European Union / Instrument For Pre-Accession Assistance (IPA) Energy Sector Technical Assistance Project

This project is co-financed by
the European Union and the Republic of Turkey.

Consulting Services for the Long Term Energy Scenarios, Capacity Building

Steering Committee Meeting: Project Overview

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8 November 2018, Ankara

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eXergia
ENERGY & ENVIRONMENT CONSULTANTS

E3 Modelling
Energy Economy Environment

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Project Overview

Profile of EXERGIA

- **Independent firm of consultants, established in 1991**

- **Operating internationally in the fields of energy, environment and water**

- **Quality ISO 9001:2015, Information Security ISO/IEC 27001:2015 and Code of Conduct**

energy

- **Energy and Climate Change Planning and Policy**
- Energy Markets Restructuring and Operation
- Generation and Grid Projects Development
- Renewable Energy Sources (RES) and CHP
- New Energy Technology Market Support and Outreach
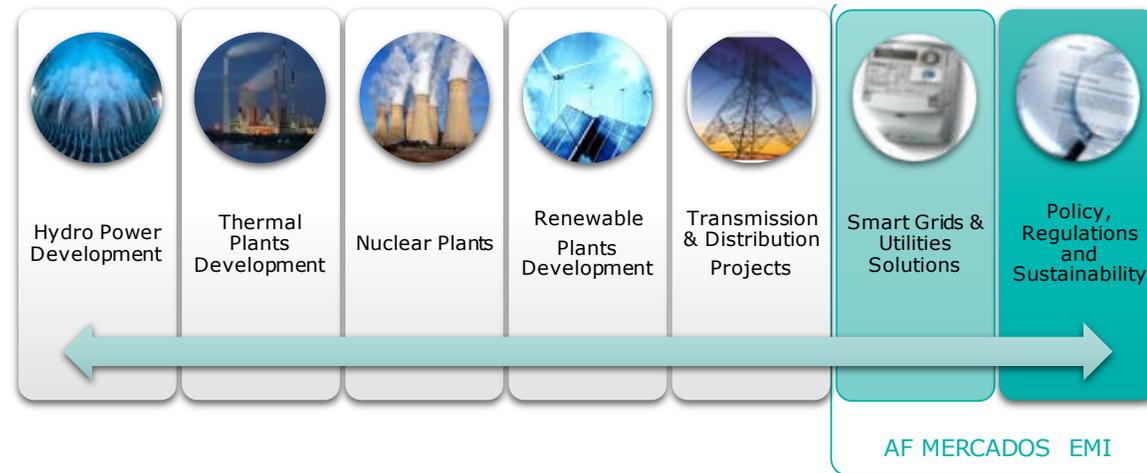
Profile of E3 Modelling

- E3-Modelling is a knowledge-based company that specializes in the field of energy systems analysis and economics, macroeconomics and environmental economics by using and developing large-scale mathematical models based on advanced techniques of Applied Econometrics, Operations Research and Computer-based Information Systems.

- The company offers policy analysis studies and consulting services worldwide. Key Clients are the European Commission (several DGs), professional associations (e.g. EUROGAS), governments (e.g. Germany, Belgium, Serbia, Spain, Slovenia and others in Europe) and large companies.

- The company develops and maintains several sector-specific models. The energy model developed and maintained for all the European Union member-states and all the European countries non-members of the EU is **PRIMES**. For the transport sector the PRIMES-TREMOVE transport model has been developed and maintained. For the economy, **GEM-E3**, a multiple-country and multiple-sectors detailed computable general equilibrium model with global coverage; the model covers the interactions between the economy, energy and the environment.

- E3-Modelling staff has carried out for the EC impact assessment studies for the Climate Change Action and RES policy package, the EU ETS, the Sixth Environmental Priorities Program, the legislative package on CCS, the Strategic Energy Review, the Green Paper on Security of Energy Supply. Our staff carried out the background modelling work for the Low Carbon Economy Roadmap 2050 communication (European Commission, 2010), the White Paper on Transport (European Commission, 2011), the Eurelectric Power Choices study and the Reloaded version (2009 and 2013), Power Choices and Role of Electricity studies (2010 and 2008) and the Energy Roadmap 2050 (European Commission, 2011).

- E3-Modelling has assisted external organizations in developing and using their own applied models for policy analysis. E3-Modelling has developed customized energy system and economic models for Slovakia and Romania. The models have been successfully installed at the stakeholders premises and a dedicated staff has been selected and provided with the necessary training to become independent users of the models. Among other projects, E3-Modelling has been supporting for many years IPTS (Joint Research Centre of the European Commission) people in the operation, development and use of large scale applied models.

Profile of AF Mercados

- **Independent firm of over 10,000 consultants, established in 1895**

- **Operating internationally in the fields of energy, infrastructure, industry and technology**

- **Quality Standards SS-EN ISO 9001:2008, SS-EN ISO 14001:2004, OHSAS 18001:2007**

energy

| Hydro Power Development | Thermal Plants Development | Nuclear Plants | Renewable Plants Development | Transmission & Distribution Projects | Smart Grids & Utilities Solutions | Policy, Regulations and Sustainability |

AF MERCADOS EMI

Our Clients
- Power utilities
- Energy related industry
- Government/municipalities
- Local authorities
- Transmission/Distribution companies
- Intern. funding institutions
- Construction companies
- Industrial companies

Project Objectives

The **aim** of the Project is:

- To increase the **institutional capacity** of MENR in modelling of the energy sector and performing projection and planning studies

The **specific objectives** of the Project are:

- To implement **software tools** which enable the Ministry to model energy sector as a whole and its individual sub-sectors, in order to obtain **medium and long-term scenarios** regarding primary and final supply and demand of energy for the use in energy planning

- To provide **capacity building to MENR** on **data sets** collection, QA&QC and maintenance, **energy scenarios** preparation for planning purposes and identification of appropriate **Key Indicators (KI)**

- To generally **enhance institutional capacity for energy planning**, including provision of capacity building activities on collecting data, macroeconomic analysis, setting energy scenarios parameters and analysis of results and KI

- To provide training to **enhance ability to study** with different scenarios and comparing corresponding results in order to analyze the effects of various policies

Project Background

Key project background elements:

- This assignment will take stock of the work done under the **previous IPA projects** and in particular: *"EU-IPA12/CS01: Consulting Services for: Acquis Alignment & Institutional Capacity of MENR, Unbundling Support for BOTAŞ and Visibility & Public Awareness"*

- **Key recommendations** to build upon:

  o Undertake projections regularly and consider the **impact of energy efficiency**

  o Turkey needs to improve the scope of **data collection** considerably to **align with EU acquis**

  o **Energy balance accounts** are already **appropriate**

  o To **improve demand forecasting,** price changes must be included

- The Consultant will build on the findings of the previous project(s), having a **critical attitude** on **which data** will be eventually needed for the implementation of the **EST model** for the purposes of this project.

- **MENR** aims to have a **core team of experts** to effectively use the model – there are not currently "modelling experts", but there are knowledgeable "energy experts".

Project Data

Start - End	18 October 2018 (M1) - 17 January 2020 (M15)
Partners	EXERGIA (GR) – leader of the JV, E3-Modelling (GR), ÅF Mercados Turkey (TK) ÅF Mercados Turkey (SP)
Effort	28 man months
Team of Experts	6 KE + 15 NKE + Admin and backstopping support
Tasks	2 +1 (management) – 10 Activities
Modelling	Fully-fledged, customized energy model **EST (Energy System for Turkey)**
Trainings	4 trainings – 6 weeks – 35 working days – 210 hours – exams and certification
Study Visits	2 study visits in 3 EU countries
Deliverables	6 management (progress) deliverables, 6 technical deliverables

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E3 Modelling
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Project Structure – Workflow

Task 1: General Training

- A crash course at a **MSc level** to provide a thorough understanding of the key underlying principles for energy planning and energy sector modelling tools.
- Topics: Fundamental Macroeconomic analysis, Energy Supply and Demand, concepts in energy modeling, energy balance tables, case studies, etc.
- All participants will acquire a common understanding on the roles of the modeling tools in energy sector planning in general and on the specific topics that are required to further use the developed modelling tools
- Training: 10 training days – 60 training hours – 40 participants – written exams

Task 2: Implementation

Study Visit 1: 3-day visit in 1 EU country

Model development
- **Data Gathering** and Preparation
- Preparation, customization and calibration of the models – **Reference Scenario**
- Preparation of **Alternative scenarios** to simulate different energy and climate policy related issues.

Training
- Initial Training: Initial Training on the modelling tools
- Training for Utilization: Use of the energy system model
- Training for Implementation: 1 – Reference Scenario
  2 – Alternative Scenarios
- Recap Training: Recap Training including Staff evaluation
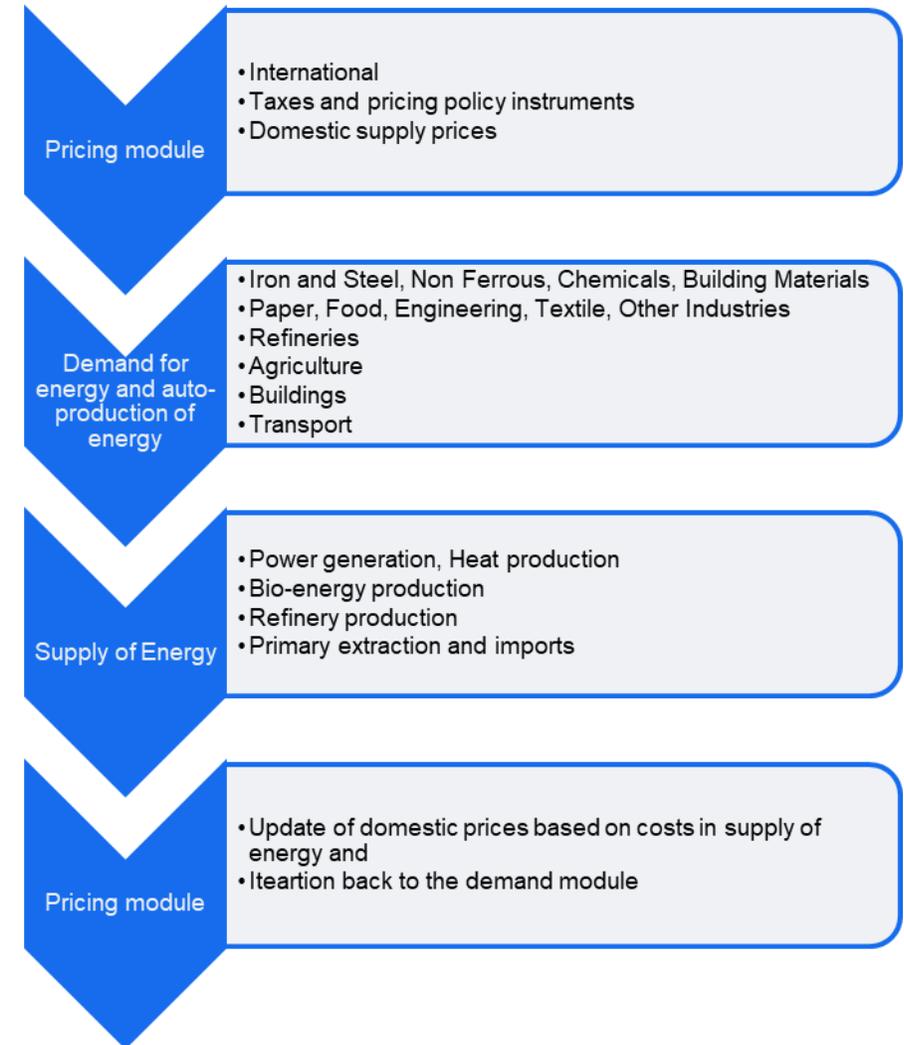
Study Visit 2: 5-day visit in 2 EU countries

Task 0: Management

Project management, organization of trainings, organization of recordings, study visits preparation, administrative and backstopping support
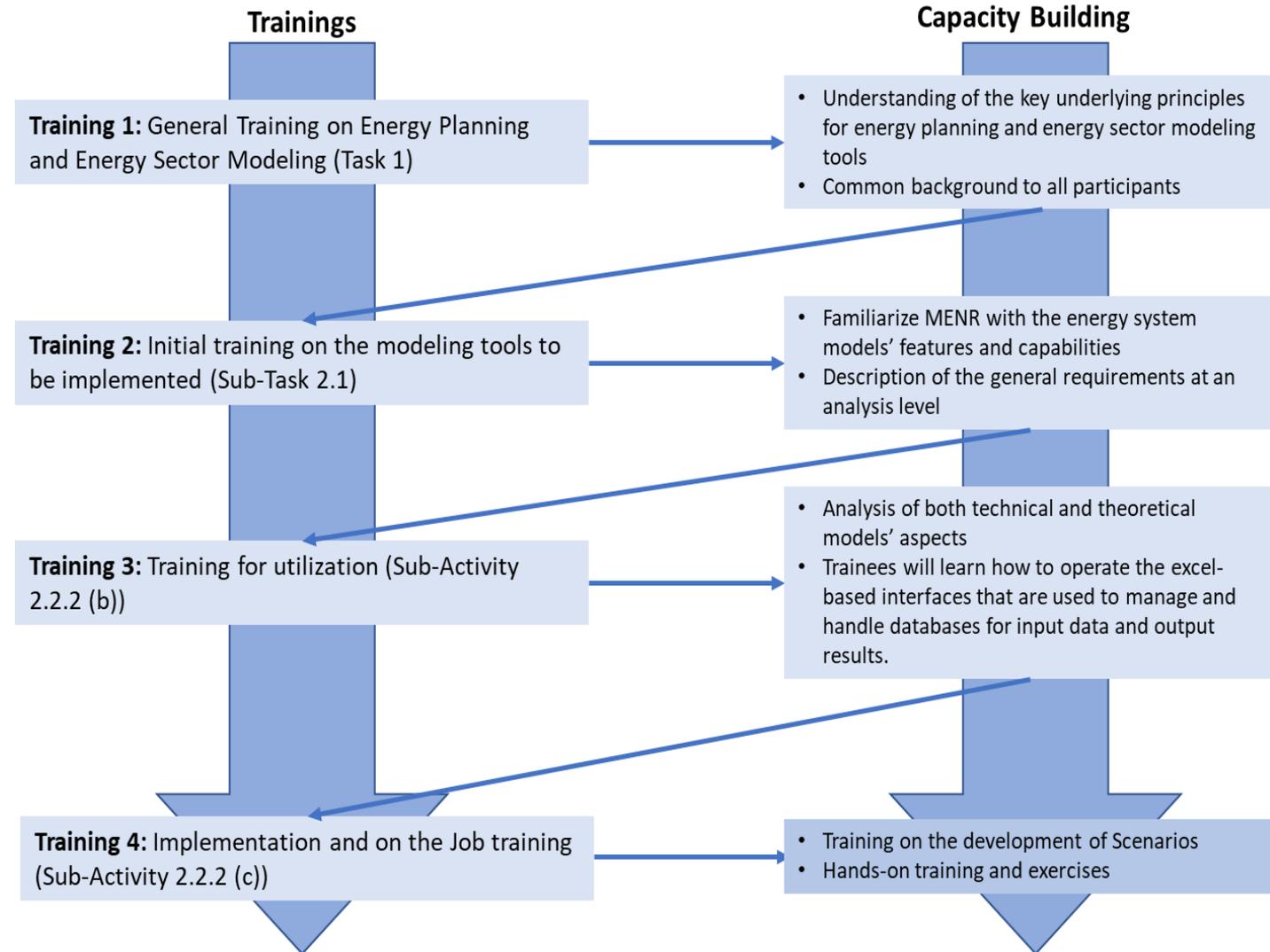
Model development

EST: Energy System model for Turkey

- Is a tailor-made, fully-fledged energy demand and supply model for single-country projections, aiming at addressing energy system planning, energy price forecasting and climate change mitigation policies

- Follows an **equilibrium approach** between energy demand and supply by sector/fuel

- Is calibrated to most recent available statistics and **customized to the Turkish energy system** specificities and requirements set by MENR

- Provides **both medium and long-term** energy demand and supply projections for different consumption categories and energy forms up to 2070

- Represents **each energy sector separately** by following microeconomic foundations of energy demand or supply behavior and the representation of market clearing by sector through energy prices

Pricing module
- International
- Taxes and pricing policy instruments
- Domestic supply prices

Demand for energy and auto-production of energy
- Iron and Steel, Non Ferrous, Chemicals, Building Materials
- Paper, Food, Engineering, Textile, Other Industries
- Refineries
- Agriculture
- Buildings
- Transport

Supply of Energy
- Power generation, Heat production
- Bio-energy production
- Refinery production
- Primary extraction and imports

Pricing module
- Update of domestic prices based on costs in supply of energy and
- Iteartion back to the demand module

Training courses

- Tailored-made trainings serving the **increase of the institutional capacity** of MENR in modeling of the energy sector and performing projection and planning studies

- **4 training courses** totaling to 210 hours and including written exams, trainees evaluation and certification

- **Training material** in the form of PowerPoint presentations

- **Training recordings** will be achieved in a structured manner

- **Simultaneous translation** during the training sessions

Trainings

Training 1: General Training on Energy Planning and Energy Sector Modeling (Task 1)

Training 2: Initial training on the modeling tools to be implemented (Sub-Task 2.1)

Training 3: Training for utilization (Sub-Activity 2.2.2 (b))

Training 4: Implementation and on the Job training (Sub-Activity 2.2.2 (c))

Capacity Building

- Understanding of the key underlying principles for energy planning and energy sector modeling tools
- Common background to all participants

- Familiarize MENR with the energy system models' features and capabilities
- Description of the general requirements at an analysis level

- Analysis of both technical and theoretical models' aspects
- Trainees will learn how to operate the excel-based interfaces that are used to manage and handle databases for input data and output results.

- Training on the development of Scenarios
- Hands-on training and exercises

Work Schedule and Deliverables

N°	Deliverables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
		Months															
		18 Oct 18	18 Nov 18	18 Dec 18	18 Jan 19	18 Feb 19	18 Mar 19	18 Apr 19	18 May 19	18 Jun 19	18 Jul 19	18 Aug 19	18 Sep 19	18 Oct 19	18 Nov 19	18 Dec 19	TOTAL
Task 0 Project management																	
D0.1	Inception Report	▲															
D0.2	Interim progress report IPR1				▲												
D0.3	Interim progress report IPR2							▲									
D0.4	Interim progress report IPR3										▲						
D0.5	Interim progress report IPR4													▲			
D0.6	Final Report															▲	
Task 1: General Training on Energy Planning and Energy Sector Modelling																	
D1.1	Task 1 Report				▲												
Task 2: Implementation and Trainings for the Selected Energy Sector Modelling Tools																	
D2.1	Initial Training Report						▲										
D2.2	Data Set Report								▲								
D2.3	Initial User Manual for each of the modelling tool													▲			
D2.4	Implementation Report													▲			
D2.5	Study Visit Report					▲								▲			

Trainings schedule (indicative)

- A staged training program to maximize knowledge assimilation and modeling performing skills

- Provisional dates have been already proposed taking into account the Consultant's experts availability

- Each training last for 1 week and there is enough timing between trainings allowing for:
  - the trainees to assimilate and possibly practically apply knowledge.
  - the Consultant to receive feedback and adjust training to the needs of MENR and the background of the trainees

- Study Visits are designed to constitute integral part of the training and capacity building activities

No	Training Title	Corresponding Task	Provisional training dates	Responsible for training delivery
1	General Training – Week 1	Task 1	10 – 14/12/2018	Mercados Turkey
2	General Training – Week 2	Task 1	28/01 – 01/02/2019	Mercados Turkey, EXERGIA, E3 Modelling, Mercados Spain
Study Visit 1 (Sub-task 2.3)				
3	Initial Training on the modelling tools	Sub-task 2.1	11 – 15/03/2019	E3 Modelling
4	Training for Utilization / Use of the energy system model	Sub-activity 2.2.2	13 – 16 /05/2019	E3 Modelling
5	Training for Implementation / Reference Scenario	Sub-activity 2.2.2	8 – 12/07/2019	E3 Modelling
6	Training for Implementation / Scenarios and Policies	Sub-activity 2.2.2	16 – 20/09/2019	E3 Modelling
Study Visit 2 (Sub-task 2.3)				
7	Recap Training including Staff evaluation	Sub-activity 2.2.2	16 – 20/11/2019	E3 Modelling

Team of Experts and Management Structure
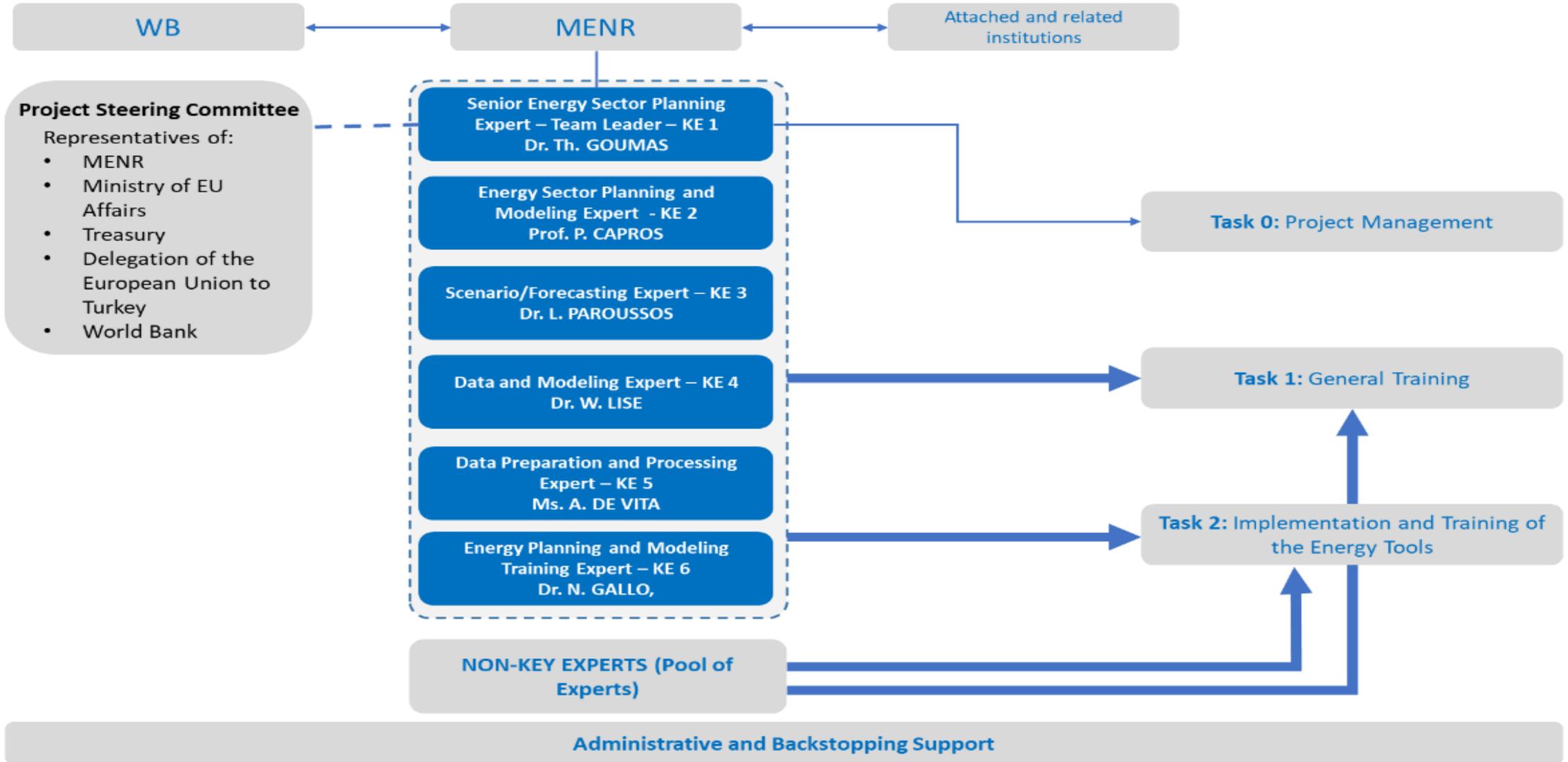
02

MENR input

MENR input

Management
- Designated liaison/contact person
- Coordination with other stakeholders
- Coordination/update with other Technical Assistance Programs

Documentation and Data
- Data and document availability
- Assistance in data collection

Availability
- Staff availability for actual training and study visits

03

Points for discussion

Points for discussion in the Inception Meeting

- Comments on the draft **Inception Report** and due date of final Inception Report

- Provisional arrangement for the **next Steering Committee meeting** (suggested: end of January together with the 2nd week of the General Training)

- Matching **MENR's expectations** with EST model capabilities

- Provisional **arrangements for training sessions** and enhancement of the pool of trainers

- Preferable or undesirable periods/**dates for training**

- Organization of **Study Visits**

- Any known project exogenous **milestones affecting** the assignment

- Financial issues related to **Stamp Tax**