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Project Title:

Collecting data and checking the performance of the installed systems (one megawatt Arak photovoltaic power plant)

Department:	Development plan for technologies and studies related to solar energy	Employer:	NRI
Project/Program Manager:	Ali Hashemi	Executor:	Mohammad Khalaj
Project Financial Code:	121016	Project Quality Code:	PSEPN05-1
Type of Project/Program:	Development plan	Assistant:	Technology

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Keywords: Solar Power Plant-Data Gathering-Performance-Solar panel-Efficiency-Repair & Maintenance-Quality Control

Project Necessity:

The development and equipment of power plants requires heavy investment, and it is in such conditions that the maintenance of existing power plants and increasing their life span is of double importance, and in this way, new investments can be avoided to a large extent and the existing capitals can be fully utilized. The main goal of a maintenance and repair system is to create a systematic method to control the condition of existing equipment and devices and to optimize them. On the other hand, if it is not properly implemented, the lifespan of the equipment will be greatly reduced and it will cause irreparable damage. In recent years, due to the progress of human knowledge, the logic governing the maintenance and repairs of industrial units, especially power plants, is changing and evolving with a significant acceleration. On a global scale, the records of scientific and accurate treatment of repair and maintenance operations go back to the birth of management science, which initially focused on human resources and tool efficiency. Later, various maintenance and repair systems were gradually developed and used, which grew faster during the last decades with the help of computers. Among the types of power plants, photovoltaic power plants are one of the emerging types and at the same time with widely used futures. Due to this issue and the establishment of

laws such as the guaranteed purchase of electricity from renewable energies at attractive prices, they have been favored by investors and the development process of photovoltaic power plants has grown significantly. has faced Niroo Research Institute, as a powerful research arm of the Ministry of Energy, and by using its valuable experience in building and operating the first megawatt photovoltaic power plant in the country, is now able to contribute more to the development and growth of this industry by compiling guidelines for the maintenance and repair of photovoltaic power plants. Have in the country. In this regard, considering the increasing development of the installed capacity of photovoltaic power plants in the country and the need to compile a manual for repair and maintenance, this project aims to increase efficiency and productivity, increase work and product safety, increase the lifespan of devices and equipment, and prevent Their wear and tear, reduction of work stoppage hours, reduction of operating costs, reduction of consumption of spare parts, prediction of the amount and time of consumption of parts and provision of suitable quality of work or production product are defined.

Project Goals:

- Preparation of instructions and checklists for the repair and maintenance of the 1 megawatt Arak photovoltaic power plant
- Increasing the reliability and reducing the maintenance costs of the Arak photovoltaic power plant
- Evaluating the experience of building a megawatt power plant in the country and identifying potential weaknesses to present to the photovoltaic industry in the country.

Abstract:

Today, photovoltaic modules are used for energy production in small and large scales, and the proper operation of the system is very important in order to optimize energy production. Photovoltaic power plant includes many parts that must be evaluated periodically to ensure optimal performance and, if necessary, measures such as repair or replacement should be carried out on them. In general, the lifespan of a photovoltaic system is estimated to be more than 25 years, and during this period, due to various factors, there is a possibility of defects in the components of the photovoltaic system. Some of the mentioned defects do not affect the overall power output of the power plant, while others can greatly reduce the amount of energy production. Therefore, it is very important to continuously monitor the performance and document the activities carried out on key parts such as modules, inverters, transformers, holders and other components of the power plant.

Such actions defined in the field of maintenance, with regular and periodic planning, play an important role in reducing downtime and increasing productivity. Considering the growth and maturity of photovoltaic systems, it is very important to focus on the maintenance and maintenance of these systems. Considering the growth and maturity of photovoltaic systems, it is very important to focus on the maintenance and maintenance of these systems. The expected life span for photovoltaic systems is 25 years or more, so safe and proper maintenance is an integral part of the reliability of the system. The scope of maintenance and maintenance of photovoltaic systems is very wide, but solar systems have no moving parts and static production require less maintenance. However, routine maintenance is required to ensure proper system operation. The existence of a comprehensive instruction helps contractors and activists in this field to improve their performance.

Steps and Methodologies:

- Reviewing the standards and guidelines for performance review, repair and maintenance of photovoltaic power plants and extracting the required devices
- Extraction of specifications and provision of data collection devices, performance review and troubleshooting of photovoltaic power plant
- Data collection and performance review of Arak one megawatt power plant
- Experimental execution of the instructions extracted from the first paragraph and preparation of maintenance instructions and checklists for the megawatt photovoltaic power plant

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

- A volume of technical report