ANSWER-TIMES
&
ANSWER-MARKAL

Software Updates

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65th Semi-annual ETSAP Meeting

Beijing, China

2-3 June 2014

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Acknowledgments

- ***Gary Goldstein of DecisionWare Group***
  - ***For presenting these slides on behalf of Noble-Soft Systems***
  - ***For suggesting that there should be a "Using VEDA-BE with ANSWER-TIMES" manual, for creating the first draft and for building the AT_VBE-Example4 VEDA-BE database***
- ***Antti Lehtila, VTT Energy Finland***
  - ***For his continued generous assistance re assorted technical aspects of TIMES, most recently in respect of Dynamic User Constraints between Successive Timeslices***
- ***GianCarlo Tosato, ASATREM Italy***
  - ***For contributing "Getting Started with the Problem – Defining and Describing the Area of Study" as Appendix A of the ANSWER-TIMES "Getting Started" Manual***

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ANSWER-TIMES Recent Enhancements

- ***ANSWER-TIMES v6.8.1 enhancements (for information of those unable to attend Seoul ETSAP Meeting, November 2013)***
  - ***Support for working with recently enhanced TIMES-MACRO-MSA Extension***
    - **Considerable assistance from Antti Lehtila, VTT**
  - ***New manual "Using VEDA-BE with ANSWER-TIMES" released***
    - **Gary Goldstein of DecisionWare Group played a pivotal role**
  - ***A few new TIMES Data Parameters supported***
    - **Including ACT_FLO (alias for VDA_FLOP), NCAP_START**
  - ***A number of topology-related enhancements implemented***
  - ***New document "Handling of Trade Processes in ANSWER-TIMES, Additional Information"***
  - ***Some other interface enhancements***
  - ***Some bug fixes***
  - ***Using ANSWER-aware TIMES GAMS code (most recent) version 3.4.5***

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ANSWER-TIMES v6.9.1 Update, May 2014 - Summary

Key features of v6.9.1 update

- ***Makes available first "Getting Started" Manual for ANSWER-TIMES***
  - **124 pages + Appendix A contributed by Dr GianCarlo Tosato**
  - **Draws on concrete examples in 3 demonstration ANSWER-TIMES databases**
- ***Supports working with recent TIMES enhancement that allows efficient specification of Dynamic User Constraints between Successive Timeslices***
  - **Considerable assistance from Antti Lehtila, VTT**
- ***Using (ANSWER-aware) most recent TIMES GAMS code version 3.6.0***
- ***ANSWER-TIMES now allows the user to have as many as 300 regions***
  - **An ANSWER-TIMES user wishing to build prototype model with 180 regions (!) encountered an error when attempting Run Model**
- ***ANSWER-TIMES' order of indexes for COM_CUMNET and COM_CUMPRD parameters has been changed from order of indexes in previous versions.***
  - **These parameters were not being properly handled at Run Model time for a Run involving rule-based constraints.**

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Some details re ANSWER-TIMES v6.9.1 Update - 1

- ***ANSWER-TIMES "Getting Started" Manual – abbreviated contents***

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Some details re ANSWER-TIMES v6.9.1 Update – 2A

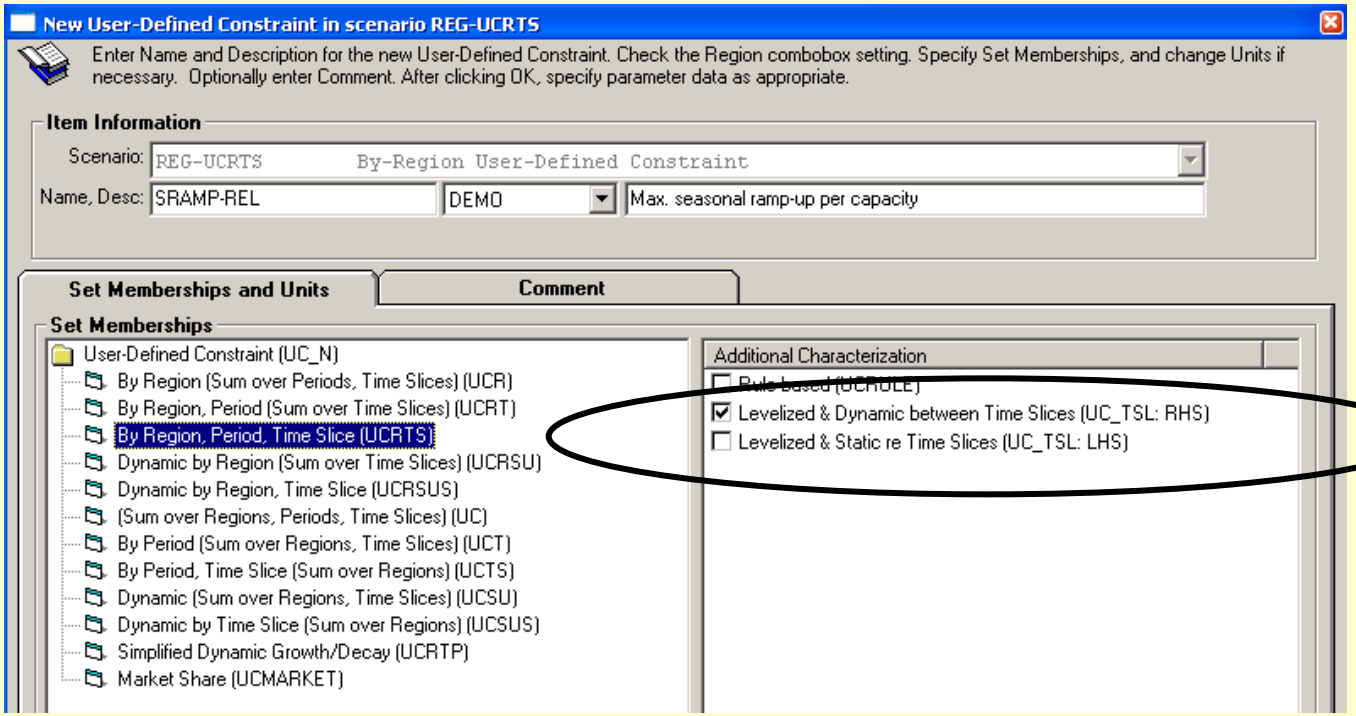
- ***Dynamic User Constraints between Successive Timeslices***
  - ***Important new category of TIMES User Constraint introduced in latest TIMES GAMS code version 3.6.0***
  - ***Allows highly compact specification of dynamic constraints between successive timeslices, such as limiting the seasonal ramp-up rate to 30% of full capacity, i.e.***

    average power level in each season <=

    average power level in previous season + 0.3*capacity
  - ***Activated in ANSWER-TIMES via new attribute UC_TSL(r,uc_n,'RHS',tslvl), and in VEDA-FE via use of UC_ATTR(r,uc_n,'RHS',uc_grp,tslvl)***
  - ***See ETSAP website "User Note on Dynamic UCs between Successive Timeslices", author Antti Lehtila***

Some details re ANSWER-TIMES v6.9.1 Update – 2B

- ***Dynamic User Constraints between Successive Timeslices in ANSWER***
  - ***Two new User Constraint Set Membership options for UCRTS:***
    - **First option is for constraints that are dynamic between successive timeslices**
    - **Second option is for constraints that are static re timeslices but have some useful supplementary features of the first option (levelized, timeslice-specific terms)**



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Some details re ANSWER-TIMES v6.9.1 Update – 2C

- ***Dynamic User Constraints between Successive Timeslices in ANSWER***
  - ***New UC_TSL TID Data Parameter to indicate UC is Dynamic between Successive Timeslices, and allow user to specify TimeSlice level***

Data Parameter	Description	Comment
UC_TSL	Indicator of levelized UCRTS constraint. RHS: dynamic between successive timeslices; LHS: static	Set **Side** index to: **RHS** to indicate a levelized constraint that is dynamic between successive timeslices; **LHS** to indicate a levelized constraint that is static re timeslices.

	Scenario	Parameter		Region	Constraint	Side	Item3	Item4	Item5	Year	Value
M	REG-UCRTS	UC_R_EACH	?	DEMO	SRAMP-REL						1
M	REG-UCRTS	UC_TSL	?	DEMO	SRAMP-REL	RHS			SEASON		1
Add	REG-UCRTS		?								

- ***In TIMES GAMS code, constraints named EQ(l)_UCRS are generated when UC_TSL is specified, rather than standard name for UCRTS of EQ(l)_UCRTS***
- ***Results Parameters UCRTS.L and UCRTS.M continue to be used for marginals associated with EQ(l)_UCRS constraint***

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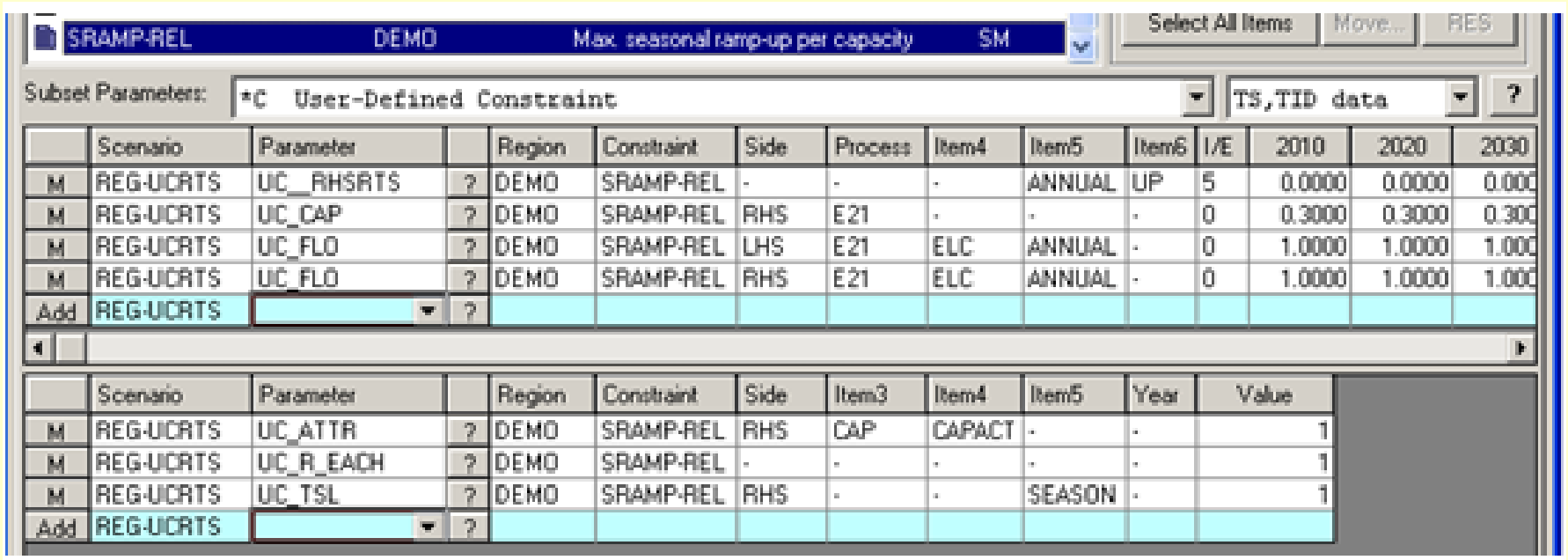
Some details re ANSWER-TIMES v6.9.1 Update – 2D

- ***Dynamic User Constraints between Successive Timeslices in ANSWER***
  - ***Below is complete Constraint tab specification of SRAMP-REL constraint in ANSWER-TIMES.***
  - ***Note highly compact nature of specification – independent of no. of SEASONs***



SRAMP-REL DEMO Max. seasonal ramp-up per capacity SM

Select All Items | Move... | RES

Subset Parameters: *C User-Defined Constraint | TS,TID data | ?

	Scenario	Parameter		Region	Constraint	Side	Process	Item4	Item5	Item6	I/E	2010	2020	2030
M	REG-UCRTS	UC_RHSRTS	?	DEMO	SRAMP-REL	-	-	-	ANNUAL	UP	5	0.0000	0.0000	0.000
M	REG-UCRTS	UC_CAP	?	DEMO	SRAMP-REL	RHS	E21	-	-	-	0	0.3000	0.3000	0.300
M	REG-UCRTS	UC_FLO	?	DEMO	SRAMP-REL	LHS	E21	ELC	ANNUAL	-	0	1.0000	1.0000	1.000
M	REG-UCRTS	UC_FLO	?	DEMO	SRAMP-REL	RHS	E21	ELC	ANNUAL	-	0	1.0000	1.0000	1.000
Add	REG-UCRTS		?											

	Scenario	Parameter		Region	Constraint	Side	Item3	Item4	Item5	Year	Value
M	REG-UCRTS	UC_ATTR	?	DEMO	SRAMP-REL	RHS	CAP	CAPACT	-	-	1
M	REG-UCRTS	UC_R_EACH	?	DEMO	SRAMP-REL	-	-	-	-	-	1
M	REG-UCRTS	UC_TSL	?	DEMO	SRAMP-REL	RHS	-	-	SEASON	-	1
Add	REG-UCRTS		?								

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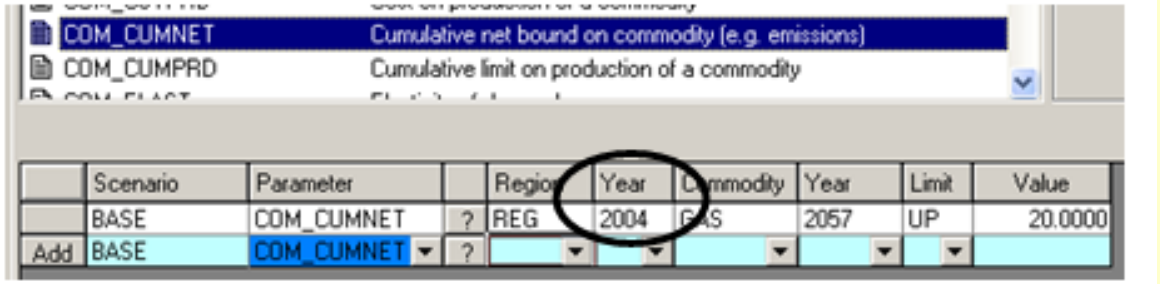
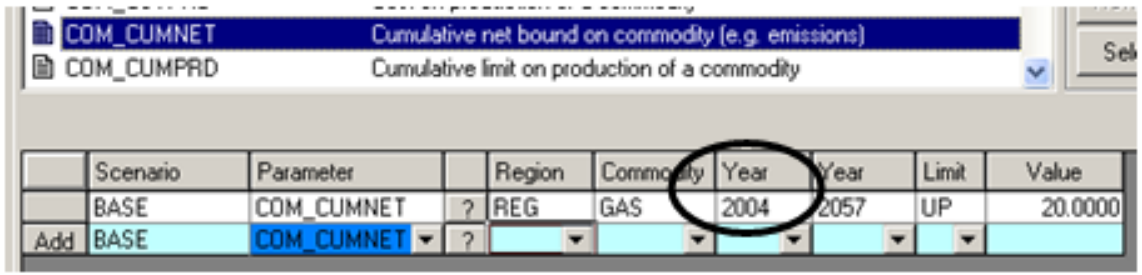
Some details re ANSWER-TIMES v6.9.1 Update - 3

- ***New order of indexes for COM_CUMNET and COM_CUMPRD parameters***

Old Index Order (first Year index in Item1 position)



New Index Order (first Year index in Item4 position)



- ***ANSWER-TIMES v6.9.1 EXE automatically updates order of indexes for COM_CUMNET and COM_CUMPRD parameter instances in older databases to the new index order***

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ANSWER-TIMES Future Enhancements

- ***Provide ANSWER-TIMES support for TIMES Electricity Grid Modeling enhancement***
  - ***The TIMES Electricity Grid Modeling enhancement was incorporated in the TIMES GAMS code around the end of 2012, but is not yet supported by ANSWER-TIMES***
  - ***For details of this enhancement, see TIMES Version 3.4 User Note "TIMES Grid Modeling Features", authors Antti Lehtila and George Giannakidis***

ANSWER-MARKAL Recent History

- ***ANSWER-MARKAL, like the ETSAP GAMS MARKAL code, has been stable for the past several years***
  - ***Changes in both ANSWER-MARKAL and ETSAP GAMS MARKAL code primarily confined to fixing bugs***
- ***April 2014: Excel 2007 version of ANSWERv6-MARKAL Load Templates Manual created***
  - ***Excel 2007 master XLSM file ANSWERver6.4.xlsm***
  - ***New manual ANSWERv6-MARKAL Load Templates Manual (Excel 2007 and higher).pdf (42 pages, revised text, completely up-to-date screenshots)***
  - ***Excel 2007 XLSM file UtopiaSmartTemplatev6.4.xlsm***
    - **Concrete example of Excel 2007 Smart Spreadsheet that specifies small MARKAL model in its entirety (except for Global Tab data)**