Review of the TIMES code in GAMS to identify areas for performance improvement
Motivation: model sizes increase as more complex energy policy questions seek for answers.
Main Idea: Identify TIMES Performance Bottlenecks

• Create instances of TIMES with a range of extensions enabled

• Generate a profile of the execution time of these instances to:
  – Identify those GAMS statements having negative performance impacts
    – Assignments for data transformation
    – Execution flow changes (loops, if-statement, etc.)
    – Equation formulations
  – Identify performance issues in the GAMS execution engine itself

• Compile the findings to be implemented in the next release(s) of the TIMES code
The project builds on past collaborations

- Large instances of TIMES models from PSI:
  - have been already used to improve the GAMS execution engine
  - have been already used for TIMES code performance improvements by VTT

Project deliverables

• Report on the code improvements in the TIMES modelling framework to serve as a basis for implementing them in the subsequent releases of the TIMES code

• Best practice guide for GAMS programmers based on the insights gained in the project – upon interest, also in the form of a webinar to the ETSAP community
Benefits to the ETSAP

• TIMES modelling framework would be less hungry for computational resources
  – unlocking new analyses with TIMES that are not easily performed today

• TIMES modelling framework with shorter execution times

• Maintain a state-of-the-art TIMES code with high performance standards
  – improve visibility of TIMES and attract new users

• Code writing techniques developed in the project can benefit also other modelling frameworks based on GAMS

• The project is relevant to the objective “Tools Maintenance, Improving and Capacity Building” of ANNEX XVI
The project leverages the existing TIMES code development contract in implementing the identified improvements to reduce the budget.

<table>
<thead>
<tr>
<th>Work package</th>
<th>Partner</th>
<th>Person days</th>
<th>Personnel cost (EUR)</th>
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<tr>
<td>WP1: Implementation of large TIMES instances (and smaller variants of them for quick tests)</td>
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<td>WP3: Synthesis report and webinar on best code practices</td>
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Time schedule: 12 months after the signing of the contract
Wir schaffen Wissen – heute für morgen

Thank you for your attention!