



WP4: Existing Data and Data Requirements

ATEsT project meeting

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26nd March, Brussels

**Institute of Energy Economics and the Rational Use of Energy
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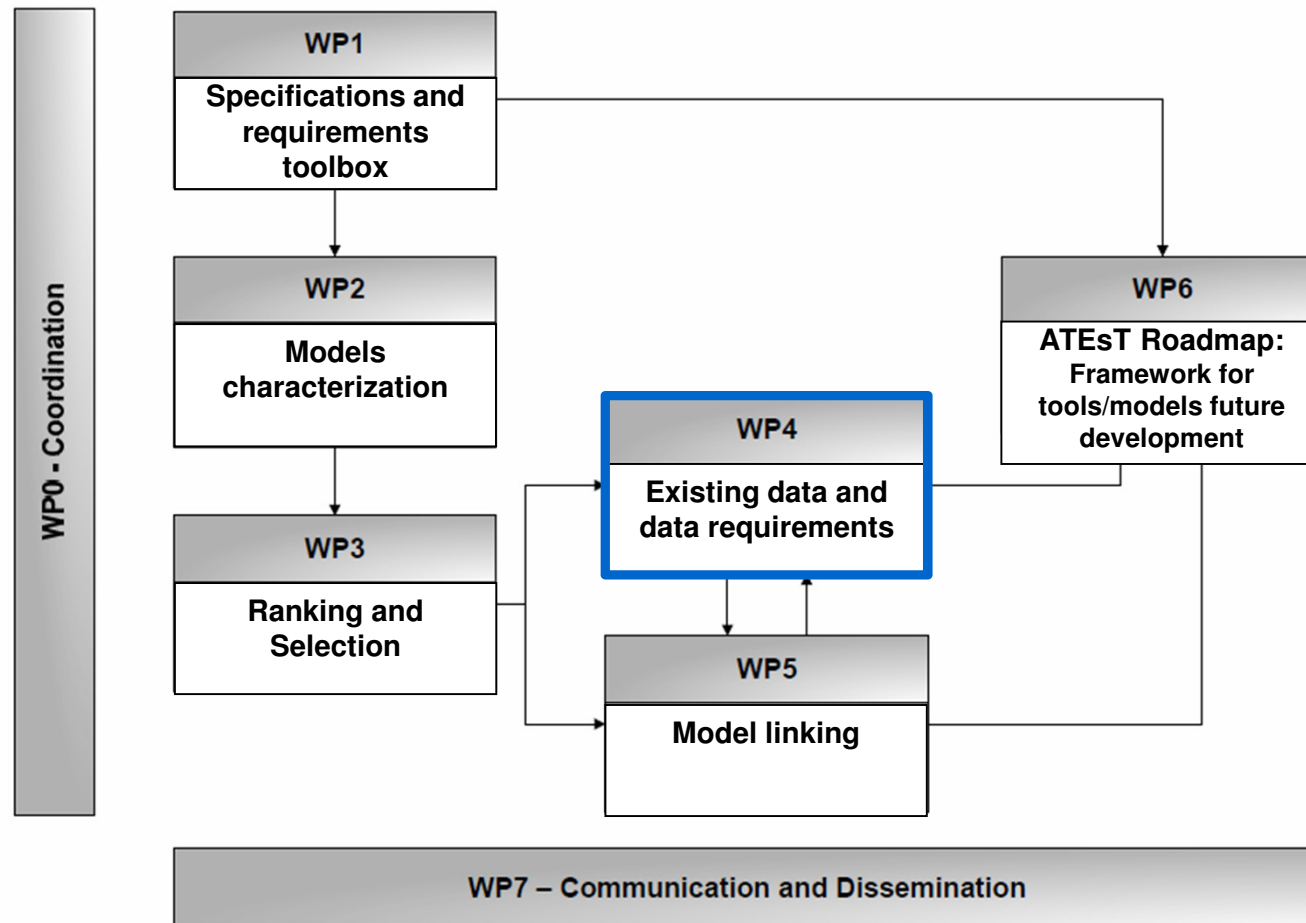


Outline

- Contribution of Work Package 4
- Methodology/ Approach
- Overview analysed sources and needs
- Existing data
- Weak points of the existing data
- Additional data requirements
- Conclusion



Contribution of WP 4



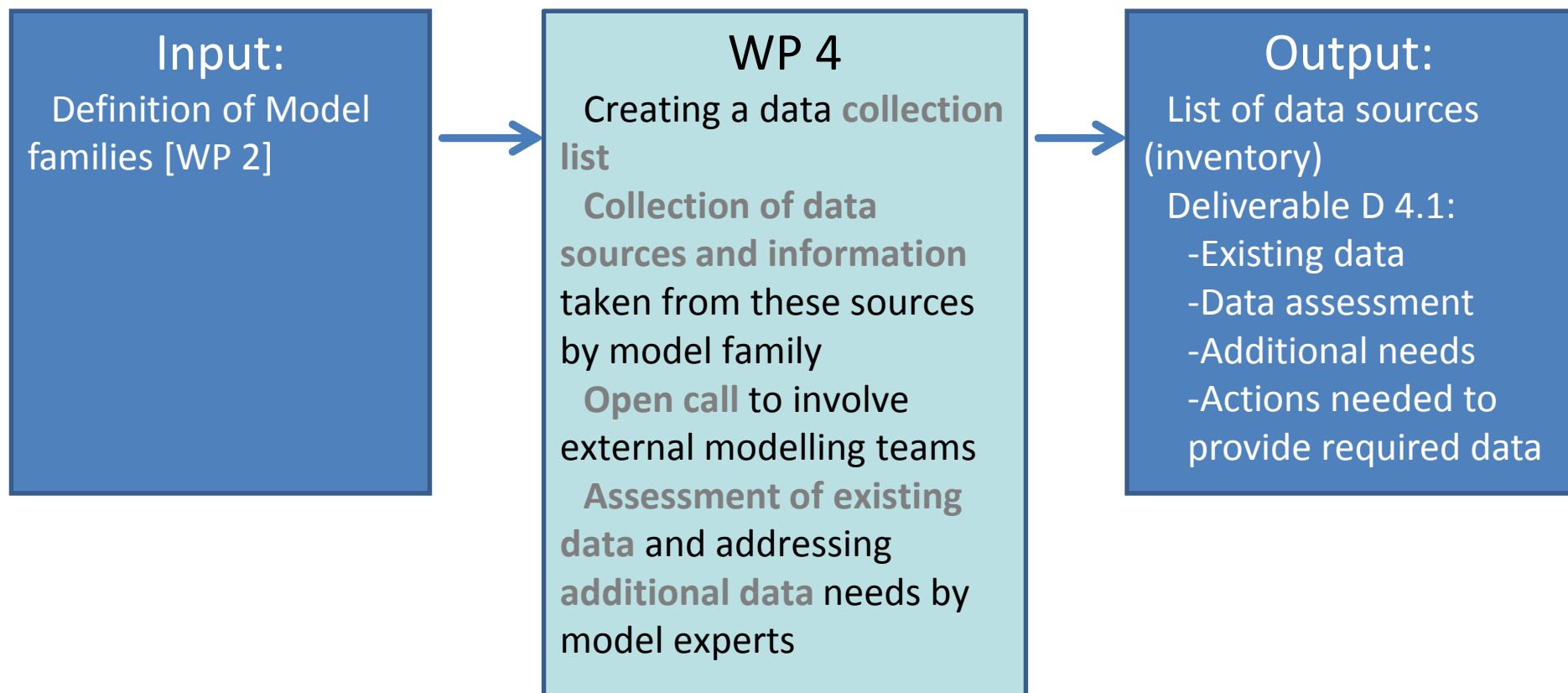


Objectives

Working Package 4

- Identification of **existing data** and creating an inventory of data sources for different model types
- **Assessing the existing data** and figuring out the **weak points** of the data currently in use
- Identifying data lacks and **additional data requirements**

Approach





Analysed model families

Model Families	Key Model Examples
• Energy System Models	• TIMES PanEU
• Macroeconomic Models	• NEWAGE • GTAP-E
• Sector Level Models	• MURE
• Disaggregated Models	• WASP-Greece • CGEN
• Energy Behaviour Tools	• ESTEEM • Climate Bonus



Approach: Data collection list categories

Model/ Institute	<ul style="list-style-type: none">• Model where data are used• Model family• Institute where model is used (ATEsT partner, Open Call)	
Data/data sources used in model/model family	Data source	<ul style="list-style-type: none">• Name of data source• Classification of data source
	<ul style="list-style-type: none">• Category of data• Description of the data taken from the source• Sector coverage of the data• Geographical resolution of data	



Approach: Data collection list categories

Assessment of data/data sources	<ul style="list-style-type: none">• Quality of data/data source	<ul style="list-style-type: none">• Time resolution• Time lag• Frequency of data publishing• Completeness/ Consistency• Level of detail• File format• Data documentation
	<ul style="list-style-type: none">• Availability of data/data source	<ul style="list-style-type: none">• Status of availability• Price
	<ul style="list-style-type: none">• Description of weak points of the existing data	
Additional requirements/ further data needs	<ul style="list-style-type: none">• Sector covered by required data• Geographical resolution of required data• Description of the lack of data/additional data need	



Approach: Data collection list (drop down)

Model group/ model family	Classification of data source	Category of data (amd additional category if needed)	Sectors covered by data source	Geographical resolution of data
Energy system	Official statistic source (public source)	Model Input Energy	Gas	Group of Countries
Macroeconomic	Private statistic services	Model Input Costs	Electricity	Country
Sector level	Company data	Model Input Technology	Transport	Part of a country
Disaggregated models	Associations (e.g. industrial associations)	Model Input demand	Industry	Location within a country
Energy behaviour tools	Literature (articles, books, newspaper)	Other model input	Buildings	Project location
Socio-technical scenarios	Stock exchange or market data	Data used for internal additional calculation	All sectors mentioned above in the drop down menu	Actor location/residence
Horizon scanning methodologies			Several of the above mentioned sectors but not all (please name the sectors in the next cell but choose only from the above mentioned ones)	Geographical coordinates
	Query, survey	Qualitative information on context		
	Interviews (experts, stakeholders)	Qualitative information on interests, values and/or expectations	Others	
	Focus groups, workshops	Behavioural information		
	Public database incl. other than statistic data	Information on carbon footprint		
	Web server	Macroeconomic data		
	Personal information account			
	Soft link with another model's output			
Database built for specific purposes				



Approach: Data collection list (drop down)

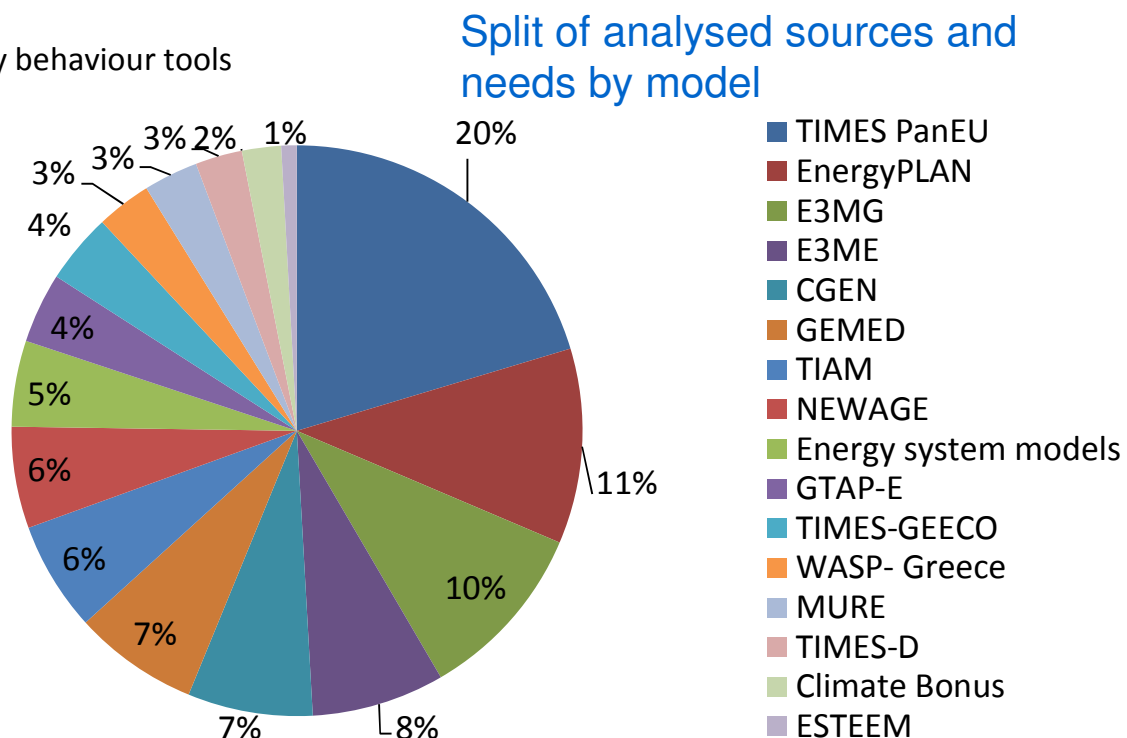
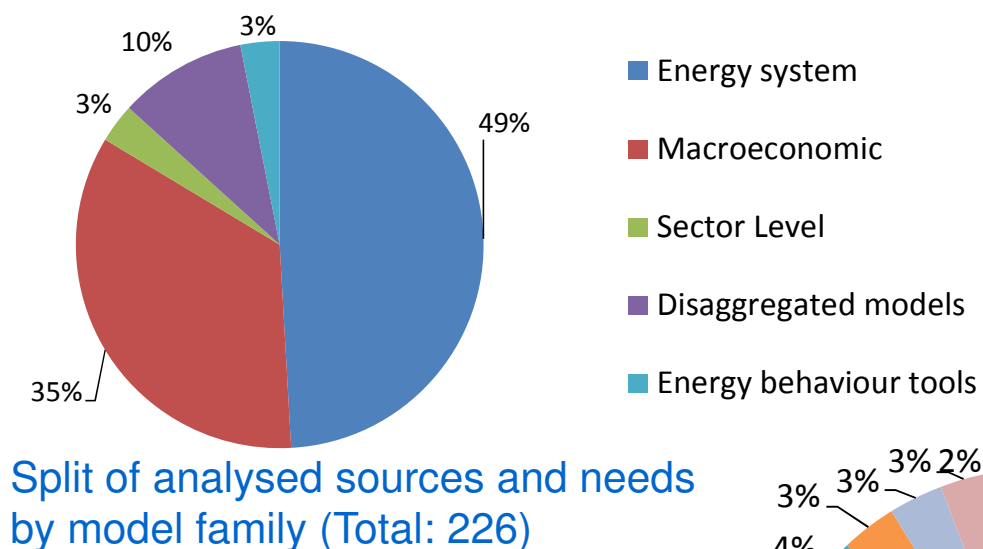
Time Resolution of data provided	Time lag (between date of publication and reference date)	Frequency of data publishing	Completeness/Consistency	Level of detail	File format	Data documentation	Status of availability
Annual	< 1 year	Continuously Updated	1 (very low)	1 (very low)	GIS data	Available	Public + free
Seasonal	1-2 years	< 1 year	2 (low)	2 (low)	Excel download	Not available	Public + charge fee
Monthly	2-4 Years	Yearly	3 (medium)	3 (medium)	PDF	Available, but not up to date	Private
Daily	> 4 years	Every two years	4 (high)	4 (high)	Paper Report		Personal contact required
Hourly	Future-oriented projections	More than two years	5 (very high)	5 (very high)	Web account/webpage		
Less than 15 min		Not periodically			Qualitative+quantitative audio-visual information		
Depends on issue in focus		Not published			Access database		
					Other database system		



Data characteristics by model family

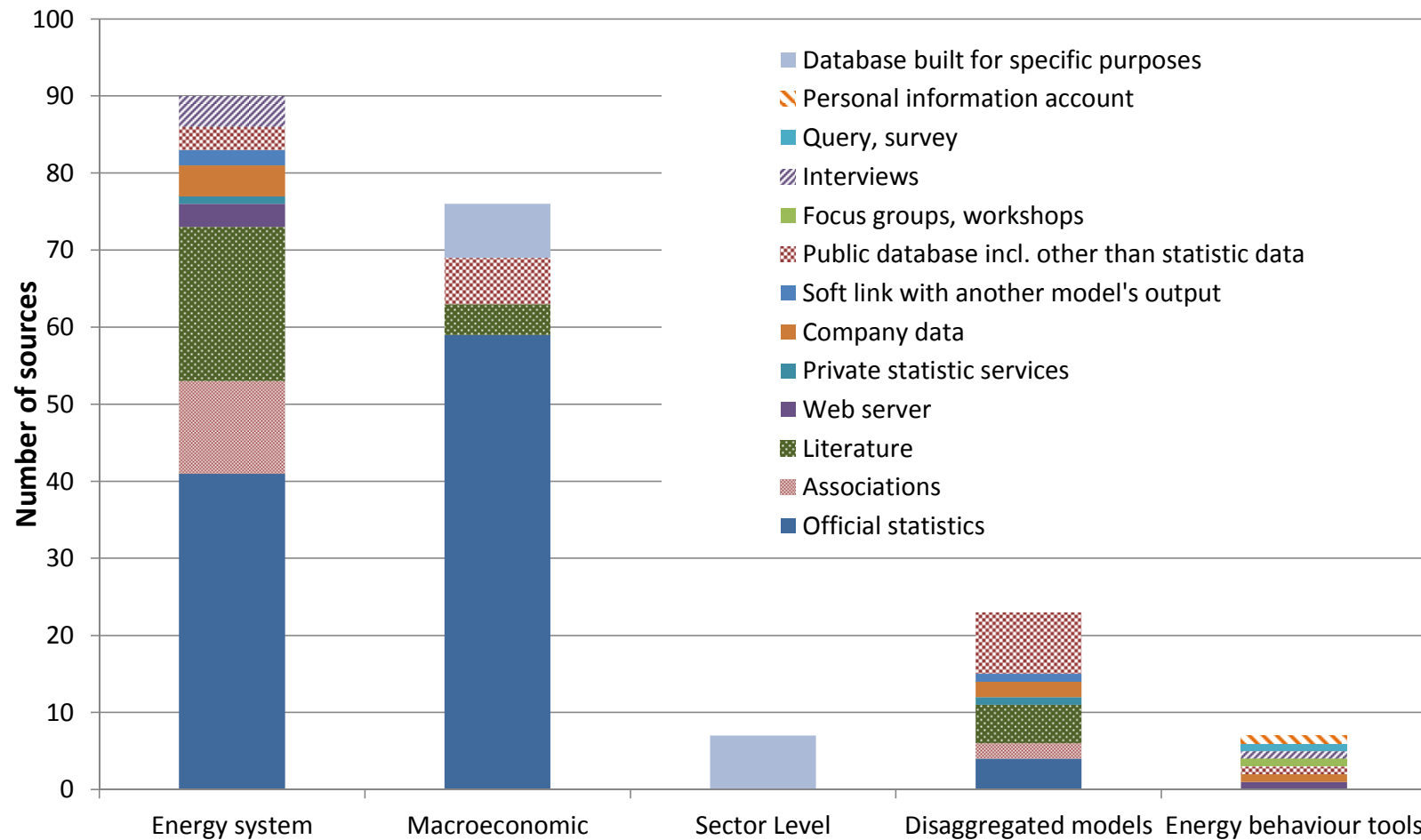
Model Family	Data characteristics
Energy System	<ul style="list-style-type: none">• Detailed data for energy supply and demand sectors and different regions
Macroeconomic	<ul style="list-style-type: none">• Highly aggregated macroeconomic information
Sector Level	<ul style="list-style-type: none">• Detailed data on one specific issue/ sector
Disaggregated	<ul style="list-style-type: none">• Detailed data on a specific part of the energy system
Energy Behaviour	<ul style="list-style-type: none">• Mainly context-specific qualitative and semi-qualitative information

Analysed sources and needs



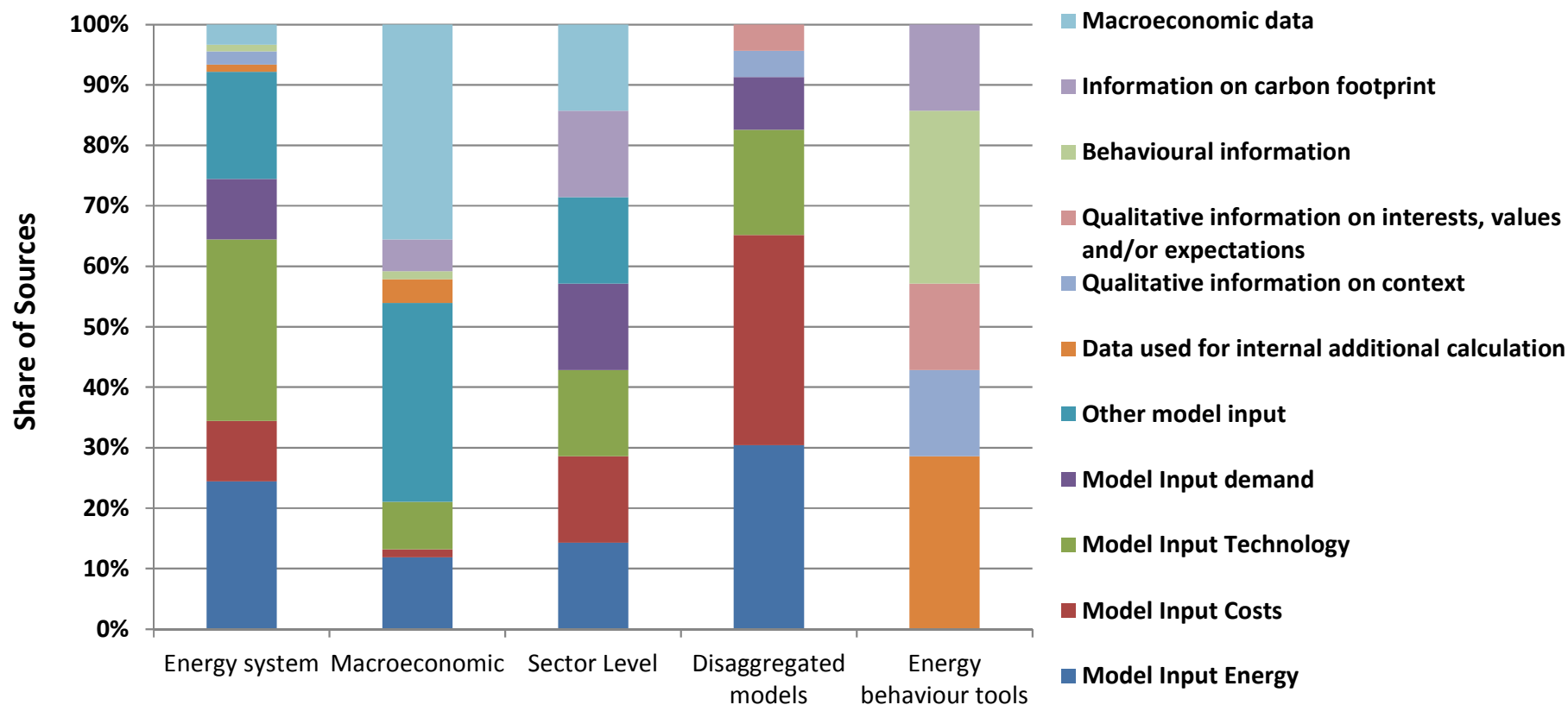


Existing data



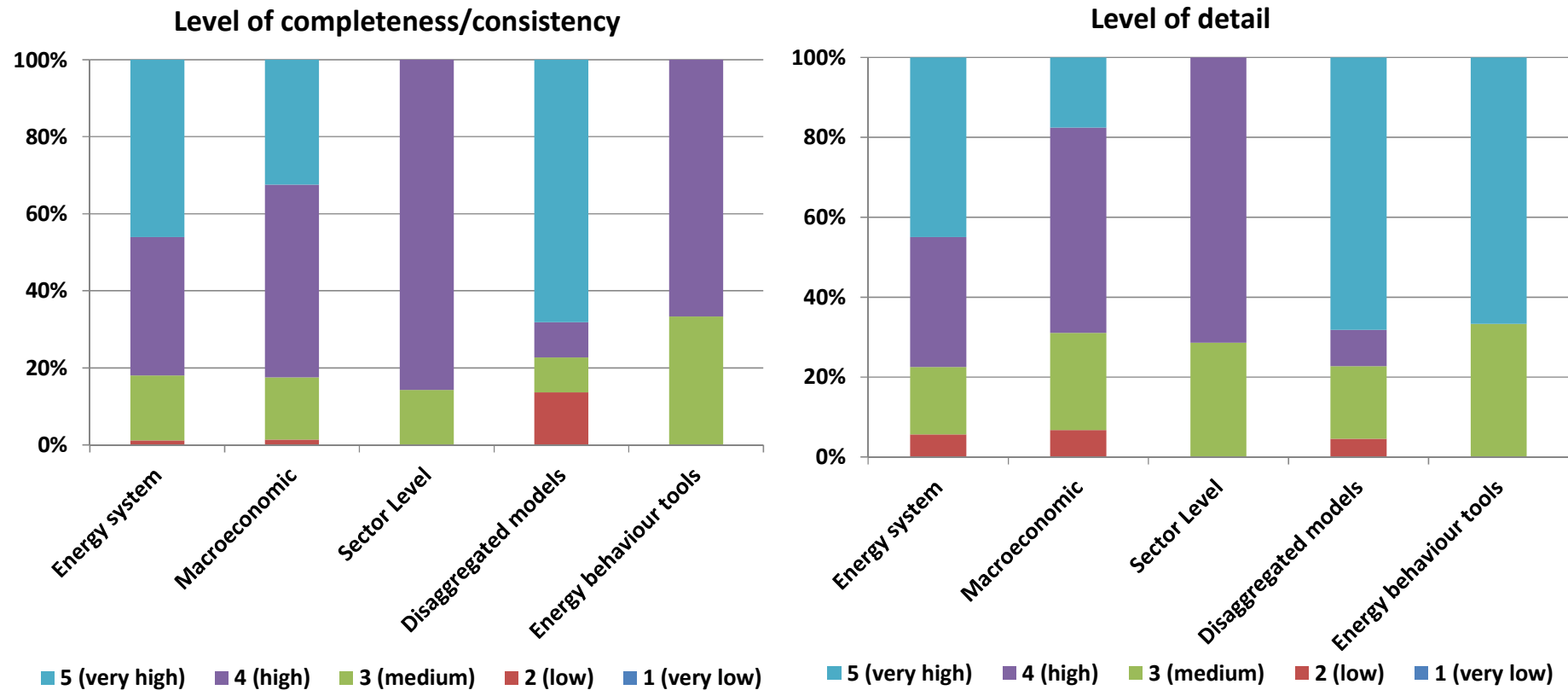
Overall split of the analysed sources by source category

Existing data



Overall split of the analysed sources by data type

Existing data



Overall split of the analysed sources by level of completeness/consistency and detail



Weak points by model family

Energy System	• Data availability and file format of data for some countries in transition (important for global modelling and TIMES South Africa)
	• Data often available just as PDF (file format not easy to process)
	• Being up to date with the model calibration when databases are continuously updated
	• Reports do not cover all relevant technologies, countries or are available just in one language
	• Data are just available on aggregated level or average numbers
	• Use of different balancing methods (for example CHPs)
	• Different statistics or publications do not fit to each other (even from one source)
	• Comparability of values about specific energy consumption (primary energy vs. final energy, balancing of heat/steam/electricity, by-products like black liquor or blast furnace gas, influence of intermediate goods like pulp)
	• Split between industrial (final energy) and public sector not always consistent and comparable (power plants, CHP, blast furnaces, coke oven)
	• Price of access to data
	• Forecast data (no detailed years given) about technological parameters



Weak points by model family

Macro-economic	• Costs for data (GTAP database)
	• Time lag until data are published Input-Output tables)
	• Inconsistencies between different technologies classifications within the macroeconomic data bases and also emission data bases
	• Limited availability of data on specific taxes, subsidies and transfers particularly in the energy-environment area
	• Elasticity parameters are often set by assumptions and not computed for the behaviour of consumers and producers in energetic and non-energetic sectors (huge variability concerning quality and frequency of data) as well as data concerning consumer behaviour
Sector Level	• Data included in the database are not updated (the base year is 1995 in the model MURE)



Weak points by model family

Dis-Aggregated Models	• Very detailed data of the existing power plants are not easily accessible
	• Detailed information of the internal power blocks of the power plants are not available (power plants, heat rates, etc.)
	• Stochastic generation profiles of wind and other renewable energy sources power plants are not updated frequently enough and do not relate the actual technologies used (type of wind turbine etc.) with the site potential and detailed measurements
Energy Behaviour	• Quality of data varies by context (and the commitment of the users of the tools)
	• Data from different contexts might not be comparable
	• Some up-to-date information may be confidential or not publicly available



Additional data requirements by model family

	Additional Requirements	Possible Ways or Source of Data Collection
Energy System	Data about the stock of technologies (age structure, current efficiencies, type of technology)	Surveys
	Trade flows of semi-finished goods and specific energy consumption to produce this goods to compare subsector energy consumptions across Europe	Macroeconomic data from statistical offices, industrial associations
	Data on recycling potentials (production and consumption values and average expected useful life of these goods)	Statistical offices, industrial associations
	Cost data of new technologies (investment costs, O&M costs, especially for the end use sectors)	Supplier, Companies, Associations
	Data about electricity and heat/steam production from public and industrial CHP	Consistent balancing, provided by statistical offices
	Steam use and production (supply and demand technologies, steam parameters)	Industrial companies, Associations
	Transport data (energy consumption of road transport by technology [car, bus, heavy/light duty vehicles, motorbikes], average specific fuel consumption, annual mileage, average daily mileage and load factors etc.)	Statistical offices, Associations



Additional data requirements by model family

	Additional Requirements	Possible Ways or Source of Data Collection
Energy System	Building data for the residential/ commercial sector (number of floors, energy consumption by energy carrier and building, age structure of buildings or building reconstruction information)	Statistical offices
	Information about behaviour in the end-use sectors	Surveys, Scientific analyses and publications
	Data about useful energy (for example process heat, cooling, compressed air in the industrial sector)	Companies, industrial associations
	Load curve data for different commodities and user groups	Utility company data, grid operators, single company or household data



Additional data requirements by model family

	Additional Requirements	Possible Ways or Source of Data Collection
Macro-economic	Sector specific data like technology classifications	Agencies and associations
	European Social Accounting Matrix (SAM) with the possibility to extract national SAMs	Statistical offices (i.e. Eurostat)
	Substitution elasticities	Scientific projects (social and natural sciences); Sophisticated econometric estimation techniques
	Detailed Physical Input-Output-Tables (PIOT) concerning resources, energy and environment	Statistical offices (i.e. Eurostat); consistent with European SAMs
	Data on useful energy production in households, data on durable goods (utility over lifetime like transport services)	Household surveys (household panels); Energy statisticians (working groups for energy balances)
	Demand patterns and motivation of consumers	Psychological studies and experiments (research)
	Sector specific data: Service (Input, Output, trade), Electricity (transmission, distribution), transport (modes and uses)	



Additional data requirements by model family

	Additional Requirements	Possible Ways or Source of Data Collection
Dis-aggregated Models	Data on Existing Power Plants	In general: Data collection under the responsibility of the main user (example WASP); <i>In case of WASP GREECE: Public Power Corporation S.A., Hellenic Transmission System Operator S.A., Independent Power Producers Centre for Renewable Energy Sources and Saving, Ministry of Environment Energy and Climate Change, Regulatory Authority for Energy, International Energy Agency</i>
	Thermal vs. electrical performance of a thermal generating plant (detailed information on the heat rates related to more operating levels)	
	Data of types of wind generators at specific sites (+ other types of renewable energy sources)	
	Load forecasting	
	Operating framework of the hydro-pumping plants	
	Amount of reserve requirements (at increasing level of RES)	
	Geographically varied, household-specific electricity demand load curves	Utility company data, grid operators, single company or household data
	Information about demand-price relationships and public acceptability	Data from research institutes based on household surveys



Additional data requirements by model family

	Additional Requirements	Possible Ways or Source of Data Collection
Energy Behaviour	Data varies by context; generation of new information for each new model process	Users of the tools (high commitment needed)
	Establish a “ case library ” (project documentation) to learn from previous projects	Users of the tool and project managers
	Qualitative/quantitative; objective data/subjective viewpoints of various stakeholders (standard process for new process and new question)	Stake holder interviews, focus group discussions
	Carbon footprint data: life cycle assessment of specific products/services at brand level	Research institutes

Conclusion

Work package 4: Existing data and data requirements

- Each Policy Question should be answered with different types of models and/or tools
- Each model type employs different ways of generating the required information
- Each model type has a need for a specific type of data
- To improve the existing model platform, additional data are required and the availability of high quality data is a key issue for the future development of these models
- Important data attributes for model improvements and enlargements are:
 - The availability of more detailed data, e.g. higher time and geographical resolutions
 - Data consistency and comparability of databases among countries, regions and sectors
 - Depth of information and context-specific understanding may be even more important when changes in behaviour are strived for



Deliverable D4.1



Project no.:
241382

Project acronym
ATEsT

Project title:
**Analysing Transition Planning and Systemic Energy Planning
Tools for the implementation of the Energy Technology
Information System**

Instrument: Coordination and Support Action
Thematic priority: ENERGY.2009.9.1.1
European Energy Infrastructure Networks and Systems Transition
Planning
Start date of project: 01 October 2009
Duration: 30 months

D4.1
Report on Existing Data and Data Requirements

30 November 2011

Organisation name of WP Coordinator for this deliverable:
IER

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