Enhancing the Utility System Resiliency - DESCO Outlook

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What is Resilience?

Resilience is the ability to cope with and recover from incapacitations.

**Resilience = Resist + Recover**

- Ability to proactively respond to potential disrupting events and newly emerging threats like natural threat or man-made misery such as cyber-attacks.
- Ability of power system to withstand disruptions within an acceptable level and recover within acceptable time and cost.
Background

• Dhaka, the capital of the country and accounts for, up to 35% of Bangladesh's economy.
• Have a increasing electricity demand along with a steady GDP growth(around 6%)
• Achieved ‘VISION 2021’ by government to provide “Electricity for All” by the ‘Golden Jubilee Year of Independence’.
• Government of Bangladesh dreams to become a High-income Country and Plans to increase its power capacity to 60,000 MW by 2041
• Government targets to implement “Smart Bangladesh”.
• Increasing resiliency in Utility system is one of the prerequisite in this perspective.
• DESCO focus on its infrastructure accordingly to enhance the resiliency of distribution system to serve quality power to its customer.
DESCO at a glance

- Area: 245 Sq. kM
- Number of S&D Division: 24
- Consumer: 11,57,490
- Maximum Demand: 1143 MW
- System Loss: 5.62%
- Number of Grid Substation: 07 + 07 (PGCB)
- 33/11 KV Substation: 53
- Installed Capacity: 2900/4060 MVA
- Distribution Line (kM): 5,544 km
  - 132 KV Line: 51.31 Ckt. kM (UG)
  - 33 KV Line: 620.14 Ckt. kM (UG)
  - 11 and 0.4 KV Line: 4,821.52 (698.95)
- Number of Dist. XFR: 7,713 Nos (Without customer XF)
- Number of Feeder: 527 Nos
- No of Pre paid Meter: 5,83,805 Nos.
DESCO Focus on the Resilient System

- To prevent the wide area power outage, DESCO
  - Maintain proper Right of Way (RoW)
  - Continuously upgrading its existing infrastructure
  - Follows the N-1 criteria for system planning and design.
  - SAIDI of DESCO is 455.25 minutes/Year/Customer
  - SAIFI of DESCO is 22.02 interruption/Year/Customer

![Graph showing System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) from 2013-14 to 2021-22]
Supervisory Control and Data Acquisition (SCADA)

- DESCO SCADA system is designed for 69 stations and 2 Control centers.
- Capacity approx. 70,000 DB points with 50% reserved designed capacity.
- Equipments up to 132kV, 33kV and 11kV Level monitored and controlled by SCADA.
- A SCADA Main Control Centre (MCC) and a redundant back-up SCADA Centre (BCC) are functional in DESCO.
- SCADA system includes RTUs and SAS Gateway Servers at DESCO substations.
- Features of DESCO SCADA system:
  - Real time Loading data
  - Network optimization & Load flow study
  - Training simulator.
  - Automatic SAIDI & SAIFI calculation.
GIS Project

DESCO is implementing a project on Design, Development & Installation of Multi-Platform GIS based application for the Management of Distribution Network. This project includes:

Expected outcomes of this project are:

• Geo-location of any asset or customer
• Quick restoration of service.
• Online Complaint Management System
GIS for Distribution Network Management

- Comprehensive survey of Distribution System Network,
- Asset mapping.
- Short-term, mid-term and long-term plan for Renovation and Expansion of Distribution Network.
- Preparation of key map of DESCO area
- Single Line Diagram (SLD) of existing and proposed infrastructure from 132kV Transmission line to 0.4kV Distribution Line
- ESRI’s ‘Arc GIS’ Software is used for the mapping
- It has the provision to integrate with GIS and SCADA system.
Undergrounding Distribution System

• Underground distribution system is more reliable compared to overhead system.
• At present, 132kV & 33kV lines are 100% undergrounded.
• DESCO has implemented two ‘Pilot Project’ on Underground Distribution System:
  – RAJUK Uttara 3rd phase Apartment Project
  – Rakeen City, Mirpur.
• Already DESCO signed a MoU with the GS, Korea to implement Underground Distribution network in RAJUK Purbachal new Town.
• Project Concept Paper(PCP) has been sent to ‘Power Division’ to implement UG system in RAJUK-Uttara 3rd Phase.
• After successful completion of the Pilot Projects, DESCO is going to implement Underground System in a larger extent.
RE Integration & Net Meter Installation

• Solar Net metering is a utility billing mechanism that offers a credit to residential and business customers who are making excess electricity with their solar panel systems and sending it back to the grid.

• Net metering can save hundreds of dollars on their utility bills every year.

• So, DESCO encourages its ‘Consumer’ to be a ‘Prosumer’ to save money as well as to reduce the pressure of load demand on the National Grid.

• Almost 42MW SHS in 36 Thousand Household and 410 nos Net Meter have been installed in DESCO jurisdiction.
Distribution Automation System (DAS)

- A Pilot Project is considered to convert the existing System into a Modernized Technology based Automation System in Gulshan and adjacent area.
- Numbers of 11kV Feeders are about 11 Nos. (Approx. length: 32.5kM).
- The project is under the assistance of JICA fund.
- JICA is going to conduct Detail Distribution Master Plan (DDMP) and considered this as a Pilot Project in DESCO area.

**Expected outcome of this project:**
After Completion of this project, power supply reliability will be improved at several locations where Distribution Automation System (DAS), Substation Automation System (SAS), Distribution Management System (DMS) have been implemented.
Master Information Centre (MIC)

• DESCO has implemented a Tier III certified Master Information Centre (MIC)
• MIC centralizes all the shared IT operations and equipment of DESCO for storing, processing, and disseminating data.
• For data interpretability and Information security, DESCO ensures the Master Information Centre offers a secure environment that minimizes the chances of a security breach.
Distribution Transformer Monitoring (DTM)

• DTM is a specialized hardware device that collects and measures information relative to electricity passing into and through a distribution transformer.

• DTM devices commonly consist of highly accurate sensors, onboard communications modules to transmit information, and a power supply provision.

• DESCO is planning to install a Monitoring System for all of its Distribution Transformers.

• Detail design and Project preparatory work is ongoing for this project.
Advanced Metering Infrastructure (AMI) & Cyber Security

AMI provides:
• A two-way communication system from control center to the meter.
• The ability to modify customers’ different service-level parameters.
• Strong and fault tolerant communication network between components,
• Advanced smart devices for remote monitoring and two-way data communication.
• Real time data and load profile.
• It can be integrated with various billing, collection and reporting software of DESCO.

It is expected that by June, 2024, 100% customer will be connected by SMART Prepaid Meter through AMI (Advanced Metering Infrastructure).

Cyber Security:
• As AMI systems are connected to the internet and other networks, it can be vulnerable to cyber-attacks.
• Cyber criminals may attempt to gain unauthorized access to the AMI system to steal sensitive customer data, manipulate meter readings, or disrupt the overall operation.
• DESCO is considering cyber security as an important benchmarks during implementing (AMI).
E-Services & E-Office System in DESCO

DESCO is the pioneer in customer services excellence among all the distribution utilities in the country. DESCO has introduced a lot of innovative services e.g.

- Online New Connection,
- Bill payment
- Mobile Apps
- 24x7 Call Centre(16120)
- SMS services
- Smart Prepaid Metering etc.

Similarly, some digital Services e.g.

- e-Tender
- e-filling
- Online recruitment
- web-based inventory management etc.

All of this aim to achieve Paperless Office and a low carbon society
Electric vehicle (EV) Charging Station

As the world is moving to EV’s and EVs will jump a lot in the upcoming years, EV charging stations can play a role in enhancing utility system resiliency by:

- Providing an alternative source of energy to power EVs
- Reducing the need for fossil fuels.
- Reducing the stress on their grid during peak periods of energy demand
- Improving the stability of power systems.
- DESCO also Planning to install EV charging Station in its jurisdiction to cope up with latest trend.
Finally, enhancing the resiliency of a utility system is a continuous approach. After completion of all the running and upcoming projects, DESCO will go ahead to the road of SMART GRID System.
Deduction

To ensure that the system is well-maintained and operated to maximize resiliency following steps to be taken

• Implementing Smart Grid technologies
• Establishing Call Centre & Outage management system
• Encouraging the adoption of renewable energy sources
• Reducing energy consumption through energy efficiency measures
• Improving the skills and capabilities of Utility workers and management
Thank You

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