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## Evaluate the Management of Physical Assets Using the Up-Time Excellence Model; Case Study of Qazvin Power Distribution Company

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### Abstract

Power distribution companies face challenges such as network aging, load fluctuations, and resource constraints. Qazvin Power Distribution Company seeks to establish a physical asset management (PAM) system. The first step is assessing the current state. This paper evaluates PAM using the Uptime Excellence Model across its ten criteria. The methodology included document analysis, process observation, questionnaires, and interviews across four phases. Gap analysis compared organizational scores with national and global benchmarks. Findings revealed significant gaps in all ten aspects, particularly in strategy, performance management, information systems, and reliability-centered approaches. For each aspect, 52 improvement projects were proposed and prioritized using the TOPSIS method. Consequently, a three-phase roadmap for implementing the PAM system was developed. This research provides a practical model for PAM assessment and improvement adaptable to other power distribution companies in Iran.

### Keywords:

Physical Asset Management; Electricity Power; Distribution Company Uptime Model; TOPSIS.

## 1. Introduction

Power distribution companies are capital-intensive organizations whose business nature is fundamentally based on physical assets. Qazvin Power Distribution Company seeks to establish a PAM system for optimal utilization of human, physical, knowledge, and financial capital. This paper describes the evaluation of PAM using the Uptime model, proposing improvement projects and a strategic roadmap. The novelty includes localizing Uptime strategies for the power industry, forming governance and executive working groups, comparing results with national and global averages, proposing gap-based improvement projects, and prioritizing them using TOPSIS.

## 2. Methodology

The research was conducted across all sites of Qazvin Power Distribution Company from March 2021 to June 2021. A four-phase process was followed: (0) preparation, (1) knowledge compilation, (2) training and questionnaire distribution, (3) focus group sessions and results validation, and (4) roadmap development. Data were collected through documents, work process observation, questionnaires, and interviews. The average score for each item was calculated, and gap analysis was performed by comparing organizational scores with national and global indices.

### 3. Activity schedule

**Table 1 - Phase 1 Activities**

Row	Action/Project Name	Row	Action/Project Name
1	Formulating the mission, vision, and policy statement for physical asset management	15	Updating and auditing performance and strategic indicators
2	Developing information portals	16	Creating management dashboards - developing Balanced Scorecard (BSC)
3	Developing an outsourcing decision-making matrix	17	Creating a mechanism for developing indicators with employee participation and updating job descriptions
4	Formulating and updating the organizational strategy document and the physical asset management strategy document	18	Auditing existing information systems in terms of efficiency, effectiveness, user-friendliness, guidance, etc.
5	Planning regular inter-unit meetings	19	Identifying and operationalizing condition monitoring equipment specific to the power distribution industry
6	Improving the suggestion review system	20	Reviewing the adequacy of system modules
7	Implementing organizational culture change projects	21	Implementing a coding system for parts and equipment
8	Implementing survey standards and effective feedback of results	22	Implementing 5S in the warehouse and procurement system
9	Developing reporting systems	23	Reviewing the processes for sending and receiving repairable goods
10	Developing JOP PLAN (Job Plan)	24	Calculating the efficiency of maintenance department staff (wrench time)
11	Holding annual meetings to review maintenance techniques	25	Adopting an Economic Production Quantity (EPQ) and Economic Order Quantity (EOQ) approach
12	Prioritizing equipment and using an intelligent platform	26	Developing a career path for multi-skilled employees along with relevant incentive systems
13	Implementing workplace organization system (5S)	27	Participation of senior managers in TPM (Total Productive Maintenance) meetings
14	Implementing autonomous maintenance	28	Regular scheduled meetings with minutes related to improvement, using approaches such as brainstorming, etc., for decision-making

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**Table 2 - Phase 2 Activities**

Row	Action/Project Name	Row	Action/Project Name
1	Implementing Business Process Management (BPM) project	10	Developing an integrated system of existing databases and creating expert systems
2	Conducting Life Cycle Cost (LCC) analysis	11	Establishing a sustainable supply chain for physical asset management
3	Maintenance budgeting and zero-based budgeting as well as Activity-Based Budgeting (ABB)	12	Implementing Root Cause Failure Analysis (RCFA)
4	Establishing a competency-based employee training system and educational needs assessment (based on skill-job table or competency matrix)	13	Identifying intervals between potential failure and functional failure (P-F) and adjusting inspection intervals accordingly
5	Continuous monitoring of performance indicators	14	Conducting criticality analysis for sensitive equipment
6	Conducting appropriate analyses to identify equipment failure patterns	15	Revising risk management guidelines and performing redesign
7	Implementing Risk-Based Inspection (RBI)	16	Developing Evidence-Based Asset Management (EBAM) maintenance indicators
8	Benchmarking and best practice mining	17	Implementing an organizational culture alignment project
9	Developing a recognition mechanism based on process indicator results	18	Updating the performance evaluation mechanism (e.g., Balanced Scorecard) and the extent of long-term goal achievement

**Table 3 - Phase 3 Activities**

Row	Action/Project Name	Row	Action/Project Name
1	Implementing ERP (Enterprise Resource Planning)	4	Implementing LCC processes across all functions
2	Implementing a system integration platform	5	Improving service quality and rate (e.g., through failure mode and effects analysis (FMEA) method for review/redesign)
3	Implementing Reliability-Centered Maintenance (RCM)	6	Revising risk management guidelines and performing redesign

#### 4. Results and Discussion

The evaluation results across the ten Uptime model aspects (Strategy, People, Work Management, Basic Care, Performance Management, Support Systems, Spare Parts Management, Reliability, Teamwork, and Continuous Improvement) showed significant gaps compared to global benchmarks. For instance, the organization lacked a well-

defined, cascaded strategy and vision. In the "People" aspect, weaknesses in motivation, multi-skilling, and inter-unit communication were evident. Information systems required better integration and reduced manual data entry. Based on these findings, 52 improvement projects and actions were defined. These were prioritized using the TOPSIS method based on expert criteria. The validation of results was confirmed by comparing employee self-assessment scores with consultant team scores, where discrepancies indicated areas requiring further alignment workshops.

## 5. Conclusion

This research successfully evaluated the PAM system of Qazvin Power Distribution Company using the Uptime Excellence Model. The assessment revealed that the organization is in the early stages of PAM maturity, with substantial gaps requiring systematic intervention. A concrete output is the three-phase roadmap (cultural infrastructure, work process improvement, and organizational excellence) with a 1.5-year per phase schedule. The theoretical implication is the operational validation of the Uptime model in a power distribution context. The practical implication is a ready-to-use roadmap for similar equipment-centric organizations. It is recommended that senior management allocate dedicated resources, increase authority for distribution companies in asset decisions, and establish PAM excellence awards to drive continuous improvement.

## 6. References

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