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Project Title: The improvement of the distribution systems operation with the aim of energy loss reduction

Department:	Plan of strategic studies for reducing electrical losses of electric distribution systems	Employer:	Niroy Research Institute
Project/Program Manager:	Hamidreza Arasteh	Executor:	Mohammadreza Safari
Project Financial Code:	700054	Project Quality Code:	PDPN15-5
Type of Project/Program:	In-house	Assistant:	Technology

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Keywords:

Operation, Technical and Non-technical losses, Loss reduction, Electric distribution systems.

Project Necessity:

... Due to the presence of numerous instruments, as well as other specific characteristics (such as single phase loads, and low voltage levels), the most part of the electricity power losses usually belongs to these systems. Distribution power losses include the highest part of the losses among all the power system and could be categorized into technical and non-technical parts. The technical part denotes the energy that is lost due to the physical network and does not have any profit. The non-technical part indicates the energy that is delivered to the consumers; but is not registered as the sold energy.

The energy loss reduction is one of the most essential activities in the distribution systems operation. Energy loss reduction is an effective action to lead the system towards the optimum operation. High energy losses in distribution systems show that it is cost-effective to support the researches regarding the loss reduction in distribution systems and implement the findings of the projects.

Project Goals:

- 1- Define the concept of operation and identify the loss reduction challenges and problems;
- 2- Identify the condition of Iran electric distribution systems from the energy loss point of view;
- 3- Classify and prioritize the approaches to reduce the operational losses of the distribution systems;
- 4- Propose the approaches to improve the operation of distribution systems with the aim of energy loss reduction

Abstract:

In addition to introducing the operational concepts and identification of the difficulties for reducing the power losses from the operational viewpoint, the investigation of the optimum condition of the system, as well as providing the effective approaches to enhance the distribution systems operation level are handled in this project. The definition of the concepts of the distribution system operation, the identification and investigation of the technical and non-technical losses, the investigation of the effective actions to reduce the distribution power losses in the operation context, the identification of the scientific findings, the investigation of the successful experiences in the operation of the distribution systems to reduce the losses (including the national and international experiences and research findings), proposing the novel approaches or improving the existing procedures, as well as the investigation of the optimum operation of the system with the aim of loss reduction by considering the importance of different approaches are addressed in this project.

Steps and Methodologies:

- 1- Introduce the concepts, and investigate different components of the electrical losses;
- 2- Investigate and identify the problems that will enhance the losses, as well as the activities that are effective to reduce the operational losses;
- 3- Investigate the experiences of the leading countries in reducing the electric operational losses;
- 4- Investigate the current conditions of the Iran electric distribution systems from the loss level point of view;
- 5- Classify and prioritize the approaches to reduce the operational losses;
- 6- Propose the ways to improve the operation of the distribution systems with the aim of loss reduction.

Main Results (technical outputs, patents, papers, books, reports, etc.):

- 1- Identify the different components of the losses in electric distribution systems;
- 2- Identify the problems that will enhance the losses of the electric distribution systems;
- 3- Identify the methods to reduce the losses of the distribution systems, from the operational point of view;
- 4- Identify the condition of the Iran electric distribution system and the most important activities that have been done for loss reduction;
- 5- Identify different parts that could affect the loss reduction activities;
- 6- Categorize and prioritize the effective activities for reducing the operational losses of distribution systems;
- 7- Identify the strengths and weaknesses of the “Comprehensive Operation Instruction”, and propose some modifications to improve it.