



European Research Infrastructure supporting Smart Grid Systems Technology Development, Validation and Roll Out

TRANSNATIONAL ACCESS PROVISION

RESEARCH INFRASTRUCTURE DESCRIPTION AND
TRANSNATIONAL ACCESS CONDITIONS

Multipower Laboratory VTT Technical Research Centre of Finland



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1 Research Infrastructure

Name of Infrastructure/Installation	Multipower Laboratory (MP-Espoo)
Location	VTT – Espoo, Finland
Web Site	www.vtt.fi

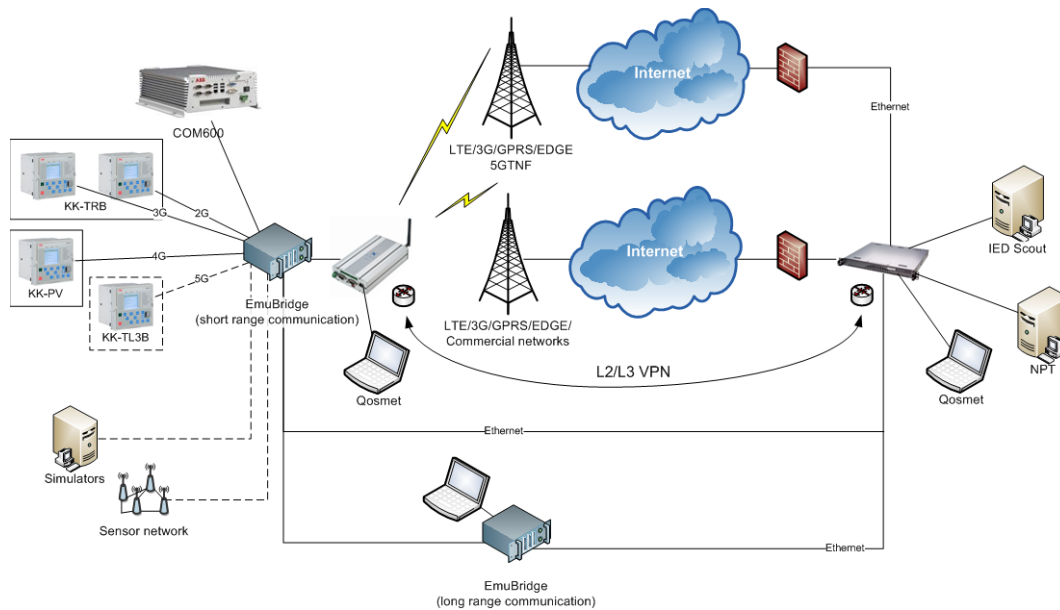
2 Description of the Research Infrastructure-Installation

Multipower Laboratory (MP-Espoo) is a national empirical research environment where new technical solutions and products for distributed energy system can be tested in a multifunctional environment. There are several independent testing facilities connected together so that the environment may cover production, control and loading concepts as well as energy storages of different sizes and technologies. Multipower laboratory facilities have a strong interconnection with fuel testing and development. The environment consists of diesel generators but also PV units, controllable converter drive and controllable loads. Laboratory is equipped with local control system fully implemented with IEC61850 enabling measurements, external connections and controls. Energy storages, especially batteries can be tested widely under different circumstances. The laboratory is also equipped with GPS system enabling synchronization of remote units and related research.



There are some specific operation areas that may be interesting for user groups:

- **IEC61850 – related testing:** The laboratory is equipped with latest IEDs from ABB, including a substation automation system based on ABB COM600 substation computer. This combination offers an environment where for instance protection or control solutions based on IEC61850 and for instance GOOSE messaging can be tested. The laboratory is also equipped with GPS system, enabling time synchronization and for instance wide area monitoring/protection type applications.
- **Communication testing:** The laboratory is currently developed to enable testing with 5G communication. The area on which the laboratory is located is among first 5G pilots. VTT is closely involved in the 5G development and looking to integrate MultiPower laboratory in 5G pilot area.



- **Battery testing:** the laboratory offers good possibilities for testing batteries, ranging from cell level to complete systems. There are climate chambers which can be used. Lifetime testing can be done with flexible testing arrangement. For EV battery purposes, recorded drive cycles can be used to perform tests emulating real driving conditions.

3 Services offered by the Research Infrastructure-Installation

MultiPower offers testing possibilities which cover development, operational acceptance and common tests for the DG products and systems. The platform is flexible and can be adapted for various purposes. Typical testing assignments and possibilities consider:

- DER generation units, fuel optimisation, network interconnection issues with protection and inverter systems
- ICT applications for DER systems, as well as operational optimization
- IEC61850-based distribution automation and devices
- Different malfunctions and faults can be freely realized in the network, and behaviour of the generation, protection and control systems can be identified in actual environment
- Possibility of emulating wind generator with converter drive
- Testing of EV battery packs, modules and cells

4 Brief description of the organization managing the Research Infrastructure

VTT Technical Research Centre of Finland is a non-profit government organisation established by law and operating under the auspices of the Finnish Ministry of Employment and the Economy. VTT is a multitechnological research organisation providing high-end technology solutions and innovation services. VTT has a staff of 2600. Through its international scientific and technology networks, VTT can produce information, upgrade technology knowledge, and create business intelligence and value added for its stakeholders. VTT's activities are focused on three areas: Knowledge intensive products and services, Smart industry and energy systems and Solutions for natural resources and environment. VTT has 70 years of experience in addressing the needs of industry and the knowledge-based society. In the past 20 years, VTT has participated in more than 1000 European R&D Framework Programme projects, within various thematic programmes. VTT has been granted ISO 9001:2000 certificate and ISO 14001 environmental certificate.

Research area "Smart Energy and System Integration" conducts wide research on future energy systems and their integration. We apply a holistic view on different energy carriers and integrate strongly ICT and communication aspect with power system research. VTT is closely involved in international co-operation networks (for instance EERA, DERlab, IEA ISGAN) as well as European research projects (for instance ELECTRA, SmartNet, STORY). VTT also participates in multiple national research programs on the area of smart grids.

5 Transnational Access conditions offered by VTT

The experimental system described is located at Espoo, Finland.

For **safety reasons**, for **critical applications**, the users are not expected to operate the systems by themselves; even when safety instructions will be provided, tests will be carried out by staff of VTT. For **the rest of applications** and after ad-hoc training, the user group will have access to the related facilities for the duration of the stay (with the support of VTT's researchers and laboratory technicians when necessary). The **scheduling of the experiments** will be agreed and booked prior to the stay according to the availability of the involved staff and equipment. Administrative documentation for the access (contract, non-disclosure agreement, etc.) will comply with ERIGrid common indications.

In addition to the general corporate services (Internet connection, working space, etc.) and the support and advice on accommodation and transportation to VTT's infrastructure, the access being offered includes supervision and help of VTT's staff:

- As a complement to the pre-access contacts between the user group and VTT, the stay will start with an introductory meeting for confirming the stay conditions (confidentiality, safety indications), scheduling the activities, explaining the on-site procedures, clarifying the logistics and technical details.
- Preparatory work: VTT's staff will assist the users for the installation of the devices, electrical connections, use of the specific instrumentation, preparation of a test procedure (if necessary) on the basis of the users requests, and programming of the experimental conditions.
- VTT's researchers will support the realisation and follow-up of the experiments.
- VTT's researchers will support the results interpretation and data processing and analysis

In principle, a typical stay of 2-4 weeks is foreseen for a single user group but this period could be extended depending on the concrete user project. The user group can use the infrastructure for the defined time.

Access to VTT premises requires a personal security clearance procedure, conducted before arrival by local authorities. Without the clearance the users are not allowed to move alone at VTT's premises nor given any access rights.

Reimbursement of expenses:

User expenses for the Transnational Access are paid by ERIGrid (EU H2020 Programme). This includes travels to Espoo by plane, accommodation, daily subsistence, and daily transportation during the stay.

For the user projects, VTT will refund the stay expenses when the stay is finished: the user must declare the incurred expenses and present the invoices/receipts to VTT in order to get the refund.

Logical expenses must be made by the user: travels will be made in economy class and conventional hotels or equivalent accommodation will be used. These costs (travel, accommodation) will be covered and additionally a daily allowance of 40€/day can be reimbursed, following the Finnish practices.

All reimbursement practices must be checked and agreed on between the user and VTT prior to making any reservations for travelling.

VTT will primarily reimburse the costs to organization (company, university, etc.). Please note that reimbursement of daily allowances to individual person can lead to taxation depending on practices.

6 Contact details for Research Infrastructure

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