
System Operator Open-Source Tools and Data Motivation

GPST Pillar 5 - Working Document

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System operators involved in G-PST Pillar 5 work have reported on the interest and involvement so far on open-source tools. This 1.5-page summary is a working document, highlighting the main experiences and motivations so far.

GPST Pillar 5 targets easier access to open-source tools for system operator applications:

- Open-source motivation for developing country system operators is access to tools for both learning and use in system operation, without costly investments

Open source is part of the digitalization journey – there is a need to build up digital competencies to be able to benefit from open source:

- Important to use an open-source approach from the start of the development of new applications and digital solutions, as it can be complex and expensive to convert existing in-house tools to open-source. Energinet recommends the “open-source first” principle: establishing the culture and the right level of support across the organisation (OSPO: open-source programme office) (Energinet, Pillar 5 webinar Oct 2021)
- Even if system operators are not yet using open-source tools directly, their suppliers are increasingly doing so – for example Kafka, Kuberneetes, Grafana. A lot of the open-source software will allow easier data sharing between different supplier products and better visualisation of data output. System operators are also giving access to open data through data interfaces (APIs, for example) to get useful tools developed in market environment, helping system operation (National Grid ESO).

System operators already have some open-source applications in use:

- Operational: short-term forecasting, situational analysis
- Planning: load flow, dynamic stability
- Tools related to markets, billing, and management software
- LFEnergy ecosystem has a collaboration with RTE (Transmission System Operator of France) and Alliander (Distribution System Operator), continuing their open-source efforts after a European project
- <https://landscape.lfenergy.org/>

System operator motivation for moving to open source (RTE and Energinet presentations at [Pillar 5 webinar](#), October 2021):

- Accelerating need for new tools: Necessity to increase tenfold the speed, cost-efficiency, and innovation of core-business software development projects
- Increased demand for development and innovation competencies
- Reducing vendor lock-in or customer-specific approaches that impede velocity and cost-efficiency. Open-source tools have available source code for customization and extension
- Improving modularity, interoperability, model evolution, and shorter release time cycles
- Reusing what exists and sharing efforts, allowing faster and cheaper software, more efficient development of software through collaboration and innovation, minimizing duplicate efforts, and adding transparency

- Tapping into international open-source communities for resources to further develop tools and, through collaboration, access wider and more diverse skills and a diversity of viewpoints, resulting in greater value creation when developing solutions across competencies and borders

For system operators, open source needs to fulfill:

- Support: An ecosystem to get support and development efforts and get help in customizing due to regional differences
- Validation and benchmarking
- Modularity and interoperability
- Security: Screening all changes to codes and making sure power system security vulnerabilities stay confidential

What the system operators cannot move to open source:

- Data and parameters in some models are proprietary. Libraries for components in tools are often more general-level data.
- When a tool is populated with power system data, it becomes applicable to a system operator and can no longer be shared. A layered approach would be needed so that any changes/improvements system operators make could be shared.
- Power system operation includes critical infrastructure for national security. This is why open source is easier to use for planning tasks than real time; however, some graphical modules for situational awareness may still be useful for the real-time operations.