

Funding application | unofficial translation to English

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Date: 30 September 2023
Status: unofficial translation of submitted application
Title: Entscheidungshilfe für die Auswahl von Open-Source-Systemen zur Modellierung von Energiesystemen
Scheme: BMBF Prototype Fund
Funding round: 15
Deadline: Saturday 30 September 2023 23:59 +0200 (CEST)
Note: the word counts refer to the German version
Scheme landing page: <https://prototypefund.de/en/>
Openmod forum topic: <https://forum.openmod.org/t/decision-support-for-selection-of-frameworks>

01 | Project title

Decision-support for the selection of open-source energy system modeling frameworks

02 | Name for the account

This is the name under which the user account will be created on the application platform. It can be a clear name, a pseudonym or a team name.

robbie.morrison

03 | First name

Robbie

04 | Last name

Morrison

05 | e-mail address

robbie.morrison@posteo.de

06 | Do you have an account on GitHub, BitBucket, or a similar platform? If so, please provide the appropriate link

<https://github.com/robbiemorrison>

07 | Briefly describe your project

100 words limit

This project aims to provide a structured approach to the selection of open-source energy system modeling frameworks to help new users make appropriate software choices.

These frameworks differ significantly in terms of their technical characteristics, developer communities, application areas, and roadmaps.

The project will draw on existing resources within the wider energy modeling community, including the Open Energy Platform model factsheets database.

Developer input will be key for this project because developers are the best placed to describe their software.

Potential users will be sought and interviewed.

08 | Which subject area do you assign your project to?

Select one of four defined funding classifications

Software Infrastructure (or Civic Tech, as these frameworks can underpin genuine transparency and participation)

09 | What social challenge do you want to address with the project?

175 words limit

New users seeking an open-source modeling framework that meets their needs and specific research questions will find that decision-relevant information is scattered and disparate.

Frameworks differ in terms of their technical capabilities, supported technologies, sectoral scope, geographic coverage, licensing terms, software management, usability, documentation, and developer and user communities.

An energy systems modeling "framework" describes the core codebase and supporting workflows. An energy system "model" is a framework duly populated with detailed system data. Analysis proceeds by developing scenarios and evaluating them against a reference case. The goal being to identify synergistic and rapid decarbonization pathways for the energy sector.

Without this type of integrated analysis, it will not be possible to achieve the climate neutrality goals set out for national energy sectors.

Well-designed software selection assistance can therefore make a contribution to this important task.

The project should be viewed in the context of the need to develop comprehensive information management practices across the open science energy system modeling domain.

10 | How do you plan to technically implement your project?

175 words limit

At this stage, the details of the technical implementation are intentionally sketchy. Issues of data structures, database design, platform choice, backend functionality, and user interaction need to be addressed, but these should be relatively easy to resolve.

Of greater importance and difficulty is the matter of providing information that meets user needs. In the longer term, the project must also be responsive and evolving, because the development of this type of service must necessarily rely on learning-by-doing.

A review of the computer science literature on decision support will form part of this project.

Another important aspect is the maintenance of the project in the future. In this case, continued community interest is critical, as this will be the primary avenue for ensuring ongoing uptake, development, and currency.

The user interface will be web-based. The project will seek a suitable infrastructure for long-term operation. There are a number of options within the open modeling community that need to be further discussed.

11 | Have you already worked on the idea? If so, briefly describe the current status and explain the planned innovations

100 words limit

I started the Wikipedia article on "open energy system models" about ten years ago and later wrote about 90% of the content, with circa 250 citations.

https://en.wikipedia.org/wiki/Open_energy_system_models

This information provides a good basis for building a more structured decision support system.

12 | Link to existing project (if any)

<https://forum.openmod.org/t/decision-support-for-selection-of-frameworks/4220>

13 | What similar approaches already exist and what will your project do differently or better?

60 words limit

The main venue for processing these kinds of queries are sporadic discussions on channels provided by projects or within the broader modeling community. This traffic is rarely comprehensive or complete and is often quickly lost. In short, there are no semi-structured methods to guide new users wishing to select an open-source energy system framework.

14 | Who is the target audience and how will your project reach them?

100 words limit

The target audience is the clearly growing number of parties taking up this kind of systematic analysis: students, early-stage researchers, engineering consultancies, companies, public institutions tasked with policy development, NGOs, and emerging climate change think-tanks.

An important motivation is to support the adoption of open-source frameworks in the global south. Not only are there no software licensing fees, but most projects also cluster helpful communities, thus providing soft technology transfer and capacity building.

Reach should not be an issue: the open energy modeling community has sufficient visibility for this kind of tooling to be readily located.

15 | What software projects have you worked on so far? For open source projects, please provide a link to the repository

Provide 3 project examples (with name and/or link to repository)
100 words limit

Key projects include deeco (lead maintainer for 7 years), xeona (wrote 58,000 source lines of C++), and the GLPK suite (contributor for 4 years).

- <https://github.com/robbiemorrison/deeco>
- <https://doi.org/10.5281/zenodo.4817704>
- <https://www.gnu.org/software/glpk/>

16 | Experience, background, motivation, perspective: What do you want us to know about you and consider in the selection?

100 words limit

I have been working with high-resolution energy system modeling frameworks since 1995 and with open-source variants since 2003. I have been active in the Open Energy Modelling Initiative (openmod) community since 2016 and am currently lead admin on their forum comprising about 1200 registered users. I am not aligned with any particular framework.

I have programmed in C++, R, Python, Lisp, Bash, and SQL.

This publication is related: Morrison, Robbie (April 2018). "Energy system modeling: public transparency, scientific reproducibility, and open development". *Energy Strategy Reviews*. **20**: 49–63. ISSN 2211-467X. doi:10.1016/j.esr.2017.12.010. 102 citations.

The applicant is well connected in the openmod community, which has wide reach worldwide.

17 | Are you applying for the grant as a team?

Note: If you want to be funded as a team, you will need to form a GbR [a kind of partnership] for the grant after you are accepted.

No

18 | Names of team members

30 words limit

NA

19 | How many hours in total do you (or does the team) plan to work on implementation during the 6-month funding period?

The maximum funding of €47500 is derived from a full-time position for one person for half a year (approx. 950 h). This corresponds to an hourly rate of 50 €. If you want to receive a higher hourly rate, you have to prove with invoices that you have already received this funding as a developer. The number of hours and the corresponding funding may of course also be divided between several team members. All funding projects in a round are entitled to the maximum funding amount, so a high number of hours does not influence the selection.

475

(half-time)

20 | Briefly outline key milestones to be implemented during the grant period

100 words limit

The following outputs are proposed:

- a user requirements document
- semi-structured interviews with potential users of energy system models and accompanying analysis
- software design proposals
- an interactive mockup interface using HTML

21 | I have read the checklist for applicants

Checklist: https://bewerbung.prototypefund.de/documents/2/PTF_Checkliste_07.2023.pdf

22 | I have read the information on data protection and agree to the use of my data within the framework of the Prototype Fund program objectives

23 | I am over 18 years old and have my primary residence in Germany

24 | I agree to make the project results available under an open source license (e.g. MIT license), publicly available (e.g. via GitHub or BitBucket)

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