STORAGE RESEARCH INFRASTRUCTURE ECO-SYSTEM

RI Information sheet 2022

SINTEF Energy, Virtual Lab (vlab)

Any energy storage technology can be applied in this laboratory
(Mechanical, Electrochemical, Chemical, Thermal, Superconducting, Magnetic, Cross-cutting)

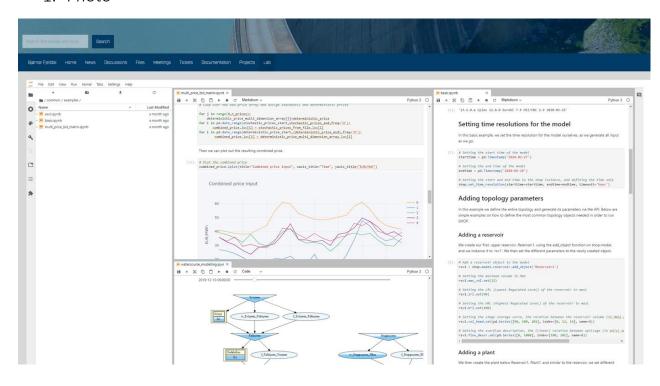Contact person 1:
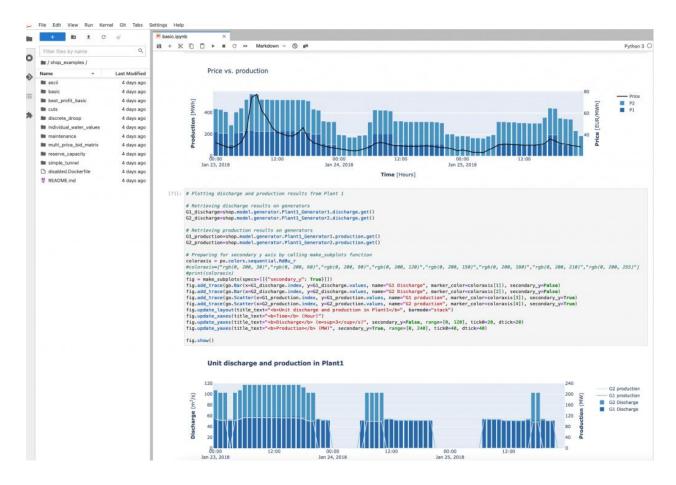Bjørnar Fjelldal, bjornar.fjelldal@sintef.no
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Project Acronym	StoRIES
Call	H2020-LC-GD-2020
Grant Agreement No.	101036910
Project Start Date	01-11-2021
Project End Date	31-10-2025
Duration	48 months

1. Photo

2. Geographical coordinates (˚, ", … N/S, E/W)

The development team is located in Trondheim, Norway, and the vlab is hosted on a Norwegian Data Center, but is accessible from anywhere in the world via the internet using a web browser.

3. Description of the research infrastructure for the webpage

The SINTEF Energy Virtual Lab (vlab) is a digital laboratory accessible online at any time from anywhere. It is based on state-of-the-art robust, secure and scalable infrastructure, and serves as a user-based virtual environment where you can research, develop, run and interact with your own and with many of SINTEF Energy's models in an intuitive and easily collaborative way.

Based on the open-source Project Jupyter, Kubernetes and Docker, you can use both Jupyter notebooks and full terminal access to create and view a combination of documentation, plots and actual code running from a live kernel in your web browser, which is great for explaining and visualizing scripts and high level code.

After entering the vlab with your own personal user credentials, you are immediately served a pre-configured, ready-to-go computational environment. This relieves you from the pains of configuring and maintaining a stable and up-to-date place for your data science needs, and instead freeing up time to work on your projects. Nevertheless, you can always customize it with your favorite packages and applications using anything that is compatible with Python, Julia and R in the frontend, and Linux in the backend.

The SINTEF Energy Virtual Lab is less limited than ordinary laboratories when it comes to what you can apply and work with, given its digital and flexible nature. This means that you can model and analyze pretty much anything if you can describe it in code. Thus, it may facilitate a new level of synergy and collaboration across fields and domains for the - but not limited to – energy researchers and industry. By using this platform and its tools, we can communicate and collaborate on a technical level with less struggle than ever before. We can discuss and work together on specific models and cases in the same code while using the same files and environments, and we avoid duplicates and sharing issues that often occurs when handling these kinds of data.

SINTEF's hydropower production scheduling model SHOP (Short-term Hydro Optimization Program) is one of the models available in the vlab that it is possible to access without installing any software, and can be used with either pre-existing interactive examples or by uploading your own test cases. This approach lowers the initial effort on behalf of the user, and it hopefully also lowers the bar for testing out the latest functionalities and fixes.

4. Availability of the research infrastructure
(Please indicate time periods in which infrastructure <u>will not be available</u> for StoRIES in the next 2 years – if already known)

The vlab is available at all times (24/7/365), but support from personnel at SINTEF may be limited in typical holiday periods like Christmas, Easter and summer.

5. Special considerations (confidentiality / NDA agreements, insurance requirement, special training, HSE training)

A privacy policy (GDPR) and NDA needs to be approved when signing up for an user account.

6. Energy storage technology that can be analysed/studied by using the research infrastructure
- Electrochemical ☒
- Chemical ☒
- Thermal ☒
- Mechanical ☒
- Superconducting Magnetic ☒
- Cross-cutting ☒ (Specifically: …   )

7. Key words for the webpage
Virtual, digital, laboratory, lab, vlab, infrastructure, cloud, online, code, python, julia, linux, shop, jupyter, docker, kubernetes

8. TRL level (if applicable):
- 1-3 ☐
- 4-6 ☒

- Above ☐