Conservation Voltage Reduction (CVR) Implementation

KINECTRICS

Project Objective

Kinectrics provided New Brunswick Power (NBP) an independent review of their potential for energy savings and peak load reduction through Conservation Voltage Reduction (CVR). Through the implementation of Advanced Metering Infrastructure (AMI), we were able to review and compare the findings of industry documents to NBP's evaluation of CVR benefits.

Implementing CVR at New Brunswick Power (NBP) was one factor that motivated them to seek New Brunswick Energy and Utilities Board's (NBEUB) approval for investing in Advanced Metering Infrastructure (AMI).

Client: Énergie NB Power

Location: New Brunswick, Canada

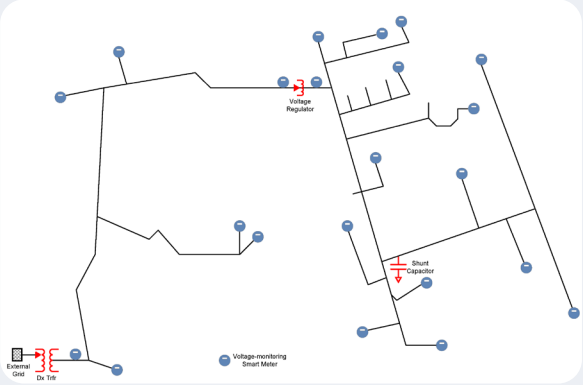
Conservation Voltage Reduction (CVR):

- A technique that **reduces energy consumption** of the loads connected to the distribution network by lowering power system voltage, which also reduces distribution losses
- CVR can be performed dynamically **during varying load conditions** by using power transformer Under-Load Tap Changers (ULTCs), station voltage regulators, feeder capacitors, line voltage regulators, and line capacitors
- To ensure successful CVR, it is necessary to **monitor the voltage at key nodes** in a distribution network, including endpoints of laterals and on customer secondaries serving large loads

Project Scope

We evaluated the expected effectiveness and benefits that could be achieved by a CVR system based on Advanced Metering Infrastructure (AMI), in comparison to a stand-alone CVR system.

In the NBP implementation, it was considered that both CVR systems would use the same control software and voltage regulating equipment. However, the systems would differ because the AMI-based system receives voltage inputs from smart meters, while the stand-alone system gathers voltage data from a set of dedicated voltage monitors.



Example Network with Voltage-Monitoring Smart Meters

Value Added Results

- AMI-based CVR system for NBP met the requirements of a benchmark CVR system.
- CRV would help achieve energy savings from voltage reduction originally calculated by NBP.
- We testified as experts at New Brunswick Energy and Utilities Board hearings held for various projects, and our testimony helped NBP win approval to install an AMI system.