IMPEXP	REG2	TOP_IRE	IMPHCO1	HCO	-	-	-	HCO	1			
29	IMPEXP	REG2	TOP IRE	IMPOIL1	01	1.	1.	1	0	1			
30	IMPEXP	REG2	TOP IRE	IMPLIEN/	URN	-		1.	URN	1			
31	*		101 _102	and Growt						· · ·			
32	REG2	IMPEXP	IRE PRICE	IMPDSL1	DSL	ANNUAL	-	IMP	-	0	10	10	10
33	REG2	IMPEXP	IRE PRICE	IMPGAS1	GAS	ANNUAL	-	IMP	-	0	6.4	6.4	6.4

To specify a Time Series or Time Independent Trade Data Parameter, select an (empty) row below 7 and *enter the regions involved in the trade in the Region and Region2 columns* 

of this row. Then position the cursor in column **C** of this row, and press the **Parameter** "smart" button. This brings up a TS and TID Trade Parameter selection list as shown below:

5	elect TS or TID Trade Para	ameter (Name will be trans	ferred to ActiveCell)			
	Sets Filter: All Data Par	ameters				•
	Name	Description		TS/TID G	lobal Set Memb	erships
	IRE_BND	Limit on inter-regional exchange	je of commodity	TS		
	IRE_CCVT	Commodity unit conversion fac	tor between regions	TID		
	IRE_FLO	Efficiency of exchange for inte	er-regional transfer	TS		
	IRE_PRICE	Price of import/export		TS		
	IRE_TSCVT	Identification and TS-conversion	on factor between regions	TID		
	TOP_IRE	Trade within area of study (Se	t)	TID		
	Both TS and TID Para	meters	Parameters Shown, Excluded	Specify Param And Args	Specify Param Preserve Args	Cancel

The mechanics of selecting the desired Parameter and specifying its Arguments, and the

operation of the Check Sheet button are exactly the same as for the TS TRADE and TID TRADE sheets.

#### 12. Loading a Smart Excel Workbook into ANSWER-TIMES

The "File, Import, Model Data from Excel" facility is used to load information in a "Smart" Excel Workbook into an ANSWER-TIMES database.

A brief overview of the steps involved in using this facility follows:

- 1. Open the ANSWER-TIMES database into which you wish to import the "Smart" Excel Workbook.
- 2. Invoke "File, Import, Model Data from Excel" to bring up the following form (initially with the 'Excel Files to be Imported' list empty, and not necessarily with either the 'Target Scenario' or 'Options' settings that are shown below):

Import Model Data from Excel allows Item, TS and TID data in one or more Microsoft Ex imported into an existing ANSWER database.	1 5 1 1 1
imported into an existing Alto HEIT database.	xcel Files to be
Event Eller to be benefied	
Excel Files to be imported	Add
C. Where the stowers_with installable momune gion.xis	Bemove
	Demours
	Remove A
	Up
	Dip
Excel Files contain Interpolate/Extrapolate Option Codes Column	Hegions
Target Scenario	
BASE	
E Before Import, Delete Online Results involving Target Scenario	
Options	
✓ Strong Checking of TS and TID Data Parameters	Details
Merge/Overwrite information in the Target Scenario with that on Sheets being Imported	Details
C Before Import, Delete Parameter information in the Target Scenario for Items on Data Sheets	Details
C Before Import, Delete All Information in the Target Scenario for Region(s) being Imported	Details
<ul> <li>Prompt user to decide whether to Import, for each Excel File that has errors</li> <li>Import only from Excel Files that are error-free, without prompting</li> <li>Import error-free records from all Excel Files, without prompting</li> </ul>	
	port Close

- 3. Click on the [Add...] button to bring up the common dialog file selection form and navigate to the folder in which you have stored the "Smart" Excel Workbook(s), then select one or more "Smart" Excel Workbooks to be imported.
- 4. Adjust the 'Target Scenario' combobox to select the target scenario for the import.
- 5. Adjust the radio button and checkbox Options to suit your particular needs.
- 6. Click on the [Import] button to carry out the import.

If at step 1 above you are unable to open the ANSWER-TIMES database, and get a message ending in "Perhaps ... it is already in use?", most likely this database is already in use because you have an open "Smart" Excel Workbook and this database is associated with it. So simply close the "Smart" Excel Workbook so that the database is no longer associated with it, and hence no longer in use.

Most users will have a number of "Smart" Excel Workbooks, and will often find it convenient to load several Workbooks in a single Import operation. To facilitate multi-selection of "Smart" Excel Workbooks at step 3 above, store all Workbooks in a single folder.

#### 13. Example ANSWER-TIMES Smart Excel Workbook

To provide users with a concrete example of an ANSWER-TIMES "Smart" Excel Workbook, *that demonstrates the specification in its entirety of a multi-region TIMES model*, the file *SmartDemoMultiRegion.xls* is provided as part of the ANSWERv6-TIMES installation files in folder C:\AnswerTIMESv6\Ans\_WrkTI.

Also, an empty ANSWER-TIMES version 6.7 database *EmptyDemoMultiRegion-v67.mdb* that has compatible time periods for Import Model Data from Excel is provided in folder C:\AnswerTIMESv6\Answer\_Databases.

To use *SmartDemoMultiRegion.xls* to explore various aspects of how an ANSWER-TIMES "Smart" Excel Workbook operates:

- If as part of exploring how an ANSWER-TIMES "Smart" Excel Workbook operates you intend to change the contents of the ANSWER-TIMES "Smart" Excel Workbook, it is suggested that you use Windows Explorer to make copies of both *SmartDemoMultiRegion.xls* and *EmptyDemoMultiRegion-v67.mdb* (so that you retain copies of both files as originally distributed).
- Open SmartDemoMultiRegion.xls and click on the [Enable Macros] button.
- When the 'Specify ANSWER Database' form appears, click on the top radio button and then use the [Browse...] button to select *EmptyDemoMultiRegion-v67.mdb* in folder C:\AnswerTIMESv6\Answer\_Databases.

The following points should be noted about *SmartDemoMultiRegion.xls* (many of these points are exactly similar to points that have already been made in *Enhanced ANSWER*-*TIMES Format for Import Model Data from Excel.doc* (in folder C:\AnswerTIMESv6\Doc) in regard to the (non-Smart) Excel Workbook **DemoMultiRegion.xls**) but there are some important differences because an ANSWER-TIMES "Smart" Excel Workbook must contain a single ITEMS sheet):

- As noted above, SmartDemoMultiRegion.xls contains the specification in its entirety of a multi-region TIMES model.
- An ANSWER-TIMES "Smart" Excel Workbook must contain a single REGIONS sheet, and a single ITEMS sheet. (An ordinary ANSWER-TIMES Excel Workbook may contain multiple ITEMS sheets).
- The user is free to have multiple instances of the other worksheets (TS DATA, TID DATA, TS&TID DATA, TS TRADE, TID TRADE, TS&TID TRADE).
- Although each of the sheets has a rather rigid format, the user has considerable freedom in regard to how Items information is ordered on an ITEMS sheet, and to how TS and TID Data is ordered on the 3 types of DATA sheets and the 3 types of TRADE sheets. The introduction of the TS&TID sheets increases the user's flexibility, since there is now the choice as to when to use them, and when to stay with the TS and TID sheets.
- To some extent, the *SmartDemoMultiRegion.xls* should be seen as endeavouring to demonstrate a range of possibilities that are available to the user. But in some respects it should also be seen as suggesting approaches that may be beneficial to adopt whenever you specify a multi-region TIMES model in an ANSWER-TIMES "Smart" Excel Workbook.

Note that it is not *necessary* to spread the TS and TID Data over 9 worksheets (GlobalTabData through to Trade-TIDData) as has been done in *SmartDemoMultiRegion.xls*. If wanting to specify the exact same information that is contained in *SmartDemoMultiRegion.xls* in the <u>minimum</u> number of

"smart" worksheets, it would be possible to use single TS&TID DATA and TS&TID TRADE worksheets (so 2 data worksheets replacing 9 data worksheets) while retaining the single REGIONS and ITEMS worksheets exactly as they are.

• There are aspects of the *ITEMS* sheet that you may find beneficial to often emulate in the ITEMS sheets of your ANSWER-TIMES "Smart" Excel Workbooks. Note that when you first create an ITEMS sheet, the following rows are **automatically generated** (but the cell A10 will initially be blank and you must enter into cell A10 a comma-delimited list of the internal regions for your model):

7	7 Comp Name De		Description	Unit(s)	Set Memberships	
8						
9	* Pre-defined Commodity G					
10	REG1,REG2,REG3	D	ACTGRP	Activity-related Group		COM_GRP,COM_GRPDEF
11		D	DEM	Demand Commodity Type		COM_GRP,COM_GRPDEF
12		D	ENV	Environmental Commodity Type		COM_GRP,COM_GRPDEF
13		D	FIN	Financial Commodity Type		COM_GRP,COM_GRPDEF
14		D	MAT	Material Commodity Type		COM_GRP,COM_GRPDEF
15		D	NRG	Energy Commodity Type		COM_GRP,COM_GRPDEF
4.0						

These rows specifying pre-defined Commodity Groups are necessary to ensure that you can specify data parameters that require pre-defined Commodity Groups as arguments, and for the correct functioning of "Check Sheet". So you should always retain them.

Note also that in ANSWER-TIMES, all TimeSlices must be specified for the \_GLOBAL region, and for every Internal region. Using inheritance of the commadelimited list of region names in cell A18 allows this specification to be made very compactly on rows 18 to 30.

- The *GlobalTab-Data* sheet demonstrates how to specify Global Tab data (that is not TimeSlice-related). You may find it beneficial to often have such a sheet in your ANSWER-TIMES Excel Workbook. What differentiates Global Tab parameters G\_DYEAR and G\_DRATE from most other parameters is that their definition does not rely on user-defined Items. The *GlobalTab-Data* sheet also demonstrates both of the new enhancements: the new TS&TID DATA sheet is used, with a commadelimited list of region names in cell B1, and with column A used to specify that G\_DYEAR should be created for the \_GLOBAL region only, and that G\_DRATE should be created for regions REG1,REG2,REG3 only.
- The *TimeSlice-Data* sheet provides another illustration of the use in column A of a comma-delimited list of region names once a region-list is specified in column A, there is <u>inheritance</u> of this region-list to successive rows in the sheet, until such time as a new region-list is specified in column A. So for rows 11 to 21, by inheritance from row 10 the \_GLOBAL region applies. (It is not necessary to have an explicit \_GLOBAL in each of cells A11 to A21.) Then for rows 25 to 48, by inheritance from row 24 the region-list REG1,REG2,REG3 applies. (It is not necessary to have an explicit REG1,REG2,REG3 in each of cells A25 to A48.)
- On the *Commodity-Data* sheet, the majority of the Commodity-specific parameters are assumed to have numeric values that are region-independent. So all of the parameters specified in rows 10 to 57 of this sheet will be created for each of the regions REG1,REG2,REG3 specified in cell A10. But note the use in column A of a single region name of REG1 in row 60, and of REG2 in row 63, and of REG3 in row 66, so that numeric values for the COM\_PROJ parameter that are region-dependent can be specified.
- The *Process-Data-DMD* sheet is presented to show TS and TID process data on a single sheet, with the data grouped by process name. The user may wish to consider whether this approach is beneficial to adopt for specifying processes. For example once a process of a particular type is known to be correctly specified, then copying all of its TS and TID data rows and then changing the process name and I/O

commodities (and numeric coefficients as necessary) may prove to be an efficient way of creating another process of this particular type.

 The Constraint-Data sheet is presented to show how a Cross-Region User Constraint (a Constraint involving Sum over Regions) similar to the one described in section 11.2 of the ANSWERv6-TIMES User Manual can be specified on a TS&TID DATA sheet. Note the role of the \_GLOBAL region to specify the RHS for the Cross-Region User Constraint.

If you use the "Import Model Data from Excel" facility to import **SmartDemoMultiRegion.xls** into **EmptyDemoMultiRegion-v67.mdb**, and then scan the Global, TimeSlice, Commodity, CommGroup, Process, TradeProcess and Constraint tabs, you will see that a multi-region TIMES model is indeed fully specified. You might also wish to carry out Run Model.

#### Appendix A: Establishing a New ANSWER-TIMES Smart Workbook

The process of establishing a new workbook must be done with care so as to ensure that all the functionality ("smart" buttons) and cell references (links) to the ITEMS sheet are properly retained. The following possibilities are detailed below:

- A.1. Creating a new (empty) ANSWER-TIMES Smart Workbook.
- A.2. Making an existing workbook aware of ANSWER-TIMES Smart Workbook facilities.
- A.3. Copying an existing workbook that is already aware of ANSWER-TIMES Smart Workbook facilities to create a new workbook.
- A.4. Updating an existing workbook that is already aware of ANSWER-TIMES Smart Workbook facilities when Noble-Soft distributes an updated version of the ANSWER-TIMES smart XLS.
- A.5. Adding a new ANSWER-TIMES smart sheet to the current XLS.

#### A.1 - Creating a new (empty) ANSWER-TIMES Smart Workbook

To create a new (empty) ANSWER-TIMES Smart Workbook, open the file ANSWER-TIMESver6 XLS distributed by Noble-Soft, for example open ANSWER-TIMESver6.7.XLS. Then select "Enable Macros" to bring up the single visible sheet of ANSWER-TIMESver6.7.XLS as follows:

Microsoft Excel - A	NSWER-TIMESver6.7.xls		-08							
Eile Edit View	Insert Format Iools Dat	:a <u>W</u> indow <u>H</u> elp	Ado <u>b</u> e PDF							
i d 💕 🖬 🖪 🖪	👌 武 📴 τ 🗳 τ Σ	• 100% • 🕢	" B "							
A1 🔻	fx ANSv6.7-Home									
A	B C D	E	F							
ANSV6.7-Home										
2										
1	Create New ANSWER									
5	Smart XLS Version									
6	6.7									
7										
8										
9										
10	Update XLS to									
11	ANSWER Smart XLS									
12	Version 0.7									
13										
14										
15	O Single region									
16	Single-region									
10	👝 Multi-region, no comm	ion								
10	naming across regions	\$								
20										
20	<ul> <li>Multi-region, common</li> <li>naming across regions</li> </ul>									
22	naming across regions									
23										
24										
25										
26	Add New ANSWER-									
27	TIMES Smart Sheet to									
28	Guillenii ALS									
29										
30										
			×							
IN A P PILANSYS.7-1	iome/									
Ready										

Retain the selection of the 'Multi-region, common naming across regions' radio buttons and then click on the 'Create New ANSWER Smart XLS Version 6.7' button. This brings up the following form:

Create New ANSWER Smart XLS version 6.7		×
Filename of XLS to be created:		Browse
	Create	Close

Use the 'Browse...' button to bring up the 'New ANSWER Smart XLS' common dialog form, and use the 'Save in' combobox at the top of the form to specify the folder where you want the new ANSWER Smart XLS to be located, then key in the filename for the new XLS in the 'File name' textbox near the bottom of the form, as follows:

New ANSWER Sm	art XLS	? 🔀
Savejn:	Ans_WikTI 🗢 🔁 📸 📰 -	
My Recent Documents Desktop My Documents My Computer	DemoMultiRegion.xls discrete-inv.xls base-ex4-old.xls utopia-tidy.xls utopia_demo_uc4.xls utopia_demo_uc3.xls utopia_demo.uc.xls utopia_demo.xls basereg4.xls basereg2.xls basereg1.xls	
My Network Places	File name:     SmartDemoMultiRegion       Save as type:     Microsoft Excel File (".xls)	ve cel

Click on the 'Save' button. The full filename of the new XLS to be created will appear in the 'Filename of XLS to be created' textbox, as follows:

Create New ANSWER Smart XLS version 6.7		<b>X</b>
Electron of the table model.		
Filename of XLS to be created:		Brausa
		Browse
	Create	Close
		CIUSE

(An alternative to using the 'Browse...' button to specify the full filename of the new XLS is to key the full filename into the textbox, but using the 'Browse...' button is recommended.)

Click on the 'Create' button. The creation process will proceed, concluding with a message box indicating that the creation of the new XLS has been completed.

The form remains open so that additional new ANSWER-TIMES Smart XLS files may be created, if desired.

Click on the 'Close' button to close the 'Create New ANSWER Smart XLS' form.

Close ANSWER-TIMESver6.7.XLS.

When you open any of the new ANSWER-TIMES Smart XLS files that you have created, you will need to use the 'Add New ANSWER Smart Sheet to Current XLS' button to add sheets to the XLS. See A.5 below for details of the operation of this button.

#### A.2 - Making an existing workbook aware of ANSWER-TIMES Smart Workbook facilities

To make an existing workbook aware of ANSWER Smart Workbook facilities, ensure that this workbook is not open and open the file ANSWER-TIMESver6.7.XLS distributed by Noble-Soft. Then select "Enable Macros" to bring up the single visible sheet of ANSWER-TIMESver6.7.XLS as follows:

🔀 Microsoft Excel - A	NSWER-TIME	Sver6.7.xls	5		
🕙 Eile Edit View	<u>I</u> nsert F <u>o</u>	rmat <u>T</u> ools	; <u>D</u> ata	<u>W</u> indow <u>H</u> elp	) Adobe PDF
: 🗅 💕 🖬 🖪 🖪	🛕 🗳 🕻	<u>-</u> -	Σ -	100% 👻 🕜	2 A - 2
	€ ANS	Sv6 7-Hom	۵		
A	B	C C	D	F	F 🚽
1 ANSv6.7-Home					^^
2					
3	C	ANCIA			
4	Create Ne	W ANSWI	-R		
5		6.7	"		
5					
8					
9					
10	Updat	e XLS to			
11	ANSWER	Smart XL	S		
12	Vers	ion 6.7			
13					
14					
15	Contractor				
16	Single-	region			
17	👝 Multi-re	gion, no (	common		
18	💛 naming	j across re	gions		
20					
20	⊖ Multi-re	egion, con	imon		
22	naming	across re	grons		
23					
24					
25					
26	Add New	ANSWER	**		
27	Cuite	ant Sneet			
28	Suite				
29					
31					
22					V
4	tome /				
Ready					

© Noble-Soft Systems Pty Ltd 2005-11

Retain the selection of the 'Multi-region, common naming across regions' radio buttons and then click on the 'Update XLS to ANSWER Smart XLS Version 6.7' button. This brings up the following form:

Update XLS to ANSWER Smart XLS version 6.7		
Filename of XLS to be updated:		Browse
Filename given to ANSWER Smart XLS created by update:		
		1
	Update	

For clarity of explanation, suppose that the existing workbook that you wish to make aware of ANSWER Smart Workbook facilities is called USER.XLS.

Use the 'Browse...' button to select USER.XLS. The form now appears as follows:

Update XLS to ANSWER Smart XLS version 6.7	8
Filename of XLS to be updated:	
C:\AnswerTIMESv6\SmartXLS\USER.xls	Browse
Filename given to ANSWER Smart XLS created by update:	
C:(Answer)IMESV6(SmartXLS(USERV6.7.XIS	
	Update Close

The default filename given to the ANSWER smart XLS that will be created by the update is taken to be the filename of the XLS to be updated with v6.7 appended. So above v6.7 is appended to USER to provide USERv6.7 as the default filename.

Click on the 'Update' button. The update process will proceed, concluding with a message box indicating that the update has been completed.

The form remains open so that additional XLS files may be selected to be made aware of ANSWER-TIMES Smart Workbook facilities, if desired.

Click on the 'Close' button to close the 'Update XLS to ANSWER Smart XLS' form.

Close ANSWER-TIMESver6.7.XLS.

#### A.3 - Copying an existing workbook that is already aware of ANSWER-TIMES Smart Workbook facilities to create a new workbook

If an existing workbook is already aware of ANSWER-TIMES Smart Workbook facilities, then simply copying this workbook to create a (renamed) copy will result in the (renamed) copy being aware of ANSWER-TIMES Smart Workbook facilities. There are two ways of carrying out the copy:

- Open the existing XLS in Excel and use 'File, Save As...' to resave with another name; or
- Use Windows Explorer to make a (renamed) copy of the XLS.

In either case, all cell references (links) will be associated with the new file name.

Depending upon your reasons for creating a new workbook by copying an existing workbook, consider what changes may be needed in the newly created copy. For example, consider whether the Region specified in cell B1 on each of the ANSWER-TIMES smart sheets may need to be adjusted.

#### A.4 - Updating an existing workbook that is already aware of ANSWER-TIMES Smart Workbook facilities when Noble-Soft distributes an updated version of the ANSWER-TIMES Smart XLS

To provide additional ANSWER-TIMES Smart Workbook facilities, or to correct bugs that are detected, from time to time Noble-Soft will distribute a new version of the ANSWER-TIMES Smart XLS.

For example in due course a new version ANSWER-TIMESver6.8.XLS will become available that provides additional facilities (and corrects bugs) in this current version ANSWER-TIMESver6.7.XLS.

When this occurs, all that will be required to update your existing (version 6.7) ANSWER-TIMES Smart Workbook to version 6.8 will be to open the file ANSWER-TIMESver6.7.XLS and follow the "Making an existing workbook aware of ANSWER-TIMES Smart Workbook facilities" procedure that is documented at A.2 above.

#### A.5 - Adding a New ANSWER-TIMES Smart Sheet to the Current XLS

This facility allows the user to easily add a new ANSWER-TIMES smart sheet to their current ANSWER-TIMES Smart XLS. To use the facility, proceed as follows:

- 1. Open an ANSWER-TIMES Smart XLS and specify the ANSWER-TIMES database to be associated with the Smart XLS.
- 2. Make the Home sheet the active sheet. For a version 6.7 ANSWER-TIMES Smart XLS this sheet appears as follows:

	1icros	oft Exc	el - Al	SWER-T	IMESver	6.7-Lit	orary-05	.xls			
	Eile	<u>E</u> dit	⊻iew	Insert	F <u>o</u> rmat	<u>T</u> ools	<u>D</u> ata	<u>W</u> indow	<u>H</u> elp	Ado <u>b</u> e Pi <b>_ 5</b>	DF Y X
10	2			실   💞	- 遇	10 -	Σ・	100%	• 🕜		
: 🛼	<b>1</b> 2	ъ.	1								_
A1 🗾 🖈 ANSv6.7-Home											
		A		В		>	D	E		F	
1	ANS	v6.7-H	ome								- 2
2											
3											
4				Create	New A	NSWE	:R				
5				Sman	6.7	ersior	'				$\perp$
6					0.1						
7											
8											-
9				Und	late XI	S to					-
10				ANSW	ER Sm	art XL	s				-
11				V	ersion 6	.7					-
12					_						-
14					_						-
15											
16				Sing	le-regi	on					-
17											
18				O Mult	i-regior	n, no c	ommoi	1			
19				nam	ing acr	oss re	grons				
20				~ Mult	i-regior	. com	mon				
21				nam	ing acr	oss re	gions				
22											
23					_						
24							_				
25				Add N		WED					
26				TIMES	Smart S	heet	to				
27				Cu	rrent X	LS					+
28											+
29											
31											-
-00		N					1				
4   4	• •		/б.7-Н	ome / RE	GIONS /	ITEMS	K TS DA	TA ( TID	<		11
Read	dy										

3. Click on the 'Add New ANSWER Smart Sheet to Current XLS' button. This brings up the following form:

Add New ANSWER Smart Sheet to XLS	
Select ANSWER Smart Sheet to be added to XLS: REGIONS ITEMS TS DATA TID DATA TS TRADE TID TRADE TS&TID TRADE TS&TID TRADE	Norra III
Specify Region-List to be added to cell B1 of Sheet:GLOBAL,REG1,REG2,REG3,IMPEXP,MINRNW	[
Add Sheet Close	

The 'Select ANSWER Smart Sheet ...' listbox contains the eight types of smart sheets, namely REGIONS, ITEMS, TS DATA, TID DATA, TS&TID DATA, TS TRADE, TID TRADE, TS&TID TRADE.

30

The 'Specify Region-List ...' combobox contains a comma-delimited list of the regions in the ANSWER-TIMES database, listed in the order: \_GLOBAL, Internal Regions (in alphabetical order), External Regions (in alphabetical order). Note that the comma-delimited list in the combobox may be edited by the user if desired.

- 4. Select the type of ANSWER-TIMES smart sheet that you wish to add by clicking on it in the listbox. For example, click on TS DATA if you wish to add a new TS DATA sheet to the current XLS.
- 5. Edit the comma-delimited Region-List in the combobox as necessary. (It is allowable to delete Regions from the Region-List, and to add new Region Names to the Region-List.) When the smart sheet is created, its cell B1 will contain the comma-delimited Region-List that is specified in the combobox. Also, realize that the user can edit the contents of cell B1 at any time after the smart sheet is created to change the Region-List.
- 6. Click on the [Add Sheet] button.
- 7. The new smart sheet is created, and the 'Add New ANSWER Smart Sheet ...' form remains open (so that the user can add another smart sheet) as follows:

	A	В	С	D	E	F	G	H		J	K	L	M
1	TS DATA	_GLOBAL,REG1	REG2,REG3,	MPEXP,MINRN	w								
2		]											
3	Check Sheet	[											
4		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt				
6													
7		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt				
8	Add No	ew ANSWER Sm	art Sheet to	XLS									
10	Select	ANSWER Smart	Sheet to be a	dded to XLS:									
12	DEC	TONS	1000000000	3303 (0 1125)									
13	ITE	MS											
14	TS	DATA											
15	TID	DATA											
16	TS8	STID DATA											
17													
18	TS8												
19													
20													
21													
22													
23	Specir	'y Region-List to b	e added to ce	ell B1 of Sheel									
24	GL	OBAL, REG1, REG	2,REG3,IMPE	XP,MINRNW									•
25	· · · ·												
26											Add Sheet	: Clos	.e
28													
29													

By default, the name given to the smart sheet that is created will be the same as the name in the listbox, so for example a TS DATA sheet will be given the default name "TS DATA". If the default name is already being used for another sheet, then "(2)" is appended and used as the name for the sheet, so for example "TS DATA (2)". If the name with "(2)" appended is already being used for another sheet, then instead "(3)" is appended, so for example "TS DATA (3)", and so on.

- 8. To add another smart sheet to the XLS, select the type of ANSWER-TIMES smart sheet to be added, adjust the contents of the Region-List combobox as necessary, and click on the [Add Sheet] button.
- 9. Click on the [Close] button to close the 'Add New ANSWER Smart Sheet ...' form.

## Appendix B: Details regarding the operation of the Parameter selection form, the Parameter Argument (Item) selection form, and [Check Sheet] Parameter checking

There are six types of "smart" worksheets currently available in an ANSWER-TIMES Smart Excel Workbook for the specifying of Data Parameters:

TS DATA, TID DATA, TS&TID DATA, TS TRADE, TID TRADE, TS&TID TRADE.

For each of these worksheets, very similar mechanics apply to the specification of Data Parameters, with the user proceeding as follows:

• Selects an (empty) row below row 7, positions the cursor in the Parameter column of this row (column B for a DATA sheet, column C for a TRADE sheet) and presses the

Parameter button. This brings up a Parameter selection form that displays all appropriate Parameters for that worksheet.

- Selects the Parameter of interest and (normally) clicks on the And Args button, exiting the Parameter selection form and causing the Parameter Name and the nature and positions of its Arguments to be written to the (previously empty) row.
- Positions the cursor in turn in whichever of the Arg1 through to Arg6 columns of this
   row is appropriate, and uses whichever of the Arg1 through to Arg6 button.

row is appropriate, and uses whichever of the **Arg** through to **Arg** buttons is appropriate to specify the Arguments for the selected Parameter.

• Specifies the Parameter's I/E Opt code (if a TS Parameter) and specifies the Parameter's numeric value(s).

On any of these worksheets the **Check Sheet** button may be clicked at any time to have a standard set of consistency and quality control checks performed.

Details regarding the operation of the Parameter selection form, the Parameter Argument (Item) selection form, and [Check Sheet] Parameter checking are contained in each of the Appendixes B.1, B.2 and B.3 as follows:

- B.1. Operation of the Parameter Selection Form, displayed after clicking on [Parameter] button.
- B.2. Operation of the Item Selection Form, displayed after clicking on [Arg1]-[Arg6] buttons.
- B.3. [Check Sheet] Checking for a Data Parameter.

Specify Param

#### B.1 - Operation of the Parameter Selection Form, displayed after clicking on [Parameter] button

For each of the worksheets used for specifying Data Parameters, the Parameter Selection

Parameter Form that is displayed after clicking on the button is extremely similar, as is the operation of the Form.

Here the operation of the Parameter Selection Form is described with reference to the Parameter Selection Form as it is displayed when invoked from the TS DATA worksheet:

Select TS Parameter (Name will be transferred to ActiveCell)										
Set	ts Filter: *All Data Par	ameters				-				
_	1		<u> </u>							
Na	me	Description	TS/TID	Global	Set Memberships					
	ACT_BND	Bound on activity of a process	TS							
	ACT_COST	Variable costs associated with activity of a process	TS			E				
	ACT_EFF	Activity efficiency for a process	TS							
	CAP_BND	Bound on total installed capacity in a period	TS							
	CM_EXOFORC	Radiative forcing from exogenous sources	TS	_GLOBAL	Climate					
	CM_LINFOR	Linearized forcing function parameter	TS	_GLOBAL	Climate					
	CM_MAXC	Maximum allowable climatic quantity	TS	_GLOBAL	Climate					
	COM_AGG	Commodity aggregation parameter	TS							
	COM_BNDNET	Net bound on commodity (e.g. emissions)	TS							
	COM_BNDPRD	Limit on production of a commodity	TS							
	COM_CSTNET	Cost on Net of commodity (e.g. emissions tax)	TS							
	COM_CSTPRD	Cost on production of a commodity	TS							
	COM_ELAST	Elasticity of demand	TS		Elastic Demand					
	COM_ELASTX	Elasticity shape of demand	TS		Elastic Demand					
Ē	COM_FR	Seasonal distribution of a commodity	TS							
	COM_IE	Seasonal efficiency of a commodity	TS							
	COM_PKFLX	Peaking flux ratio	TS							
	COM_PKRSV	Peaking reserve margin	TS							
B	COM_PROJ	Demand baseline projection	TS							
	COM_SUBNET	Subsidy on a commodity net	TS							
B	COM_SUBPRD	Subsidy on production of a commodity net	TS			-				
	COM TAUNET	T	TC							
	Only TS Parameters	Parameters Shown, Excluded	tify Param nd Args	Specif Prese	v Param rve Args	el				

As has already been explained on the previous page, the basic operation of this form is as follows:

- Select the Parameter of interest. .
- Specify Param And Args Click on the button, thereby exiting the Parameter Selection Form and . causing the Parameter Name and the nature and positions of its Arguments to be written to the Parameter and Arg1-Arg6 columns of the row where the cursor was Parameter button was clicked. positioned when the

For example if the cursor is placed in row 59, so at cell B59, and ACT\_BND is the selected Specify Param And Args

Parameter, then after clicking on the button row 59 will appear as follows:

	A	В	С	D	E	F	G	Н	I	J
1	TS DATA	REG1,REG2,REG3								
2										
3	Check Sheet									
4		Parameter	Arat	Αια2	Ara3	Ara4	Ara5	Ara6	L/E Opt	
5				,			,			
6										
7		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt	
58										
-59		ACT_BND	Process	-	-	-	TimeSlice	Limit	0	
60										

This indicates that the ACT\_BND Parameter must have Process, TimeSlice and Limit Arguments in positions 1, 5 and 6 respectively (and with the place-holder of - (minus) in positions 2, 3, 4).

#### Sets Filter combobox (to expedite selection of Parameter of interest)

The Sets Filter combobox at the top of the form allows the user to reduce the number of Parameters that are displayed in the selection list, and thereby to expedite the selection of the Parameter of interest.

- Use of the Sets Filter combobox may be beneficial when the Parameter Selection Form has been invoked from the TS DATA or TID DATA or TS&TID DATA worksheets.
- When the ANSWER-TIMES database that is associated with the workbook is version 6.7.2 or higher, it will often be beneficial to choose the second setting for the combobox "All Data Parameters, Excluding Parameters for TIMES Extensions, so that Parameters that are displayed in the selection list are confined to "standard" TIMES (TS) Data Parameters:

5	Select TS Parameter (Name will be transferred to ActiveCell)							
	Sets Filter:	*All Data Parameters						
		*All Data Parameters						
	Name	All Data Parameters, Excluding Parameters for TIMES Extensions						
	🖹 ACT BND	Climate Data Parameters 6						
		Damage Data Parameters						
		Discrete Capacity Investment Data Parameters						
	🗐 ACT_EFF	Elastic Demand Data Parameters						
	CAP_BND	Endogenous Technology Learning (ETL) Data Parameters						
		FIXBOH and Time-Stepped Data Parameters						

#### [Specify Params] buttons

Two buttons are provided to the left of the	Cancel	button, a	And Args	button, a	and a
Specify Param					

Preserve Args button.

Specify Param

• The And Args button is used when initially specifying a Parameter instance, because it indicates the nature and positions of the Arguments that must be specified for the selected Parameter. See the example for the ACT\_BND Parameter presented above.

Constitut Dourses

#### Specify Param

• The Preserve Args button (the one immediately to the left of the Cancel button) can be useful if you have already specified a Parameter instance, including its Arguments, and subsequently realize that you got the Parameter Name wrong, but that the correct Parameter Name has exactly the same Arguments as those for the wrong Parameter Name!

34

## B.2 - Operation of the Parameter Argument (Item) Selection Form, displayed after clicking on [Arg1]-[Arg6] buttons

For each of the worksheets used for specifying Data Parameters, the Parameter Argument

(Item) Selection Form that is displayed after clicking on any of the Arg1 through to

Arg6 buttons is extremely similar, as is the operation of the Form.

Here the operation of the Parameter Argument (Item) Selection Form is described with reference to the Select Process Form for the ACT\_BND example from Appendix B.1:

	A	В	С	D	E	F	G	Н		J
1	TS DATA	REG1,REG2,REG3								
2										
3	Check Sheet									
4		Parameter	Arat	Ara2	Ara3	Ara4	Ara5	Arg6	I/E Opt	
5				711.94		,	,			
6										
7		Parameter	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	I/E Opt	
58										
59		ACT_BND	Process	-	-	-	TimeSlice	Limit	0	
60										

To specify the Process, position the cursor in cell **C59** and click on the Arg1 "smart" button. This brings up the Select Process form, as shown below:

Select Process (Name will be transferred to Active Cell)							
Sets Filter: *All Pri	rocesses (PR	C)					
- Name and Descripti	ion Filter —						
Nama Filter (Like	a) [		G AND C OD Description Filter (Like)	Apply Silter			
				Apply Flicer			
Name	No.	Region(s)	Description	Set Memberships			
BITRADE-ELC	2	DEMO,UTOPIA	Bilateral Trade in Electricity	PRC,ELE,DAYNITE,IRE			
E01	2	DEMO, UTOPIA	Coal Steam Electric	PRC,ELE,DAYNITE			
🖹 E21	2	DEMO, UTOPIA	LWR Nuclear Plant	PRC,ELE,SEASON			
🖹 E31	2	DEMO,UTOPIA	Hydro-electric Plant	PRC,ELE,DAYNITE			
🖹 E41	2	DEMO,UTOPIA	Natural gas combined-cycle plant	PRC,ELE,DAYNITE			
🗎 E51	2	DEMO,UTOPIA	Pumped Storage Power Plant	PRC,ELE,STGTSS,DAYNITE			
🖹 E52	2	DEMO, UTOPIA	Hydro-electric Plant 2 - renewable	PRC,ELE,DAYNITE			
🖹 E70	2	DEMO,UTOPIA	Oil Plant	PRC,ELE,DAYNITE			
🗎 ID1	2	DEMO,UTOPIA	Coal Boiler Process Heat	PRC, DMD, ANNUAL			
IMPDSL1	3	DEMO, UTOPIA, IMPEXP	Import of Diesel	PRC,PRE,ANNUAL,IRE			
IMPGAS1	3	DEMO, UTOPIA, IMPEXP	Import of Uranium	PRC,PRE,ANNUAL,IRE			
IMPGSL1	3	DEMO, UTOPIA, IMPEXP	Import of Gasoline	PRC,PRE,ANNUAL,IRE			
IMPHCO1	3	DEMO, UTOPIA, IMPEXP	Import of Hard Coal	PRC,PRE,ANNUAL,IRE			
IMPOIL1	3	DEMO, UTOPIA, IMPEXP	Import of Crude	PRC,PRE,ANNUAL,IRE			
IMPURN1	3	DEMO, UTOPIA, IMPEXP	Import of Uranium	PRC,PRE,ANNUAL,IRE			
RHE RHE	2	DEMO,UTOPIA	Electric Boiler	PRC,DMD,DAYNITE			
🖹 RHG	2	DEMO,UTOPIA	Gas/oil Boiler	PRC, DMD, ANNUAL			
RHO	2	DEMO.LITOPIA	Diesel Boiler	PRC.DMD.DAYNITE			
Select from ITEMS	Sheet	- Process Set Membershi	ps Restrictions for ACT_BND				
Seleccirolititems	OK Cancel						
C Select from Database							

Select from ITEMS Sheet

An important feature of the form is the pair of option buttons Select from Database at the bottom left of the form that allow the user to choose whether the form displays:

- Processes that are specified on the ITEMS sheet, when the Select from ITEMS Sheet option button is on (the default) or
- Processes that are specified in the associated ANSWER-TIMES database (the database that you specified when you opened the "smart" workbook), when the
   Select from Database option button is on.

Another useful feature of the form is the availability at the top of the form of a **Sets Filter** and a **Name and Description Filter**. Particularly for large models, the user may find either or both of these filters beneficial in reducing the number of Process Items that are displayed,

and thereby expediting the selection of the Process Item of interest. This pair of Filters may

be used for either of the Select from ITEMS Sheet and Select from Database option button settings.

#### Sets Filter, Name and Description Filter

The **Sets Filter** combobox allows the user to filter the Processes that are displayed to those that have particular Set Memberships, for example to those that are Electric Generation Processes (ELE):

s	Select Process (Name will be transferred to Active Cell)							
	Sets Filter:	*All Processes (PRC)						
	Name and	*All Processes (PRC) ANNUAL - Processes, Annual Time Slice Level						
	🗌 Name F	Name F CHP - Combined Heat & Power Processes     CHP - Combined Heat & Power Processes						
	DISTR - Distribution Systems Processes							
	Name	ELE - Electric Generation Processes HPL - Heat Generation Processes	4					
	🗎 E01	2 DEMO,UTOPIA	Coal Steam Electric					

The **Name and Description Filter** allows the user to filter the Processes that are displayed by Name or by Description or by a *compound* filter that involves both a Name Filter and a Description Filter, that are applied with a logical AND or OR.

 For example if the user wishes to display those Processes whose Description contains **Electric**, what is required is to enter \***Electric**\* in the Description Filter (like) textbox, and then check the Description Filter checkbox:

×				· · · · · · · · · · · · · · · · · · ·
	Select Process (Name	will be tr	ansferred to Active	Cell)
Γ		(05	-	
I	Sets Filter: T *All Pro	DCESSES (PH	(C)	
I	Name and Description	on Filter —		
	🗌 Name Filter (Like	e) 📃		● AND ● OR
l				
I				
L	Name	No.	Region(s)	Description
I	BITRADE-ELC	2	DEMO, UTOPIA	Bilateral Trade in Electricity
I	🖹 E01	2	DEMO, UTOPIA	Coal Steam Electric
I	🗎 E31	2	DEMO, UTOPIA	Hydro-electric Plant
I	🗎 E52	2	DEMO, UTOPIA	Hydro-electric Plant 2 - renewable
I	🖹 RHE	2	DEMO, UTOPIA	Electric Boiler
l	TXE	2	DEMO, UTOPIA	Electric Car
L				

The **\*Electric**\* filter (where the asterisk character \* indicates zero or more characters) selects those Processes that contain **Electric** anywhere within their Description. (To select those Processes whose Description *starts with* **Electric** use the filter **Electric**\*; to select those Processes whose Description *ends with* **Electric** use the filter \***Electric**.)

- The Name Filter checkbox and textbox operate in an exactly similar fashion to the Description Filter checkbox and textbox.
- It is possible to specify a *compound* filter that involves both a Name and a Description Filter, that are applied with a logical AND or OR. For example to select those Processes where the Name ends in E or where the Description contains Electric, check the Name Filter checkbox and enter \*E in its textbox, select the OR option

button, check the Description Filter checkbox and enter \***Electric**\* in its textbox, and then click on the Apply Filter button:

Select Process (Name will be transferred to Active Cell)								
Sets Filter:	Sets Filter: *All Processes (PRC)							
Name and Description Filter								
🔽 Name Filt	er (Like) 🛛 *E	E		_	O AND	• OR	Description Filter (Like) *Electric*	
							,	
Name	N N	Jo.	Region(s)			Descrip	tion	
BITRADE-EL	.C 2	2	DEMO,UTOPIA			Bilatera	al Trade in Electricity	
🗎 E01	2	2	DEMO,UTOPIA			Coal St	eam Electric	
🖹 E31	2	2	DEMO,UTOPIA			Hydro-	electric Plant	
🗎 E52	2	2	DEMO,UTOPIA			Hydro-	electric Plant 2 - renewable	
RHE	2	2	DEMO,UTOPIA			Electric	Boiler	
SRE SRE	2	2	DEMO,UTOPIA			Oil Refi	inery	
TXE	2	2	DEMO,UTOPIA			Electric	Car	

 The Name and Description Filter is always used in conjunction with the current setting of the Sets Filter combobox.

#### Specifying Parameter Arguments for Items that cannot occur on the ITEMS sheet

We have seen in section 5 that only Items under user control (TimeSlices, Commodities, Commodity Groups, Processes and Constraints) can be specified on the ITEMS sheet. For all such Items, the operation of the Parameter Argument (Item) Selection form mimicks that of the Process Selection Form described above.

• In particular the user will be able to select such Items as Arguments from <u>either</u> the ITEMS sheet <u>or</u> the associated ANSWER-TIMES database.

Where a TIMES Data Parameter has as an argument a Component Item that <u>cannot</u> occur on the ITEMS sheet, an Argument (Item) Selection form is still displayed when the user clicks on

the appropriate button from among the Arg1 through to Arg6 buttons, but the user will be able to select such Items as Arguments only from predefined Items in the associated ANSWER-TIMES database.

An example of such a Component is the Limit Component, which we previously saw was in the Arg6 position for the ACT\_BND parameter.

To specify the Limit, position the cursor in cell H59 and click on the Arg6 "smart" button to bring up the Select Limit form:

Select Limit (N	ame will be transferred to Activ	e Cell)	
Sets Filter:	Limits		<b>•</b>
- Name and D	Description Filter		
🗖 Name Fi	ilter (Like)	💿 AND 🔿 OR 🗖 Description Filter (Li	ke) Apply Filter
Name	No. Region(s)	Description	Set Memberships
FX FX	1 -	Fixed	LIM,BD
LO 🗎	1 -	Lower	LIM,BD
🖹 UP	1 -	Upper	LIM,BD
C Select from Select from	m ITEM5 Sheet Limit Set Mer Must Include:	nberships Restrictions for ACT_BND	OK Cancel

When the Select Limit form appears, the C Select from ITEMS Sheet option button is disabled,

the Select from Database option button is on, and the form displays the predefined members of the Limit Component that are stored in the ANSWER-TIMES database (and that are appropriate for the ACT\_BND Parameter).

 The Limit Component in TIMES comprises NB (non-binding) as well as FX, LO, UP but NB is not displayed because only FX, LO, UP are appropriate for the ACT\_BND Parameter.

#### B.3 - [Check Sheet] Checking for a Data Parameter

On each of the worksheets used for specifying Data Parameters, the <u>Check Sheet</u> button may be clicked at any time to have a standard set of consistency and quality control checks performed.

The checking that is carried out includes checking that:

- Each Parameter that is specified is a valid Data Parameter.
- For a valid Data Parameter, each of its Arguments occurring in the Arg1 to Arg6 columns (columns C through H, or columns D through I for a TRADE sheet) is valid. This means that Arguments must occur on either the ITEMS sheet or in the associated database, and must be of the correct Component. (So for example when checking an instance of the ACT\_BND parameter, Arg1 must occur on either the ITEMS sheet or in the associated database, and must be a Process.) Also the Argument must satisfy any Set Memberships requirements.

For an Argument such as for the Process Component, that can be specified on the ITEMS sheet, or may already occur in the associated ANSWER-TIMES database, checking is carried out as follows (for clarity of explanation, we suppose that the Argument being checked has Item Name E01 and must be a Process):

- First the ITEMS sheet is checked to see whether it contains a Process with Item Name E01. If it does, then <u>the associated database is not checked</u>. However other checking of E01 is carried out:
  - (a) Are its Set Memberships (as specified on the ITEMS sheet) appropriate for the Parameter?
  - (b) Does the Region-List for E01 (as specified on the ITEMS sheet) embrace every region in the Region-List on the TS DATA sheet that applies to the Parameter?
- If the ITEMS sheet does <u>not</u> contain a Process with Item Name E01, then the associated database is checked to see if it contains such an Item. This checking is carried out for every region in the Region-List on the TS DATA sheet that applies to the Parameter. In addition the Set Memberships (as specified in the associated database) are checked for appropriateness for the Parameter.