

## BASIC TRAINING COURSE ON VEDA-TIMES

9 - 11 DECEMBER 2020, WEB TRAINING, 14.00 - 19.00 CET

Participation fee: Each course is free of charge for ETSAP Contracting Parties. The following training fees apply: Participants from

- Companies €1200
- Institutions €1000
- University Staff €750
- Private persons €750
- Students/PhD €300 per person per course.

Payment is only possible through bank transfer to the ETSAP operating agent.

Note: VEDA2.0 and GAMS have to be installed prior to the training course on your laptop, following the instruction that will be provided two weeks in advance

TRAINER: MR MAURIZIO GARGIULO ([gargiulo.maurizio@gmail.com](mailto:gargiulo.maurizio@gmail.com))

### WEDNESDAY 9 DECEMBER - INTRODUCTION AND BASE ELEMENTS

14.00-14.15	All participants	Presentation of the program and round table
14.15-15.45	Presentation:	Introduction to the TIMES model generator
15.45-16.15	Presentation:	Overview of VEDA2.0
16.15-16.45	Break	
16.45-19.00	Hands-on:	The VEDA2.0-TIMES DemoS models: supply curve <ul style="list-style-type: none"> <li>• Base year templates for data input</li> <li>• How to use VEDA2.0 with DemoS</li> <li>• Results Functionality</li> </ul>

### THURSDAY 10 DECEMBER - GENERATION SECTOR AND MULTI-REGIONAL APPROACH

14.00-16.30	Presentation/Hands-on:	The VEDA2.0-TIMES DemoS: electricity generation sector <ul style="list-style-type: none"> <li>• How to include the generation sector in VEDA-TIMES</li> <li>• Results analysis</li> </ul>
16.30-16.45	Break	
16.45-17.15	Presentation:	Multi-regional approach in VEDA-TIMES
17.15-19.00	Hands-on:	Other VEDA2.0 templates for building scenario analysis <ul style="list-style-type: none"> <li>• Scenario templates</li> <li>• Demand scenario</li> <li>• SubRes templates</li> </ul>

ANNEX XV: ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT GOALS



**FRIDAY 11 DECEMBER - USER CONSTRAINTS AND EXERCISES**

14.00-16.30	Presentation: Hands-on	User constraints in TIMES Example of user constraints in VEDA2.0-TIMES <ul style="list-style-type: none"><li>• Absolute constraint</li><li>• Share constraint</li></ul>
16.30-16.45	Break	
16.45-19.00	Hands-on:	Exercises with Demo models

## REFERENCES

### TIMES Documentation and Demo Models

- Part I: [TIMES concepts and theory](#)

Part I provides a general description of the TIMES paradigm, with emphasis on the model's general structure and its economic significance. Part I also includes a simplified mathematical formulation of TIMES, a chapter comparing it to the MARKAL model, pointing to similarities and differences, and chapters describing new model options.

- Part II: [Comprehensive Reference Manual](#)

Part II constitutes a comprehensive reference manual intended for the technically minded modeler or programmer looking for an in-depth understanding of the complete model details, in particular the relationship between the input data and the model mathematics, or contemplating making changes to the model's equations. Part II includes a full description of the sets, attributes, variables, and equations of the TIMES model.

- Part III: [The Operation of the TIMES code \(organization of the TIMES modelling environment\)](#)

Part III describes the organization of the TIMES modeling environment and the GAMS control statements required to run the TIMES model. GAMS is a modeling language that translates a TIMES database into the Linear Programming matrix, and then submits this LP to an optimizer and generates the result files. Part III describes how the routines comprising the TIMES source code guide the model through compilation, execution, solve, and reporting; the files produced by the run process and their use; and the various switches that control the execution of the TIMES code according to the model instance, formulation options, and run options selected by the user. It also includes a section on identifying and resolving errors that may occur during the run process.

- Part IV: [Building a TIMES model using VEDA-FE<sup>1</sup>](#)

Part IV provides a step-by-step introduction to building a TIMES model in the VEDA-Front End (VEDA-FE) model management software. It first offers an orientation to the basic features of VEDA-FE, including software layout, data files and tables, and model management features. It then describes in detail twelve Demo models that progressively introduce VEDA-TIMES principles and modeling techniques.

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<sup>1</sup> The VEDA2.0 documentation will be available on the ETSAP web site in the coming months.