

# xl2times Future Development and Maintenance

Final report for IEA-ETSAP Project, contract no.  
RC-2024-08\_GEMA\_006

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Project timeline: 2024/09/01 - 2025/08/31

## Introduction

This is a final report that describes the development undertaken under and the outcomes of the IEA-ETSAP project xl2times Future Development and Maintenance (contract no. RC-2024-08\_GEMA\_006).

The outcomes of the projects include adding benchmarks (including a large TIMES-GEO model), improving the performance of the tool 4-5x on TIMES-GEO, and successfully engaging with the community on the development of the tool.

The Project Team is grateful to the ETSAP Community as whole for supporting the project, in particular the active collaboration with Olexandr Balyk, and to the following ETSAP Institutions that have been involved in various stages of this project: EECA, DESNZ, and PSI.

## Goals & Progress

Project Goal	Progress
General development and maintenance	<ul style="list-style-type: none"><li>● <a href="#">82 pull requests</a> were opened, 79 were reviewed merged successfully<ul style="list-style-type: none"><li>○ Huge thanks to many great contributions by Olexandr Balyk!</li></ul></li><li>● Expanded benchmarks with TIMES-GEO, TIMES-NZ, and additional cases for the TIMES-Ireland Model</li><li>● Accuracy improvements:<ul style="list-style-type: none"><li>○ All DemoS models are now between 99.7-100%</li><li>○ TIMES-NZ – <b>full reproduction of results</b> for the available cases!</li></ul></li></ul>
Fixing bugs / responding to bug reports	<ul style="list-style-type: none"><li>● <a href="#">22 issues</a> were opened, all were responded to / investigated</li></ul>

	<ul style="list-style-type: none"> <li>• 11 of those were fixed / resolved</li> <li>• Addressed issues brought by the community (including by TIMES source code maintainer Antti Lehtilä)</li> </ul>
Performance	<ul style="list-style-type: none"> <li>• Performance was <a href="#">improved 4-5x</a> on TFM_MIG tables by using parallel processing</li> </ul>
On-boarding new users	<ul style="list-style-type: none"> <li>• A simple <a href="#">guide</a> for getting started with the tool has been added</li> <li>• Engaged with the community (e.g. PSI, EECA, LTU) on the usage of the tool for their purposes</li> </ul>
Compatibility of Python and dependencies	<ul style="list-style-type: none"> <li>• We continuously test xl2times on latest Python and dependency versions using <a href="#">GitHub Actions</a></li> </ul>
Supporting new TIMES features	<ul style="list-style-type: none"> <li>• Created a new Python-style API to enable transparent and reproducible scenario analysis workflows using e.g. Jupyter Notebooks (via a new TimesModel object)</li> </ul>

## Deliverables

- [2 releases](#) in the duration of the project, latest release v0.3.0 is on GitHub and PyPI and can be easily installed using pip
- A [presentation](#) at the IEA-ETSAP meeting in Summer 2025 on the new Python-style API and Jupyter Notebook workflow