

Online system for optimum control of voltage and reactive power

OPENVQ



What is OPENVQ?

OPENVQ (Optimized Performance Enabling Network for Volt/var (Q)) is a system that combines data on power-grid assets and monitoring data with external information (such as unit commitment and dispatch results and weather forecasts). Based on this data, OPENVQ forecasts the demand and supply balance to estimate the power-grid conditions in the near future, and thereby maximizes the performance of the power grid. OPENVQ increases efficiency by, for example, reducing transmission loss. OPENVQ can be used to increase the available transfer capability and reduce greenhouse gas emissions generated because of transmission loss.

Case example — PoC in Thailand

An ongoing project in Thailand aims to reduce greenhouse gas emissions by using OPENVQ for sophisticated and streamlined power-grid operations. This project is based on a written agreement by NEDO (New Energy and Industrial Technology Development Organization) and the Energy Ministry of Thailand. They exchanged a written agreement that the two parties will join forces to conduct a PoC (Proof of Concept) project with the aims of decarbonation and improving power-grid operations. The PoC project was outsourced to Hitachi, Ltd. and is conducted jointly with the Electricity Generating Authority of Thailand.

Problems Power grid in Thailand

As the demand for electrical energy increases, there is an urgent need to reduce transmission loss.



Due to concerns over the burden on the environment and aging facilities, some thermal power plants will stop operations.



As the adoption of renewable energy is expected to increase, the cost of investments in facilities is rising.

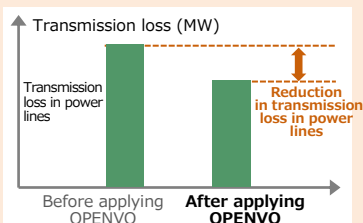


Solutions Use OPENVQ to calculate the optimum voltage profile

Power companies can consolidate and analyze data on power-grid assets, monitoring data, and weather forecast data and constantly use the optimum voltage profile to provide fine-grained control of the facilities. As such, companies can reduce transmission loss and increase available transfer capability.

Reduce greenhouse gas emissions

Reduce greenhouse gas emissions generated because of transmission loss



Address the uncertainties of renewable energy output

Properly maintain the reliability of the power grid even after adoption of renewable energy, which involves many uncertainties



Reduce capital expenditures

Improve the available transfer capability without large investments in reinforcing the power grid



Further benefits can be expected if the achievements gained from the PoC project in Thailand are applied to the entire ASEAN region.

Benefits

OPENVQ contributes to increasing the sophistication and efficiency of power-grid operations.

Before

**Voltage profiles are determined manually.
Optimum states can be maintained only in limited circumstances.**

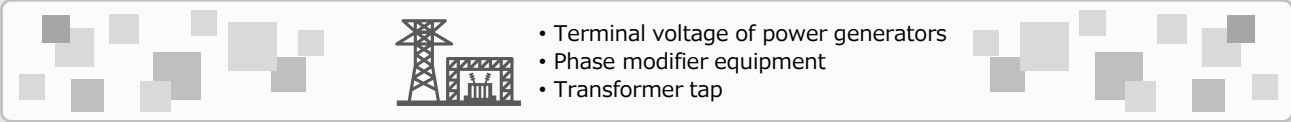
Creation of voltage profiles involves trial and error
Consider typical situations (weekdays, holidays, etc.) and specify settings



Local control equipment

Setting

Instructions for operations



Consider the uncertainties of renewable energy output and aim for a constant optimum state

After

The power company can calculate and implement the best voltage profile for the current environment.

Weather forecast data

Calculate the voltage profile online

OPENVQ system

Maximize the use of existing equipment

Adopt an interface based on international standards to eliminate the need of a major revamp

Establish a loose coupling of systems and implement customization with flexibility to respond to customer requests

Hitachi's information platform

Data on power-grid assets Observation data Optimization control

Deploy other applications

The OPENVQ system is built on Hitachi's information platform. Other sophisticated applications can be deployed smoothly.

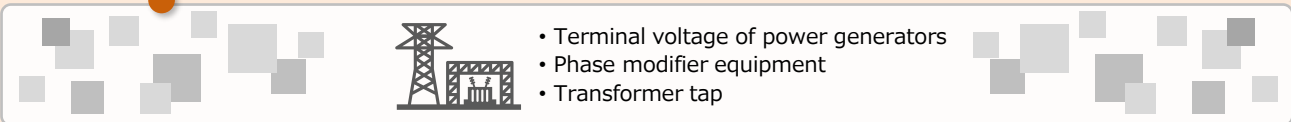
Existing power transmission system

Enable operations that can prevent mutual interference

Data on power-grid assets, observation data

Instruction for operations

Map greenhouse gas emission reductions to environment performance, and propose JCM methodologies.



We proposed JCM (Joint Crediting Mechanism) methodologies to quantify transmission loss. The governments of the two countries are expressing great expectations for NEDO's PoC project for quantifying the reduction of CO2 that was generated because of transmission loss.



Please contact Hitachi if you are interested in reducing transmission loss. We can simulate the impact of the reductions.

NEDO's PoC project for OPENVQ is scheduled to be completed by the end of FY 2022. The release of OPENVQ to customers is scheduled for FY 2023 or later. We welcome any inquiries about feasibility studies or any other matters before the release of OPENVQ.

Product information and inquiries

- Please visit the following website on the internet:
https://www.hitachi.com/products/it/control_sys/ems/opencvq.html

