The European Commission's science and knowledge service

Joint Research Centre

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The JRC-IDEES database

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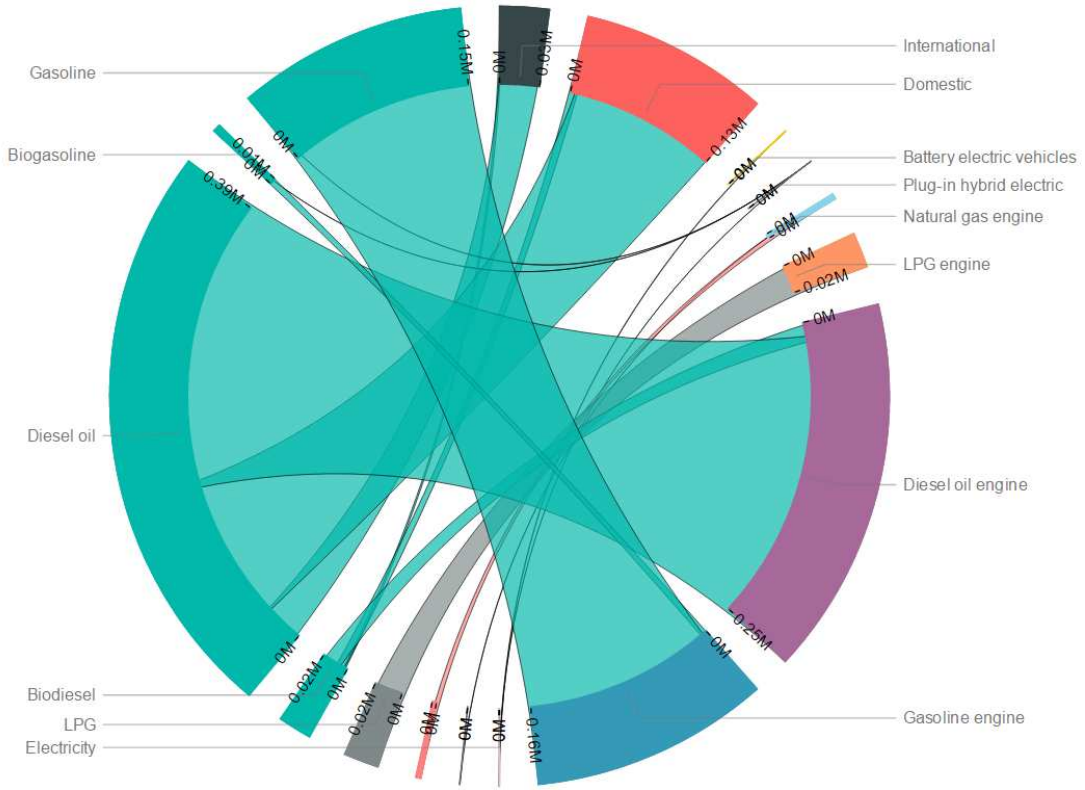
JRC-IDEES

Integrated
Database of the
European
Energy
System



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INTRODUCTION

JRC-IDEES is an **open source** complete database of the energy system and all associated factors

- EUROSTAT compliant
- Time horizon: 2000-latest statistical year on an annual basis (currently: 2015)
- Geographical coverage: EU Member States

FIRST-OF-ITS-KIND

MOTIVATION

All modelling tools need to put together the statistical data that they use

Decomposition of data applies as to match the level of detail represented in the model structure

JRC-IDEES forms **an integral part** of the POTEnCIA model

- *reflecting the current structure and properties of the energy system*
- *identifying existing equipment vintages and characteristics*
- *capturing behavioural aspects with regards to the use of equipment*

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JRC-IDEES CONSISTS OF:

Official Statistical data

Economy related

Demographics

Energy balances

Energy prices

Emissions

Physical industrial production

Transport mobility

Processed "data"

Equipment characterisation

- Technology deployment
- Stock related data

Structural & behavioural features

- Detailed energy use info
- Behavioural patterns
- Operating characteristics

Non energy using equipment related factors

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The Challenges

Compiling official statistical data from different sources and with different scopes

Main data sources include

- EUROSTAT
- Data published by policy DGs
- EEA
- IEA
- UN databases
- U.S. DOE
- Official National statistics

Issues to deal with

Inconsistencies

- Level of detail
- Methodologies
- Timing

Incompleteness

JRC-IDEES is constructed as to ensure consistency to EUROSTAT energy balances

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The Challenges

Compiling official statistical data from different sources and with different scopes

Performing a detailed decomposition of energy use

Level of detail matching that of the POTEnCIA model

Industry	11 sectors 21 subsectors	6 to 11 processes per subsector	~14 end-uses ~44 technology options per subsector
Residential	9 household types 9 appliances types	43 combined space and water heating types	135 technology options
Services	4 thermal uses 6 appliances types		47 technology options
Transport	4 (+2) modes	16 transport means	2 to 5 engine types 6 to 27 technology options per mean

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The Challenges

Compiling official statistical data from different sources and with different scopes

Performing a detailed decomposition of energy use

Level of detail matching that of the POTEnCIA model

Thermal uses	Specific electricity uses
Space heating Space cooling Water heating Cooking Main household types o central heating with solids o central heating with diesel oil o central heating with natural gas o central heating with LPG o central heating with biomass and waste o advance electric heating households o conventional electric heating households o district heating households o geothermal heating households	Lighting White appliances o refrigerators and freezers o washing machines o tumble dryers o dishwashers TV and multimedia ICT equipment Other electric appliances

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Performing a detailed decomposition of energy use

Level of detail matching that of the POTEnCIA model

Residential: Diesel oil heating household	Space heating, water heating (oil household)	Oil boiler / SHD wh	Space heating (oil household) Water heating (oil household)	Oil boiler Space heating device (oil)
		Oil boiler / SHD+solar wh	Space heating (oil household) Water heating (oil household)	Oil boiler Space heating device (oil) + Solar
		Oil boiler / electric wh	Space heating (oil household) Water heating (oil household)	Oil boiler Electric water heater
		Oil boiler / solar-electric wh	Space heating (oil household) Water heating (oil household)	Oil boiler Solar-Electric water heater
	Space cooling (oil household)	Space cooling (oil household)		Air conditioning
	Cooking (oil household)	Cooking (oil household)		Cooking LPG Cooking Electric

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The Challenges

Compiling official statistical data from different sources and with different scopes

Performing a detailed decomposition of energy use

Level of detail matching that of the POTEnCIA model

Characterised at the level of consumption unit

- Energy use specific

Decomposition to reflect the different drivers of energy consumption

- Operating hours
- Size
- Technical characteristics (efficiency etc.)

Explicit consideration of new equipment characteristics

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The Challenges

Compiling official statistical data from different sources and with different scopes

Performing a detailed decomposition of energy use

- Level of detail matching that of the POTEnCIA model
- Respect the energy balances by fuel and sector *without any exception*
- Respect activity data *without any exception*

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The Challenges

Compiling official statistical data from different sources and with different scopes

Performing a detailed decomposition of energy use

Respecting equipment stock and technology dynamics

- Vintage specific identification of equipment stock and investment
- Existing installations form a constraint
- Investment in new equipment explicitly quantified
- Operating characteristics dependent on energy use and existing installations

The Challenges

Compiling official statistical data from different sources and with different scopes

Performing a detailed decomposition of energy use

Respecting equipment stock and technology evolution

Distinguishing the characteristics of energy using equipment from other factors

- Introducing the concept of the representative consumption unit
- Unit specific useful energy needs allow identifying different structures and/or the role of non energy using equipment
- Identifying the impact of the way we operate our equipment on its technical characteristics

The Challenges

Compiling official statistical data from different sources and with different scopes

Performing a detailed decomposition of energy use

Respecting equipment stock and technology evolution

Distinguishing the characteristics of energy using equipment from other factors

Data sources used

- National surveys
- Studies and reports
  - EC supported
  - US-DOE
  - EEA
  - IEA
  - Industrial associations

Issues to deal with

- Fragmented information
- Lack of data
- Lack of transparency
- Country and sector specificities require:
  - a tailor made approach
  - while ensuring consistency at the EU level

*there is **no unique way** of performing such a disaggregation*

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JRC-IDEES OFFERS THE POSSIBILITY TO

Identify the drivers for past energy system evolution

- *macro-economic/demographic/climatic*
- *technology dynamics*
- *structural changes and behavioural patterns*
- *the impact of past policies*
- *implicit monitoring of policies*

Quantify the scope for future policy actions

- *which are the key energy consuming end uses?*
- *what is the margin for the (technical) improvement of the energy equipment stock?*
- *what is the role of non-energy equipment?*

Set a **common reference** for future energy policy assessment within the Energy Union

- *Saving resources by avoiding redundant work on decomposing historical energy data*
- *Improving the data quality through experts and scientific feedback*
- *Ensuring transparency*
- *Rendering modelling results comparable*

fully flexible and expandable

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JRC-IDEES ACCESSIBILITY

Accessible to the general public through an online platform

- Documentation on JRC-IDEES
- Full JRC-IDEES data-box
  - Detailed excel files for the whole energy system

    sector specific ones but also energy and CO2 emissions balances (enhanced)
  - Visualisations of the available data
  - Database structure (under investigation)

in line with the JRC open data principles

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Next steps and Maintenance

Iterative consultation process allowing continuous improvements

- JRC-IDEES 2015 (version 0.9)
  - Access to it will be made available to Member States experts tomorrow
  - Initiating a validation process
  - Involving stakeholders and the academia
- JRC-IDEES 2015 foreseen to be made available to the general public not later than March 2018 …

… initiating the process for the development of the JRC-IDEES 2016

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Thank you for your attention

JRC Science Hub –POTEnCIA:
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