

# Enhancing Hydroelectric Power Plants: SCADA System Implementation and Software Suitability for Sustainable Energy

This thesis delves into SCADA system implementation and assesses WideQuick software for optimizing hydroelectric power. Addressing the growing electricity demand, it emphasizes technology's crucial role in fostering sustainability and efficiency.

The purpose is to delineate the essential requirements for implementing a Supervisory Control And Data Acquisition (SCADA) system in a hydroelectric power plant. Essentially, this involves automating and overseeing the plant through an application. Once the requirements have been established, the second task is to assess whether the software WideQuick, developed by Kentima, is suitable for developing such an application.

Over the last decade, the demand for electricity has increased each year by over 2%. This continuous trend is expected to rise by 2.7% annually between 2030 and 2050. This means that the demand for electricity in the year 2050 can be almost double today's levels! Producing this amount of electricity without changes in our production methods will undoubtedly result in a significant increase in greenhouse gas emissions. A significant aspect, of course, involves transitioning to fossil-free energy production methods. Another key component for reducing carbon emissions is to automate all aspects of the power sector, including electricity production! The benefits of implementing a SCADA system for power production are not limited to the reduction of greenhouse gas emissions. Other advantages include lower operational and maintenance costs, faster decision-making, and an overall safer system for both personnel and equipment. So yes SCADA systems are necessary to deploy in the power production.

To implement a SCADA system in a small hydroelectric power plant, the following components are necessary: protection of the turbine, control of active and reactive power, continuous monitoring of frequency, voltage, and current, planning of generation operations, monitoring the water dam, and fault detection and reporting. Additionally, it is essential to have the ability to store and display any relevant historical data. It is also evident that WideQuick is suitable software for developing a SCADA system for power generation.

*David Karlsson*

Lunds Tekniska högskola