

# ***MODELING SMART METERING SYSTEM FOR DISTRIBUTION ELECTRICITY GRIDS***

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## **Overview**

Distribution networks of Kyrgyzstan faces many difficulties. With high rates of electrification, the country's electricity utilities are challenged to meet the population's growing demand for electricity, particularly during the winter months. The use of energy by various economic sectors has shifted substantially over the past two decades, with increases in the proportion used by the residential sector and decreases in the share utilized by the industrial and agricultural sectors. As of the early 1990s, the residential sector consumed 16% of the total electricity supplied, in contrast to 19% by government organizations and 65% by industry, agriculture, and commercial users. The structure of electricity consumption has shifted dramatically since that time. Currently, an estimated 63% of electricity supplied within the country is consumed by the residential sector, whereas 12% is consumed by government entities and only 25% is utilized by the industrial, agricultural, and commercial sectors.

This situation led to a large overloading of distribution networks. High technical losses, commercial losses, underload / overload of transformers by capacity, a large winter load causes huge problems. The solution of the situation is complicated by the lack of systematicity in the distribution companies, the automated recording of the distribution of electricity flows. The impossibility of detailed analysis of technical parameters in networks does not allow to determine what technical solutions are needed for usage in distribution grid.

## **Methods**

As a solution for determining the technical parameters of power distribution networks, it is proposed to implement a smart grid system that will identify technical problems of networks and reduce losses. In addition, the reduction of technical losses will allow the development solutions for connection of power generating units based on RES, in particular PV stations. Also, within the framework of the task of connection renewable energy into the general distribution network of Kyrgyzstan, there is the issue of technical connection of these capacities.

## **Results**

In the framework of research conduction smart meters and systems for balancing and distributing electricity, managing network parameters (smart grid) are under installation. One of the important tasks of the smart grid implementation is to create, together with distribution companies, the necessary conditions for connecting to the network and working on-grid renewable energy generating station.

Within the framework of the research project it is planned to install smart meters on transformers for distribution company, installation of measuring tools and concentrators for data collection; develop and implement a system adapted for local conditions (software) for managing smart meters, balancing and monitoring of electrical energy consumption.

## **Conclusions**

Smart metering project will give solutions for improvement of management in distribution grid, determination of technical losses and connection to the grid renewable energy generation stations.

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