

Open Source TIMES Excel Reader

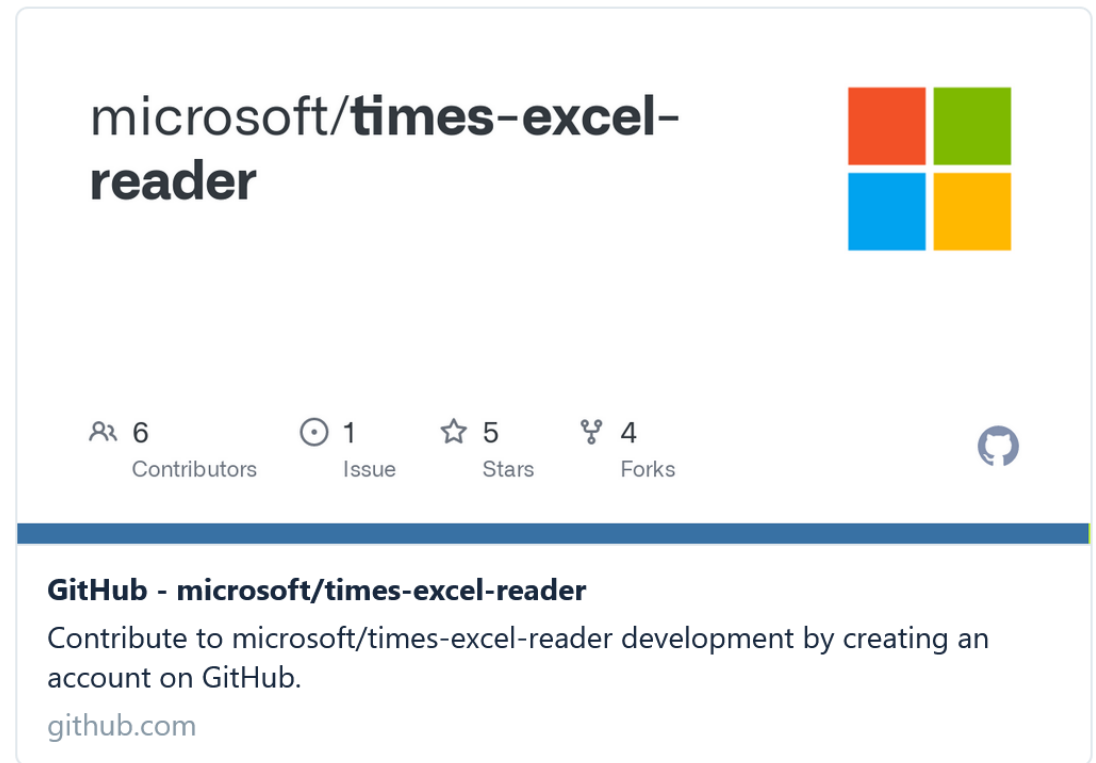
Submitted by: Olexandr Balyk (Facilitate Energy Ltd.)

Participating Partners: BEIS, CGEP, DEA, EECA, GAMS, IER, LTU, UCC, UCL.
Open for others to join at a later stage.

Other Participants: Original developers of the tool

Background

- Started by volunteers @Microsoft
- Without active engagement from the ETSAP community
- Able to correctly match 70% of inputs for TIM (i.e. dd files)
- MIT license



The screenshot shows the GitHub repository page for `microsoft/times-excel-reader`. The repository name is displayed in the top left, and the Microsoft logo (four colored squares) is in the top right. Below the repository name, the statistics are shown: 6 Contributors, 1 Issue, 5 Stars, and 4 Forks. A GitHub logo is also present. A blue horizontal bar separates the repository header from the main content area. Below the bar, the text reads: "GitHub - microsoft/times-excel-reader", "Contribute to microsoft/times-excel-reader development by creating an account on GitHub.", and "github.com".

microsoft/**times-excel-reader**

6 Contributors 1 Issue 5 Stars 4 Forks

GitHub - microsoft/times-excel-reader
Contribute to microsoft/times-excel-reader development by creating an account on GitHub.
github.com

Project goals

- Finalise the TIMES Excel Reader
- Test the TIMES Excel Reader on several models
- Create examples of usage for the TIMES Excel Reader

Motivation

Veda

- User-friendly interface
- Includes predetermined set of functionality
- Cannot be modified by the user to test a new idea
- Runs only on Windows

Open source TIMES Excel Reader

- No UI concerns
- Open source – i.e. can be modified
- Flexibility to integrate with other tools / test novel approaches
- Can run on Window, Linux, Mac

Examples of use cases

Effect of proposed model changes on set membership

- A pull request is opened on GitHub
- A workflow checks and outputs:
 - New processes and commodities
 - Removed processes and commodities
 - Changes in set memberships

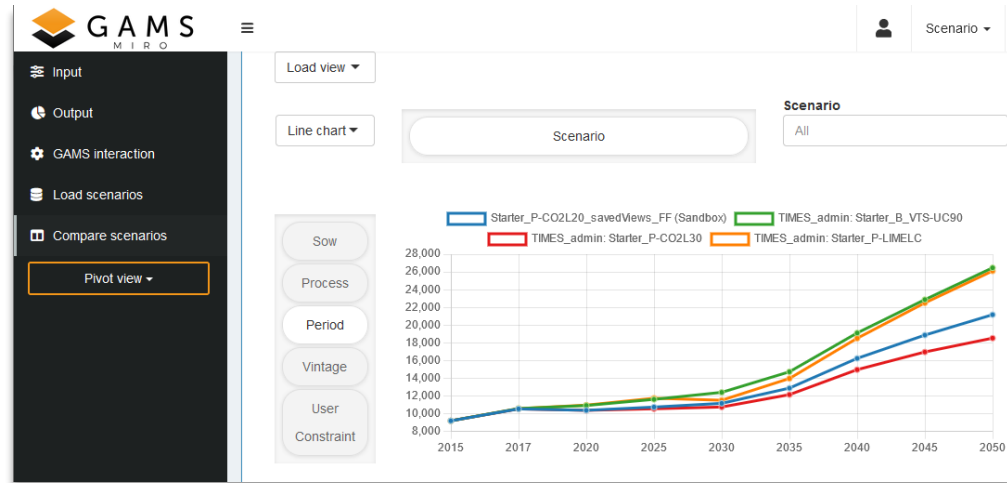
Effect of proposed model changes on results

- A pull request is opened on GitHub
- A workflow is triggered that:
 - Executes predetermined scenarios
 - Creates a comparison with previous version

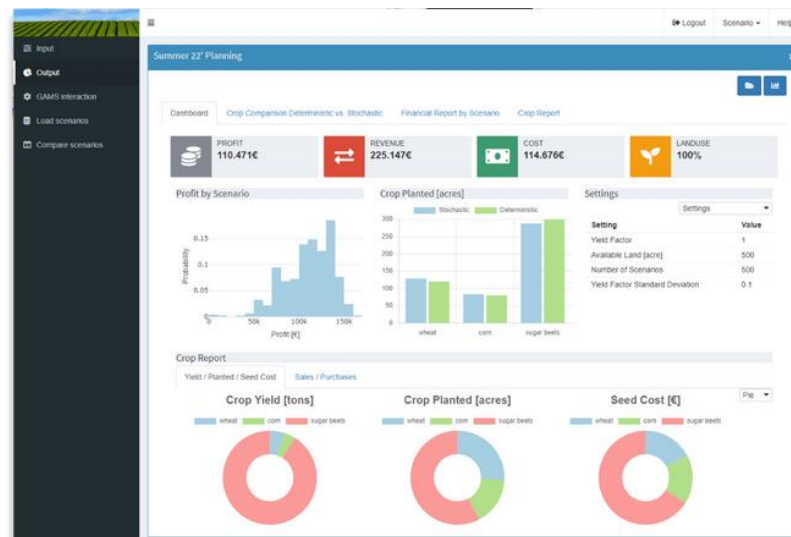
WP 1: TIMES Excel Reader

- Finalise the TIMES Excel Reader (incl. testing on at least 3 models chosen by the project partners).
- TIMES models tend to be heterogeneous and rely on Veda-specific attributes to a varying degree, a 90% correct model input interpretation may be considered a success in some cases.
- Produce Future Development and Maintenance Outlook / Recommendations based on the challenges encountered and insights gained during the project.

WP 2: TIMES-MIRO App



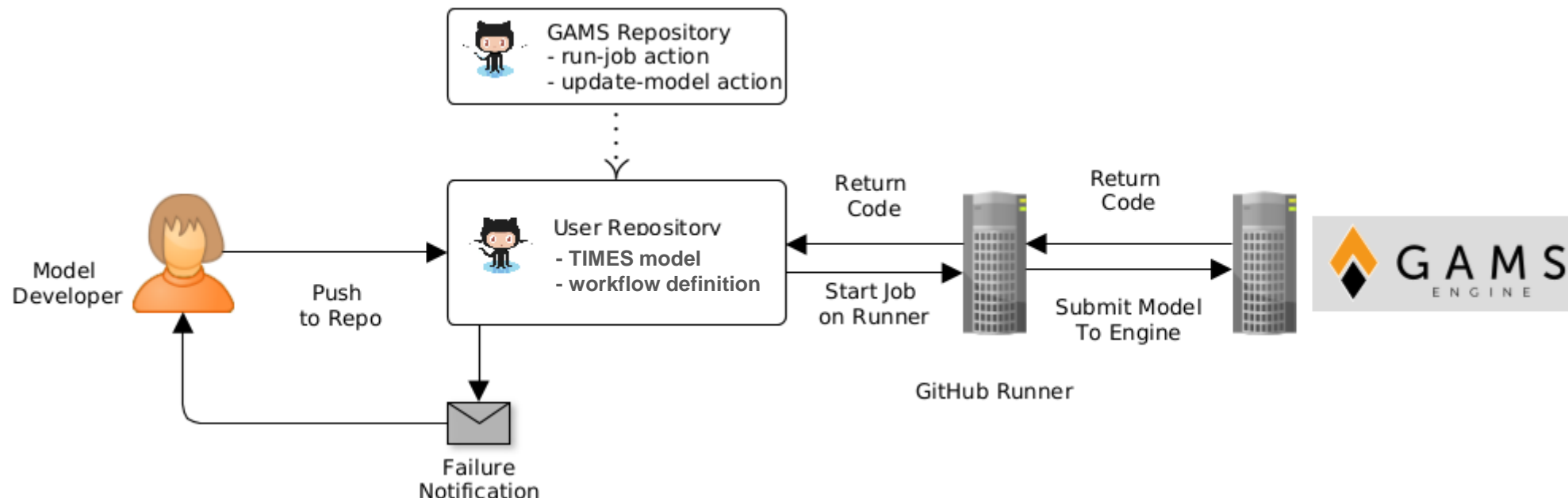
- TIMES-MIRO App is an open source front end to TIMES Models ([github](#))
- Currently, to import a new TIMES scenario, dd files are required
- The open source TIMES Excel reader will be integrated as a custom importer, such that TIMES scenarios can be directly imported from Excel files



- Implementation of customized TIME-MIRO Apps for up to 3 TIMES Models
- E.g. implementation of preconfigured graphs and custom dashboards custom dashboards that summarize the most important results at a glance

WP 3: GitHub Actions

- GitHub Actions allow automation of build, test, and deployment pipelines
- Automated Testing of TIMES Models can be challenging due to the Excel to dd file conversion
- Integration of TIMES Excel reader opens new opportunities for GitHub actions



Deliverables

1. TIMES Excel Reader (incl. documentation) tested on minimum 3 TIMES models
2. Future Development and Maintenance Outlook / Recommendations
3. Extension of the current TIMES-MIRO App to allow uploading common TIMES Excel Files, incl. development of an adapted TIMES-MIRO App for up to 3 interested teams
4. Examples for GitHub actions (e.g. for comparison of model results)

Time Schedule and Costs

The project is expected to run for 12 month, e.g. from January to December 2023, with task 1 completion in June 2023.

| Personnel costs based on tasks* | Estimated Person-Days | Average Cost per Person-Day, EUR | Total cost, EUR |
|---|----------------------------------|---|----------------------------|
| TIMES Excel Reader (incl. documentation) | 30 | 1000 | 30000 |
| TIMES-MIRO Apps for up to 3 interested teams (GAMS) | 17 | 1000 | 17000 |
| Examples for GitHub actions, e.g. for comparison of model results (GAMS) | 3 | 1000 | 3000 |
| Total project cost | 50 | 1000 | 50000 |

Innovation

Innovation of this project comes from the flexibility that it gives to the TIMES models users in:

- i. Their ability to implement custom analysis designs
- ii. Technology stack utilisation (e.g. ability to develop and execute model on Linux)
- iii. Applying various model development workflows
- iv. Evaluating model changes

Benefit to Partners

Project partners will benefit from the project in the following way:

- i. Ensuring that the tool works well with their model
- ii. Opportunity to develop a TIMES-MIRO App for their model
- iii. Possibility to influence the functionality of the tool

Benefit to the Community

The ETSAP Community will benefit from the project in the following way:

- i. Enabling open science compatible workflows
- ii. Better transparency and documentation of how the input format is converted into model equations
- iii. Greater flexibility with respect to running TIMES models in the cloud and locally
- iv. Opportunity to automate command-line workflows
- v. Easier to apply git-powered workflows, especially with respect to evaluating effects of changes brought about by new model functionality
- vi. Unlocking the creativity within the community with respect to new analysis designs that are not yet easily supported by current user interfaces
- vii. Easier / more convenient use of some of the existing tools, e.g. TIMES MIRO App
- viii. Ability to integrate with other tools (e.g. SPINE, ixmp, etc)
- ix. Improved accessibility and affordability of TIMES

Relevance to Annex XV Topics

The proposed project is relevant to Annex XV “Energy Systems and Sustainable Development Goals” since it relates directly to the objective “Tools Maintenance, Improving and Capacity Building” by increasing the transparency, openness, flexibility and affordability of the TIMES model generator, associated software and data sets.

Cost Effectiveness

- ETSAP is expected to cover only direct expenses related to deliverables.
- The project will benefit from the initial “heavy-lifting” that has been already made by the original developers of the tool.
- Moreover, as an open source project it could unlock the potential of community contributions that benefit all and are cost effective.