SRE

ASSIGNMENT-2:

PROBLEM ANALYSIS IN A GOVERNMENT ORGANIZATION

WAPDA

GROUP 9:

1. ZUNAIRA ABDUL AZIZ	BSSE23058
2. FAIQA ARSHAD	BSSE23028
3. HAMNA FATIMA	BSSE23080
4. AREEBA SHAHBAZ	BSSE23097

ORGANIZATION

WAPDA (Water and Power Development Authority) is a government organization in Pakistan that deals with issues related to water and power. It was established in 1958 and it constructs and manages dams and hydropower plants, for electricity support and water supply for the country.

PROBLEM DEFINITION

Challenges faced

WAPDA is dealing with a variety of challenges that make its power distribution and management less effective. These challenges are leading to problems like higher power losses, frequent power blackouts, higher costs of doing business and overall poor service delivery to its customers. These problems stem from old and inefficient infrastructure, the management of energy using outdated methods, and inadequate exploitation of renewable power sources such as hydropower and solar power which are freely available in the region.

Impact of Challenges on operations

- **Energy Losses**: WAPDA's outdated equipment leads to significant electricity loss during transmission and distribution, wasting energy and causing revenue losses.
- **Power Outages**: Ineffective management of supply and demand results in frequent power outages, diminishing consumer satisfaction and creating a perception of unreliability.
- **Financial Struggles**: High operational costs from energy losses and poor resource management affect WAPDA's profitability and limit investments in modernization.
- **Underutilization of Renewables**: Despite having potential for renewable energy sources like hydropower and solar, WAPDA relies heavily on conventional thermal power, missing opportunities for cleaner and cheaper energy.

ROOT CAUSE ANALYSIS

Problem 1: Energy Losses

Why is WAPDA experiencing significant electricity loss during transmission and distribution?

Because WAPDA's infrastructure is old and inefficient.

Why is the infrastructure old and inefficient?

Because it has not been properly upgraded or modernized over the years.

Why has it not been upgraded or modernized?

Because of inadequate financial investments in infrastructure improvements.

Why is there a lack of financial investment?

Because operational costs are high due to energy losses and ineffective resource management.

Why are operational costs high and resources managed ineffectively?

Because WAPDA is using outdated technology and lacks a modern energy management system.

Root Cause: WAPDA's outdated infrastructure and lack of investment in modern technology lead to significant energy losses.

Problem 2:Power Outages

Why is WAPDA experiencing frequent power outages?

Because of ineffective management of supply and demand.

Why is the supply and demand not effectively managed?

Because there is insufficient monitoring and forecasting of energy consumption.

Why is there insufficient monitoring and forecasting?

Because the current systems in place are outdated and lack modern data analytics capabilities.

Why hasn't WAPDA adopted modern systems?

Because of budget constraints and a focus on short-term fixes rather than long-term technological solutions.

Why is there a focus on short-term fixes?

Because of pressure to address immediate power shortages, rather than implementing a strategic plan for sustainable energy management.

Root Cause: WAPDA's reliance on outdated systems for managing energy supply and demand leads to power outages.

Problem 3: Financial Struggles

Why is WAPDA facing financial struggles?

Because of high operational costs and revenue losses.

Why are operational costs high and revenues low?

Because energy losses during transmission and distribution are significant, and operational inefficiencies persist.

Why are these inefficiencies persisting?

Because the organization lacks the funds to implement large-scale upgrades or improve operational efficiency.

Why does WAPDA lack the funds for upgrades?

Because of poor financial management, underperforming revenue models, and an over-reliance on conventional energy sources.

Why is there poor financial management and an over-reliance on conventional energy sources?

Because WAPDA has not diversified its energy mix to include cost-effective renewable sources like hydropower and solar energy.

Root Cause: WAPDA's financial struggles stem from poor operational efficiency, revenue losses, and failure to invest in renewable energy solutions.

Problem 4: Underutilization of Renewables

Why is WAPDA underutilizing renewable energy sources?

Because it relies heavily on conventional thermal power generation.

Why does it rely on thermal power instead of renewable energy?

Because transitioning to renewable energy sources requires large investments in infrastructure.

Why hasn't WAPDA made those investments?

Because of financial constraints and lack of prioritization of long-term renewable energy projects.

Why are renewable energy projects not prioritized?

Because of short-term thinking focused on meeting immediate power demands, rather than planning for sustainable growth.

Why is the focus on short-term power solutions?

Because of insufficient governmental policy support for renewables and a lack of strategic vision within WAPDA for clean energy adoption.

Root Cause: WAPDA's underutilization of renewables is due to financial constraints, short-term focus, and lack of governmental support for renewable energy investment.

STAKEHOLDER IDENTIFICATION

Stakeholders are individuals, groups, or organizations that have an interest in or are affected by the issues faced by WAPDA. The key stakeholders for WAPDA's challenges include both internal and external parties, as outlined below:

Internal Stakeholders:

WAPDA Management:

Responsible for decision-making, strategy formulation, and overseeing the operations of WAPDA. Impacted by inefficiencies in power distribution and financial constraints, which hinder their ability to implement strategic changes and modernize infrastructure.

Operational Staff and Engineers:

Include technical teams, field workers, and engineers who manage day-to-day operations, maintenance of power plants, and distribution networks. They face challenges due to outdated equipment and technology, affecting their productivity and job satisfaction.

Finance Department:

Manages WAPDA's financial resources, budget allocations, and investment decisions. Directly involved in resource constraints and high operational costs, impacting the ability to fund upgrades or renewable projects.

Research and Development Department:

Engages in developing new strategies and technologies for improving efficiency and exploring renewable energy sources. Constrained by limited funding and inadequate focus on long-term projects.

Project Managers and Executives:

Handle various infrastructure and power generation projects. Affected by delays and cost overruns due to financial constraints and outdated infrastructure, impacting project execution.

External Stakeholders

Citizens and Consumers:

Include residential, commercial, and industrial consumers of electricity.Experience the direct impact of power outages, high electricity costs, and poor service delivery, leading to dissatisfaction and loss of trust in WAPDA.

Government and Regulatory Bodies:

Includes the Ministry of Water and Power, National Electric Power Regulatory Authority (NEPRA), and other government entities. Influence WAPDA's policies, regulations, and funding. They are also responsible for providing policy support and ensuring that WAPDA meets its obligations.

Suppliers and Contractors:

Provide equipment, technology, and services needed for maintaining and upgrading infrastructure. Affected by WAPDA's financial constraints, which may result in delays in procurement, project execution, and payments.

Investors and Donor Agencies:

Include local and international financial institutions, development banks, and donor agencies that provide funding for infrastructure projects. Their investment decisions are influenced by WAPDA's operational efficiency and financial health.

Environmental and Renewable Energy Organizations:

Advocate for the adoption of clean and sustainable energy sources. Impacted by WAPDA's slow adoption of renewable energy technologies and heavy reliance on conventional energy sources.

Other Utility Organizations:

Collaborate or compete with WAPDA in providing water and energy services. Interested in WAPDA's performance as it impacts the overall energy and water management in the region.

Local Communities and NGOs:

Inhabit areas affected by WAPDA's infrastructure projects, such as dam constructions and power plant operations. Concerned about environmental impacts, displacement, and access to resources.

SOLUTION SYSTEM BOUNDARY

Boundaries of the Proposed Solution:

Infrastructure Modernization: The solution will focus on upgrading WAPDA's outdated infrastructure to reduce energy losses during transmission and distribution. This will involve implementing modern technologies and better resource management strategies.

Energy Management Systems: The solution will include adopting modern energy management systems to improve the supply-demand balance and reduce power outages. Advanced forecasting tools and data analytics will be part of this system upgrade.

Renewable Energy Integration: A key aspect will be promoting the adoption of renewable energy sources, such as hydropower and solar, to reduce dependency on thermal power and lower operational costs.

Financial Efficiency: The solution will address the financial struggles by improving revenue models and operational efficiency, ensuring that funds can be reallocated for modernization and investments in renewables.

Long-term Strategic Planning: The solution will prioritize long-term investments and planning over short-term fixes to ensure sustainable energy management and overall operational improvement.

Areas Outside the Scope:

Governmental Policy Reform: While the solution can propose recommendations, changing government policies or securing governmental support for renewable energy investment will be outside the scope.

External Stakeholder Management: While external stakeholder impact will be considered, the active management of relationships with suppliers, regulatory bodies, and donor agencies is beyond the proposed solution's focus.

Immediate Funding Increases: Addressing the financial constraints due to inadequate funding will be part of the recommendations, but obtaining new funding from external sources, such as donor agencies, is not within the immediate scope.

CONSTRAINTS IDENTIFICATION

- **Budget Limitations**:
  WAPDA doesn't have enough money due to high costs and revenue losses. This limits its ability to invest in new technologies, upgrade infrastructure, or start renewable energy projects.
- **Legal and Regulatory Barriers**:
  WAPDA has to follow rules set by government and regulatory bodies, which can delay or complicate the implementation of new energy strategies.
- **Organizational Resistance to Change**:
  WAPDA's management may resist changes because they focus on quick fixes and follow a rigid structure, making it hard to adopt new solutions.
- **Outdated Technology**:
  The current infrastructure is old and doesn't support modern energy management systems or renewable technologies. Upgrading will need major investments and staff training.

- **Dependence on Conventional Energy**:
  WAPDA heavily relies on thermal power, making it difficult to switch to renewables like solar and hydropower without huge investments.
- **Conflicting Stakeholder Expectations**:
  Different stakeholders (e.g., government, investors, communities) want different outcomes, making it hard for WAPDA to satisfy everyone while improving its operations.
- **Weak Government Support for Renewables**:
  There's limited policy support or incentives for adopting renewable energy, making it challenging to prioritize sustainable energy solutions.

PLAGIARISM REPORT

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by Zunaira Abdul Aziz

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ORIGINALITY REPORT

3%	1%	0%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Southern New Hampshire University - Continuing Education Student Paper	1%
2	Submitted to Florida Virtual School Student Paper	1%
3	pakcolors.wordpress.com Internet Source	1%
4	shura.shu.ac.uk Internet Source	1%

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Exclude bibliography	On		