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# **AFGHAN UTILITY ADDRESSES ASSET MANAGEMENT CHALLENGES WITH INSIGHTS FROM MALAYSIAN UTILITY**

## **BENCHMARKING VISIT ON ASSET MANAGEMENT, MALAYSIA**

**JANUARY 2014 - KUALA LUMPUR, MALAYSIA -** In an executive exchange conducted by the U.S. Energy Association and funded by the U.S. Agency for International Development, fourteen delegates from Afghanistan’s electric utility (DABS) learned best practices in asset management from Tenaga Nasional Berhad (TNB), Malaysia’s electric utility. Asset management for electric utilities refers to the optimal lifecycle management of physical assets, such as transformers and cables, to sustainably achieve the stated business objectives.

The training at TNB’s Integrated Learning Solution facility (ILSAS) aimed to improve the profitability, efficiency and safety of DABS’ operations through the transfer of industry best practices. Through a combination of presentations and site visits, TNB’s training program covered generation, transmission and distribution asset management at the corporate and division levels.



Supported by the U.S. Agency for International Development (USAID), the U.S.-Afghanistan Utility Partnership Program focuses on utility best practices in power generation, transmission and distribution.

## BACKGROUND ON AFGHANISTAN'S POWER SECTOR

**Da Afghanistan Breshna Sherkat (DABS)**, is the state-owned provider of electrical power in Afghanistan. Of the estimated 5 million MWh of electricity consumed in Afghanistan in 2013, 78% was imported from neighboring countries and 19% was generated in Afghanistan with hydroelectric sources. As DABS seeks to expand energy access and independence, its growing operations will require an increasingly sophisticated asset management system to ensure profitability, efficiency and safety of its operations. Afghanistan is in the process of reassessing its asset management system and does not have a streamlined formal process in place throughout the utility. Its current challenges include determining asset values, upgrading asset management system software and embedding asset management practices into the corporate culture.

## BACKGROUND ON MALAYSIA'S POWER SECTOR

**Tenaga Nasional Berhad (TNB)**, Malaysia's national electric utility, is vertically integrated and owns 9,110 MW of the 21,748 MW of total installed capacity on Peninsular Malaysia. With 8.3 million customers, TNB sold 96,257.2 GWh in FY2012. The utility transmits and distributes electricity for 99% of Peninsular Malaysia.

TNB has 35 billion assets valued at over \$30 billion. Its asset management system is certified under the British Publically Available Specification 55 standard (PAS 55). PAS 55 provides objectivity across 28 aspects of good asset management, from lifecycle strategy to everyday maintenance. TNB began the switch from the ISO 9000 Quality Management Standard (QMS) to PAS 55 in 2004 in order to align with the leading international standard. PAS 55 overlaps many ISO QMS specifications, and it addresses the additional elements of risk management and optimization.



TNB displayed its ILSAS training facilities, where employees learn the necessary skills for any job at TNB.

**TNB's Integrated Learning Solution (ILSAS)** is TNB's training division. It was established in 1976 to address all aspects of training in the electric power sector from generation to distribution. ILSAS regularly hosts international groups; however, this was the first visit by a delegation from Afghanistan.

## PRIMARY TOPICS OF THE EXCHANGE

Key topics of the four-day workshop included:

- Asset management principles and practices
- Asset management for generation
- Asset management for transmission & distribution

## ASSET MANAGEMENT PRINCIPLES AND PRACTICES

TNB welcomed the participants from Afghanistan at its ILSAS training facility in the outskirts of Kuala Lumpur. It began the four-day training session with an overview of TNB's asset management system and a tour of their training facilities.



Participants toured a mockup of a control room, which ILSAS uses for training.

Like most major utilities, TNB divides its assets between generation, transmission and distribution. TNB explained that asset management involves software as well as formalized processes for registering, evaluating and tracking the upkeep and condition of equipment. The main focus of asset management at TNB is risk management and criticality. Risk management is the ability to identify and respond to incidents that affect the power supply. Criticality is the process of prioritizing assets that are most important in maintaining power supply, such as substation transformers.



Participants visited a district cooling facility, one of a wide variety of divisions of TNB that employ asset management best practices.

Much of the week’s discussion focused on asset management standards, such as PAS55, which provide an opportunity for the utility to benchmark against the international community. Certification is a long-term process. For TNB, full certification took ten years and required a significant commitment from all levels of the utility; however, the benefits of formalizing asset management processes can be seen even in the early stages.

The first step in the asset management process is to create an inventory of current equipment. DABS faces the problem that it does not know the value of many of its existing assets, some of which were purchased prior to any record-keeping and have since considerably depreciated in value. A thorough asset inventory will allow the utility to have an improved understanding of their existing infrastructure and current needs. Instructors at TNB advised that DABS look at certification as a long-term goal to be broken down into a series of annual and 5-year objectives.

One of the largest hurdles in implementing an asset management system is the change in management practices. DABS delegates wanted to learn more about how they could convince their different departments to embrace asset management standards. TNB explained the importance of communicating the benefits of asset management as a way to embed asset management practices into the corporate culture. Asset management increases the quality of the work environment, improves utility performance and adds to the company’s bottom line.

Additionally, TNB explained that its corporate culture was pushed top-down toward asset management certification through incentive-based regulation (IBR) from the Malaysian government and through an upper management that believed in the value of asset management. Under the IBR requirements, TNB must submit its asset management plan annually. TNB chose to become certified with ISO to demonstrate improvement and showcase their performance.

**ASSET MANAGEMENT FOR GENERATION**

To learn more about asset management at power generation facilities, the delegation visited a 2,100 MW clean coal power plant at Manjung. TNB presenters at the clean coal plant showed how their asset management system improves risk management by recording outages and incidents for rapid response and analysis.



TNB is expanding the 2,100 MW clean coal power plant at Manjung by another 1,000 MW.

DABS participants were interested in learning more about how TNB deals with damaged equipment. TNB explained that each facility has a scrap committee, composed of one person from each unit at the department level, which determines how to deal with damaged equipment. This committee system helps avoid internal disagreement over the disposal of damaged equipment.

The delegation also visited a 5 MW solar farm—an IPP funded by the regional government in Melaka. Afghanistan’s environmental conditions are favorable for solar energy. Solar has significant potential as a distributed generation source in areas that are far from the existing grid.



**Participants visited a solar farm in Melaka, which sparked discussions about how to increase the use of solar power in Afghanistan.**

### **ASSET MANAGEMENT FOR TRANSMISSION & DISTRIBUTION**

TNB presenters at the transmission and distribution divisions explained the core concepts that structure their asset management system, such as the “plan-do-check-act”. This decision cycle is a core concept of PAS 55, as it describes the procedures for creating asset management policies.

To see these concepts in action, the delegation visited a 132/33/11 kV substation near Melaka. Engineers from TNB demonstrated the substation’s extensive safety and redundancy measures that help minimize the interruption of service to customers. In addition to TNB’s goal of providing excellent service to its customers, the national regulator charges the utility a high penalty fee for outages over four hours in duration.



**TNB brought the participants to a substation outside Melaka to demonstrate their safety practices and the management of assets in distribution networks.**

The distribution division at TNB Melaka reinforced the importance of redundancy in risk management. TNB currently has a 64 minute/year System Average Interruption Duration Index (SAIDI); however, they plan to reduce it to 50 by the end of 2014. TNB also improves its reliability and performance through the use of Supervisory Control and Data Acquisition (SCADA) and an Auto Transfer Scheme (ATS). ATS uses redundant utility sources via a transfer scheme that switches from a preferred to an alternate source in the event of a power upset.

### **BEST PRACTICES INTRODUCED**

Over the course of the program, TNB presented many best practices in asset management. Through the course of the workshop, presenters introduced the following best practices:

#### **Asset Management Principles and Practices**

- Do not forget the human factor; employees must be trained to enter and manage data correctly, otherwise the system will not function properly.
- Embed asset management practices into the company culture; certification is not an end in itself.
- Build asset management system around the guidelines provided by ISO standards (e.g. ISO 9000 and ISO 14000).
- Build asset management system gradually; do not implement the latest standard without first starting a quality management system (QMS) as a step towards international standard certification.
- Enlist the help of an asset management expert or a consultant, who can help a utility begin the lengthy process of international standard certification.
- Implement a change management strategy, since implementation of asset management requires management and human resources to develop steps to ensure buy-in on all levels of the utility's staff.
- Use asset management in procurement. When TNB divisions submit annual budget and procurement requests, the asset management's planning function system includes upcoming expected maintenance needs. In turn, this assists the division to develop an accurate assessment of their future expenditure requirements.
- Use asset management to help the utility better track the condition of its assets and save money. Asset management helped TNB switch from time-based maintenance scheduling to Condition Based Maintenance (CBM)—maintenance when the need arises.



**During the course of several presentations, participants learned about PAS 55 and other international standards for asset management.**

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### **Asset Management for Generation**

- Create a decision process for designating scrap equipment, and organize a committee to sell scrap when the pile is full.
- Create teams of mixed technical and non-technical personnel to inspect for defects, safety hazards, etc., and report information into SAP software database. TNB calls this risk management process "Management by Walking About".

### **Asset Management for Transmission & Distribution**

- Use an asset management CPR (Cost, Performance, Risk) system, which assists the utility to best leverage between high performance, low risk and low cost.
- Employ redundancy measures to reduce outage times for customers, because installed redundancy is a more efficient solution than relying solely on replacement equipment sitting in warehouses.
- Use the asset management PDC (plan-do-check-act or plan-do-check) process, which is an iterative three-step management method used in business for the control and continuous improvement of processes and products.
- To minimize repair and outage time, stock local warehouses with all necessary replacement parts. Purchasing and tracking parts, and scheduling maintenance, can be monitored using asset management.

## **RESULTS**

- **Setting Long-Term Goal of Certification:** DABS aims to start the long-term planning process towards the goal of achieving certification by an international standard, such as PAS55 or ISO 55000.
- **Determining Criticality:** DABS delegates learned about rating system for criticality and risk management.

- **Introducing Asset Management into Corporate Culture:** DABS will start discussions within their company about the benefits of a proper asset management system, with the goal of changing management attitudes.
- **Projecting Capital Costs:** Asset management will help DABS project capital costs for replacement and maintenance, allowing it to better negotiate its desired tariff rates with regulators.
- **Creating Asset Inventory:** A thorough asset inventory will allow DABS to have an improved understanding of their existing infrastructure and current needs.
- **Increasing Solar Power Generation:** The visit to the solar power plant in Melaka impressed the DABS delegation, who would like to see more solar power developed in Afghanistan.
- **Registering Assets:** DABS delegation realized the need to register and evaluate their existing stockpile of assets.
- **Improving Risk Management:** DABS realized the important benefits to risk management and criticality offered by asset management systems. Improving risk management will increase the safety and reliability of their grid.

## EXCHANGE PROGRAM PARTICIPANTS

1. Mr. Ahmad Farid Ibrahim, Asset/Inventory Manager, Da Afghanistan Breshna Sherkat (DABS)
2. Mr. Wasiq Ahmad Hamim, Accounting Manager, DABS
3. Mr. Safiullah Noori, Deputy Director Finance, Kabul Electricity Directorate (KED)
4. Mr. Mohammad Nasim Ahmadzai, Asset/Inventory Manger, KED
5. Mr. Dilawer Totakhail, Asset/Inventory Officer, KED
6. Mr. Tajawel Safi, Deputy Director Finance, DABS
7. Mr. Sayed Hussain Yousefi, Director, ICT & Information Systems, DABS
8. Mr. Mohammad Sharif Hakimy, Accounting Officer, DABS
9. Mr. Abdulilah Daudkheil, Procurement Manager, DABS
10. Mr. Mohammad Yousuf Anwari, Contracting Manager, DABS
11. Mr. Ahmad Farhad Ahmadzai, Accounting Officer, DABS
12. Mr. Mohammad Hamed Kamal, Contact Officer, DABS
13. Mr. Nasrullah Manoor, Representative, KED
14. Mr. Abdul Wasi Majid Poor, Archive & Documentation Officer, DABS



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